STATTER HARBOR
Improvements Phase III(D)
Upland Improvements

Contract No. DH25-023

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A list of Drawings is available in the Drawing Index.

END OF SECTION

SECTION 00030 NOTICE INVITING BIDS

OBTAINING CONTRACT DOCUMENTS. The Contract Documents are entitled:

STATTER HARBOR IMPROVEMENTS
PHASE III(D) – UPLAND IMPROVEMENTS
Contract No. DH25-023

The Contract Documents may be downloaded from the CBJ Public Purchase webpage at https://www.publicpurchase.com/juneau,ak. Instructions for the Public Purchase registration process can be found here https://juneau.org/engineering-public-works/bids-rfps

PRE-BID CONFERENCE. Prospective Bidders are encouraged to attend a pre-Bid conference to discuss the proposed WORK, which will be conducted by the OWNER, **at 10:00 a.m. on April 23, 2025, via teleconference**. The object of the conference is to acquaint Bidders with the project and bid documents. Prospective bidders intending to participate shall email contracts@juneau.gov by 4:30 p.m., April 22, 2025.

DESCRIPTION OF WORK. This Project generally includes paving the existing parking lot, curb and gutters, sidewalks, landscaping, seawalk extension, and lighting and electrical updates and all related work.

ENGINEER'S ESTIMATE RANGE: Between $3,000,000 and 3,500,000.

COMPLETION OF WORK. The WORK must be completed by:

Work Description	Completion Date
Substantial Completion	May 31, 2026
Final Completion	June 30, 2026

DEADLINE FOR BIDDER QUESTIONS: April 30, 2025.

DEADLINE FOR BIDS: Electronic bids must be received by the Port Director **prior to 2:00 p.m., Alaska Time on May 7, 2025,** or such later time as may be announced by addendum at any time prior to the deadline. **Bids will be opened** via Teleconference. Bidders may attend this bid opening by calling 907-713-2140, with participant code 370829, unless otherwise specified.

SUBMISSION INSTRUCTIONS: Timely responses are accepted via Electronic Submission at Public Purchase, www.publicpurchase.com, the CBJ's eProcurement Provider. Bidders must register online prior to submitting a bid, it may take up to 24 hours for registration to be complete.

Late responses will not be accepted.

To Respond, Bidders must complete an online registration.

- Registration is a two-step process, registering with Public Purchase, and then registering with CBJ within Public Purchase.
- Get help registering using the Public Purchase Help Menu Tab.
- Register early to avoid missing the deadline, as Registration may take up to 24 hours to complete.

Registered Bidders may submit a Bid Schedule to Public Purchase by downloading the provided PDF solicitation documents, filling out the fields indicated, and uploading the document to Public Purchase.

SITE OF WORK. The site of the WORK is Juneau, Alaska.

SECTION 00030 NOTICE INVITING BIDS

BIDDING, CONTRACT, or TECHNICAL QUESTIONS. All communications relative to this WORK, prior to opening Bids, shall be directed to the following:

Greg Smith, Contract Administrator
CBJ Engineering Department, 3rd Floor, Marine View Center
Email: greg.smith@juneau.gov
Telephone: (907) 586-0800 ext. 4196
Fax: (907) 586-4530

BID SECURITY. Each Bid shall be accompanied by a certified or cashier's check or Bid Bond, in the amount of 5% percent of the Bid, payable to the City and Borough of Juneau, Alaska, as a guarantee that the Bidder, if its Bid is accepted, will promptly execute the Agreement. A Bid shall not be considered unless one of the forms of Bidder's security is provided as prescribed in Section 00100, Article 12, at the time of bid.

CONTRACTOR'S LICENSE. All contractors are required to have a current Alaska Contractor's License, prior to submitting a Bid, and a current Alaska Business License prior to award.

BID TO REMAIN OPEN. The Bidder shall guarantee the Bid for a period of 120 Days from the date of Bid opening. Any component of the Bid may be awarded anytime during the 120 Days.

OWNER'S RIGHTS RESERVED. The OWNER reserves the right to reject any or all Bids, to waive any informality in a Bid, and to make award to the lowest responsive, responsible Bidder as it may best serve the interests of the OWNER.

OWNER: City and Borough of Juneau

By: Carl Uchytil
Carl Uchytil, PE, Port Director

4/14/2025
Date

END OF SECTION

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1.0 DEFINED TERMS. Terms used in these Instructions to Bidders and the Notice Inviting Bids, which are defined in the General Conditions, have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to the OWNER, as distinct from a sub-bidder, who submits a Bid to a Bidder.

2.0 INTERPRETATIONS AND ADDENDA.

A. INTERPRETATIONS. All questions about the meaning or intent of the Contract Documents are to be directed to the Engineering Contracts Administrator. Interpretations or clarifications considered necessary by the Engineering Contracts Administrator in response to such questions will be issued by Addendum, mailed, faxed, or delivered to all parties recorded by the Engineering Contracts Administrator, or OWNER, as having received the Contract Documents. Questions received less than seven Days prior to the Deadline for Bids may not be answered. Only questions answered by formal written Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect.

B. ADDENDA. Addenda may be issued to modify the Contract Documents as deemed advisable by the OWNER. Addenda may be faxed or, if addendum format warrants, addenda may be posted to the CBJ Engineering Department website. In any event, notification of addendum issuance will be faxed to planholders. Hard copies are available upon request. The OWNER will make all reasonable attempts to ensure that all planholders receive notification of Addenda, however, it is strongly recommended by the OWNER that bidders independently confirm the contents, number, and dates of each Addendum prior to submitting a Bid.

3.0 FAIR COMPETITION. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the OWNER believes that any Bidder is interested in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the OWNER believes that collusion exists among the Bidders, all Bids will be rejected.

4.0 RESPONSIBILITY OF BIDDERS. Only responsive Bids from responsible Bidders will be considered. A Bid submitted by a Bidder determined to be not responsible may be rejected. The OWNER may find a bidder to be not responsible for any one of the following reasons, but is not limited in its responsibility analysis to the following factors:

A. Evidence of bid rigging or collusion;

B. Fraud or dishonesty in the performance of previous contracts;

C. Record of integrity;

D. More than one bid for the same work from an individual, firm, or corporation under the same or different name;

E. Unsatisfactory performance on previous or current contracts;

F. Failure to pay, or satisfactorily settle, all bills due for labor and material on previous contracts;

G. Uncompleted work that, in the judgment of the OWNER, might hinder or prevent the bidder's prompt completion of additional work, if awarded;

H. Failure to reimburse the OWNER for monies owed on any previous contracts;

I. Default under previous contracts;

J. Failure to comply with any qualification requirements of the OWNER; special standards for responsibility, if applicable, will be specified. These special standards establish minimum standards or experience required for a responsible Bidder on a specific contract;

K. Engaging in any activity that constitutes a cause for debarment or suspension under the CBJ Procurement Code 53.50 or submitting a bid during a period of debarment;

L. Lack of skill, ability, financial resources, or equipment required to perform the contract; or

M. Lack of legal capacity to contract.

N. Bidders must be registered as required by law and in good standing for all amounts owed to the OWNER per Paragraph 21.0 of this Section.

O. Failure to submit a complete Subcontractor Report as required in section Section 00360 – Subcontractor Report.

Nothing contained in this section deprives the OWNER of its discretion in determining the lowest responsible bidder. Before a Bid is considered for award, a Bidder may be requested to submit information documenting its ability and competency to perform the WORK, according to general standards of responsibility and any special standards which may apply. It is Bidder's responsibility to submit sufficient, relevant, and adequate information. OWNER will make its determination of responsibility and has no obligation to request clarification or supplementary information.

5.0 NON-RESPONSIVE BIDS. Only responsive Bids will be considered. Bids may be considered non-responsive and may be rejected. Some of the reasons a Bid may be rejected for being non-responsive are:

A. If a Bid is received by the CBJ Port Director after the Deadline for Bids.

B. If the Bid is on a form other than that furnished by the OWNER, or legible copies thereof; or if the form is altered or any part thereof is detached; or if the Bid is improperly signed.

C. If there are unauthorized additions, conditional or alternate Bids, or irregularities of any kind which may tend to make the bid incomplete, indefinite, ambiguous as to its meaning, or in conflict with the OWNER's Bid document.

D. If the Bidder adds any unauthorized conditions, limitations, or provisions reserving the right to accept or reject any award, or to enter into a contract pursuant to an award. This does not exclude a Bid limiting the maximum gross amount of awards acceptable to any one Bidder at any one Bid opening, provided that any selection of awards will be made by the OWNER.

E. If the Bid does not contain a Unit Price for each pay item listed, except in the case of authorized alternate pay items.

F. If the Bidder has not acknowledged receipt of each Addendum.

G. If the Bidder fails to furnish an acceptable Bid guaranty with the Bid.

H. If any of the Unit Prices Bid are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the OWNER.

I. If a Bid modification does not conform to Article 15.0 of this Section.

6.0 BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND SITE. It is the responsibility of each Bidder before submitting a Bid:

A. To examine thoroughly the Contract Documents, and other related data identified in the Bidding documents (including "technical data" referred to below):

1. To visit the site to become familiar with and to satisfy the Bidder as to the general and local conditions that may affect cost, progress, or performance, of the WORK,
2. To consider federal, state and local laws and regulations that may affect cost, progress, or performance of the WORK,
3. To study and carefully correlate the Bidder's observations with the Contract Documents, and other related data; and
4. To notify the ENGINEER of all conflicts, errors, or discrepancies in or between the Contract Documents and such other related data.

7.0 REFERENCE IS MADE TO THE SUPPLEMENTARY GENERAL CONDITIONS FOR IDENTIFICATION OF:

A. Those reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such reports, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with non-technical data, interpretations, and opinions contained therein or the completeness thereof is the responsibility of the Bidder.

B. Those Drawings of physical conditions in or relating to existing surface and subsurface conditions (except underground utilities) which are at or contiguous to the site have been utilized by the Engineer of Record in the preparation of the Contract Documents. The Bidder may rely upon the accuracy of the technical data contained in such Drawings, however, the interpretation of such technical data, including any interpolation or extrapolation thereof, together with nontechnical data, interpretations, and opinions contained in such Drawings or the completeness thereof is the responsibility of the Bidder.

C. Copies of such reports and Drawings will be made available by the OWNER to any Bidder on request if said reports and Drawings are not bound herein. Those reports and Drawings are not part of the Contract Documents, but the technical data contained therein upon which the Bidder is entitled to rely, as provided in Paragraph SGC-4.2 of the Supplementary General Conditions, are incorporated herein by reference.

D. Information and data reflected in the Contract Documents with respect to underground utilities at or contiguous to the site is based upon information and data furnished to the OWNER and the Engineer of Record by the owners of such underground utilities or others, and the OWNER does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions, or in Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.

E. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, underground utilities and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2, 4.3, and 4.4 of the General Conditions.

F. Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and underground utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.

G. On request in advance, the OWNER will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and shall clean up and restore the site to its former condition upon completion of such explorations.

H. The lands upon which the WORK is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the OWNER unless otherwise provided in the Contract Documents.

I. The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of Article 6.0, "Bidder's Examination of Contract Documents and Site" herein, that without exception the Bid is premised upon performing the WORK required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.

8.0 BID FORM.

A. The Bid shall be made on the Bid Schedule(s) bound herein, or by another acceptable submission method as specified in Section 00030, Notice Inviting Bids, and shall contain the following: Sections 00300, 00310 or other specified acceptable form of Bid Schedule, the required Bid Security, and any other documents required in Section 00300 – Bid.

B. All blanks on the Bid Form and Bid Schedule must be completed in ink or typed.

C. Bids by corporations must be executed in the corporate name by the president, a vice-president (or other corporate officer). The corporate address and state of incorporation must appear below the signature.

D. Bids by partnerships must be executed in the partnership name and be signed by a managing partner, and the official address of the partnership must appear below the signature.

E. The Bidder's Bid must be signed. All names must be printed or typed below the signature.

F. The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid form. Failure to acknowledge Addenda may render Bid non-responsive and may cause its rejection.

G. The address to which communications regarding the Bid are to be directed must be shown.

9.0 QUANTITIES OF WORK. The quantities of WORK, or material, stated in Unit Price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of WORK, or material, will correspond therewith, and reserves the right after award to increase or decrease the amount of any Unit Price item of the WORK by an amount up to and including 25 percent of any Bid item, without a change in the Unit Price, and shall include the right to delete any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Contract Price (see Section 00700 - General Conditions, Article 10 Changes In the WORK).

10.0 SUBSTITUTE OR "OR-EQUAL" ITEMS. Substitution requests are not accepted during the bidding process. The procedure for the submittal of substitute or "or-equal" products is specified in Section 01300 – Contractor Submittals.

11.0 SUBMISSION OF BIDS. The Bid shall be delivered by the time and to the place stipulated in Section 00030 - Notice Inviting Bids. It is the Bidder's sole responsibility to see that its Bid is received in proper time. Oral, telegraphic, emailed, or faxed Bids will not be considered. The envelope enclosing the sealed Bids shall be plainly marked in the upper left-hand corner with the name and address of the Bidder and shall also include the label included in Section 00030 – Notice Inviting Bids. The Bid Security shall be enclosed in the same envelope with the Bid

12.0 BID SECURITY, BONDS, AND INSURANCE. Each Bid shall be accompanied by a certified, or cashier's check, or approved Bid Bond in an amount of at least 5 percent of the total Bid price. The "total Bid price" is the amount of the Base Bid, plus the amount of alternate Bids, if any, which total to the maximum amount for which the CONTRACT could be awarded. Said check or Bond shall be made payable to the OWNER and shall be given as a guarantee that the Bidder, if offered the WORK, will enter into an Agreement with the OWNER, and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond; each of said Bonds, if required, and insurance amounts shall be as stated in the Supplementary General Conditions. In case of refusal or failure to enter into said Agreement, the check or Bid Bond, as the case may be, may be forfeited to the OWNER. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein, or one conforming substantially to it in form. Bid Bonds must be accompanied by a legible Power of Attorney.

Bid Bonds shall be submitted by being scanned and uploaded to Public Purchase along with the other required Bid documents. When a Bid security check is used, it must be received by the Purchasing Division prior to the Deadline for Bids. Bid security checks will be time and date stamped by the Purchasing Division, which will establish the official time of receipt.

In addition to uploading a scanned file of the Bid Bond, the original hardcopy Bid Bond shall be submitted and received by the CBJ Contracts Office by 2:00 p.m. Alaska Time no more than seven calendar days after Bid Opening.

In lieu of the original hardcopy Bid Bond submittal requirement, bidders who have a Surety 2000 Bid Bond ID may validate their Bid Bond with Surety 2000 within the Bid Bond Response Information Form in the Public Purchase bid page.

Bid security checks shall be submitted in a sealed envelope that clearly indicates: that a bid security check is enclosed, the name of the bidding firm, and the project name and number. The envelope must not reveal the check amount so that the final Bid price will not be known until the sealed bids are opened.

Bid security checks delivered **in person** or by **courier** service must be delivered to:

PHYSICAL LOCATION:
CBJ Docks and Harbors
Port Director's Office
76 Egan Drive, 2nd Floor
Juneau, AK 99801

Bid security checks delivered by **U.S. Postal Service** must be mailed to:

MAILING ADDRESS:
CBJ Docks and Harbors
Port Director
155 Heritage Way
Juneau, AK 99801

Mailing/delivery times to Alaska may take longer than other areas of the U.S. Late bid security checks may cause a Bid to be deemed non-responsive

13.0 RETURN OF BID SECURITY. The OWNER will return all Bid security checks (certified or cashier's) accompanying such of the Bids as are not considered in making the award. All other Bid securities will be held until the Agreement has been executed. Following execution of the Agreement, all other Bid security checks will be returned to the respective Bidders whose Bids they accompanied and Bid security bonds will be appropriately discarded.

14.0 DISCREPANCIES IN BIDS. In the event there is more than one Pay Item in a Bid Schedule, the Bidder shall furnish a price for all Pay Items in the schedule, and failure to do so may render the Bid non-responsive and cause its rejection. In the event there are Unit Price Pay Items in a Bid Schedule and the "amount" indicated for a Unit Price Bid Item does not equal the product of the Unit Price and quantity, the Unit Price shall govern and the amount will be corrected accordingly, and the Bidder shall be bound by said correction. In the event there is more than one Pay Item in a Bid Schedule and the total indicated for the schedule does not agree with the sum of the prices Bid on the individual items, the prices Bid on the individual items shall govern and the total for the schedule will be corrected accordingly, and the Bidder shall be bound by said correction.

15.0 BID MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS.

A. Any bidder may deliver a modification to a bid in person, by mail or fax (907-586-0295), provided that such modification is received by the Port Director no later than the deadline

for bids. Modifications will be time and date stamped by the Port Director, which will establish the official time of receipt of the modification. The modification must not reveal the bid price but should be in the form of an addition or subtraction or other modification so that the final prices will not be known until the sealed bid is opened.

The Bid modifications shall be provided on the **Bid Modification Form** located at the end of this Section. Submittal of any other form by the vendor may deem the modification unacceptable by the OWNER **A mail or fax modification should not reveal the Bid price but should provide the addition or subtraction or other modification so that the final prices will not be known by the City and Borough until the sealed Bid is opened.** Submitted Modification forms shall include the modification to the unit price or lump sum amount of each pay item modified.

FAX DISCLAIMER: It is the responsibility of the bidder to submit modifications in a timely manner. Bidders' use of a fax machine to modify their bid shall be at bidders' sole risk. The Port Director will attempt to keep the fax machine in good working order but will not be responsible for bid modifications that are late due to mechanical failure, a busy fax machine, or any other cause arising from bidder's use of a fax machine, even if bidder submits a transmission report or provides other confirmation indicating that the bidder transmitted a bid modification prior to the deadline. The City will not be responsible for its failure to receive the modification whether such failure is caused by equipment or human error, or otherwise. Bidders are therefore strongly encouraged to confirm receipt of their bid modification with the Port Director (907-586-0292) prior to deadline.

B. Conditioned bids, limitations, or provisos attached to the Bid or bid modification will render it unauthorized and cause its rejection as being non-responsive. The completed Bid forms shall be without interlineations, alterations, or erasures in the printed text. All changes shall be initialed by the person signing the Bid. Alternative Bids will not be considered unless called for.

16.0 WITHDRAWAL OF BID. Prior to the Deadline for Bids, the Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids.

17.0 AWARD OF CONTRACT.

A. Award of a contract, if it is awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Technical Specifications and will be made to the lowest responsive, responsible Bidder whose Bid complies with all the requirements prescribed. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the Bids are to remain open. Unless otherwise indicated, a single award will be made for all the Bid items in an individual Bid Schedule.

B. If the OWNER has elected to advertise this Project with a Base Bid and Alternates, the OWNER may elect to award the contract for the Base Bid, or the Base Bid in combination with one or more Alternates selected by the OWNER. In either case, award shall be made to the responsive, responsible bidder offering the lowest total Bid for the WORK to be awarded.

18.0 EXECUTION OF AGREEMENT.

A. All Bids of value greater than $100,000 must be approved by the CBJ Assembly. After the CBJ Assembly has approved the award and after the Bid protest period, the OWNER will issue a Notice of Intent to Award to the approved Bidder. The Bidder to whom award is made shall execute a written Agreement with the OWNER on the Agreement form, Section 00500, collect insurance, and shall furnish all certificates and Bonds required by the Contract Documents within 10 Days (calendar) from the date of the Notice of Intent to Award letter.

B. Failure or refusal to enter into the Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the Bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third lowest Bidder to execute the Agreement, each such Bidder's Bid securities shall be likewise forfeited to the OWNER.

19.0 LIQUIDATED DAMAGES. Provisions for liquidated damages if any, are set forth in Section 00500 - Agreement.

20.0 FILING A PROTEST.

A. A Bidder may protest the proposed award of a competitive sealed Bid by the City and Borough of Juneau. The protest shall be executed in accordance with CBJ Ordinance 53.50.062 PROTESTS and CBJ Ordinance 53.50.080 ADMINISTRATION OF PROTEST. The entire text of the CBJ Purchasing Ordinance can be accessed at the CBJ website, *http://www.juneau.org/law/code/code.php*, or call the CBJ Purchasing Division at (907) 586-5258 for a copy of the ordinance.

B. Late protests shall not be considered by the CBJ Port Director.

21.0 CONTRACTOR'S GOOD STANDING WITH CBJ FINANCE DEPARTMENT: Contractors must be in good standing with the CBJ prior to award, and prior to any contract renewals, and in any event no later than ***seven business days*** following notification by the CBJ of intent to award. **Good standing** means: all amounts owed to the CBJ are current and the Contractor is not delinquent with respect to any taxes, fees, assessment, or other monies due and owed the CBJ, or a Confession of Judgment has been executed and the Contractor is in compliance with the terms of any stipulation associated with the Confession of Judgment, including being current as to any installment payments due; and Contractor is current in all CBJ reporting obligations (such as sales tax registration and reporting and business personal property declarations). Failure to meet these requirements may be cause for rejection of your bid. To determine if your business is in good standing, or for further information, contact the CBJ Finance Department's Sales Tax Division at (907) 586-5215 for sales tax issues, Assessor's Office at (907)586-5215 for business personal property issues, or Collections Division at (907) 586-5215 for all other accounts.

22.0 PERMITS AND LICENSES. The CONTRACTOR is responsible for all WORK associated with meeting any local, state, and/or federal permit and licensing requirements.

CITY AND BOROUGH OF JUNEAU
CBJ DOCKS AND HARBORS
FAX NO. 907-586-0295

BID MODIFICATION FORM

Modification Number: _____ Modification Page ____ of ____

Note: All modifications shall be made to the original bid amount(s). If more than one Modification form is submitted by any one bidder, changes from all Modification forms submitted will be combined and applied to the original bid. Changes to the modified Bid amounts will be calculated by the OWNER. Bidder may use multiple modification pages if required.

PAY ITEM NO.	PAY ITEM DESCRIPTION	MODIFICATIONS TO UNIT PRICE OR LUMP SUM (*indicate* +/-)

Total Bid Increase or Decrease: $_____

_____
Name of Bidding Firm

_____
Responsible Party Signature

_____
Printed Name (must be an authorized signatory for Bidding Firm)

END OF SECTION

SECTION 00300 - BID

BID TO: THE CITY AND BOROUGH OF JUNEAU

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the OWNER on the form included in the Contract Documents (as defined in Article 7 of Section 00500 - Agreement) to perform the WORK as specified or indicated in said Contract Documents entitled

Statter Harbor Improvements Phase III(D)
Contract No. DH25-023

2. Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the "Notice Inviting Bids" and "Instructions to Bidders," dealing with the disposition of the Bid Security.

3. This Bid will remain open for the period stated in the "Notice Inviting Bids" unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders," and will furnish insurance certificates, Payment Bond, Performance Bond, and any other documents as may be required by the Contract Documents.

4. Bidder has familiarized itself with the nature and extent of the Contract Documents, WORK, site, locality where the WORK is to be performed, the legal requirements (federal, state and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress or performance of the WORK and has made such independent investigations as Bidder deems necessary.

5. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

6. To all the foregoing, and including all Bid Schedule and information required of Bidder contained in this Bid Form, said Bidder further agrees to complete the WORK required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefore the Contract Price based on the total bid price(s) named in the aforementioned Bid Schedule.

7. Bidder has examined copies of all the Contract Documents including the following Addenda (receipt of all of which is hereby acknowledged by the Undersigned):

Addenda No.	Date Issued	Addenda No.	Date Issued

Give number and date of each Addenda above. Failure to acknowledge receipt of all Addenda may cause the Bid to be non-responsive and may cause its rejection.

8. The Bidder has read this Bid and agrees to the conditions as stated herein by signing its signature in the space provided below.

Dated: _____	Bidder: _____ (Company Name)
Alaska CONTRACTOR's Business License No: _____	By: _____ (Signature)
Alaska CONTRACTOR's License No: _____	Printed Name: _____
Telephone No: _____	Title: _____
Fax No: _____	Address: _____ (Street or P.O. Box)
E-mail: _____	_____ (City, State, Zip)

9. TO BE CONSIDERED, ALL BIDDERS MUST COMPLETE AND INCLUDE THE FOLLOWING AT THE TIME OF THE DEADLINE FOR BIDS. **MISSING DOCUMENTS MAY DEEM THIS BID NON-RESPONSIVE:**

- Bid, Section 00300 (includes Addenda receipt statement)
- Completed Bid Schedule, Section 00310, or other acceptable form of Bid Schedule as specified in Section 00030, Notice Inviting Bids
- Bid Security (Bid Bond, Section 00320, or by a certified or cashier's check as stipulated in the Notice Inviting Bids, Section 00030)
- Copy of Current Alaska Contractors License
- **Contractor Financial Responsibility, Section 00370**

10. The apparent low Bidder is required to complete and submit the following documents by 4:30 p.m. on the ***fifth business day*** following the date of the Posting Notice.

- Subcontractor Report, Section 00360

The apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in Section 00360 – Subcontractor Report may be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER may then consider the next lowest Bidder for award of the contract.

11. The successful Bidder will be required to submit, ***within ten Days (calendar)*** after the date of the "Notice of Intent to Award" letter, the following executed documents:

- Agreement Forms, Section 00500
- Performance Bond, Section 00610
- Payment Bond, Section 00620
- Certificates of Insurance, (CONTRACTOR) Section 00700 and Section 00800

END OF SECTION

SECTION 00320 - BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that_____

_____ as Principal, and _____

as Surety, are held and firmly bound unto **THE CITY AND BOROUGH OF JUNEAU** hereinafter called "OWNER," in the sum of _____

_____dollars, (not less than five percent of the total amount of the Bid) for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the Bid Schedule of the OWNER's Contract Documents entitled

Statter Harbor Improvements III(D)
Contract No. DH25-023

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders" enters into a written Agreement on the form of Agreement bound with said Contract Documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit, including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this _____ day of _____, 20___

(SEAL)_____ (SEAL)_____
(Principal) (Surety)

By:_____ By:_____
(Signature) (Signature)

END OF SECTION

BASE BID

Pay Item No.	Pay Item Description	Pay Unit	Approx. Quantity	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
1505.1	Mobilization	LS	All Req'd	Lump	Sum		
1570.1	Erosion and Sediment Control	LS	All Req'd	Lump	Sum		
2060.1	Demolition, Salvage and Disposal	LS	All Req'd	Lump	Sum		
2202.1	Unusable Excavation	CY	1,300				
2202.2	Usable Excavation	CY	200				
2202.3	Class A Shot Rock Borrow	CY	2,000				
2204.1	Base Course, Grading D-1	CY	1,150				
2204.2	Base Course, Grading A	CY	100				
2205.1	Class II Armor Rock	CY	150				
2402.1	Adjust Existing Cleanout to Finish Grade	EA	3				
2402.2	Adjust Existing Pump Station to Finish Grade	LS	All Req'd	Lump	Sum		
2501.1	18-Inch CPP Storm Drain Pipe	LF	174				
2501.2	6-Inch PVC Storm Drain Pipe	LF	21				
2502.1	Storm Drain Catch Basin, Type IV	EA	3				
2502.2	Deck Drain	EA	2				
2502.3	Reconstruct Existing Manhole to Finish Grade	EA	3				
2502.4	Adjust Existing Manhole to Finish Grade w/ Frame and Grate	EA	1				
2502.5	Trench Drain	LS	All Req'd	Lump	Sum		
2601.1	1-Inch HDPE Water Pipe	LF	35				
2601.2	Yard Hydrant	LS	All Req'd	Lump	Sum		
2602.1	Adjust Existing Valve Box to Finish Grade	EA	4				
2702.1	Construction Surveying	LS	All Req'd	Lump	Sum		

BASE BID

Pay Item No.	Pay Item Description	Pay Unit	Approx. Quantity	Unit Price Dollars	Unit Price Cents	Amount Dollars	Amount Cents
2718.1	Signage	LS	All Req'd	Lump	Sum		
2720.1	Painted Traffic Markings	LS	All Req'd	Lump	Sum		
2726.1	1-ft thick MSE Wall Blocks	LS	All Req'd	Lump	Sum		
2801.1	AC Pavement, Type II, Class B, 3-Inch Thick	TON	1,400				
2892.1	Handrail	LS	All Req'd	Lump	Sum		
2910.1	Planting Soils	LS	All Req'd	Lump	Sum		
2930.1	Exterior Plants and General Landscaping	LS	All Req'd	Lump	Sum		
2970.1	Landscape Maintenance	LS	All Req'd	Lump	Sum		
3303.1	6-Inch Thick Colored Concrete	SY	90				
3303.2	6-Inch Thick Concrete Sidewalk	SY	895				
3303.3	Curb and Gutter, Types I-V	LF	940				
3303.4	Concrete Wheel Stop	EA	36				
3304.1	Concrete Seawalk	SY	90				
3304.2	Cantilevered Concrete Seawalk	SY	330				
3304.3	Concrete Landscape Seatwall Planter	LS	All Req'd	Lump	Sum		
16000.1	Electrical System	LS	All Req'd	Lump	Sum		

TOTAL BASE BID AMOUNT IN FIGURES: $ _____

TOTAL BASE BID AMOUNT IN WORDS: _____

COMPANY NAME: _____

SECTION 00360 - SUBCONTRACTOR REPORT

LIST OF SUBCONTRACTORS (AS 36.30.115)

The apparent low Bidder must submit a list of Subcontractors that the Bidder proposes to use in the performance of this contract ***on the fifth business day*** following the Posting Notice of Bids. If the fifth day falls on a weekend or holiday, the report is due by close of business on the next business Day following the weekend or holiday. The Subcontractor Report list must include each Subcontractor's name, address, location, evidence of valid Alaska Business License, and valid Alaska Contractor's Registration under AS 08.18. ***If no Subcontractors are to be utilized in the performance of the WORK, write in ink or type "NONE" on line (1) below.***

SUBCONTRACTOR ADDRESS	[1] AK Contractor License No. [2] AK Business License No.	[1] Contact Name [2] Phone No.	Type of Work	Contract Amount	✓ if DBE
1.	[1]			$	☐
	[2]				
2.	[1]			$	☐
	[2]				
3.	[1]			$	☐
	[2]				
4.	[1]			$	☐
	[2]				

I certify that the above listed Alaska Business License(s) and CONTRACTOR Registration(s), if applicable, were valid at the time Bids were opened for this Project.

_____
CONTRACTOR, Authorized Signature

_____
CONTRACTOR, Printed Name

_____
COMPANY

SECTION 00360 - SUBCONTRACTOR REPORT

A. A Bidder may replace a listed Subcontractor if the Subcontractor:

1. fails to comply with AS 08.18;
2. files for bankruptcy or becomes insolvent;
3. fails to execute a contract with the Bidder involving performance of the WORK for which the Subcontractor was listed and the Bidder acted in good faith;
4. fails to obtain bonding;
5. fails to obtain insurance acceptable to the OWNER;
6. fails to perform the contract with the Bidder involving work for which the Subcontractor was listed;
7. must be substituted in order for the CONTRACTOR to satisfy required state and federal affirmative action requirements;
8. refuses to agree or abide with the Bidder's labor agreement; or
9. is determined by the OWNER not to be responsible.
10. is not in "Good Standing" with the OWNER as required in Article 21.0 in Section 00100 – Instructions to Bidders.

B. If a Bidder fails to list a Subcontractor or lists more than one Subcontractor for the same portion of WORK, the Bidder shall be considered to have agreed to perform that portion of WORK without the use of a Subcontractor and to have represented the Bidder to be qualified to perform that WORK.

C. A Bidder who attempts to circumvent the requirements of this section by listing as a Subcontractor another contractor who, in turn, sublets the majority of the WORK required under the contract violates this section.

D. If a contract is awarded to a Bidder who violates this section, the OWNER may:

1. cancel the contract; or
2. after notice and a hearing, assess a penalty on the Bidder in an amount that does not exceed 10 percent of the value of the subcontract at issue.

E. On the Subcontractor Report, the apparent low Bidder must list any Subcontractors anticipated to perform WORK with a value of greater than one-half of one percent of the intended award amount, or $2,000, whichever is less.

F. An apparent low Bidder who fails to submit a completed Subcontractor Report within the time specified in this section may be found to be not a responsible Bidder and may be required to forfeit the Bid security. The OWNER will then consider the next lowest Bidder for award of the contract.

END OF SECTION

SECTION 00370 - CONTRACTOR'S FINANCIAL RESPONSIBILITY

To be considered, all bidders must complete and include this form ***at the time of the deadline for bids***. Attach additional sheets as necessary to respond to questions.

PROJECT: DH25-023 Statter Harbor Improvements Phase III(D)

As the General Contractor on this project, I intend to subcontract _____% of the total value of this contract.

A. EXPERIENCE

1. Have you ever failed to complete a contract due to insufficient resources?
[ ] No [ ] Yes If YES, explain:

_____
_____
_____
_____

2. Describe arrangements you have made to finance this work:

_____
_____
_____
_____

3. Have you had previous construction contracts or subcontracts with the City and Borough of Juneau?
[ ] Yes [ ] No

4. Describe your most recent or current contract, its completion date, and scope of work:

_____
_____
_____
_____
_____
_____

5. List below, and/or as an attachment to this questionnaire, other construction projects you have completed, dates of completion, scope of work, and total contract amount for each project completed in the past twelve months.

_____
_____
_____
_____
_____

6. Per Alaska Statute 36.90.210, on previous public contracts, have you ever failed to pay a subcontractor within eight working days after receiving payment from the Owner (for projects occurring within the last 3 years)?

[ ] Yes [ ] No If yes, please attach a detailed explanation for each occurrence.

B. EQUIPMENT

1. Describe below, and/or as an attachment, the equipment you have available and intend to use for this project.

ITEM	QUANTITY	MAKE	MODEL	SIZE/CAPACITY	PRESENT MARKET VALUE

2. Do you propose to purchase any equipment for use on this project not listed on table B-1?

[ ] No [ ] Yes If YES, describe type, quantity, and approximate cost:

_____
_____
_____
_____

3. Do you propose to rent any equipment for this work not listed on table B-1?

[ ] No [ ] Yes If YES, describe type and quantity:

_____
_____
_____
_____
_____
_____

4. Is your bid based on firm offers for all materials necessary for this project?
[ ] Yes [ ] No If NO, please explain:

_____
_____
_____
_____
_____
_____

I hereby certify that the above statements are true and complete.

_____ _____
Contractor Name and Title of Person Signing

_____ _____
Signature Date

SECTION 00500 - AGREEMENT

THIS AGREEMENT is between THE CITY AND BOROUGH OF JUNEAU (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR) OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

CONTRACTOR shall complete the WORK as specified or as indicated under the Bid Schedule of the OWNER's Bid Documents entitled Contract No. DH25-023 Statter Harbor Improvements Phase III(D).

This Project generally includes paving the existing parking lot, curb and gutters, sidewalks, landscaping, seawalk extension, and lighting and electrical updates and all related work.

The WORK to be paid under this contract shall include the following: Total Bid as shown in Section 00310 - Bid Schedule.

ARTICLE 2. CONTRACT COMPLETION TIME.

Work Description	**Completion Date**
Substantial Completion	May 31, 2026
Final Completion	June 30, 2026

ARTICLE 3. DATE OF AGREEMENT

The date of this Agreement will be the date of the last signature on page three of this section.

ARTICLE 4. LIQUIDATED DAMAGES.

OWNER and the CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual damages suffered by the OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and the CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay the OWNER **$1,200.00 for each Day** that expires after the completion time specified in Article 2 herein. The amount of liquidated damages specified above is agreed to be a reasonable estimate based on all facts known as of the date of this Agreement.

ARTICLE 5. CONTRACT PRICE.

OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in the amount set forth in the Bid Schedule. The CONTRACTOR agrees to accept as full and complete payment for all WORK to be done in this contract for: **Contract No. DH25-023** , those Lump Sum amounts as set forth in the Bid Schedule in the Contract Documents for this Project.

The total amount of this contract shall be _____ ($ _____), except as adjusted in accordance with the provisions of the Bid Documents.

ARTICLE 6. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the ENGINEER as provided in the General Conditions.

Progress payments will be paid in full in accordance with Article 14 of the General Conditions until ninety (90) percent of the Contract Price has been paid. The remaining ten (10) percent of the Contract Price may be retained, in accordance with applicable Alaska State Statutes, until final inspection, completion, and acceptance of the Project by the OWNER.

ARTICLE 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR concerning the WORK consist of this Agreement (pages 00500-1 to 00500-6, inclusive) and the following sections of the Contract Documents:

- Table of Contents (pages 00005-1 to 00005-2, inclusive)
- Notice Inviting Bids (pages 00030-1 to 00030-2, inclusive).
- Instructions to Bidders (pages 00100-1 to 00100-10, inclusive).
- Bid (pages 00300-1 to 00300-2, inclusive).
- Bid Schedule (pages 00310-1 to 00310-2, inclusive).
- Bid Bond (page 00320-1, inclusive) or Bid Security.
- Subcontractor Report (pages 00360-1 to 00360-2, inclusive).
- Contractor Financial Responsibility (pages 00370-1 to 00370-2, inclusive).
- Performance Bond (pages 00610-1 to 00610-2, inclusive).
- Payment Bond (pages 00620-1 to 00620-2, inclusive).
- Insurance Certificate(s).
- General Conditions (pages 00700-1 to 00700-48, inclusive).
- Supplementary General Conditions (pages 00800-1 to 00800-5, inclusive).
- Alaska Labor Standards, Reporting, and Prevailing Wage Determination (page 00830-1 to 00830-40, inclusive).
- Technical Specifications as listed in the Table of Contents.
- Drawings consisting of 28 sheets, as listed in the Table of Contents.
- Addenda numbers _____ to ____, inclusive.
- Change Orders which may be delivered or issued after the Date of the Agreement and which are not attached hereto.

There are no Contract Documents other than those listed in this Article 7. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.3 of the General Conditions.

ARTICLE 8. MISCELLANEOUS.

Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

ARTICLE 8. MISCELLANEOUS. (Cont'd.)

No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents. This Agreement shall be governed by the laws of the State of Alaska. Jurisdiction shall be in the State of Alaska, First Judicial District.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have caused this Agreement to be executed on the date listed below by OWNER.

OWNER:	**CONTRACTOR:**
City and Borough of Juneau	_____ (Company Name)
_____ (Signature)	_____ (Signature)
By: Carl Uchytil, PE, Port Director (Printed Name)	By: _____ (Printed Name, Authority or Title)
Date: _____	CONTRACTOR Signature Date: _____
OWNER's address for giving notices:	CONTRACTOR's address for giving notices:
155 Heritage Way	_____
Juneau, Alaska 99801	_____
907-586-0292 907-586-0295 (Telephone) (Fax)	_____ (Telephone) (Fax)
	_____ (E-mail address)
	Contractor License No. _____

CERTIFICATE
(if Corporation)

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Board of Directors of the

_____a corporation existing under the laws of

the State of_____, held on _____, 20____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ President of the Corporation, be and is hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF JUNEAU and this corporation and that the execution thereof, attested by the Secretary of the Corporation, and with the Corporate Seal affixed, shall be the official act and deed of this Corporation."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the

corporation this _____ day of _____, 20____.

_____
Secretary

(SEAL)

CERTIFICATE
(if Partnership)

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Partners of the

_____ a partnership existing under the laws of the State

of _____, held on _____, 20____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Partnership, be and is hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF JUNEAU and this partnership and that the execution thereof, attested by the _____shall be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20_____.

_____
Secretary

(SEAL)

CERTIFICATE
(if Joint Venture)

STATE OF)
) SS:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Principals of the

_____ a joint venture existing under the laws of the

State of _____, held on _____, 20___, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Joint Venture, be and is hereby authorized to **execute the Agreement** with the CITY AND BOROUGH OF JUNEAU and this joint venture and that the execution thereof, attested by the _____ shall be the official act and deed of this Joint Venture."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20___.

_____
Secretary

(SEAL)

END OF SECTION

SECTION 00610 - PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we _____
(Name of Contractor)
_____ a _____
(Corporation, Partnership, Individual)

hereinafter called "Principal" and _____
(Surety)
of _____, State of _____hereinafter called the "Surety," are held and firmly bound to the CITY AND BOROUGH of JUNEAU, ALASKA hereinafter called "OWNER,"
(Owner) (City and State)
for the penal sum of _____

_____dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered into a certain contract with the OWNER, the effective date of which is (CBJ Contracts Office to fill in effective date) _____, a copy of which is hereto attached and made a part hereof for the construction of:

Statter Harbor Improvements Phase III(D)
Contract No. DH25-023

NOW, THEREFORE, if the Principal shall truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof, which may be granted by the OWNER, with or without notice to the Surety, and if it shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

SECTION 00610 - PERFORMANCE BOND

Statter Harbor Improvements Phase III(D)
Contract No. DH25-023

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

CONTRACTOR:

By:_____
(Signature)

_____
(Printed Name)

_____
(Company Name)

_____
(Street or P.0. Box)

_____
(City, State, Zip Code)

SURETY:

By: _____ Date Issued:_____
(Signature of Attorney-in-Fact)

_____
(Printed Name)

_____
(Company Name)

_____
(Street or P.0. Box)

_____
(City, State, Zip Code)

(Affix SURETY'S SEAL)

NOTE: If CONTRACTOR is Partnership, <u>all</u> Partners must execute bond.

END OF SECTION

SECTION 00620 - PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: That we _____
(Name of Contractor)

_____ a _____
(Corporation, Partnership, Individual)

hereinafter called "Principal" and _____
(Surety)

of _____, State of _____hereinafter called the "Surety," are held and firmly bound to the CITY AND BOROUGH of JUNEAU, ALASKA hereinafter called "OWNER,"
(Owner) (City and State)

for the penal sum of _____

_____dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the CONTRACTOR has entered into a certain contract with the OWNER, the effective date of which is (CBJ Contracts Office to fill in effective date) _____, a copy of which is hereto attached and made a part hereof for the construction of:

Statter Harbor Improvements Phase III(D)
Contract No. DH25-023

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, Subcontractors, and corporations furnishing materials for, or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said work, and for all labor performed in such WORK, whether by Subcontractor or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the Specifications.

PROVIDED, FURTHER, that no final settlement between the OWNER and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

SECTION 00620 - PAYMENT BOND

Statter Harbor Improvements Phase III(D)
Contract No. DH25-023

IN WITNESS WHEREOF, this instrument is issued in two (2) identical counterparts, each one of which shall be deemed an original.

CONTRACTOR:

By:_____
(Signature)

_____
(Printed Name)

_____
(Company Name)

_____
(Street or P.0. Box)

_____
(City, State, Zip Code)

SURETY:

By: _____ Date Issued:_____
(Signature of Attorney-in-Fact)

_____
(Printed Name)

_____
(Company Name)

_____
(Street or P.0. Box)

_____
(City, State, Zip Code)

(Affix SURETY'S SEAL)

NOTE: If CONTRACTOR is Partnership, <u>all</u> Partners must execute bond.

END OF SECTION

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(Revised 03-2003)

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ARTICLE 1 DEFINITIONS

Wherever used in these General Conditions or in the Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof. Where an entire word is capitalized in the definitions and is found not capitalized in the Contract Documents it has the ordinary dictionary definition.

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the OWNER and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment - The form furnished by the ENGINEER which is to be used by the CONTRACTOR to request progress or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

Bonds - Bid, Performance, and Payment Bonds and other instruments which protect against loss due to inability or refusal of the CONTRACTOR to perform its contract.

CBJ Project Manager - The authorized representative of the City and Borough of Juneau Engineering Department, as OWNER, who is responsible for administration of the contract.

Change Order - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Time - The number of successive calendar Days stated in the Contract Documents for the completion of the WORK.

CONTRACTOR - The individual, partnership, corporation, joint-venture or other legal entity with whom the OWNER has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective WORK - WORK that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or WORK that has been damaged prior to the ENGINEER's recommendation of final payment.

Drawings - The Drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are referred to in the Contract Documents. Shop Drawings are not within the meaning of this paragraph.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Engineer of Record - The individual, partnership, corporation, joint-venture or other legal entity named as such in the Contract Documents.

ENGINEER - The ENGINEER is the firm or person(s) selected by the City and Borough of Juneau (CBJ) to perform the duties of project inspection and management. CBJ will inform the CONTRACTOR of the identity of the ENGINEER at or before the Notice to Proceed.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

General Requirements - Division 1 of the Technical Specifications.

Hazardous Waste - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 9603) as amended from time to time.

Holidays - The CBJ legal holidays occur on:

1. New Year's Day - January 1
2. Martin Luther King's Birthday - Third Monday in January
3. President's Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18
9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday and the following Friday in November
11. Christmas Day – December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both legal holidays.

Inspector - The authorized representative of the ENGINEER assigned to make detailed inspections for conformance to the Contract Documents. Any reference to the Resident Project Representative in this document shall mean the Inspector.

Laws and Regulations; Laws or Regulations - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

Mechanic's Lien - A form of security, an interest in real property, which is held to secure the payment of an obligation. When referred to in these Contract Documents, "Mechanic's Lien" or "lien" means "Stop Notice".

Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date of a portion of the WORK, or a period of time within which the portion of the WORK should be performed prior to Substantial Completion of all the WORK.

Notice of Award - The written notice by the OWNER to the apparent successful bidder stating that the apparent successful bidder has complied with all conditions for award of the contract.

Notice of Completion - A form signed by the ENGINEER and the CONTRACTOR recommending to the OWNER that the WORK is Substantially Complete and fixing the date of Substantial Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder. This filing starts the 30-day lien filing period on the WORK.

Notice to Proceed - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Time.

Notice of Intent to Award - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the requirements listed therein, within the time specified, the OWNER will enter into an Agreement.

OWNER - The City and Borough of Juneau (CBJ), acting through its legally designated officials, officers, or employees.

Partial Utilization - Use by the OWNER or a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

PCB's - Polychlorinated biphenyls.

PERMITTEE – See definition for CONTRACTOR.

Petroleum - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

Project - The total construction of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Radioactive Material - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

Shop Drawings - All Drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR, to the ENGINEER, to illustrate some portion of WORK.

Specifications - Same definition as "Technical Specifications" hereinafter.

Stop Notice - A legal remedy for Subcontractors and suppliers who contribute to public works, but who are not paid for their WORK, which secures payment from construction funds possessed by the OWNER. For public property, the Stop Notice remedy is designed to substitute for mechanic's lien rights.

Sub-Consultant - The individual, partnership, corporation, joint-venture or other legal entity having a direct contract with ENGINEER, or with any of its Consultants to furnish services with respect to the Project.

Subcontractor - An individual, partnership, corporation, joint-venture or other legal entity having a direct contract with the CONTRACTOR, or with any of its Subcontractors, for the performance of a part of the WORK at the site.

Substantial Completion - Refers to when the WORK has progressed to the point where, in the opinion of the ENGINEER as evidenced by Notice of Completion as applicable, it is sufficiently complete, in accordance with the Contract Documents, so that the WORK can be utilized for the purposes for which it is intended; or if no such notice is issued, when final payment is due in accordance with Paragraph 14.8. The terms "substantially complete" and "substantially completed" as applied to any WORK refer to substantial completion thereof.

Supplementary General Conditions (SGC) - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman, or vendor.

Technical Specifications - Divisions 1 through 16 of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the WORK.

Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK, Work - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing, or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

ARTICLE 2 PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS/INSURANCE CERTIFICATES. When the CONTRACTOR delivers the signed Agreements to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and Insurance Policies and Certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

2.2 COPIES OF DOCUMENTS. The OWNER shall furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.

2.3 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED. The Contract Time will start to run on the commencement date stated in the Notice to Proceed.

2.4 STARTING THE WORK

A. The CONTRACTOR shall begin to perform the WORK within 10 days after the commencement date stated in the Notice to Proceed, but no WORK shall be done at the site prior to said commencement date.

B. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The CONTRACTOR shall promptly report in writing to the ENGINEER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any WORK affected thereby.

C. The CONTRACTOR shall submit to the ENGINEER for review those documents called for under Section 01300 - CONTRACTOR Submittals in the General Requirements.

2.5 PRE-CONSTRUCTION CONFERENCE. The CONTRACTOR is required to attend a Pre-Construction Conference. This conference will be attended by the ENGINEER and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in the General Requirements, Section 01010 - Summary of WORK in the General Requirements.

2.6 FINALIZING CONTRACTOR SUBMITTALS. At least 7 days before submittal of the first Application for Payment a conference attended by the CONTRACTOR, the ENGINEER and others as appropriate will be held to finalize the initial CONTRACTOR submittals in accordance with the General Requirements. As a minimum the CONTRACTOR's representatives should include the project manager and schedule expert. The CONTRACTOR should plan on this meeting taking no less than 8 hours. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first application for payment. No application for payment will be processed until CONTRACTOR submittals are finalized.

ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 INTENT

A. The Contract Documents comprise the entire Agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents shall be construed as a whole in accordance with Alaska Law.

B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any work, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in accordance with that meaning, unless a definition has been provided in Article 1 of the General Conditions. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.

C. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, the CONTRACTOR shall report it to the ENGINEER in writing at once, and the CONTRACTOR shall not proceed with the WORK affected thereby (except in an emergency as authorized by the ENGINEER) until a clarification field order, or Change Order to the Contract Documents has been issued.

3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. In resolving conflicts resulting from, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Permits from other agencies as may be required by law, excepting the definition of “PERMITEE” in these permits.
2. Field Orders
3. Change Orders
4. ENGINEER’s written interpretations and clarifications.
5. Agreement
6. Addenda
7. CONTRACTOR's Bid (Bid Form)
8. Supplementary General Conditions
9. Notice Inviting Bids
10. Instructions to Bidders

11. General Conditions
12. Technical Specifications
13. Drawings

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail Drawings govern over general Drawings
3. Addenda/ Change Order drawings govern over Contract Drawings
4. Contract Drawings govern over standard drawings

3.3 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10 CHANGES IN THE WORK).

3.4 REUSE OF DOCUMENTS. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of the OWNER.

ARTICLE 4 AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 AVAILABILITY OF LANDS. The OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement, lease or other appropriate agreement has been executed by the CONTRACTOR and the property owner, and a copy of said agreement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any such properties.

4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES

A. Explorations and Reports. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those reports of explorations and tests of sub-surface conditions at the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, however, reports are not to be considered complete or comprehensive and nontechnical data, interpretations, and opinions contained in such reports are not to be relied on by the CONTRACTOR. The CONTRACTOR is

responsible for any further explorations or tests that may be necessary and any interpretation, interpolation, or extrapolation that it makes of any information shown in such reports.

B. Existing Structures. Reference is made to SGC 4.2 Physical Conditions of the Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Utilities referred to in Paragraph 4.4 herein) which are at or contiguous to the site that have been utilized by the ENGINEER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, however, nontechnical data, interpretations, and opinions contained in such drawings are not to be relied on by the CONTRACTOR. The CONTRACTOR is also responsible for any interpretation, interpolation, or extrapolation that it makes of any information shown in such drawings.

4.3 DIFFERING SITE CONDITIONS

A. The CONTRACTOR shall promptly upon discovery (but in no event later than 14 days thereafter) and before the following conditions are disturbed, notify the ENGINEER, in writing of any:

1. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Article 1 of these General Conditions, or asbestos, PCB's, petroleum or any other substance or material posing a threat to human or to the environment.
2. Subsurface or latent physical conditions at the site differing from those indicated.
3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in WORK of the character provided for in the contract.

B. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR's cost of, or the time required for, performance of any part of the WORK shall issue a Change Order under the procedures described in the contract.

C. In the event that a dispute arises between the OWNER and the CONTRACTOR whether the conditions materially differ, or involved hazardous waste or other materials listed above, or cause a decrease or increase in the CONTRACTOR's cost of, or time required for, performance of any part of the WORK, the CONTRACTOR shall not be excused from any scheduled completion date provided for by the contract, but shall proceed with all WORK to be performed under the contract. The CONTRACTOR shall retain any and all rights provided either by contract or by Law which pertain to the resolution of disputes and protests between the contracting parties.

4.4 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

A. Indicated. The information and data indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such Underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full

responsibility for reviewing and checking all such information and data, for locating all Underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such Underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of which will be considered as having been included in the Contract Price.

B. Not Indicated. If an Underground Utility is uncovered or revealed at or contiguous to the site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such Underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Supplementary General Conditions and Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.

4.5 REFERENCE POINTS

A. The ENGINEER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.

B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by its own employees or by its Subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by personnel qualified under the Alaska Statute governing the licensing of Architects, Engineers, and Land Surveyors.

4.6 USE OF THE CBJ/STATE LEMON CREEK GRAVEL PIT

A. On City and Borough of Juneau (CBJ) construction projects, the CBJ may make unclassified material available to CONTRACTORs, from the CBJ/State Lemon Creek gravel pit, at a rate less than charged other customers. CONTRACTORs are not required to use material from the CBJ/State pit and the CBJ makes no guarantee as to the quantity or quality of the available material. For this Project, the price shall be $1.90 per ton.

B. CONTRACTORs proposing to use gravel from the CBJ/State pit are required to be in good standing for all amounts owed to the CBJ, for previous gravel operations, prior to submitting a mining plan for approval. CONTRACTORs using the pit must comply with Allowable Use Permit USE 98-00047. Failure to meet these requirements, if so subject, shall be sufficient reason to deny use of the CBJ/State pit as a gravel source. To determine if your company is subject to these requirements, contact the CBJ Engineering Department, Gravel Pit Management, at (907) 586-0800.

C. CONTRACTORs deciding to use material from the CBJ/State pit shall provide an Individual Mining Plan prepared by a professional engineer registered in the State of Alaska. The Individual Mining Plan must be reviewed and approved by the CBJ, prior to commencing operations within the pit. CONTRACTORs shall also secure a Performance Bond to ensure compliance with contract provisions, including any Individual Mining Plan stipulations. The bond shall remain in full force and effect until a release is obtained from the CBJ.

D. If CONTRACTOR operations for a project do not exceed 500 tons of material, the CONTRACTOR will not be required to provide an Individual Mining Plan prepared by an engineer. However, the CONTRACTOR must submit an Individual Mining Plan that is in compliance with Allowable Use Permit USE 98-00047 for gravel extraction within the CBJ/State pit. The CONTRACTOR must contact the CBJ Engineering Department for conditions for the extraction.

E. CONTRACTORs using the CBJ material may do primary dry separation (screening) of materials within the pit. Crushing and washing of material will not be allowed. CONTRACTORs shall account for placement of materials removed from the pit. The CBJ may require CONTRACTORs to cross-check weight tickets, submit to an audit, or participate in other measures required by the CBJ to ensure accountability. Unprocessed overburden removed from the pit will not be weighed. All other material mined will be weighed at the CBJ scale. CONTRACTORs will be responsible for loading and/or screening their own material. If asphalt pavement is removed as part of the WORK, CONTRACTORs shall dispose of the material at a to-be-specified location within the pit area, as directed by the CBJ Project Manager.

F. The gravel pit overhead charge shall be paid to the CBJ by the CONTRACTOR within 60 days after removal of all materials from the pit and prior to requesting and/or receiving final payment. Upon completion of each excavation CONTRACTORs shall notify the CBJ, in writing, in sufficient time to perform a field-compliance examination prior to vacating the pit. Any significant deviation from the stipulations of the Individual Mining Plan identified during the field inspection shall be corrected by the CONTRACTOR prior to release of the bond. A signed release from CBJ will be required prior to releasing the CONTRACTOR's bond.

G. If asphalt pavement is removed as part of this WORK, the CONTRACTOR shall dispose of the material at the location designated as the Asphalt Storage Facility, or as directed by the ENGINEER.

H. The CBJ/State pit is a seasonal operation. The hours of operation are from 7:00 a.m. to 6:00 p.m., Monday through Friday, from April 1 through October 15 of the year. CONTRACTORS may obtain gravel on weekends, or during the off-season, by applying for a separate agreement with the City and Borough of Juneau Engineering Department. The CONTRACTOR will be responsible for any additional costs incurred during weekend or off-season operations at the gravel pit.

I. All Contractors/Equipment Operators using the CBJ/State Pit shall be in compliance with Federal Mine Safety and Health Administration regulations for quarry and gravel operations.

ARTICLE 5 BONDS AND INSURANCE

5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS

A. The CONTRACTOR shall furnish, when required, Performance and Payment Bonds on forms provided by the CBJ for the penal sums of 100% of the amount of the Bid award. The surety on each bond may be any corporation or partnership authorized to do business in the State of Alaska as an insurer under AS 21.09. These bonds shall remain in effect for 12

months after the date of final payment and until all obligations and liens under this contract have been satisfied. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

B. If the surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and Surety, which must be acceptable to the OWNER.

C. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of Alaska to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions. The City Engineer may, on behalf of the OWNER, notify the surety of any potential default or liability.

5.2 INSURANCE

A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement up to the date of Final Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing Defective WORK in accordance with Paragraph 13.6, but the CONTRACTOR's liabilities under this Agreement shall not be deemed limited in any way to the insurance coverage required.

B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed or authorized in the State of Alaska to issue insurance policies for the limits and coverages so required. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

C. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by certified mail. All such insurance required herein (except for Workers' Compensation and Employer's Liability) shall name the OWNER, its Consultants and subconsultants and their officers, directors, agents, and employees as

"additional insureds" under the policies. The CONTRACTOR shall purchase and maintain the following insurance:

1. Workers' Compensation and Employer's Liability. This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workers' Compensation law. This policy shall include an "all states" endorsement. The CONTRACTOR shall require each Subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such WORK unless such employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In case any class of employees is not protected, under the Workers' Compensation Statute, the CONTRACTOR shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected.
2. Commercial General Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees or damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees, or Subcontractors. The policy shall contain no exclusions for any operations within the scope of this contract.
3. Comprehensive Automobile Liability. This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired. Coverage for hired motor vehicles should include endorsement covering liability assumed under this Agreement.
4. Subcontractor's Commercial General Liability Insurance and Commercial Automobile Liability Insurance. The CONTRACTOR shall either require each of its Subcontractors to procure and to maintain Subcontractor's Commercial General Liability and Property Damage Insurance and Vehicle Liability Insurance of the type and in the amounts specified in the Supplementary General Conditions or insure the activities of its Subcontractors in the CONTRACTOR's own policy, in like amount.
5. Builder's Risk. This insurance shall be of the "all risks" type, shall be written in completed value form, and shall protect the CONTRACTOR, the OWNER, and the ENGINEER, against risks of damage to buildings, structures, and materials and equipment. The amount of such insurance shall be not less than the insurable value of the WORK at completion. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR and the OWNER, as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, and the ENGINEER. The Builder's Risk policy shall insure against all risks of direct physical loss or damage to property from any external cause including flood and earthquake. Allowable exclusions, if any, shall be as specified in the Supplementary General Conditions.

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

6.1 SUPERVISION AND SUPERINTENDENCE

A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.

B. The CONTRACTOR shall designate in writing and keep on the WORK site at all times during its progress a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER and the ENGINEER only.

C. The CONTRACTOR's superintendent shall be present at the site of the WORK at all times while WORK is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the site.

6.2 LABOR, MATERIALS, AND EQUIPMENT

A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any temporary works as may be required. The CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the WORK or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all WORK at the site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER.

B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.

C. All costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER shall have the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.

D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.

E. All materials and equipment to be incorporated into the WORK shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the ENGINEER, or any of the ENGINEER consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraphs 9.9C and 9.9D.

F. The CONTRACTOR shall at all times employ sufficient labor and equipment for prosecuting the several classes of WORK to full completion in the manner and time set forth in and required by these specifications. All workers shall have sufficient skill and experience to perform property the WORK assigned to them. Workers engaged in special WORK, or skilled WORK, shall have sufficient experience in such WORK and in the operation of the equipment required to perform all WORK, properly and satisfactorily.

G. Any person employed by the CONTRACTOR or by any Subcontractor who, in the opinion of the ENGINEER, does not perform the WORK in a proper and skillful manner, or is intemperate or disorderly shall, at the written request of the ENGINEER, be removed forthwith by the CONTRACTOR or Subcontractor employing such person, and shall not be employed again in any portion of the WORK without the approval of the ENGINEER. Should the CONTRACTOR fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the WORK, the ENGINEER may suspend the WORK by written notice until such orders are complied with.

6.3 ADJUSTING PROGRESS SCHEDULE. The CONTRACTOR shall submit monthly updates of the progress schedule to the ENGINEER for acceptance in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.

6.4 SUBSTITUTES OR "OR-EQUAL" ITEMS. The CONTRACTOR shall submit proposed substitutes or "or-equal" items in accordance with the provisions in Section 01300 - CONTRACTOR Submittals in the General Requirements.

6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS.

A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the prime contract.

B. The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the awarded contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for contract award, and any other information requested by the OWNER from the apparent low bidder.

6.6 PERMITS

A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements under this contract shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids. The CONTRACTOR shall pay all charges of utility owners for connections to the WORK.

B. These Contract Documents may require that the WORK be performed within the conditions and/or requirements of local, state and/or federal permits. These permits may be bound within the Contract Documents, included within the Contract Documents by reference, or included as part of the WORK, as designated in this Section. The CONTRACTOR is responsible for completing the WORK required for compliance with all permit requirements; this WORK is incidental to other items in the Contract Documents. Any reference to the PERMITTEE in the permits shall mean the CONTRACTOR. If any permits were acquired by the OWNER, this action was done to expedite the start of construction. If the CONTRACTOR does not complete the WORK within the specified permit window, the CONTRACTOR shall be responsible for the permit extension, and for completing any additional requirements placed upon the permit.

C. The OWNER shall apply for, and obtain, the necessary building permit for this Project, however, the CONTRACTOR is responsible for scheduling and coordinating all necessary inspections. The CBJ Inspection number is 586-1703. All other provisions of this Section remain in effect.

6.7 PATENT FEES AND ROYALTIES. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, software or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed

by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

6.8 LAWS AND REGULATIONS. The CONTRACTOR shall observe and comply with all federal, state, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in this contract in relation to any such law, ordinance, code, order, or regulation, the CONTRACTOR shall report the same in writing to the ENGINEER. The CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, and their officers, agents, and employees against all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors, or third parties. Any particular law or regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations.
The OWNER may, per AS 36.30, audit the CONTRACTOR's or Subcontractor(s) records that are related to the cost or pricing data for this contract, all related Change Orders, and/or contract modifications.

6.9 TAXES. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to (1) the Project site, (2) the land and areas identified in and permitted by the Contract Documents, and (3) the other land and areas permitted by Laws and Regulations, rights-of-way, permits, leases and easements. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER, their Consultants, Sub-consultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all employees on the WORK and other persons and organizations who may be affected thereby;
2. all the WORK and materials and equipment to be incorporated therein, whether in storage on or off the site; and
3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

B. The CONTRACTOR shall comply with all applicable Laws and Regulations whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. The CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and program.

D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be requested by the CONTRACTOR from the manufacturer of any hazardous product used.

E. Material usage shall be accomplished with strict adherence to all safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.

F. The CONTRACTOR shall be responsible for coordinating communications on any exchange of Material Safety Data Sheets or other hazardous material information that is required to be made available to, or exchanged between, or among, employers at the site in accordance with Laws or Regulations.

G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended usage to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

6.12 SHOP DRAWINGS AND SAMPLES

A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the ENGINEER for review, all Shop Drawings in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.

B. The CONTRACTOR shall also submit to the ENGINEER for review all samples in accordance with Section 01300 - CONTRACTOR Submittals in the General Requirements.

C. Before submittal of each shop drawing or sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the WORK and the Contract Documents.

6.13 CONTINUING THE WORK. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.

6.14 INDEMNIFICATION

A. To the fullest extent permitted by Laws and Regulations, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their Consultants, Sub-consultants and the officers, directors, employees, and agents of each and any of them, against and from all claims and liability arising under, by reason of or incidentally to the contract or any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER, and the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:

1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, agents, or third parties;
2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR’s or Subcontractor’s own employees engaged in the WORK resulting in actions brought by or on behalf of such employees against the OWNER, and the ENGINEER;
3. Liability or claims arising directly or indirectly from or based on the violation of any law, ordinance, regulation, order, or decree, whether by the CONTRACTOR, its employees, or agents;
4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its employees, or agents in the performance of this contract of any copyrighted or non-copyrighted composition, secret process, patented or non-patented invention, computer software, article, or appliance, unless otherwise specifically stipulated in this contract.

5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER or any other parties by the CONTRACTOR, its employees, or agents;
6. Liabilities or claims arising directly or indirectly from the willful or criminal misconduct of the CONTRACTOR, its employees, or agents; and,
7. Liabilities or claims arising directly or indirectly from any breach of the obligations assumed herein by the CONTRACTOR.

B. The CONTRACTOR shall reimburse the ENGINEER and the OWNER for all costs and expenses, (including but not limited to fees and charges of engineers, attorneys, and other professionals and court costs including all costs of appeals) incurred by said OWNER, and the ENGINEER in enforcing the provisions of this Paragraph 6.14.

C. The indemnification obligation under this Paragraph 6.14 shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

6.15 CONTRACTOR'S DAILY REPORTS. The CONTRACTOR shall complete a daily report indicating total manpower for each construction trade, major equipment on site, each Subcontractor's manpower, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms provided by the ENGINEER and shall be submitted to the ENGINEER at the conclusion of each workday. The report should comment on the daily progress and status of the WORK within each major component of the WORK. These components will be decided by the ENGINEER. CONTRACTOR shall record the name, affiliation, time of arrival and departure, and reason for visit for all visitors to the location of the WORK.

6.16 ASSIGNMENT OF CONTRACT. The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the contract or any portion thereof, or its right, title, or interest therein, or obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the contract may be terminated at the option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

6.17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES. It is understood that any turn-on or turn-off, line locates and any other work or assistance necessary by the CBJ Water Utilities Division, will be at the CONTRACTOR's expense unless otherwise stated in the bid documents. All cost must be agreed to prior to any related actions, and will be considered incidental to the project cost. Billing to the CONTRACTOR will be direct from the CBJ Water Utilities Division.

6.18 OPERATING WATER SYSTEM VALVES

A. The CONTRACTOR shall submit a written request, to the ENGINEER, for approval to operate any valve on any in-service section of the CBJ water system. The request must be submitted at least 24-hours prior to operating any valves. The CBJ Water Utilities Division reserves the right to approve or deny the request. The request shall specifically identify each valve to be operated, the time of operation, and the operation to be performed. The CONTRACTOR shall obtain the written approval of the ENGINEER for any scheduled operation before operating any valve.

B. The CONTRACTOR shall be responsible for all damages, both direct and consequential, to the City or any other party, caused by unauthorized operation of any valve of the CBJ water system.

6.19 CONTRACTOR'S WORK SCHEDULE LIMITATIONS. Construction of Buildings and Projects. It is unlawful to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or similar heavy construction equipment before 7:00 a.m. or after 10:00 p.m., Monday through Friday, or before 9:00 a.m. or after 10:00 p.m., Saturday and Sunday, unless a permit shall first be obtained from the City and Borough Building Official. Such permit shall be issued by the Building Official only upon a determination that such operation during hours not otherwise permitted hereunder is necessary and will not result in unreasonable disturbance to surrounding residents.

ARTICLE 7 OTHER WORK

7.1 RELATED WORK AT SITE

A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts therefor which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.

B. The CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to make its several parts come together properly and integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.

C. If the proper execution or results of any part of the CONTRACTOR's work depends upon the work of any such other contractor or utility owner (or OWNER), the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

7.2 COORDINATION. If the OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary General Conditions, and the specific matters to be covered by such authority and responsibility will be itemized and the extent of such authority and responsibilities will be provided in the Supplementary General Conditions.

ARTICLE 8 OWNER'S RESPONSIBILITIES

8.1 COMMUNICATIONS

A. The OWNER shall issue all its communications to the CONTRACTOR through the ENGINEER.

B. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER.

8.2 PAYMENTS. The OWNER shall make payments to the CONTRACTOR as provided in Paragraphs 14.5, 14.8, 14.9 and 14.10.

8.3 LANDS, EASEMENTS, AND SURVEYS. The OWNER's duties in respect of providing lands and easements and providing surveys to establish reference points are set forth in Paragraphs 4.1 and 4.5.

8.4 CHANGE ORDERS. The OWNER shall execute Change Orders as indicated in Paragraph 10.1F.

8.5 INSPECTIONS AND TESTS. The OWNER's responsibility in respect of inspections, tests, and approvals is set forth in Paragraph 13.3.

8.6 SUSPENSION OF WORK. In connection with the OWNER's right to stop WORK or suspend WORK, see Paragraphs 13.4 and 15.1.

8.7 TERMINATION OF AGREEMENT. Paragraphs 15.2 and 15.3 deal with the OWNER's right to terminate services of the CONTRACTOR.

ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

9.1 OWNER'S REPRESENTATIVE. The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in the Contract Documents.

9.2 VISITS TO SITE. The ENGINEER will make visits to the site during construction to observe the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. Exhaustive or continuous on-site inspections to check the quality or quantity of the WORK will not be required of the ENGINEER. The ENGINEER will not, during such visits, or as a result of such observations of the CONTRACTOR's WORK in progress, supervise, direct, or have control over the CONTRACTOR's WORK.

9.3 PROJECT REPRESENTATION. The ENGINEER may furnish an Inspector to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority are as follows:

A. Duties, Responsibilities and Limitations of Authority of Inspector

General. The Inspector, who is the ENGINEER's Agent, will act as directed by and under the supervision of the ENGINEER and will confer with the ENGINEER regarding its actions. The Inspector's dealings in matters pertaining to the on-site WORK shall, in general, be only with the ENGINEER and the CONTRACTOR, and dealings with Subcontractors shall only

be through or with the full knowledge of the CONTRACTOR. Written communication with the OWNER will be only through or as directed by the ENGINEER.

Duties and Responsibilities. The Inspector may:

1. Review the progress schedule, list of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability.
2. Attend pre-construction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with the ENGINEER and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.
3. Serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents. Assist the ENGINEER in serving as the OWNER's liaison with the CONTRACTOR when the CONTRACTOR's operations affect the OWNER's on-site operations.
4. As requested by the ENGINEER, assist in obtaining from the OWNER additional details or information, when required at the site for proper execution of the WORK.
5. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by the CONTRACTOR and notify the ENGINEER of their availability for examination.
6. Conduct on-site observations of the WORK in progress to assist the ENGINEER in determining if the WORK is proceeding in accordance with the Contract Documents.
7. Report to the ENGINEER whenever the Inspector believes that any WORK is unsatisfactory, faulty, or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspection, tests or approval required to be made or has been damaged prior to final payment; and advise the ENGINEER when the Inspector believes WORK should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.
8. Verify that the tests, equipment, and systems startups and operating and maintenance instruction are conducted as required by the Contract Documents and in presence of the required personnel, and that the CONTRACTOR maintains adequate records thereof; observe, record and report to the ENGINEER appropriate details relative to the test procedures and start-ups.
9. Accompany visiting inspectors representing public or other agencies having jurisdiction over the WORK, record the outcome of these inspections, and report to the ENGINEER.
10. Transmit to the CONTRACTOR the ENGINEER's clarifications and interpretations of the Contract Documents.
11. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the ENGINEER.
12. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and sample submittals, reproductions of original Contract Documents including all addenda, Change Orders, field orders, additional Drawings issued subsequent to the execution of the contract, the ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other related documents.
13. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list all project visitors, daily activities,

decisions, observations in general, and specific observations in more detail as in the case of performing and observing test procedures. Send copies to the ENGINEER.

14. Record names, addresses, and telephone numbers of the CONTRACTOR, Subcontractors, and major suppliers of materials and equipment.
15. Furnish the ENGINEER with periodic reports as required of progress of the WORK and the CONTRACTOR's compliance with the accepted progress schedule and schedule of CONTRACTOR submittals.
16. Consult with the ENGINEER in advance of scheduled major tests, inspections, or start of important phases of the WORK.
17. Report immediately to the ENGINEER upon the occurrence of any accident.
18. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the ENGINEER, noting particularly their relation to the schedule of values, WORK completed, and materials and equipment delivered at the site but not incorporated in the WORK.
19. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed; and deliver this material to the ENGINEER for its review and forwarding to the OWNER prior to final acceptance of the WORK.
20. Before the ENGINEER prepares a Certificate of Substantial Completion/Notice of Completion, as applicable, review the CONTRACTOR's punch list items requiring completion or correction and add any items that CONTRACTOR has omitted.
21. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a final punch list of items to be completed or corrected.
22. Verify that all items on the punch list have been completed or corrected and make recommendations to the ENGINEER concerning acceptance.

Limitations of Authority. Except upon written instruction of the ENGINEER, the Inspector:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute material or equipment.
2. Shall not exceed limitations on the ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of the CONTRACTOR, Subcontractors or CONTRACTOR's superintendent, or expedite the WORK.
4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences, or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the WORK.

9.4 CLARIFICATIONS AND INTERPRETATIONS. The ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the ENGINEER may determine necessary, which shall be consistent with, or reasonably inferred from, the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and

will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the contract completion date. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.6 REJECTING DEFECTIVE WORK. The ENGINEER will have authority to reject WORK which the ENGINEER believes to be defective and will also have authority to require special inspection or testing of the WORK as provided in Paragraph 13.3G, whether or not the WORK is fabricated, installed, or completed.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals, including Shop Drawings, samples, substitutes, or "or equal" items, etc., in order to determine if the items covered by the submittals will, after installation or incorporation in the WORK, conform to the requirements of the Contract Documents and be compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. The ENGINEER's review will not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto.

B. In connection with the ENGINEER's responsibilities as to Change Orders, see Articles 10, 11, and 12.

C. In connection with the ENGINEER's responsibilities in respect of Applications for Payment, see Article 14.

9.8 DECISIONS ON DISPUTES

A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK; the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK; and those claims under Articles 11 and 12 in respect to changes in the Contract Price or Contract Time will be referred initially to the ENGINEER in writing with a request for formal decision in accordance with this paragraph, which the ENGINEER will render in writing within 30 days of receipt of the request. Written notice of each such claim, dispute, and other matter will be delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise thereto. Written supporting data will be submitted to the ENGINEER within 60 days after such occurrence unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

B. The rendering of a decision by the ENGINEER with respect to any such claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 14.12) will be a condition precedent to any exercise by the OWNER or the CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Law or Regulations in respect of any such claim, dispute, or other matter.

9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

A. Neither the ENGINEER's authority to act under this Article or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.

B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9C or 9.9D.

C. The ENGINEER will not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations, applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents.

D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, supplier, or any other person or organization performing any of the WORK.

ARTICLE 10 CHANGES IN THE WORK

10.1 GENERAL

A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the ENGINEER.

B. If the CONTRACTOR believes that it is entitled to an increase or decrease in the Contract Price, or an extension or shortening in the Contract Time as the result of a Field Order, a claim may be made as provided in Articles 11 and 12.

C. If the OWNER and CONTRACTOR agree on the value of any work, or the amount of Contract Time that should be allowed as a result of a Field Order, upon receiving written notice from the ENGINEER, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the work pending the issuance of a Change Order.

D. If the OWNER and the CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of Time and Materials so as to minimize the impact on and delays to WORK, and a claim may be made therefor as provided in Articles 11 and 12.

E. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3G.

F. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:

1. changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.1A;
2. changes required because of acceptance of Defective WORK under Paragraph 13.7;
3. changes in the Contract Price or Contract Time which are agreed to by the parties; or
4. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by the ENGINEER pursuant to Paragraph 9.8.

G. If notice of any change is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

10.2 ALLOWABLE QUANTITY VARIATIONS

A. In the event of an increase or decrease in Bid item quantity of a unit price contract, the total amount of WORK actually done or materials or equipment furnished shall be paid for according to the unit price established for such WORK under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract

Price may be made for changes which result in an increase or decrease in excess of 25% of the estimated quantity of any major item of the WORK. Major Item is defined as any bid item amount that is ten percent (10%) or more of the total contract amount.

B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, said price shall be determined in accordance with the provisions of Article 11.

ARTICLE 11 CHANGE OF CONTRACT PRICE

11.1 GENERAL

A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.

B. The Contract Price may only be changed by a Change Order. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 7 days) after the start of the occurrence or the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 14 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by the ENGINEER in accordance with Paragraph 9.8A if the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1B.

C. The value of any WORK covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the WORK involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4.
3. On the basis of the cost of WORK (determined as provided in Paragraphs 11.3) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.4).

11.2 COSTS RELATING TO WEATHER. The CONTRACTOR shall have no claims against the OWNER for damages for any injury to WORK, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment and work, the CONTRACTOR may be granted a reasonable extension of Contract Time to make proper repairs, renewals, and replacements of the work, materials, or equipment.

11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

A. General. The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project; shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.5 EXCLUDED COSTS.

B. Labor. The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, worker's compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers shall be paid only when such costs are not included in the invoice for equipment rental. The labor costs for forepersons shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Non-direct labor costs including superintendence shall be considered part of the mark-up set out in paragraph 11.4.

C. Materials. The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the job in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:

1. Trade discounts available to the purchaser shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Mark-up except for actual costs incurred in the handling of such materials will not be allowed.
3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the work site, whichever price is lower.
4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be allowed by the CONTRACTOR for costs and profit on such materials.

D. Equipment. The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the Supplementary General Conditions. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in

the Supplementary General Conditions, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate.

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used.
2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number.
3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
4. Individual pieces of equipment or tools having a replacement value of $200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.
5. Rental time will not be allowed while equipment is inoperative due to breakdowns.
6. Equipment Rental Rates. Unless otherwise agreed in writing, the CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication: "Rental Rate Blue Book" as published by Dataquest (a company of the Dunn and Bradstreet Corporation), 1290 Ridder Park Drive, San Jose, CA 95131, telephone number (800) 227-8444.

E. Equipment on the Work Site. The rental time to be paid for equipment on the work site shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than the extra work. The following shall be used in computing the rental time of equipment on the work site.

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.
2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs (3), (4), and (5), following.
3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3D, herein.
4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the work site, or in the absence of such labor, established by collective bargaining agreements for the type of worker and location of the extra work, whether

or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.3B, herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages.

5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.

F. Specialty Work. Specialty work is defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following shall apply in making estimates for payment for specialty work:

1. Any bid item of WORK to be classified as Specialty Work shall be listed as such in the Supplementary General Conditions. Specialty work shall be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for specialty work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs.
2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as specialty work and accordingly, the invoices for the work may be accepted without detailed itemization.
3. All invoices for specialty work will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.4, herein, an allowance of 5 percent will be added to invoices for specialty work.

G. Sureties. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S FEE

A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

Actual Overhead and Profit Allowance

Labor	15 percent
Materials	10 percent
Equipment	10 percent

To the sum of the costs and mark-ups provided for in this Article, one percent shall be added as compensation for bonding.

B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS. The term "Cost of the Work" shall not include any of the following:

A. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, estimators, attorneys' auditors, accountants, purchasing and contracting agents, expenditures, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the work, or not specifically covered by paragraph 11.3, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

B. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

C. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments.

D. Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by paragraph 11.4 above).

E. Costs due to the negligence of CONTRACTOR , any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective WORK, disposal of materials or equipment wrongly supplied and making good any damage to property.

F. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in paragraph 11.4.

ARTICLE 12 CHANGE OF CONTRACT TIME

12.1 GENERAL

A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract Time (or Milestones) shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 60 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the ENGINEER in accordance with Paragraph 9.8 if the OWNER and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this Paragraph 12.1A. An increase in Contract Time does not mean that the Contractor is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.

B. All time limits stated in the Contract Documents are of the essence of the Agreement.

C. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the project due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, unprecedented weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

D. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost on the critical path of the project due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall the OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

12.2 EXTENSIONS OF TIME FOR DELAY DUE TO WEATHER. Contract Time may be extended by the ENGINEER because of delays in completion of the WORK due to unusually severe weather, provided that the CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing of the cause of delay and request an extension of Contract Time. The ENGINEER will ascertain the facts and the extent of the delay and extend the time for completing the

work when, in the ENGINEER's judgment, the findings of fact justify such an extension. Unprecedented, abnormal, or unusually severe weather will be defined as an event, or events, with a greater than 50-year recurrence interval, as determined by the National Weather Service, or equivalent State or Federal agency

ARTICLE 13 WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.1 WARRANTY AND GUARANTEE. The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of defects known to the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.

13.2 ACCESS TO WORK. OWNER, ENGINEER, their Consultants, sub-consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the WORK at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

13.3 TESTS AND INSPECTIONS

A. The CONTRACTOR shall give the ENGINEER timely notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. If Laws or Regulations of any public body having jurisdiction other than the OWNER require any WORK to specifically be inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the OWNER's or the ENGINEER's acceptance of a Supplier of materials or equipment proposed as a substitution or (or-equal) to be incorporated in the WORK, or of materials or equipment submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. The cost of all inspections, tests, and approvals in addition to the above which are required by the Contract Documents shall be paid by the OWNER (unless otherwise specified).

C. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in the Supplementary General Conditions, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the ENGINEER and the CONTRACTOR.

E. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER timely notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.

F. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.

G. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such WORK is defective, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to fees and charges of engineers, attorneys, and other professionals. However, if such WORK is not found to be defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

13.4 OWNER MAY STOP THE WORK. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK. If required by the ENGINEER, the CONTRACTOR shall promptly, either correct all defective work, whether or not fabricated, installed, or completed, or, if the WORK has been rejected by the ENGINEER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, attorneys, and other professionals made necessary thereby.

13.6 ONE YEAR CORRECTION PERIOD

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with OWNER's written notification, (i) correct such Defective WORK, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work, and (ii) satisfactorily correct or remove and replace any damage to other work of others resulting therefrom. If the CONTRACTOR does not promptly comply with such notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the Defective WORK corrected or the rejected WORK removed and replaced, and all direct, indirect, and consequential costs and damages of such removal and replacement including but not limited to fees and charges of engineers, attorneys and other professionals will be paid by the CONTRACTOR.

B. Where Defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.6, the correction period hereunder with respect to such WORK will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

13.7 ACCEPTANCE OF DEFECTIVE WORK. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the WORK, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept such defective work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN). The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the ENGINEER.

14.2 UNIT PRICE BID SCHEDULE. Progress payments on account of Unit Price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, an Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR'S Total Earnings to Date, plus the Value of Materials Stored at the Site which have not yet been incorporated in the WORK, and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which

payment was allowed under the provisions for payment for Materials Stored at the Site, but not yet incorporated in the WORK.

C. The Net Payment Due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the total amount of all previous payments made to the CONTRACTOR. Progress payments will be paid in full in accordance with Article 14 of the General Conditions until 90% of the Contract Price has been paid. The remaining 10% of the Contract Price amount may be withheld until:

1. final inspection has been made;
2. completion of the Project; and
3. acceptance of the Project by the OWNER.

D. The Value of Materials Stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in the Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing; provided, each such individual item has a value of more than $5,000.00 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by an invoice (including shipping), a certification that the materials meet the applicable contract specifications, and any evidence required by the OWNER that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER. Payment for materials will not constitute final acceptance. It shall be the CONTRACTOR’s responsibility to protect the material from damage, theft, loss, or peril while in storage. Unless otherwise prescribed by law, the Value of Materials Stored at the Site shall be paid at the invoice amount up to a maximum of 85% of the Contract Price for those items.

14.4 CONTRACTOR'S WARRANTY OF TITLE. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of payment free and clear of all liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the later case, the CONTRACTOR may make the necessary corrections and resubmit the Application. If the ENGINEER still disagrees with a portion of the Application, it will submit the Application recommending the undisputed portion of the Application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B) become due and when due will be paid by the OWNER to the CONTRACTOR.

B. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the

CONTRACTOR's performance of the WORK or Liens have been filed in connection with the WORK or there are other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days (with a copy to the ENGINEER) stating the reasons for such action.

14.6 PARTIAL UTILIZATION

A. The OWNER shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.

B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of partial utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.

C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER and the CONTRACTOR's one year correction period shall commence only after the date of Substantial Completion for the WORK.

14.7 SUBSTANTIAL COMPLETION. When the CONTRACTOR considers the WORK ready for its intended use the CONTRACTOR shall notify the OWNER and the ENGINEER in writing that the WORK is substantially complete. The CONTRACTOR will attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, or the list of remaining work items to be comprehensive, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER, for its execution and recording, the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.

14.8 FINAL APPLICATION FOR PAYMENT. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.7 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, record as-built documents (as provided in the General Requirements) and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all liens arising out of or filed in connection with the WORK.

14.9 FINAL PAYMENT AND ACCEPTANCE

A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the Application to the OWNER for payment.

B. After acceptance of the WORK by the OWNER's governing body, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:

1. Liquidated damages, as applicable.
2. Two times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER within the time stated on the Notice of Completion, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.

14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

A. After executing the necessary documents to initiate the lien period, and not more than 45 days thereafter (based on a 30-day lien filing period and 15-day processing time), the OWNER will release to the CONTRACTOR the retainage funds withheld pursuant to the Agreement, less any deductions to cover pending claims against the OWNER pursuant to Paragraph 14.5B.

B. After filing of the necessary documents to initiate the lien period, the CONTRACTOR shall have 30 days to complete any outstanding items of correction work remaining to be completed or corrected as listed on a final punch list made a part of the Notice of Completion. Upon expiration of the 45 days, referred to in Paragraph 14.10A, the amounts withheld pursuant to the provisions of Paragraph 14.9B herein, for all remaining work items will be returned to the CONTRACTOR; provided, that said work has been completed or corrected to the satisfaction of the OWNER within said 30 days. Otherwise, the CONTRACTOR does hereby waive any and all claims for all monies withheld by the OWNER under the Contract to cover 2 times the value of such remaining uncompleted or uncorrected items.

14.11 CONTRACTOR'S CONTINUING OBLIGATION. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Notice of Completion, nor any payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a Shop Drawing or sample submittal, will constitute an acceptance of work not in accordance with the Contract Documents or a

release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less monies withheld as applicable, pursuant to Paragraph 14.10A. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.9 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act of neglect of the OWNER or of any person relating to or affecting the WORK, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.9 herein; and excepting pending, unresolved claims filed prior to the date of the Notice of Completion.

ARTICLE 15 SUSPENSION OF WORK AND TERMINATION

15.1 SUSPENSION OF WORK BY OWNER. The OWNER, acting through the ENGINEER, may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt from the ENGINEER of a notice of resumption of work. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

15.2 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)

A. In the event of default by the CONTRACTOR, the OWNER may give 10 days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default. It shall be considered a default by the CONTRACTOR whenever CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or quality of work meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or ENGINEER's instructions; (4) fail to prosecute the WORK according to the approved progress schedule; or, (5) fail to provide a qualified superintendent, competent workers, or materials or equipment meeting the requirements of the Contract Documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue the Notice of Termination.

B. In the event the Agreement is terminated in accordance with Paragraph 15.2A, herein, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

15.3 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE). The OWNER may terminate the Agreement at any time if it is found that reasons beyond the control of either the

OWNER or CONTRACTOR make it impossible or against the OWNER's interests to complete the WORK. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of work performed up to the date the Agreement is terminated; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the ENGINEER in accordance with the procedure prescribed for the making of the final application for payment and payment under Paragraphs 14.8 and 14.9.

15.4 TERMINATION OF AGREEMENT BY CONTRACTOR. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: 1) the WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or, 2) the OWNER should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless within said 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.

ARTICLE 16 MISCELLANEOUS

16.1 GIVING NOTICE. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.2 RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK

A. The CONTRACTOR may use on the Project, with ENGINEER's approval, such stone, gravel, sand, or other material determined suitable by the ENGINEER, as may be found in the excavation. The CONTRACTOR will be paid for the excavation of such material at the corresponding contract unit price. No additional payment will be made for utilizing the material from excavation as borrow, or select borrow.

B. The CONTRACTOR shall replace, at its own expense, with other acceptable material, all of that portion of the excavated material so removed and used which was needed for use on the project. No charge for the materials so used will be made against the CONTRACTOR except that the CONTRACTOR shall be responsible for payment of any royalties required.

C. The CONTRACTOR shall not excavate or remove any material from within the Project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the ENGINEER.

D. In the event the CONTRACTOR has processed materials from OWNER-furnished sources in excess of the quantities required for performance of this contract, including any waste material produced as a by-product, the CBJ may retain possession of such materials without

obligation to reimburse the CONTRACTOR for the cost of their production. When such materials are in a stockpile, the ENGINEER may require: That it remain in stockpile; the CONTRACTOR level such stockpile(s); or that the CONTRACTOR remove such materials and restore the premises to a satisfactory condition at the CONTRACTOR's expense. This provision shall not preclude the CBJ from arranging with the CONTRACTOR to produce material over and above the contract needs, payment for which shall be by written agreement between the CBJ and the CONTRACTOR.

E. Unless otherwise provided, the material from any existing old structure may be used temporarily by the CONTRACTOR in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the ENGINEER.

16.3 RIGHT TO AUDIT. If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.

16.4 ARCHEOLOGICAL OR HISTORICAL DISCOVERIES. When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, such as shell heaps, land or sea mammal bones or tusks, or other items of historical significance, the CONTRACTOR shall cease operations immediately and notify the ENGINEER. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the ENGINEER order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra work, such order(s) shall be covered by an appropriate contract change document.

16.5 CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS. All work over, on, or adjacent to navigable waters shall be so conducted that free navigation of the waterways will not be interfered with and the existing navigable depths will not be impaired, except as allowed by permit issued the U.S. Coast Guard and/or the U.S. Army Corps of Engineers, as applicable.

16.6 GRATUITY AND CONFLICT OF INTEREST. The CONTRACTOR agrees to not extend any loan, gratuity or gift of money of any form whatsoever to any employee or elected official of the OWNER, nor will the CONTRACTOR rent or purchase any equipment or materials from any employee or elected official of the OWNER, or to the best of the CONTRACTOR’s knowledge, from any agent of any employee or elected official of the OWNER. Before final payment, the CONTRACTOR shall execute and furnish the OWNER an affidavit certifying that the CONTRACTOR has complied with the above provisions of the contract.

16.7 SUITS OF LAW CONCERNING THE WORK

A. Should a suit of law be entered into, either by the CONTRACTOR (or the CONTRACTOR's surety) against the OWNER, or by the OWNER against the CONTRACTOR (or the CONTRACTOR's surety), the suit of law shall be tried in the First Judicial District of Alaska.

B. If one of the questions at issue is the satisfactory performance of the work by the CONTRACTOR and should the appropriate court of law judge the work of the CONTRACTOR to be unsatisfactory, then the CONTRACTOR (or the CONTRACTOR's surety) shall reimburse the OWNER for all legal and all other expenses (as may be allowed and set by the court) incurred by the OWNER because of the suit of the law and, further, it is agreed that the OWNER may deduct such expense from any sum or sums then, or any that become due the CONTRACTOR under the contract.

16.8 CERTIFIED PAYROLLS

A. All CONTRACTORs or Subcontractor who perform work on a public construction contract for the OWNER shall file a certified payroll with the Alaska Department of Labor before Friday of each week that covers the preceding week (Section 14-2-4 ACLA 1949; am Section 4 ch 142 SLA 1972).

B. In lieu of submitting the State payroll form, the CONTRACTOR's standard payroll form may be submitted, provided it contains the information required by AS 36.05.040 and a statement that the CONTRACTOR is complying with AS 36.10.010.

C. A contractor or subcontractor, who performs work on public construction in the State, as defined by AS 36.95.010(3), shall pay not less than the current prevailing rate of wages as issued by the Alaska Department of Labor before the end of the pay period. (AS 36.05.010).

16.9 PREVAILING WAGE RATES

A. Wage rates for Laborers and Mechanics on Public Contracts, AS 36.05.070. The CONTRACTOR, or Subcontractors, shall pay all employees unconditionally and not less than once a week. Wages may not be less than those stated in Paragraph 16.8C, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors. The scale of wages to be paid shall be posted by the CONTRACTOR in a prominent, easily accessible place at the site of the WORK.

B. Failure to Pay Agreed Wages, AS 36.05.080. If it is found that a laborer, mechanic, or field surveyor employed by the CONTRACTOR or Subcontractor has been, or is being, paid a rate or wages less than the established rate, the OWNER may, by written notice, terminate the CONTRACTOR or Subcontractors right to proceed with the work. The OWNER may prosecute the work to completion by contract or otherwise, and the CONTRACTOR and sureties will be held liable to the OWNER for excess costs for completing the WORK. (Section 2 ch 52 SLA 1959).

C. Listing Contractor's Who Violate Contracts, AS 36.05.090. In addition, a list giving the names of persons who have disregarded the rights of their employees shall be distributed to

all departments of State government and all political subdivisions. No person appearing on this list, and no firm, corporation, partnership or association in which the person has an interest, may work as a CONTRACTOR or Subcontractor on a public construction contract for the State, or a political subdivision of the state, until three years after the date of publication of the list. (Section 3 ch 52 SLA 1959; am Section 9 ch 142 SLA).

16.10 EMPLOYMENT REFERENCE. Workers employed in the execution of the contract by the CONTRACTOR or by any Subcontractor under this contract shall not be required or permitted to labor more than 8 hours a day or 40 hours per week in violation of the provisions of the Alaska Wage and Hour Act, Section 23.10.060.

16.11 COST REDUCTION INCENTIVE

A. At any time within 45 days after the date of the Notice of Award, the CONTRACTOR may submit to the ENGINEER in writing, proposals for modifying the plans, specifications, or other requirements of this contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair in any manner the essential functions or characteristics of the project, including but not limited to, service life, economy of operation, ease of maintenance, desired appearance or design and safety standards.

B. The cost reduction proposal shall contain the following information:

1. Description of both the existing contract requirements for performing the WORK and the proposed changes.
2. An itemization of the contract requirements that must be changed if the proposal is adopted.
3. A detailed estimate of the time required and the cost of performing the WORK under both the existing contract and the proposed change.
4. A statement of the date by which the CONTRACTOR must receive the decision from the OWNER on the cost reduction proposal.
5. The contract items of WORK effected by the proposed changes including any quantity variations.
6. A description and estimate of costs the OWNER may incur in implementing the proposed changes, such as test and evaluation and operating and support costs.
7. A prediction of any effects the proposed change would have on future operations and maintenance costs to the OWNER.

C. The provisions of this section shall not be construed to require the OWNER to consider any cost reduction proposal which may be submitted; nor will the OWNER be liable to the CONTRACTOR for failure to accept or act upon any cost reduction proposal submitted, or for delays to the work attributable to the consideration or implementation of any such proposal.

D. If a cost reduction proposal is similar to a change in the plans or specifications for the project under consideration by the OWNER at the time the proposal is submitted, the OWNER will not accept such proposal and reserves the right to make such changes without compensation to the CONTRACTOR under the provisions of this section.

E. The CONTRACTOR shall continue to perform the work in accordance with the requirements of the contract until an executed Change Order incorporating the cost reduction

proposal has been issued. If any executed Change Order has not been issued by the date upon which the CONTRACTOR's cost reduction proposal specifies that a decision should be made by the OWNER, in writing, the cost reduction proposal shall be considered rejected.

F. The OWNER, shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in Contract Time and construction costs resulting from the adoption of all or any part of such proposal. Should the CONTRACTOR disagree with OWNER's decision on the cost reduction proposal, there is no further consideration. The OWNER reserves the right to make final determination.

G. If the CONTRACTOR's cost reduction proposal is accepted in whole or in part, such acceptance will be made by a contract Change Order, which specifically states that the change is executed pursuant to this cost reduction proposal section. Such Change Order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect and shall include any conditions upon which the OWNER's approval is based, if such approval is conditional. The Change Order shall also describe the estimated net savings in the cost of performing the work attributable to the cost reduction proposal, and shall further provide that the contract cost be adjusted by crediting the OWNER with the estimated net savings amount.

H. Acceptance of the cost reduction proposal and performance of the work does not extend the time of completion of the contract, unless specifically provided in the Change Order authorizing the use of the submitted proposal. Should the adoption of the cost reduction proposal result in a Contract Time savings, the total Contract Time shall be reduced by an amount equal to the time savings realized.

I. The amount specified to the CONTRACTOR in the Change Order accepted in the cost reduction proposal shall constitute full compensation for the performance of WORK. No claims for additional costs as a result of the changes specified in the cost reduction proposal shall be allowed.

J. The OWNER reserves the right to adopt and utilize any approved cost reduction proposal for general use on any contract administered when it is determined suitable for such application. Cost reduction proposals identical, similar, or previously submitted will not be accepted for consideration if acceptance and compensation has previously been approved. The OWNER reserves the right to use all or part of any cost reduction proposal without obligation or compensation of any kind to the CONTRACTOR.

K. The CONTRACTOR shall bear the costs, if any, to revise all bonds and insurance requirements for the project, to include the cost reduction WORK.

END OF SECTION

SECTION 00800 - SUPPLEMENTARY GENERAL CONDITIONS

GENERAL. These Supplementary General Conditions make additions, deletions, or revisions to the General Conditions as indicated herein. All provisions which are not so added, deleted, or revised remain in full force and effect. Terms used in these Supplementary General Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SGC 1 DEFINITIONS. ***Remove*** the definition for Contract Documents and ***replace*** with the following:

Contract Documents – The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Subcontractor Report, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination, Special Provisions, Standard Specifications, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

SGC 2.2 COPIES OF DOCUMENTS. ***Add*** the following:

The OWNER shall furnish to the CONTRACTOR two (2) hard copies of the Contract Documents which will include bound reduced Drawings and full size drawings and one (1) electronic copy (pdf format) on a CD-ROM. Additional copies of contract documents are the responsibility of the contractor.

SGC 3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS. ***Remove*** No. 12. Technical Specifications and No. 13. Drawings, and ***add*** the following:

12. Special Provisions Section
13. Standard Specifications for Civil Engineering Projects and Subdivision Improvements December 2003 Edition with current Errata Sheets.
14. Drawings.

SGC 4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES. ***Add*** the following:

C. In the preparation of the Contract Documents, the Engineer of Record has relied upon field measurements and visual inspection of the existing structures and surface conditions.

SGC - 4.6 USE OF THE CBJ/STATE LEMON CREEK GRAVEL PIT. ***Add*** the following.

The CBJ/State Lemon Creek Gravel Pit is not available for this Project

Add the following SGC 4.7**:**

SGC 4.7 USE OF CITY/STATE STABLER'S POINT ROCK QUARRY. ***Add*** the following:

The CBJ/State Stabler's Point Rock Quarry is not available for this Project

SGC 5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS. The Contractor shall furnish Performance and Payment Bonds in the amount of 100% of the Bid.

SGC 5.2 INSURANCE AMOUNTS. The limits of liability for the insurance required by Paragraph 5.2 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations**.** The CONTRACTOR must provide certification of proper insurance coverage and amendatory endorsements or copies of the applicable policy language affecting coverage required in this agreement to the City and Borough of Juneau. All certificates of insurance supplied to the OWNER shall state that the OWNER is named as **"Additional Insured for any and all work performed for the City & Borough of Juneau" for the Commercial General Liability policy and any other policies, if required in this Section**.

Delete paragraph C and ***Replace*** with the following paragraph C:

C. The CONTRACTOR shall furnish the OWNER with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Failure of CBJ to demand such certificate or other evidence of full compliance with these insurance requirements or failure of CBJ to identify a deficiency from evidence that is provided shall not be construed as a waiver of the obligation of the Contractor to maintain the insurance required by this contract. The coverage afforded will not be cancelled, reduced in coverage, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by the CONTRACTOR. **All such insurance required herein (except for Workers' Compensation and Employer's Liability) shall name the OWNER, its Consultants and subconsultants and their officers, directors, agents, and employees as "additional insureds" under the policies.**

The CONTRACTOR shall purchase and maintain the following insurance:

1. Workers' Compensation and Employer's Liability. This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a Workers' Compensation law. The CONTRACTOR shall require each Subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In case any class of employees is not protected, under the Workers' Compensation Statute, the CONTRACTOR shall provide and shall cause each subcontractor to provide adequate employer's liability insurance for the protection of such of its employees as are not otherwise protected. **The CONTRACTOR grants a waiver of any right to subrogation against the OWNER by virtue of the payment of any loss under such insurance.** This provision applies regardless of whether or not the OWNER has received a waiver of subrogation endorsement from the insurer.

Workers' Compensation: (under Paragraph 5.2C.1 of the General Conditions) as in accordance with AS 23.30.045:

a. State: Statutory
b. Applicable Federal (e.g., Longshore): Statutory

Note: If the WORK called for in the Contract Documents involves work in or on any navigable waters, the CONTRACTOR shall provide Workers' Compensation coverage which shall include coverage under the Longshore and Harbor Workers' Compensation Act, the Jones Act, and any other coverage required under Federal or State laws pertaining to workers in or on navigable waters.

a. Employers Liability

Bodily Injury by Accident:	$1,000,000.00	Each Accident
Bodily Injury by Disease:	$1,000,000.00	Each Employee
Bodily Injury by Disease:	$1,000,000.00	Policy Limit

1. CONTRACTOR agrees to waive all rights of subrogation against the OWNER for WORK performed under contract.
2. If CONTRACTOR directly utilizes labor outside of the State of Alaska in the prosecution of the WORK, "Other States" endorsement shall be required as a condition of the contract.

2. Commercial General Liability (CGL), including products and completed operations, property damage, bodily injury and personal and advertising injury, with limits no less than $1,000,000 each occurrence and $2,000,000 aggregate. (under Paragraph 5.2C.2 of the General Conditions) **This insurance policy is to contain, or be endorsed to contain, additional insured status for the CBJ, its officers, officials, employees, and volunteers.** If Additional insured status is provided in the form of an endorsement to the Contractor's insurance, the endorsement shall be at least as broad as ISO Form CG 20 10 11 85 or **both** CG 20 10, CG 20 26, CG 20 33, or CG 20 38; **and** CG 20 37 forms if later revisions used).

3. Commercial Automobile Liability: (under Paragraph 5.2C.3 of the General Conditions) including Owned, Hired, and Non-Owned Vehicles:

Combined Single Limit, Bodily Injury and Property Damage $1,000,000.00

This insurance policy is to contain, or be endorsed to contain, additional insured status for the CBJ, its officers, officials, employees, and volunteers The CONTRACTOR shall require each Subcontractor similarly to provide Commercial Automobile Liability Insurance for all of the latter's employees to be engaged in such WORK unless such employees are covered by the protection afforded by the CONTRACTOR's Commercial Automobile Liability Insurance.

Add the following paragraphs:

C. Builder's Risk: CONTRACTOR is not required to obtain a Builder's Risk insurance policy for this project.

D. Marine Protection and Indemnity $2,000,000 per Accident or Occurrence including coverage for all crew members. Divers must have appropriate certifications. This coverage is required for any in-water work performed on a marine vessel. This coverage may be provided by the Prime Contractor or the Subcontractor, if the Subcontractor is contracted to do the in-water work on a marine vessel.

E. All Subcontractors are required to secure and maintain the insurance coverages listed above, unless otherwise noted.

F. If the CONTRACTOR maintains higher limits than the minimums shown above, the OWNER requires and shall be entitled to coverage for the higher limits maintained by the CONTRACTOR. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the OWNER.

G. Policies shall also specify insurance provided by CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER.

H. Should any of the policies described above be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

SGC 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS. ***Add*** the following:

B. The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the original contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for Contract Award, and any other information requested by the OWNER from the apparent low Bidder.

SGC 6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS, ***Add*** the following paragraph:

C. CONTRACTOR must pay Subcontractors and/or Suppliers within 30 days of receiving payment from the OWNER, if that payment was made for Work performed by the Subcontractor and/or materials received. Failure to pay Subcontractors within 30 days of receiving payment from which Subcontractor and/or Supplier is to be paid may result in the OWNER initiating debarment proceedings as prescribed in the City and Borough of Juneau Purchasing Code. *The 30 day City and Borough of Juneau requirement does not supersede AS 36.90.210.*

SGC 6.6 PERMITS, ***Add*** the following paragraph:

D. Contractor is responsible for obtaining a Hot Works permit from the CBJ Permit Center, if performing work which requires such a permit. Work requiring a Hot Works Permit includes but is not limited to the following: cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar activity.

SGC 14.3 APPLICATION FOR PROGRESS PAYMENT. Paragraph D.

D. The Value of Materials Stored at the site shall be an amount equal to 85%.

SGC 14.9 FINAL PAYMENT AND ACCEPTANCE. ***Add*** the following paragraph:

C. Prior to the final payment the CONTRACTOR shall contact the Alaska Department of Labor and Workforce Development (ADOL) and provide the OWNER with clearance from the ADOL for the CONTRACTOR and all Subcontractors that have worked on the Project. This clearance shall indicate that all Employment Security Taxes have been paid. A sample form for this purpose is at the end of this section. The CONTRACTOR shall also submit a "NOTICE OF COMPLETION OF PUBLIC WORKS" signed by ADOL.

SGC 16.8 CERTIFIED PAYROLLS. ***Change*** paragraph A. to read:

A. All CONTRACTORs or Subcontractors who perform work on a public construction contract for the OWNER shall file a certified payroll with Alaska Department of Labor. See Section 00830 - Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination.

Add the following SGC 16.12.

SGC 16.12 EQUAL EMPLOYMENT OPPORTUNITY (EEO)

The CONTRACTOR may not discriminate against any employee or applicant for employment because of race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy or parenthood. The CONTRACTOR shall post a notice setting out the provisions of this paragraph in a conspicuous place available to employees and applicants for employment.

The CONTRACTOR and each Subcontractor shall state in all solicitations and advertisements for employees to work on this Project, that it is an Equal Opportunity Employer and that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy or parenthood.

The CONTRACTOR shall include the provisions of this EEO article in every contract relating to this Project and shall require the inclusion of these provisions in every agreement entered into for this Project, so that those provisions will be binding upon the CONTRACTOR and each Subcontractor.

Add the following SGC 17**:**

SGC 17 GENERAL INFORMATION. This Project is currently funded by the City and Borough of Juneau, Alaska.

END OF SECTION

SECTION 00830 - ALASKA LABOR STANDARDS, REPORTING, AND PREVAILING WAGE RATE DETERMINATION

State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, is provided in its entirety in SECTION 00830 – APPENDIX A.

The rates that are in effect 10 days prior to the final date for submission of bids are the rates that will apply to this project. These rates will apply for 24 calendar months from the date the project is awarded to a prime contractor. At the end of the initial 24-month period, the latest wage rates issued by the Alaska Department of Labor shall become effective for the next 24-month period. This process repeats itself until the project is completed.

The CONTRACTOR is responsible for contacting the Alaska Department of Labor to determine compliance with current regulations.

Correspondence regarding Title 36 requirements may be submitted to ADOL electronically or paper copies can be submitted by mail. To submit Title 36 documents and certified payrolls electronically, go to https://myalaska.state.ak.us/home/app.

The CONTRACTOR and each Subcontractor shall submit Certified Payrolls to Matthew Sill at matthew.sill@juneau.org upon request. If the Port Engineer does not receive the requested Certified Payrolls within five (5) working days, the Port Engineer will request the Certified Payrolls from ADOL. The CONTRACTOR shall be responsible for all costs charged by ADOL for delivery of the requested Certified Payrolls, including those costs for Subcontractors.

Within 10 Days of "Notice of Award/Notice to Proceed" make a list of **all** Subcontractors. Include their name, address, phone, estimated subcontract amount, and estimated start and finish dates. Send this list to the Wage and Hour Section (contact information below).

Certified Payrolls must be submitted every two weeks. Before the second Friday, each CONTRACTOR and Subcontractor must file Certified Payrolls with Statements of Compliance for the previous two weeks. Indicate ***"Start"*** on your first payroll, and ***"Final"*** on your last payroll for this Project.

As part of the **final payment request package,** CONTRACTOR must submit a "NOTICE OF COMPLETION OF PUBLIC WORKS" form signed by ADOL personnel.

Contact Information:

Wage and Hour Section
State of Alaska
Department of Labor and Workforce Development
Labor Standards and Safety Division
Wage and Hour Administration
P.O. Box 11149
Juneau, AK 99811-1149
907-465-4842
http://labor.state.ak.us/lss/home.htm

and

Matthew Sill, Port Engineer
City and Borough of Juneau
Docks and Harbors
155 Heritage Way
Juneau, AK 99801
(907) 586-0292
Matthew.Sill@juneau.gov

SECTION 00830 - ALASKA LABOR STANDARDS, REPORTING, AND PREVAILING WAGE RATE DETERMINATION

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The rates that are in effect 10 days prior to the final date for submission of bids are the rates that will apply to this project. These rates will apply for 24 calendar months from the date the project is awarded to a prime contractor. At the end of the initial 24-month period, the latest wage rates issued by the Alaska Department of Labor shall become effective for the next 24-month period. This process repeats itself until the project is completed.

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Contact Information:

Wage and Hour Section
State of Alaska
Department of Labor and Workforce Development
Labor Standards and Safety Division
Wage and Hour Administration
P.O. Box 11149
Juneau, AK 99811-1149
907-465-4842
http://labor.state.ak.us/lss/home.htm

and

Matthew Sill, Port Engineer
City and Borough of Juneau
Docks and Harbors
155 Heritage Way
Juneau, AK 99801
(907) 586-0292
Matthew.Sill@juneau.gov



MINIMUM RATES OF PAY
For Laborers and Mechanics

Effective April 1, 2025 **Issue 50**

PAMPHLET No. 600

Title 36. Public Contracts
AS 36.05

DEPARTMENT OF LABOR
AND WORKFORCE DEVELOPMENT
Wage and Hour

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THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Labor and Workforce Development

Office of the Commissioner

Post Office Box 111149
Juneau, Alaska 99811
Main: 907.465.2700
fax: 907.465-2784

April 1, 2025

TO ALL CONTRACTING AGENCIES:

At the Alaska Department of Labor and Workforce Development our goal is putting Alaskans to work. This pamphlet is designed to help contractors awarded public construction contracts understand the most significant laws of the State of Alaska pertaining to prevailing wages.

This pamphlet identifies current prevailing wage rates for public construction contracts (any construction projects awarded for the State of Alaska or its political subdivisions, such as local governments and certain non-profit organizations). Because these rates may change in a subsequent determination, please be sure you are using the appropriate rates. The rates published in this edition become effective April 1, 2025.

The prevailing wage rates contained in this pamphlet are applicable to public construction projects with a final bid date of April 11, 2025, or later. As the law now provides, these rates will remain stable during the life of a contract or for 24 calendar months, whichever is shorter. **The 24-month period begins on the date the prime contract is awarded.** Upon expiration of the initial 24-month period, the latest wage rates issued by the department shall become effective for a subsequent 24-month period or until the original contract is completed, whichever occurs first. This process shall be repeated until the original contract is completed.

The term "original contract" means the signed contract that resulted from the original bid and any amendments, including changes of work scope, additions, extensions, change orders, and other instruments agreed to by the parties that have not been subject to subsequent open bid procedures.

If a higher federal rate is required due to partial federal funding or other federal participation, the higher rate must be paid.

For additional copies of this pamphlet go to: http://labor.state.ak.us/lss/pamp600.htm

For questions regarding prevailing wage or employment preference requirements, please contact the nearest Wage and Hour office. These offices are listed on Page x.

Sincerely,

Catherine Muñoz
Commissioner

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Note to Readers: The statutes and administrative regulations listed in this publication were taken from the official codes, as of the effective date of the publication. However, there may be errors or omissions that have not been identified and changes that occurred after the publication was printed. This publication is intended as an informational guide only and is not intended to serve as a precise statement of the statutes and regulations of the State of Alaska. To be certain of current laws and regulations, please refer to the official codes.

EXCERPTS FROM ALASKA LAW

Sec. 36.05.005. Applicability.
This chapter applies only to a public construction contract that exceeds $25,000.

Sec. 36.05.010. Wage rates on public construction.
A contractor or subcontractor who performs work on a public construction contract in the state shall pay not less than the current prevailing rate of wages for work of a similar nature in the region in which the work is done. The current prevailing rate of wages is that contained in the latest determination of prevailing rate of wages issued by the Department of Labor and Workforce Development at least 10 days before the final date for submission of bids for the contract. The rate shall remain in effect for the life of the contract or for 24 calendar months, whichever is shorter. At the end of the initial 24-month period, if new wage determinations have been issued by the department, the latest wage determination shall become effective for the next 24-month period or until the contract is completed, whichever occurs first. This process shall be repeated until the contract is completed.

Sec. 36.05.040. Filing schedule of employees, wages paid, and other information.
All contractors or subcontractors who perform work on a public construction contract for the state or for a political subdivision of the state shall, before the Friday of every second week, file with the Department of Labor and Workforce Development a sworn affidavit for the previous reporting period, setting out in detail the number of persons employed, wages paid, job classification of each employee, hours worked each day and week, and other information on a form provided by the Department of Labor and Workforce Development.

Sec. 36.05.045. Notice of work and completion; withholding of payment.

(a) Before commencing work on a public construction contract, the person entering into the contract with a contracting agency shall designate a primary contractor for purposes of this section. Before work commences, the primary contractor shall file a notice of work with the Department of Labor and Workforce Development. The notice of work must list work to be performed under the public construction contract by each contractor who will perform any portion of work on the contract and the contract price being paid to each contractor. The primary contractor shall pay all filing fees for each contractor performing work on the contract, including a filing fee based on the contract price being paid for work performed by the primary contractor's employees. The filing fee payable shall be the sum of all fees calculated for each contractor. The filing fee shall be one percent of each contractor's contract price. The total filing fee payable by the primary contractor under this subsection may not exceed $5,000. In this subsection, "contractor" means an employer who is using employees to perform work on the public construction contract under the contract or a subcontract.

(b) Upon completion of all work on the public construction contract, the primary contractor shall file with the Department of Labor and Workforce Development a notice of completion together with payment of any additional filing fees owed due to increased contract amounts. Within 30 days after the department's receipt of the primary contractor's notice of completion, the department shall inform the contracting agency of the amount, if any, to be withheld from the final payment.

(c) A contracting agency

(1) may release final payment of a public construction contract to the extent that the agency has received verification from the Department of Labor and Workforce Development that

(A) the primary contractor has complied with (a) and (b) of this section;

(B) the Department of Labor and Workforce Development is not conducting an investigation under this title; and

(C) the Department of Labor and Workforce Development has not issued a notice of a violation of this chapter to the primary contractor or any other contractors working on the public construction contract; and

(2) shall withhold from the final payment an amount sufficient to pay the department's estimate of what may be needed to compensate the employees of any contractors under investigation on this construction contract, and any unpaid filing fees.

(d) The notice and filing fee required under (a) of this section may be filed after work has begun if
   (1) The public construction contract is for work undertaken in immediate response to an emergency; and
   (2) The notice and fees are filed not later than 14 days after the work has begun.

(e) A false statement made on a notice required by this section is punishable under AS 11.56.210.

Sec. 36.05.060. Penalty for violation of this chapter.

A contractor who violates this chapter is guilty of a misdemeanor and upon conviction is punishable by a fine of not less than $100 nor more than $1,000, or by imprisonment for not less than 10 days nor more than 90 days, or by both. Each day a violation exists constitutes a separate offense.

Sec. 36.05.070. Wage rates in specifications and contracts for public works.

(a) The advertised specifications for a public construction contract that requires or involves the employment of mechanics, laborers, or field surveyors must contain a provision stating the minimum wages to be paid various classes of laborers, mechanics, or field surveyors and that the rate of wages shall be adjusted to the wage rate under AS 36.05.010.

(b) Repealed by §17 ch 142 SLA 1972.

(c) A public construction contract under (a) of this section must contain provisions that
   (1) the contractor or subcontractors of the contractor shall pay all employees unconditionally and not less than once a week;
   (2) wages may not be less than those stated in the advertised specifications, regardless of the contractual relationship between the contractor or subcontractors and laborers, mechanics, or field surveyors;
   (3) the scale of wages to be paid shall be posted by the contractor in a prominent and easily accessible place at the site of the work;
   (4) the state or a political subdivision shall withhold so much of the accrued payments as is necessary to pay to laborers, mechanics, or field surveyors employed by the contractor or subcontractors the difference between
      (A) the rates of wages required by the contract to be paid laborers, mechanics, or field surveyors on the work; and
      (B) the rates of wages in fact received by laborers, mechanics, or field surveyors.

Sec. 36.05.080. Failure to pay agreed wages.

Every contract within the scope of AS 36.05.070 shall contain a provision that if it is found that a laborer, mechanic, or field surveyor employed by the contractor or subcontractor has been or is being paid a rate of wages less than the rate of wages required by the contract to be paid, the state or its political subdivision may, by written notice to the contractor, terminate the contractor's right to proceed with the work or the part of the work for which there is a failure to pay the required wages and to prosecute the work to completion by contract or otherwise, and the contractor and the contractor's sureties are liable to the state or its political subdivision for excess costs for completing the work.

Sec. 36.05.090. Payment of wages from withheld payments and listing contractors who violate contracts.

(a) The state disbursing officer in the case of a state public construction contract and the local fiscal officer in the case of a political subdivision public construction contract shall pay directly to laborers, mechanics, or field surveyors from accrued payments withheld under the terms of the contract the wages due laborers, mechanics, or field surveyors under AS 36.05.070.

(b) The state disbursing officer or the local fiscal officer shall distribute to all departments of the state government and to all political subdivisions of the state a list giving the names of persons who have disregarded their obligations to employees. A person appearing on this list and a firm, corporation, partnership, or association in which the person has an interest may not work as a contractor or

subcontractor on a public construction contract for the state or a political subdivision of the state until three years after the date of publication of the list. If the accrued payments withheld under the contract are insufficient to reimburse all the laborers, mechanics, or field surveyors with respect to whom there has been a failure to pay the wages required under AS 36.05.070, the laborers, mechanics, or field surveyors have the right of action or intervention or both against the contractor and the contractor's sureties conferred by law upon persons furnishing labor or materials, and in the proceedings it is not a defense that the laborers, mechanics, or field surveyors accepted or agreed to accept less than the required rate of wages or voluntarily made refunds.

Sec. 36.05.900. Definition.
In this chapter, "contracting agency" means the state or a political subdivision of the state that has entered into a public construction contract with a contractor.

EXCERPTS FROM ALASKA ADMINISTRATIVE CODE

Notice:** Regulations relating to board and lodging and per diem went into effect on November 25, 2018. The new regulations are excerpted here

8 AAC 30.051. Purpose. The purpose of 8 AAC 30.052 – 8 AAC 30.056 is to ensure that wages paid to laborers, mechanics, and field surveyors do not fall below the prevailing rate of pay.

8 AAC 30.052. Board and lodging; remote sites. (a) A contractor on a public construction project located 65 or more road miles from the international airport closest to the project area in either Fairbanks, Juneau, or Anchorage, or that is inaccessible by road in a two-wheel drive vehicle, shall provide adequate board and lodging to each laborer, mechanic, or field surveyor while the person is employed on the project. If commercial lodging facilities are not available, the contractor shall provide temporary lodging facilities. Lodging facilities must comply with all applicable state and federal laws. For a highway project, the location of the project is measured from the midpoint of the project.

(b) A contractor is not required to provide board and lodging:

(1) to a laborer, mechanic, or field surveyor who is a domiciled resident of the project area; or

(2) on a laborer, mechanic, or field surveyor's scheduled days off, when the person can reasonably travel between the project and the person's permanent residence; for the purposes of this paragraph, "scheduled day off" means a day in which a person does not perform work on-site, is not required to remain at or near the job location for the benefit of the contractor, and is informed of the day off at least seven days before the day off.

(c) Upon a contractor's written request, the commissioner may waive the requirements of (a) of this section where:

(1) the project is inaccessible by road in a two-wheel drive vehicle, but the laborer, mechanic, or field surveyor can reasonably travel between the project and the person's permanent residence within one hour; or

(2) a laborer, mechanic, or field surveyor is not a domiciled resident of the project area, but has established permanent residence, with the intent to remain indefinitely, within 65 road miles of the project, or for a highway project, the mid-point of the project.

8 AAC 30.054. Per diem instead of board and lodging. (a) A contractor may pay a laborer, mechanic, or field surveyor per diem instead of providing board and lodging, when the following conditions are met:

(1) the department determines that per diem instead of board and lodging is an established practice for the work classification; the department shall publish and periodically revise its determinations in the pamphlet *Laborers and Mechanics Minimum Rates of Pay*;

(2) the contractor pays each laborer, mechanic, or field surveyor the appropriate per diem rate as published and periodically revised in the pamphlet *Laborers and Mechanics Minimum Rates of Pay*; and

(3) the contractor pays the per diem to each laborer, mechanic, or field surveyor on the same day that wages are paid.

(b) A contractor may not pay per diem instead of board and lodging on a highway project located

(1) west of Livengood on the Elliot Highway, AK-2;

(2) on the Dalton Highway, AK-11;

(3) north of milepost 20 on the Taylor Highway, AK-5;

(4) east of Chicken on the Top of the World Highway; or

(5) south of Tetlin Junction to the Alaska-Canada border on the Alaska Highway, AK-2.

8 AAC 30.056. Alternative arrangement. Upon a contractor's written request, the commissioner may approve an alternative board and lodging or per diem arrangement, provided

(1) the arrangement does not reduce the laborer, mechanic, or field surveyor's wages below the prevailing wage rate; and

(2) the laborer, mechanic, or field surveyor voluntarily enters into and signs the written arrangement; a labor organization representing laborers, mechanics, or field surveyors may enter into the written agreement on their behalf.

8 AAC 30.900. General definitions (selected excerpts only):

In this chapter and in AS 36

(22) "domiciled resident" means a person living within 65 road miles of a public construction project, or in the case of a highway project, the mid-point of the project, for at least 12 consecutive months prior to the award of the public construction project;

(23) "employed on the project" means the time period from the date the laborer, mechanic, or field surveyor first reports on-site to the project through the final date the person reports on-site to the project.

ADDITIONAL INFORMATION

PER DIEM

Notice: New regulations relating to board and lodging and per diem went into effect on November 25, 2018. The regulations provide a comprehensive set of requirements for the provision of board and lodging or per diem for workers on remote projects. Please refer to Alaska Administrative Code 8 AAC Chapter 30 and read the chapter carefully.

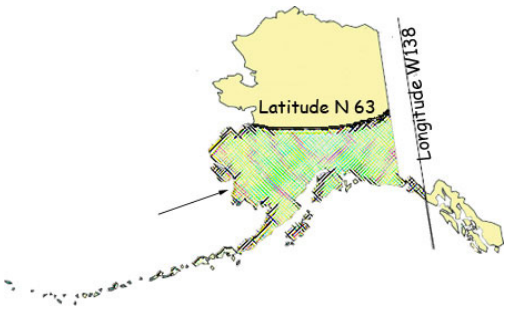
The Alaska Department of Labor and Workforce Development has determined that per diem is an established work practice for certain work classifications. These classifications are indicated throughout the Pamphlet by an asterisk (*) under the classification title. If all of the conditions of 8 AAC 30.054 are met, an employer may pay workers in these classifications per diem instead of providing board and lodging on a remote project.

Per Diem Rate: As of May 1, 2019, the minimum per diem rate is $100.00 per day, or part thereof, the worker is employed on the project. In the event that a contractor provides lodging facilities, but no meals, the department will accept a payment of $48 per day for meals to meet the per diem requirements.

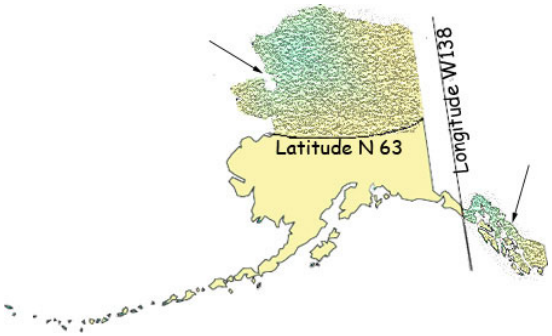
LABORER CLASSIFICATION CLARIFICATION

The laborer rates categorized in class code S1201-S1206 apply in one area of Alaska; the area that is south of N63 latitude and west of W138 Longitude. The laborer rates categorized in class code N1201-N1206 apply in two areas of Alaska; the Alaska areas north of N63 latitude and east of W138 longitude. The following graphic representations should assist with clarifying the applicable wage rate categories:

S1201-
S1206



N1201-
N1206



APPRENTICE RATES

Apprentice rates at less than the minimum prevailing rates may be paid to apprentices according to an apprentice program which has been registered and approved by the Commissioner of the Alaska Department of Labor and Workforce Development in writing or according to a bona fide apprenticeship program registered with the U.S. Department of Labor, Office of Apprenticeship Training. **Any employee listed on a payroll at an apprentice wage rate who is not registered as above shall be paid the journeyman prevailing minimum wage in that work classification.** Wage rates are based on prevailing crew makeup practices in Alaska and apply to work performed regardless of either the quality of the work performed by the employee or the titles or classifications which may be assigned to individual employees.

FRINGE BENEFIT PLANS

Contractors/subcontractors may compensate fringe benefits to their employees in any one of three methods. The fringe benefits may be paid into a union trust fund, into an approved benefit plan, or paid directly on the paycheck as gross wages.

Where fringe benefits are paid into approved plans, funds, or programs including union trust funds, the payments must be contributed at least monthly. If contractors submit their own payroll forms and are paying fringe benefits into approved plans, funds, or programs, the employer's certification must include, in addition to those requirements of 8 AAC 30.020(c), a statement that fringe benefit payments have been or will be paid at least monthly. Contractors who pay fringe benefits to a plan must ensure the plan is one approved by the Internal Revenue Service and that the plan meets the requirements of 8 AAC 30.025 (eff. 3/2/08) in order for payments to be credited toward the prevailing wage obligation.

SPECIAL PREVAILING WAGE RATE DETERMINATION

Special prevailing wage rate determinations may be requested for special projects or a special worker classification if the work to be performed does not conform to traditional public construction for which a prevailing wage rate has been established under 8 AAC 30.050(a) of this section. Requests for special wage rate determinations must be in writing and filed with the Commissioner at least 30 days before the award of the contract. An applicant for a special wage rate determination shall have the responsibility to support the necessity for the special rate. An application for a special wage rate determination filed under this section must contain:

(1) a specification of the contract or project on which the special rates will apply and a description of the work to be performed;
(2) a brief narrative explaining why special wage rates are necessary;
(3) the job class or classes involved;
(4) the special wage rates the applicant is requesting, including survey or other relevant wage data to support the requested rates;
(5) the approximate number of employees who would be affected; and
(6) any other information which might be helpful in determining if special wage rates are appropriate.

Requests made pursuant to the above should be addressed to:

Director
Alaska Department of Labor and Workforce Development
Labor Standards and Safety Division
Wage and Hour
P.O. Box 111149
Juneau, AK 99811-1149
-or-
Email: statewide.wagehour@alaska.gov

EMPLOYMENT PREFERENCE INFORMATION

In October 2019, the Alaska Attorney General issued a formal opinion stating that the Alaska Statutes 36.10.150 of the State's 90% Employment Preference law, also known as the Alaska Resident Hire law, violates both the U.S. and Alaska Constitutions. As a result, the state has stopped all enforcement activity.
A copy of the Attorney General opinion is found here:

http://law.alaska.gov/pdf/opinions/opinions_2019/19-005_AK-hire.pdf

Alaska Department of Labor and Workforce Development
Labor Standards and Safety Division
Wage and Hour
Web site: http://labor.state.ak.us/lss/pamp600.htm

Anchorage	Juneau	Fairbanks
1251 Muldoon Road, Suite 113 Anchorage, Alaska 99504-2098 Phone: (907) 269-4900 Email: statewide.wagehour@alaska.gov	PO Box 111149 Juneau, Alaska 99811 Phone: (907) 465-4842 Email: statewide.wagehour@alaska.gov	Regional State Office Building 675 7th Ave., Station J-1 Fairbanks, Alaska 99701-4593 Phone: (907) 451-2886 Email: statewide.wagehour@alaska.gov

LABOR STANDARDS AND SAFETY NOTICE REQUESTS

If you would like to receive Wage and Hour or Mechanical Inspection **regulation notices** or **publications information**, they are available via electronic mail, by signing up in the GovDelivery System, https://public.govdelivery.com/accounts/AKDOL/subscriber/new and selecting topics *LSS – Wage and Hour – Forms and Publications*, *LSS – Mechanical Inspection Regulations*, or *LSS – Wage and Hour Regulations*.

Publications are also available online at http://labor.alaska.gov/lss/home.htm

DEBARMENT LIST

AS 36.05.090(b) states that "the state disbursing officer or the local fiscal officer shall distribute to all departments of the state government and to all political subdivisions of the state a list giving the names of persons who have disregarded their obligations to employees."

A person appearing on the following debarment list and a firm, corporation, partnership, or association in which the person has an interest may not work as a contractor or subcontractor on a public construction contract for the state or a political subdivision of the state for three years from the date of debarment.

Company Name	Debarment Expires

No companies are currently debarred.

Laborers' & Mechanics' Minimum Rates of Pay

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
Boilermakers								
	*See per diem note on last page							
						VAC	**SAF**	
A0101	Boilermaker (journeyman)	54.08	8.57	18.72	2.50	4.25	0.34	88.46
Bricklayers & Allied Craftworkers								
	*See per diem note on last page							
						L&M	**ANU**	
A0201	Blocklayer, including:	52.77		9.91	0.66	0.20	2.45	65.99
	Bricklayer Marble Mason Refractory Worker (Firebrick, Plastic, Castable, and Gunite Refractory Applications) Stone Mason Terrazzo Worker Tile Setter							
						L&M	**ANU**	
A0202	Pointer/Caulker/Cleaner (PCC)	52.77		9.91	0.66	0.20	2.45	65.99
	Caulker Cleaner Tuck Pointer							
						L&M	**ANU**	
A0203	Finisher	40.91		10.03	0.54	0.20	2.45	54.13
	Marble Finisher Terrazzo Finisher Tile Finisher							
						L&M	**ANU**	
A0204	Torginal Applicator	40.91		10.03	0.54	0.20	2.45	54.13
Carpenters, Region I (North of 63 latitude)								
	*See per diem note on last page							
						L&M	**SAF**	
N0301	Carpenter (journeyman)	50.79	8.75	16.80	0.77	0.10		77.21
	Lather/Drywall/Acoustical							
Carpenters, Region II (South of N63 latitude)								
	*See per diem note on last page							
						L&M	**SAF**	
S0301	Carpenter (journeyman)	50.79	8.75	17.34	0.77	0.10		77.75

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
Carpenters, Region II (South of N63 latitude)								
	*See per diem note on last page							
						L&M	**SAF**	
S0301	Carpenter (journeyman)	50.79	8.75	17.34	0.77	0.10		77.75
	Lather/Drywall/Acoustical							
Cement Masons								
	*See per diem note on last page							
						L&M		
A0401	Group I, including:	49.28	8.80	11.80	1.68	0.10		71.66
	Application of Sealing Compound							
	Application of Underlayment							
	Building, General							
	Cement Finisher							
	Cement Mason (journeyman)							
	Concrete							
	Concrete Paving							
	Concrete Polishing							
	Concrete Repair							
	Curb & Gutter, Sidewalk							
	Curing of All Concrete							
	General Concrete Pour Tender							
	Grouting & Caulking of Tilt-Up Panels							
	Grouting of All Plates							
	Patching Concrete							
	Screed Pin Setter							
	Screeder or Rodder							
	Spackling/Skim Coating							
						L&M		
A0402	Group II, including:	49.28	8.80	11.80	1.68	0.10		71.66
	Form Setter							
						L&M		
A0403	Group III, including:	49.28	8.80	11.80	1.68	0.10		71.66
	Concrete Saw Cutter Operator (All Control Joints and Self-powered)							
	Curb & Gutter Machine							
	Floor Grinder							
	Pneumatic Power Tools							
	Power Chipping & Bushing							
	Sand Blasting Architectural Finish							
	Screed & Rodding Machine Operator							
	Troweling Machine Operator (all concrete surfaces)							
						L&M		
A0404	Group IV, including:	49.28	8.80	11.80	1.68	0.10		71.66

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Cement Masons							
	*See per diem note on last page						
A0404	Group IV, including:	49.28	8.80	11.80	1.68	L&M 0.10	71.66
	Acoustical or Imitation Acoustical Finish						
	Application of All Composition Mastic						
	Application of All Epoxy Finishes on Concrete Surfaces						
	Application of All Plastic Material						
	Finish Colored Concrete						
	Gunite Nozzleman						
	Hand Powered Grinder						
	Preparing, scratching and browsing of all ceilings and walls, finished with terrazo or tile						
	Tunnel Worker						
A0405	Group V, including:	49.28	8.80	11.80	1.68	L&M 0.10	71.66
	Casting and finishing						
	EIFS Systems						
	Finishing of all interior and exterior plastering						
	Fireproofing (Pryocrete, Cafco, Albi-Clad, sprayed fiberglass)						
	Gypsum, Portland Cement						
	Kindred material and products						
	Operation and control of all types of plastering machines, including power tools and floats, used by the industry						
	Overcoating and maintenance of interior/exterior plaster surfaces						
	Plasterer						
	Support and control of all concrete 3D printing operations (Excluding Paint)						
	Use of 3D structural and architectural printing and finishes						
	Use of sustainable materials and equipment practices						
	Veneer plastering process (Rapid Plaster, U.S.G. "Imperial Systems", and Pabcoat Systems")						
	Venetian plaster and color-integrated Italian/Middle-Eastern line plaster						
Culinary Workers							
A0501	Baker/Cook	29.95	7.53	8.83		LEG	46.31
A0503	General Helper	25.92	7.53	8.83		LEG	42.28
	Housekeeper						
	Janitor						
	Kitchen Helper						

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Culinary Workers							
A0504	Head Cook	29.95	7.53	8.83		LEG	46.31
A0505	Head Housekeeper	26.20	7.53	8.83		LEG	42.56
	Head Kitchen Help						
Dredgemen	*See per diem note on last page						
A0601	Assistant Engineer	52.32	12.10	16.25	1.05	L&M 0.10	81.82
	Craneman						
	Electrical Generator Operator (primary pump/power barge/dredge)						
	Engineer						
	Welder						
A0602	Assistant Mate (deckhand)	50.93	12.10	16.25	1.05	L&M 0.10	80.43
A0603	Fireman	51.46	12.10	16.25	1.05	L&M 0.10	80.96
A0605	Leverman Clamshell	55.33	12.10	16.25	1.05	L&M 0.10	84.83
A0606	Leverman Hydraulic	53.23	12.10	16.25	1.05	L&M 0.10	82.73
A0607	Mate & Boatman	52.32	12.10	16.25	1.05	L&M 0.10	81.82
A0608	Oiler (dredge)	51.46	12.10	16.25	1.05	L&M 0.10	80.96
Electricians	*See per diem note on last page						
A0701	Inside Cable Splicer	53.44	14.83	14.49	0.95	L&M 0.25 LEG 0.15	84.11
A0702	Inside Journeyman Wireman, including:	53.44	14.83	14.49	0.95	L&M 0.25 LEG 0.15	84.11
	Technicians (including use of drones in electrical construction)						
A0703	Power Cable Splicer	74.34	14.83	19.92	0.95	L&M 0.25 LEG 0.15	110.44
A0704	Tele Com Cable Splicer	55.28	14.83	18.56	0.95	L&M 0.25 LEG 0.15	90.02

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
Electricians								
	*See per diem note on last page							
						L&M	**LEG**	
A0705	Power Journeyman Lineman, including:	72.59	14.83	19.87	0.95	0.25	0.15	108.64
	Power Equipment Operator							
	Technician (including use of drones in electrical construction)							
						L&M	**LEG**	
A0706	Tele Com Journeyman Lineman, including:	53.53	14.83	18.51	0.95	0.25	0.15	88.22
	Technician (including use of drones in telecommunications construction)							
	Tele Com Equipment Operator							
						L&M	**LEG**	
A0707	Straight Line Installer - Repairman	53.53	14.83	18.51	0.95	0.25	0.15	88.22
						L&M	**LEG**	
A0708	Powderman	70.59	14.83	19.81	0.95	0.25	0.15	106.58
						L&M	**LEG**	
A0710	Material Handler	29.57	15.34	5.89	0.15	0.15	0.15	51.25
						L&M	**LEG**	
A0712	Tree Trimmer Groundman	32.97	14.83	14.84	0.15	0.15	0.15	63.09
						L&M	**LEG**	
A0713	Journeyman Tree Trimmer	42.23	14.83	15.12	0.15	0.15	0.15	72.63
						L&M	**LEG**	
A0714	Vegetation Control Sprayer	45.91	14.83	15.23	0.15	0.15	0.15	76.42
						L&M	**LEG**	
A0715	Inside Journeyman Communications CO/PBX	53.44	14.83	14.49	0.95	0.25	0.15	84.11
Elevator Workers								
	*See per diem note on last page							
						L&M	**VAC**	
A0802	Elevator Constructor	50.01	16.28	21.36	0.80	1.60	5.55	95.60
						L&M	**VAC**	
A0803	Elevator Constructor Mechanic	71.44	16.28	21.36	0.80	1.60	7.93	119.41
Heat & Frost Insulators/Asbestos Workers (North of 63rd Parallel)								
	*See per diem note on last page							
						IAF	**LML**	
N0902	Asbestos Abatement-Mechanical Systems	43.85	9.24	11.13	1.50	0.18	0.05	65.95
						IAF	**LML**	
N0903	Asbestos Abatement/General Demolition All Systems	43.85	9.24	11.13	1.50	0.18	0.05	65.95
						IAF	**LML**	
N0904	Insulator, Group II	43.85	9.24	11.13	1.50	0.18	0.05	65.95

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
Heat & Frost Insulators/Asbestos Workers (North of 63rd Parallel) *See per diem note on last page								
						IAF	**LML**	
N0905	Fire Stop	43.85	9.24	11.13	1.50	0.18	0.05	65.95
Heat & Frost Insulators/Asbestos Workers (South of 63rd Parallel) *See per diem note on last page								
						IAF	**LML**	
S0902	Asbestos Abatement-Mechanical Systems	43.35	9.24	11.13	1.50	0.18	0.05	65.45
						IAF	**LML**	
S0903	Asbestos Abatement/General Demolition All Systems	43.35	9.24	11.13	1.50	0.18	0.05	65.45
						IAF	**LML**	
S0904	Insulator, Group II	43.35	9.24	11.13	1.50	0.18	0.05	65.45
						IAF	**LML**	
S0905	Fire Stop	43.35	9.24	11.13	1.50	0.18	0.05	65.45
IronWorkers *See per diem note on last page								
						L&M	**IAF**	
A1101	Ironworkers, including:	46.49	10.16	26.45	0.87	0.20	0.24	84.41
	Bender Operators Bridge & Structural Hangar Doors Hollow Metal Doors Industrial Doors Machinery Mover Mass Timber Construction (Cross Laminate Timber) Ornamental Reinforcing Rigger Sheeter Signalman Stage Rigger Toxic Haz-Mat Work Welder							
						L&M	**IAF**	
A1102	Helicopter	47.49	10.16	26.45	0.87	0.20	0.24	85.41
	Helicopter (used for rigging and setting) Tower (energy producing windmill type towers to include nacelle and blades)							
						L&M	**IAF**	
A1103	Fence/Barrier Installer	42.99	10.16	26.45	0.87	0.20	0.24	80.91

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
IronWorkers								
	*See per diem note on last page							
						L&M	**IAF**	
A1104	Guard Rail Layout Man	43.73	10.16	26.45	0.87	0.20	0.24	81.65
						L&M	**IAF**	
A1105	Guard Rail Installer	43.99	10.16	26.45	0.87	0.20	0.24	81.91
Laborers (The Alaska areas north of N63 latitude and east of W138 longitude)								
	*See per diem note on last page							
						L&M	**LEG**	
N1201	Group I, including:	40.25	10.55	21.51	2.00	0.35	0.20	74.86

Asphalt Worker (shovelman, plant crew)
Brush Cutter
Camp Maintenance Laborer
Carpenter Tender or Helper
Choke Setter, Hook Tender, Rigger, Signalman
Concrete Labor (curb & gutter, chute handler, curing, grouting, screeding)
Crusher Plant Laborer
Demolition Laborer
Ditch Digger
Dumpman
Environmental Laborer (hazard/toxic waste, oil spill)
Fence Installer
Fire Watch Laborer
Flagman
Form Stripper
General Laborer
Guardrail Laborer, Bridge Rail Installer
Hydro Seeder Nozzleman
Laborer, Building
Landscaper or Planter
Laying of Mortarless Decorative Block (retaining walls, flowered decorative block 4 feet or less - highway or landscape work)
Material Handler
Pneumatic or Power Tools
Portable or Chemical Toilet Serviceman
Pump Man or Mixer Man
Railroad Track Laborer
Sandblast, Pot Tender
Saw Tender
Slurry Work
Steam Cleaner Operator
Steam Point or Water Jet Operator

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	L&M	LEG	THR
Laborers (The Alaska areas north of N63 latitude and east of W138 longitude) *See per diem note on last page									
N1201	Group I, including:	40.25	10.55	21.51	2.00		0.35	0.20	74.86
	Storm Water Pollution Protection Plan Worker (SWPPP Worker - erosion and sediment control Laborer)								
	Tank Cleaning								
	Utiliwalk & Utilidor Laborer								
	Watchman (construction projects)								
	Window Cleaner								
N1202	Group II, including:	41.25	10.55	21.51	2.00		0.35	0.20	75.86
	Burning & Cutting Torch								
	Cement or Lime Dumper or Handler (sack or bulk)								
	Certified Erosion Sediment Control Lead (CESCL Laborer)								
	Choker Splicer								
	Chucktender (wagon, air-track & hydraulic drills)								
	Concrete Laborer (power buggy, concrete saws, pumpcrete nozzleman, vibratorman)								
	Culvert Pipe Laborer								
	Cured Inplace Pipelayer								
	Environmental Laborer (asbestos, marine work)								
	Floor Preparation, Core Drilling								
	Foam Gun or Foam Machine Operator								
	Green Cutter (dam work)								
	Gunite Operator								
	Hod Carrier								
	Jackhammer/Chipping Gun or Pavement Breaker								
	Laser Instrument Operator								
	Laying of Mortarless Decorative Block (retaining walls, flowered decorative block over 4 feet - highway or landscape work)								
	Mason Tender & Mud Mixer (sewer work)								
	Pilot Car								
	Pipelayer Helper								
	Plasterer, Bricklayer & Cement Finisher Tender								
	Powderman Helper								
	Power Saw Operator								
	Railroad Switch Layout Laborer								
	Sandblaster								
	Scaffold Building & Erecting								
	Sewer Caulker								
	Sewer Plant Maintenance Man								
	Thermal Plastic Applicator								
	Timber Faller, Chainsaw Operator, Filer								
	Timberman								

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	L&M	LEG	THR
Laborers (The Alaska areas north of N63 latitude and east of W138 longitude) *See per diem note on last page									
N1203	Group III, including:	42.15	10.55	21.51	2.00		0.35	0.20	76.76
	Bit Grinder Camera/Tool/Video Operator Guardrail Machine Operator High Rigger & Tree Topper High Scaler Multiplate Plastic Welding Slurry Seal Squeegee Man Traffic Control Supervisor Welding Certified (in connection with laborer's work)								
N1204	Group IIIA	46.53	10.55	21.51	2.00		0.35	0.20	81.14
	Asphalt Raker, Asphalt Belly Dump Lay Down Drill Doctor (in the field) Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills) Pioneer Drilling & Drilling Off Tugger (all type drills) Pipelayers Powderman (Employee Possessor) Storm Water Pollution Protection Plan Specialist (SWPPP Specialist) Traffic Control Supervisor, DOT Qualified								
N1205	Group IV	29.82	10.55	21.51	2.00		0.35	0.20	64.43
	Final Building Cleanup Permanent Yard Worker								
N1206	Group IIIB	54.01	5.50	21.51	1.60		0.35	0.20	83.17
	Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)(over 5,000 hours) Federal Powderman (Responsible Person in Charge) Grade Checking (setting or transferring of grade marks, line and grade, GPS, drones) Pioneer Drilling & Drilling Off Tugger (all type drills)(over 5,000 hours) Stake Hopper								
Laborers (The area that is south of N63 latitude and west of W138 longitude) *See per diem note on last page									
S1201	Group I, including:	40.25	10.55	21.51	2.00		0.35	0.20	74.86
	Asphalt Worker (shovelman, plant crew)								

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	L&M	LEG	THR

Laborers (The area that is south of N63 latitude and west of W138 longitude)

*See per diem note on last page

S1201	Group I, including:	40.25	10.55	21.51	2.00		0.35	0.20	74.86

Brush Cutter
Camp Maintenance Laborer
Carpenter Tender or Helper
Choke Setter, Hook Tender, Rigger, Signalman
Concrete Labor (curb & gutter, chute handler, curing, grouting, screeding)
Crusher Plant Laborer
Demolition Laborer
Ditch Digger
Dumpman
Environmental Laborer (hazard/toxic waste, oil spill)
Fence Installer
Fire Watch Laborer
Flagman
Form Stripper
General Laborer
Guardrail Laborer, Bridge Rail Installer
Hydro Seeder Nozzleman
Laborer, Building
Landscaper or Planter
Laying of Mortarless Decorative Block (retaining walls, flowered decorative block 4 feet or less - highway or landscape work)
Material Handler
Pneumatic or Power Tools
Portable or Chemical Toilet Serviceman
Pump Man or Mixer Man
Railroad Track Laborer
Sandblast, Pot Tender
Saw Tender
Slurry Work
Steam Cleaner Operator
Steam Point or Water Jet Operator
Storm Water Pollution Protection Plan Worker (SWPPP Worker - erosion and sediment control Laborer)
Tank Cleaning
Utiliwalk & Utilidor Laborer
Watchman (construction projects)
Window Cleaner

S1202	Group II, including:	41.25	10.55	21.51	2.00		0.35	0.20	75.86

Burning & Cutting Torch

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	L&M	LEG	THR

Laborers (The area that is south of N63 latitude and west of W138 longitude)

*See per diem note on last page

						L&M	LEG	
S1202	Group II, including:	41.25	10.55	21.51	2.00	0.35	0.20	75.86

Cement or Lime Dumper or Handler (sack or bulk)
Certified Erosion Sediment Control Lead (CESCL Laborer)
Choker Splicer
Chucktender (wagon, air-track & hydraulic drills)
Concrete Laborer (power buggy, concrete saws, pumpcrete nozzleman, vibratorman)
Culvert Pipe Laborer
Cured Inplace Pipelayer
Environmental Laborer (asbestos, marine work)
Floor Preparation, Core Drilling
Foam Gun or Foam Machine Operator
Green Cutter (dam work)
Gunite Operator
Hod Carrier
Jackhammer/Chipping Gun or Pavement Breaker
Laser Instrument Operator
Laying of Mortarless Decorative Block (retaining walls, flowered decorative block over 4 feet - highway or landscape work)
Mason Tender & Mud Mixer (sewer work)
Pilot Car
Pipelayer Helper
Plasterer, Bricklayer & Cement Finisher Tender
Powderman Helper
Power Saw Operator
Railroad Switch Layout Laborer
Sandblaster
Scaffold Building & Erecting
Sewer Caulker
Sewer Plant Maintenance Man
Thermal Plastic Applicator
Timber Faller, Chainsaw Operator, Filer
Timberman

						L&M	LEG	
S1203	Group III, including:	42.15	10.55	21.51	2.00	0.35	0.20	76.76

Bit Grinder
Camera/Tool/Video Operator
Guardrail Machine Operator
High Rigger & Tree Topper
High Scaler
Multiplate
Plastic Welding

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
						L&M	LEG	
Laborers (The area that is south of N63 latitude and west of W138 longitude)								
	*See per diem note on last page							
S1203	Group III, including:	42.15	10.55	21.51	2.00	0.35	0.20	76.76
	Slurry Seal Squeegee Man							
	Traffic Control Supervisor							
	Welding Certified (in connection with laborer's work)							
						L&M	LEG	
S1204	Group IIIA	46.53	10.55	21.51	2.00	0.35	0.20	81.14
	Asphalt Raker, Asphalt Belly Dump Lay Down							
	Drill Doctor (in the field)							
	Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)							
	Pioneer Drilling & Drilling Off Tugger (all type drills)							
	Pipelayers							
	Powderman (Employee Possessor)							
	Storm Water Pollution Protection Plan Specialist (SWPPP Specialist)							
	Traffic Control Supervisor, DOT Qualified							
						L&M	LEG	
S1205	Group IV	29.82	10.55	21.51	2.00	0.35	0.20	64.43
	Final Building Cleanup							
	Permanent Yard Worker							
						L&M	LEG	
S1206	Group IIIB	54.01	5.50	21.51	1.60	0.35	0.20	83.17
	Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)(over 5,000 hours)							
	Federal Powderman (Responsible Person in Charge)							
	Grade Checking (setting or transferring of grade marks, line and grade, GPS, drones)							
	Pioneer Drilling & Drilling Off Tugger (all type drills)(over 5,000 hours)							
	Stake Hopper							
Millwrights								
	*See per diem note on last page							
						L&M		
A1251	Millwright (journeyman)	55.42	8.75	15.00	1.11	0.20	0.25	80.73
						L&M		
A1252	Millwright Welder	56.42	8.75	15.00	1.11	0.20	0.25	81.73
Painters, Region I (North of N63 latitude)								
	*See per diem note on last page							
						L&M		
N1301	Group I, including:	40.33	9.97	15.10	1.10	0.10		66.60

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Painters, Region I (North of N63 latitude)							
	*See per diem note on last page						
						L&M	
N1301	Group I, including:	40.33	9.97	15.10	1.10	0.10	66.60
	Brush						
	General Painter						
	Hand Taping						
	Hazardous Material Handler						
	Lead-Based Paint Abatement						
	Roll						
						L&M	
N1302	Group II, including:	40.85	9.97	15.10	1.10	0.10	67.12
	Bridge Painter						
	Epoxy Applicator						
	General Drywall Finisher						
	Hand/Spray Texturing						
	Industrial Coatings Specialist						
	Machine/Automatic Taping						
	Pot Tender						
	Sandblasting						
	Specialty Painter						
	Spray						
	Structural Steel Painter						
	Wallpaper/Vinyl Hanger						
N1304	Group IV, including:	44.54	9.97	18.61	1.10	0.10	74.32
	Glazier						
	Storefront/Automatic Door Mechanic						
N1305	Group V, including:	39.66	9.97	5.00	1.10	0.10	55.83
	Carpet Installer						
	Floor Coverer						
	Heat Weld/Cove Base						
	Linoleum/Soft Tile Installer						
N1306	Group VI, including:	69.78	11.01	7.80	1.10	0.10	89.79
	Traffic Control Striper						
Painters, Region II (South of N63 latitude)							
	*See per diem note on last page						
						L&M	
S1301	Group I, including :	35.97	9.97	17.45	1.10	0.10	64.59
	Brush						

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Painters, Region II (South of N63 latitude)							
	*See per diem note on last page						
						L&M	
S1301	Group I, including :	35.97	9.97	17.45	1.10	0.10	64.59
	General Painter						
	Hand Taping						
	Hazardous Material Handler						
	Lead-Based Paint Abatement						
	Roll						
	Spray						
						L&M	
S1302	Group II, including :	37.22	9.97	17.45	1.10	0.10	65.84
	General Drywall Finisher						
	Hand/Spray Texturing						
	Machine/Automatic Taping						
	Wallpaper/Vinyl Hanger						
						L&M	
S1303	Group III, including :	37.32	9.97	17.45	1.10	0.10	65.94
	Bridge Painter						
	Epoxy Applicator						
	Industrial Coatings Specialist						
	Pot Tender						
	Sandblasting						
	Specialty Painter						
	Structural Steel Painter						
						L&M	
S1304	Group IV, including:	45.20	9.97	17.25	1.10	0.10	73.62
	Glazier						
	Storefront/Automatic Door Mechanic						
						L&M	
S1305	Group V, including:	39.66	9.97	5.00	1.10	0.10	55.83
	Carpet Installer						
	Floor Coverer						
	Heat Weld/Cove Base						
	Linoleum/Soft Tile Installer						
S1306	Group VI, including:	69.78	11.01	7.80	1.10	0.10	89.79
	Traffic Control Striper						
Piledrivers							
	*See per diem note on last page						

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Piledrivers							
	*See per diem note on last page						
						L&M **IAF**	
A1401	Piledriver	50.79	8.75	16.80	0.77	0.10	77.21
	Assistant Dive Tender						
	Carpenter/Piledriver						
	Rigger						
	Sheet Stabber						
	Skiff Operator						
						L&M **IAF**	
A1402	Piledriver-Welder/Toxic Worker	51.79	8.75	16.80	0.77	0.10	78.21
						L&M **IAF**	
A1403	Remotely Operated Vehicle Pilot/Technician	55.10	8.75	16.80	0.77	0.10	81.52
	Single Atmosphere Suit, Bell or Submersible Pilot						
						L&M **IAF**	
A1404	Diver (working) **See note on last page	94.90	8.75	16.80	0.77	0.10	121.32
						L&M **IAF**	
A1405	Diver (standby) **See note on last page	55.10	8.75	16.80	0.77	0.10	81.52
						L&M **IAF**	
A1406	Dive Tender **See note on last page	54.10	8.75	16.80	0.77	0.10	80.52
						L&M **IAF**	
A1407	Welder (American Welding Society, Certified Welding Inspector)	56.35	8.75	16.80	0.77	0.10	82.77
Plumbers, Region I (North of N63 latitude)							
	*See per diem note on last page						
						L&M **S&L**	
N1501	Journeyman Pipefitter	51.66	12.45	18.70	1.75	1.20	85.76
	Plumber						
	Welder						
Plumbers, Region II (South of N63 latitude)							
	*See per diem note on last page						
						L&M	
S1501	Journeyman Pipefitter	47.50	14.03	16.02	2.40	0.20	80.15
	Plumber						
	Welder						
Plumbers, Region IIA (1st Judicial District)							
	*See per diem note on last page						
						L&M	
X1501	Journeyman Pipefitter	50.50	15.67	12.25	2.95	0.24	81.61

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Plumbers, Region IIA (1st Judicial District)							
	*See per diem note on last page						
						L&M	
X1501	Journeyman Pipefitter	50.50	15.67	12.25	2.95	0.24	81.61
	Plumber						
	Welder						
Power Equipment Operators							
	*See per diem note on last page						
						L&M	
A1601	Group I, including:	53.23	12.10	16.25	1.05	0.10	82.73
	Asphalt Roller: Breakdown, Intermediate, and Finish						
	Back Filler						
	Barrier Machine (Zipper)						
	Beltcrete with Power Pack & similar conveyors						
	Bending Machine						
	Boat Coxswain						
	Bulldozer						
	Cableways, Highlines & Cablecars						
	Cleaning Machine						
	Coating Machine						
	Concrete Hydro Blaster						
	Cranes (45 tons & under or 150 feet of boom & under (including jib & attachments))						
	(a) Hydralifts or Transporters, (all track or truck type)						
	(b) Derricks						
	(c) Overhead						
	Crushers						
	Deck Winches, Double Drum						
	Ditching or Trenching Machine (16 inch or over)						
	Drag Scraper, Yarder, and similar types						
	Drilling Machines, Core, Cable, Rotary and Exploration						
	Finishing Machine Operator, Concrete Paving, Laser Screed, Sidewalk, Curb & Gutter Machine						
	Grade Checker and/or Line and Grade including Drone						
	Helicopters						
	Hover Craft, Flex Craft, Loadmaster, Air Cushion, All-Terrain Vehicle, Rollagon, Bargecable, Nodwell, & Snow Cat						
	Hydro Ax, Feller Buncher & similar						
	Hydro Excavation (Vac-Truck and Similar)						
	Loaders (2 1/2 yards through 5 yards, including all attachments):						
	(a) Forklifts (with telescopic boom & swing attachment)						
	(b) Front End & Overhead, (2-1/2 yards through 5 yards)						
	(c) Loaders, (with forks or pipe clamp)						
	(d) Loaders, (elevating belt type, Euclid & similar types)						

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Power Equipment Operators *See per diem note on last page							
						L&M	
A1601	Group I, including:	53.23	12.10	16.25	1.05	0.10	82.73
	Material Transfer Vehicle (Elevating Grader, Pickup Machine, and similar types)						
	Mechanic, Welder, Bodyman, Electrical, Camp & Maintenance Engineer						
	Micro Tunneling Machine						
	Mixers: Mobile type with hoist combination						
	Motor Patrol Grader						
	Mucking Machine: Mole, Tunnel Drill, Horizontal/Directional Drill Operator and/or Shield						
	Off-Road Hauler (including Articulating and Haul Trucks)						
	Operator on Dredges						
	Piledriver Engineer, L.B. Foster, Puller or similar paving breaker						
	Plant Operator (Asphalt & Concrete)						
	Power Plant, Turbine Operator 200 k.w & over (power plants or combination of power units over 300 k.w.)						
	Remote Controlled Equipment						
	Scraper (through 40 yards)						
	Service Oiler/Service Engineer						
	Shot Blast Machine						
	Shovels, Backhoes, Excavators with all attachments, and Gradealls (3 yards & under)						
	Sideboom (under 45 tons)						
	Sub Grader (Gurries & similar types)						
	Tack Tractor						
	Truck Mounted Concrete Pump, Conveyor/Tele-belt, & Creter						
	Wate Kote Machine						
						L&M	
A1602	Group IA, including:	55.33	12.10	16.25	1.05	0.10	84.83
	Camera/Tool/Video Operator (Slipline)						
	Certified Welder, Electrical Mechanic, Camp Maintenance Engineer, Mechanic (over 10,000 hours)						
	Cranes (over 45 tons or 150 feet including jib & attachments)						
	(a) Clamshells & Draglines (over 3 yards)						
	(b) Tower Cranes						
	Licensed Water/Waste Water Treatment Operator						
	Loaders (over 5 yards)						
	Motor Patrol Grader, Dozer, Grade Tractor (finish: when finishing to final grade and/or to hubs, or for asphalt)						
	Power Plants (1000 k.w. & over)						
	Profiler, Reclaimer, and Roto-Mill						
	Quad						
	Scrapers (over 40 yards)						

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Power Equipment Operators							
	*See per diem note on last page						
						L&M	
A1602	Group IA, including:	55.33	12.10	16.25	1.05	0.10	84.83
	Screed						
	Shovels, Backhoes, Excavators with all attachments (over 3 yards)						
	Sidebooms (over 45 tons)						
	Slip Form Paver, C.M.I. & similar types						
	Topside (Asphalt Paver, Slurry machine, Spreaders, and similar types)						
						L&M	
A1603	Group II, including:	52.32	12.10	16.25	1.05	0.10	81.82
	Boiler - Fireman						
	Cement Hogs & Concrete Pump Operator						
	Conveyors (except those listed in Group I)						
	Hoists on Steel Erection, Towermobiles & Air Tuggers						
	Horizontal/Directional Drill Locator						
	Locomotives, Rod & Geared Engines						
	Mixers						
	Screening, Washing Plant						
	Sideboom (cradling rock drill, regardless of size)						
	Skidder						
	Trenching Machines (under 16 inches)						
	Water/Waste Water Treatment Operator						
						L&M	
A1604	Group III, including:	51.46	12.10	16.25	1.05	0.10	80.96
	"A" Frame Trucks, Deck Winches						
	Bombardier (tack or tow rig)						
	Boring Machine						
	Brooms, Power (sweeper, elevator, vacuum, or similar)						
	Bump Cutter						
	Compressor						
	Farm Tractor						
	Forklift, Industrial Type						
	Gin Truck or Winch Truck (with poles when used for hoisting)						
	Hoists, Air Tuggers, Elevators						
	Loaders:						
	(a) Elevating-Athey, Barber Greene & similar types						
	(b) Forklifts or Lumber Carrier (on construction job sites)						
	(c) Forklifts, (with tower)						
	(d) Overhead & Front End, (under 2-l/2 yards)						
	Locomotives: Dinkey (air, steam, gas & electric) Speeders						
	Mechanics, Light Duty						
	Oil, Blower Distribution						
	Posthole Digger, Mechanical						

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Power Equipment Operators *See per diem note on last page							
						L&M	
A1604	Group III, including:	51.46	12.10	16.25	1.05	0.10	80.96
	Pot Fireman (power agitated)						
	Power Plant, Turbine Operator, (under 200 k.w.)						
	Pumps, Water						
	Roller (other than Asphalt)						
	Saws, Concrete						
	Skid Hustler						
	Skid Steer (with all attachments)						
	Stake Hopper						
	Straightening Machine						
	Tow Tractor						
						L&M	
A1605	Group IV, including:	44.06	12.10	16.25	1.05	0.10	73.56
	Crane Assistant Engineer/Rig Oiler						
	Drill Helper						
	Parts & Equipment Coordinator						
	Spotter						
	Steam Cleaner						
	Swamper (on trenching machines or shovel type equipment)						
Roofers *See per diem note on last page							
						L&M	
A1701	Roofer & Waterproofer	52.07	13.90	4.01	0.81	0.10	0.09 70.98
						L&M	
A1702	Roofer Material Handler	38.68	13.90	4.01	0.81	0.10	0.09 57.59
Sheet Metal Workers, Region I (North of N63 latitude) *See per diem note on last page							
						L&M	
N1801	Sheet Metal Journeyman	54.00	12.80	15.94	1.80	0.12	84.66
	Air Balancing and duct cleaning of HVAC & HVAC-R systems						
	Brazing, soldering or welding of metals						
	Demolition of sheet metal HVAC & HVAC-R systems						
	Fabrication and installation of exterior wall sheathing, siding, metal roofing, flashing, decking and architectural sheet metal work						
	Fabrication and installation of heating, ventilation and air conditioning ducts and equipment						
	Fabrication and installation of louvers and hoods						
	Fabrication and installation of sheet metal lagging						

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Sheet Metal Workers, Region I (North of N63 latitude)							
	*See per diem note on last page						
						L&M	
N1801	Sheet Metal Journeyman	54.00	12.80	15.94	1.80	0.12	84.66

Fabrication and installation of stainless steel commercial or industrial food service equipment & wall sheathing

HVAC & HVAC-R Service Mechanic, servicing and maintaining and making operable HVAC & HVAC-R Systems

HVAC & HVAC-R systems controls and programming

Manufacture, fabrication assembly, installation and alteration of all ferrous and nonferrous metal work

Metal lavatory partitions

Preparation of drawings taken from architectural and engineering plans required for fabrication and erection of sheet metal work

Sheet Metal shelving, lockers

Sheet Metal venting, chimneys and breaching

Skylight installation

Sheet Metal Workers, Region II (South of N63 latitude)							
	*See per diem note on last page						
						L&M	
S1801	Sheet Metal Journeyman	48.75	12.80	15.30	2.06	0.43	79.34

Air Balancing and duct cleaning of HVAC & HVAC-R systems

Brazing, soldering or welding of metals

Demolition of sheet metal HVAC & HVAC-R systems

Fabrication and installation of exterior wall sheathing, siding, metal roofing, flashing, decking and architectural sheet metal work

Fabrication and installation of heating, ventilation and air conditioning ducts and equipment

Fabrication and installation of louvers and hoods

Fabrication and installation of sheet metal lagging

Fabrication and installation of stainless steel commercial or industrial food service equipment & wall sheathing

HVAC & HVAC-R Service Mechanic, servicing and maintaining and making operable HVAC & HVAC-R Systems

HVAC & HVAC-R systems controls and programming

Manufacture, fabrication assembly, installation and alteration of all ferrous and nonferrous metal work

Metal lavatory partitions

Preparation of drawings taken from architectural and engineering plans required for fabrication and erection of sheet metal work

Sheet Metal shelving, lockers

Sheet Metal venting, chimneys and breaching

Skylight installation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Sprinkler Fitters	*See per diem note on last page						
A1901	Sprinkler Fitter	56.61	12.40	18.45	0.54	L&M 0.25	88.25
Surveyors	*See per diem note on last page						
A2001	Chief of Parties	59.93	13.48	14.64	1.30	L&M 0.10	89.45
A2002	Party Chief	55.78	13.48	14.64	1.30	L&M 0.10	85.30
A2003	Line & Grade Technician/Office Technician/GPS, Drones	52.77	13.48	14.64	1.30	L&M 0.10	82.29
A2004	Associate Party Chief (including Instrument Person & Head Chain Person)/Stake Hop/Grademan	50.31	13.48	14.64	1.30	L&M 0.10	79.83
A2006	Chain Person (for crews with more than 2 people)	45.29	13.48	14.64	1.30	L&M 0.10	74.81
Truck Drivers	*See per diem note on last page						
A2101	Group I, including:	51.58	13.48	14.64	1.30	L&M 0.10	81.10

Air/Sea Traffic Controllers
Ambulance/Fire Truck Driver (EMT certified)
Boat Coxswain
Captains & Pilots (air & water)
Deltas, Commanders, Rollagons, & similar equipment (when pulling sleds, trailers or similar equipment)
Dump Trucks (including articulating end dumps, rockbuggy, side dump, belly dump, & trucks with pups) over 40 yards up to & including 60 yards
Fueler
Helicopter Transporter
Liquid Vac Truck/Super Vac Truck
Material Coordinator or Purchasing Agent
Oil Distributor Truck
Ready-mix (over 12 yards up to & including 15 yards) (over 15 yards to be negotiated)
Semi with Double Box Mixer
Tireman, Medium Duty (Truck Tires up to 1200-24")
Water Wagon (250 Bbls and above)

A2102	Group 1A including:	53.05	13.48	14.64	1.30	L&M 0.10	82.57

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Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Truck Drivers	*See per diem note on last page						
						L&M	
A2102	Group 1A including:	53.05	13.48	14.64	1.30	0.10	82.57
	Dump Trucks (including rockbuggy, side dump, belly dump & trucks with pups) over 60 yards up to & including 100 yards (over 100 yards to be negotiated)						
	Jeeps (driver under load)						
	Lowboys, including tractor attached trailers & jeeps, up to & including 12 axles (over 12 axles or 150 tons to be negotiated)						
	Tireman Heavy Duty (earthmover tires, i.e., loader, scraper, haul truck)						
						L&M	
A2103	Group II, including:	50.12	13.48	14.64	1.30	0.10	79.64
	All Deltas, Commanders, Rollagons, & similar equipment						
	Batch Trucks (8 yards & up)						
	Batch Trucks (up to & including 7 yards)						
	Boom Truck/Knuckle Truck (over 5 tons)						
	Cacasco Truck/Heat Stress Truck						
	Construction and Material Safety Technician						
	Dump Trucks (including articulating end dump, rockbuggy, side dump, belly dump, & trucks with pups) over 20 yards up to & including 40 yards						
	Gin Pole Truck, Winch Truck, Wrecker (truck mounted "A" frame manufactured rating over 5 tons)						
	Mechanics						
	Partsman						
	Ready-mix (up to & including 12 yards)						
	Stringing Truck						
	Turn-O-Wagon or DW-10 (not self loading)						
						L&M	
A2104	Group III, including:	49.17	13.48	14.64	1.30	0.10	78.69
	Boom Truck/Knuckle Truck (up to & including 5 tons)						
	Dump Trucks (including articulating end dump, rockbuggy, side dump, belly dump, & trucks with pups) over 10 yards up to & including 20 yards						
	Expeditor (electrical & pipefitting materials)						
	Gin Pole Truck, Winch Truck, Wrecker (truck mounted "A" frame manufactured rating 5 tons & under)						
	Greaser - Shop						
	Semi or Truck & Trailer						
	Thermal Plastic Layout Technician						
	Traffic Control Technician						
	Trucks/Jeeps (push or pull)						
						L&M	
A2105	Group IV, including:	48.50	13.48	14.64	1.30	0.10	78.02
	Air Cushion or similar type vehicle						
	All Terrain Vehicle						

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR

Truck Drivers

*See per diem note on last page

						L&M	
A2105	Group IV, including:	48.50	13.48	14.64	1.30	0.10	78.02

Buggymobile
Bull Lift & Fork Lift, Fork Lift with Power Boom & Swing Attachment (over 5 tons)
Bus Operator (over 30 passengers)
Cement Spreader, Dry
Combination Truck-Fuel & Grease
Compactor (when pulled by rubber tired equipment)
Dump Trucks (including rockbuggy, side dump, belly dump, & trucks with pups) up to & including 10 yards
Dumpster
Expeditor (general)
Fire Truck/Ambulance Driver
Flat Beds, Dual Rear Axle
Foam Distributor Truck Dual Axle
Front End Loader with Fork
Grease Truck
Hydro Seeder, Dual Axle
Hyster Operators (handling bulk aggregate)
Loadmaster (air & water operations)
Lumber Carrier
Ready-mix, (up to & including 7 yards)
Rigger (air/water/oilfield)
Tireman, Light Duty
Track Truck Equipment
Truck Vacuum Sweeper
Warehouseperson
Water Truck (Below 250 Bbls)
Water Truck (straight)
Water Wagon, Semi

						L&M	
A2106	Group V, including:	47.62	13.48	14.64	1.30	0.10	77.14

Buffer Truck
Bull Lifts & Fork Lifts, Fork Lifts with Power Boom & Swing Attachments (up to & including 5 tons)
Bus Operator (up to 30 passengers)
Farm Type Rubber Tired Tractor (when material handling or pulling wagons on a construction project)
Flat Beds, Single Rear Axle
Foam Distributor Truck Single Axle
Fuel Handler (station/bulk attendant)
Gear/Supply Truck

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Truck Drivers							
	*See per diem note on last page						
						L&M	
A2106	Group V, including:	47.62	13.48	14.64	1.30	0.10	77.14
	Gravel Spreader Box Operator on Truck						
	Hydro Seeder, Single Axle						
	Pickups (pilot cars & all light-duty vehicles)						
	Rigger						
	Swamper						
	Tack Truck (welders/gear)						
	Team Drivers (horses, mules, & similar equipment)						
Tunnel Workers, Laborers (The Alaska areas north of N63 latitude and east of W138 longitude)							
	*See per diem note on last page						
						L&M	**LEG**
N2201	Group I, including:	44.28	10.55	21.51	2.00	0.35	0.20	78.89
	Brakeman						
	Mucker						
	Nipper						
	Storm Water Pollution Protection Plan Worker (SWPPP Worker - erosion and sediment control Laborer)						
	Topman & Bull Gang						
	Tunnel Track Laborer						
						L&M	**LEG**
N2202	Group II, including:	45.38	10.55	21.51	2.00	0.35	0.20	79.99
	Burning & Cutting Torch						
	Certified Erosion Sediment Control Lead (CESCL Laborer)						
	Concrete Laborer						
	Floor Preparation, Core Drilling						
	Jackhammer/Chipping Gun or Pavement Breaker						
	Laser Instrument Operator						
	Nozzlemen, Pumpcrete or Shotcrete						
	Pipelayer Helper						
						L&M	**LEG**
N2203	Group III, including:	46.37	10.55	21.51	2.00	0.35	0.20	80.98
	Miner						
	Retimberman						
						L&M	**LEG**
N2204	Group IIIA, including:	51.18	10.55	21.51	2.00	0.35	0.20	85.79
	Asphalt Raker, Asphalt Belly Dump Lay Down						
	Drill Doctor (in the field)						
	Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)						

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits		THR
						L&M	LEG	

Tunnel Workers, Laborers (The Alaska areas north of N63 latitude and east of W138 longitude)
*See per diem note on last page

N2204	Group IIIA, including:	51.18	10.55	21.51	2.00	0.35	0.20	85.79

Pioneer Drilling & Drilling Off Tugger (all type drills)
Pipelayer
Powderman (Employee Possessor)
Storm Water Pollution Protection Plan Specialist (SWPPP Specialist)
Traffic Control Supervisor, DOT Qualified

N2206	Group IIIB, including:	59.41	5.50	21.51	1.60	0.35	0.20	88.57

Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)(over 5,000 hours)
Federal Powderman (Responsible Person in Charge)
Grade Checking (setting or transferring of grade marks, line and grade, GPS, drones)
Pioneer Drilling & Drilling Off Tugger (all type drills)(over 5,000 hours)
Stake Hopper

Tunnel Workers, Laborers (The area that is south of N63 latitude and west of W138 longitude)
*See per diem note on last page

S2201	Group I, including:	44.28	10.55	21.51	2.00	0.35	0.20	78.89

Brakeman
Mucker
Nipper
Storm Water Pollution Protection Plan Worker (SWPPP Worker - erosion and sediment control Laborer)
Topman & Bull Gang
Tunnel Track Laborer

S2202	Group II, including:	45.38	10.55	21.51	2.00	0.35	0.20	79.99

Burning & Cutting Torch
Certified Erosion Sediment Control Lead (CESCL Laborer)
Concrete Laborer
Floor Preparation, Core Drilling
Jackhammer/Chipping Gun or Pavement Breaker
Laser Instrument Operator
Nozzlemen, Pumpcrete or Shotcrete
Pipelayer Helper

S2203	Group III, including:	46.37	10.55	21.51	2.00	0.35	0.20	80.98

Miner
Retimberman

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

Class Code	Classification of Laborers & Mechanics	BHR	H&W	PEN	TRN	Other Benefits	THR
Tunnel Workers, Laborers (The area that is south of N63 latitude and west of W138 longitude) *See per diem note on last page							
						L&M	**LEG**	
S2204	Group IIIA, including:	51.18	10.55	21.51	2.00	0.35	0.20	85.79
	Asphalt Raker, Asphalt Belly Dump Lay Down Drill Doctor (in the field) Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills) Pioneer Drilling & Drilling Off Tugger (all type drills) Pipelayer Powderman (Employee Possessor) Storm Water Pollution Protection Plan Specialist (SWPPP Specialist) Traffic Control Supervisor, DOT Qualified							
						L&M	**LEG**	
S2206	Group IIIB, including:	59.41	5.50	21.51	1.60	0.35	0.20	88.57
	Driller (including, but not limited to wagon drills, air-track drills, hydraulic drills)(over 5,000 hours) Federal Powderman (Responsible Person in Charge) Grade Checking (setting or transferring of grade marks, line and grade, GPS, drones) Pioneer Drilling & Drilling Off Tugger (all type drills)(over 5,000 hours) Stake Hopper							
Tunnel Workers, Power Equipment Operators *See per diem note on last page							
						L&M	
A2207	Group I	58.55	12.10	16.25	1.05	0.10		88.05
						L&M	
A2208	Group IA	60.86	12.10	16.25	1.05	0.10		90.36
						L&M	
A2209	Group II	57.55	12.10	16.25	1.05	0.10		87.05
						L&M	
A2210	Group III	56.60	12.10	16.25	1.05	0.10		86.10
						L&M	
A2211	Group IV	48.47	12.10	16.25	1.05	0.10		77.97

Wage benefits key: ANU=Annuity, BHR=basic hourly rate; H&W=health and welfare; IAF=industry advancement fund; LEG=legal fund; L&M=labor/management fund; PEN=pension fund; SAF=safety; SUI=supplemental unemployment insurance; S&L=SUI & LEG combined; TRN=training; THR=total hourly rate; VAC=vacation

*** Per diem is an established practice for this classification. This means that per diem is an allowable alternative to board and lodging if all criteria are met. See 8 AAC 30.051-08 AAC 30.056, and the per diem information on page vii of this Pamphlet.**

**** Work in combination of classifications: Employees working in any combination of classifications within the diving crew (working diver, standby diver, and tender) in a shift are paid in the classification with the highest rate for a minimum of 8 hours per shift.**

SECTION 00852 – PERMITS

PART 1 – GENERAL

INDEX OF PERMITS

1. U.S. Army Corps of Engineers, Department of the Army Permit No. POA-2008-00782-M7, Auke Bay, March 7, 2025.

2. U.S. Army Corps of Engineers, Department of the Army Permit No. POA-2008-00782-M4, Auke Bay, February 26, 2019.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

STATTER HARBOR IMPROVEMENTS

PHASE III(D)

U.S. Army Corps of Engineers, Department of the Army
Permit No. POA-2008-00782-M7, Auke Bay,
March 7, 2025.

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
P.O. BOX 22270
JUNEAU, AK 99803-2270

March 7, 2025

Regulatory Division
POA-2008-00782-M7

Mr. Carl Uchytil
Port Director
City and Borough of Juneau
155 South Seward Street
Juneau, Alaska 99801

Dear Mr. Uchytil:

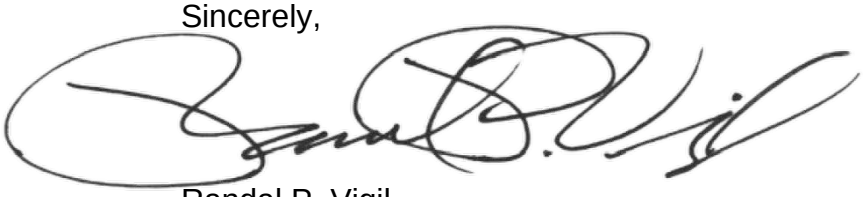
Enclosed is the signed Department of the Army permit modification, file number POA-2008-00782-M7, Auke Bay. This is the third permit modification of the original permit. Also enclosed is a Notice of Authorization that should be posted in a prominent location near the authorized work.

If changes to the plans or location of the work are necessary for any reason, plans must be submitted to us immediately. Federal law requires approval of any changes before construction begins.

Nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations.

Please contact me via email at Randal.P.Vigil@usace.army.mil, by mail at the address above, or by phone at (907) 201-5022, if you have questions.

Sincerely,



Randal P. Vigil
Chief, Southeast Section

Enclosures

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
P.O. BOX 22270
JUNEAU, AK 99803-2270

March 7, 2025

Regulatory Division
POA-2008-00782-M7

DEPARTMENT OF THE ARMY
PERMIT MODIFICATION

Department of the Army permit number POA-2008-00782-M4, Auke Bay, was issued to the City and Borough of Juneau on April 3, 2019, to dredge, discharge fill and dredged material, and install of structures, including pile driving, in navigable waters of the United States to construct harbor improvements. The permit was modified on November 29, 2019, to include the installation below the Mean High Water Mark (approximate elevation +15.3 feet above the 0.0 foot contour) (MHW): (1) 16-foot wide by 255-foot long timber headwalk float, and (1) 10-foot wide by 100-foot long aluminum gangway. On January 15, 202, the permit was modified to authorize the installation below the MHW (3) 16-inch diameter steel pipe piles to secure a 105 foot long by 13 foot wide transient float.

The project site is located within Section 23, T. 40 S., R. 65 E., Copper River Meridian; USGS Quad Map Juneau B-2; Latitude 58.385º N., Longitude 134.646º W.; Don D. Statter Harbor, in Juneau, Alaska.

This is the third modification of the original permit. In accordance with your request, General Condition No. 1 of the permit is hereby amended to read as follows: The time limit for completing the work authorized ends on **January 31, 2027**. If you find that you need more time to complete the authorized activity, please submit your request for a time extension to the U.S. Army Corps of Engineers for consideration at least one month before permit expiration.

All other conditions under which the subject authorization was made remain in full force and effect.

This authorization and the enclosed modified plans should be attached to the original permit. Also enclosed is a Notice of Authorization that should be posted in a prominent location near the authorized work.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Randal P. Vigil
Chief, Southeast Section

This notice of authorization must be conspicuously displayed at the site of work.

United States Army Corps of Engineers
Auke Bay

A permit to: dredge, discharge fill and dredged material, and install structures, including pile driving, to construct harbor improvements

at: Don D. Statter Harbor, within Auke Bay, in Juneau, AK

has been issued to: the City & Borough of Juneau

on: March 7, 2025, and expires on: January 31, 2027.

Address of Permittee: 155 S. SEWARD ST., JUNEAU, AK 99801.

Permit Number:

POA-2008-00782-M7

FOR: ***District Commander***
NAME
TITLE
REGULATORY DIVISION

ENG FORM 4336, Jul 81 (33 CFR 320-330) EDITION OF JUL 70 MAY BE USED (Proponent: CECW-O)

STATTER HARBOR IMPROVEMENTS

PHASE III(D)

U.S. Army Corps of Engineers, Department of the Army
Permit No. POA-2008-00782-M4, Auke Bay
February 26, 2019.

DEPARTMENT OF THE ARMY
ALASKA DISTRICT, U.S. ARMY CORPS OF ENGINEERS
REGULATORY DIVISION
P.O. BOX 22270
JUNEAU, AK 99802-2270

April 3, 2019

Regulatory Division
POA-2008-00782-M4

Mr. Carl Uchytil
Port Director
City and Borough of Juneau
155 South Seward Street
Juneau, Alaska 99801

Dear Mr. Uchytil:

Enclosed is the signed Department of the Army (DA) permit, file number POA-2008-00782-M4, Auke Bay, which authorizes dredging, the discharge of fill and dredged material, and the installation of structures, including pile driving, in navigable waters of the United States to construct harbor improvements.

The project site is located within Section 23, T. 40 S., R. 65 E., Copper River Meridian; USGS Quad Map Juneau B-2; Latitude 58.385º N., Longitude 134.646º W.; Don D. Statter Harbor, in Juneau, Alaska. Also enclosed is a Notice of Authorization which should be posted in a prominent location near the authorized work.

If changes to the plans or location of the work are necessary for any reason, plans must be submitted to us immediately. Federal law requires approval of any changes before construction begins.

Nothing in this letter excuses you from compliance with other Federal, State, or local statutes, ordinances, or regulations.

Please contact me via email at Randal.P.Vigil@usace.army.mil, by mail at the address above, or by phone at (907) 790-4491, if you have questions.

Sincerely,

Randal P. Vigil
Project Manager

Enclosures

CC:

BHughes@pndengineers.com
BLambert@pndengineers.com

This notice of authorization must be conspicuously displayed at the site of work.

UNITED STATES ARMY CORPS OF ENGINEERS
AUKE BAY

A PERMIT TO: DREDGE, DISCHARGE FILL AND DREDGED MATERIAL, AND INSTALL STRUCTURES, INCLUDING PILE DRIVING, TO CONSTRUCT HARBOR IMPROVEMENTS

AT: DON D. STATTER HARBOR, WITHIN AUKE BAY, IN JUNEAU, AK

HAS BEEN ISSUED TO: THE CITY & BOROUGH OF JUNEAU

ON: APRIL 3, 2019, AND EXPIRES: APRIL 30, 2024.

ADDRESS OF PERMITTEE: 155 S. SEWARD ST., JUNEAU, AK 99801.

PERMIT NUMBER:

POA-2008-00782-M4

FOR: ***DISTRICT COMMANDER***
RANDAL P. VIGIL
PROJECT MANAGER
REGULATORY DIVISION

ENG FORM 4336, Jul 81 (33 CFR 320-330) EDITION OF JUL 70 MAY BE USED (Proponent: CECW-O)

DEPARTMENT OF THE ARMY PERMIT

Permittee: City and Borough of Juneau

Permit No.: POA-2008-00782-M4 (Auke Bay)

Issuing Office: U.S. Army Engineer District, Alaska

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

1. From below the Mean High Water Mark (approximate elevation +15.3 feet above the 0.0 foot contour) (MHW demolish and dispose of the existing 16 feet wide by 200 feet long concrete boat launch ramp and planks;

2. From below the MHW demolish and dispose of the existing 8 feet wide by 240 feet long timber boarding float, including (4) 12.75 inch diameter steel pipe piles;

3. From below the MHW demolish and dispose of the existing 1,152 square feet timber boat haul-out pier, including (16) creosote treated timber piles;

4. Dredge 24,300 cubic yards of marine sediment from 1.47 acres below the MHW to provide sufficient water depth for vessels at all tidal ranges. The disposal of 30,375 cubic yards of dredged material (increase due to bulking factor) is proposed through the discharge over 65 acres of the seafloor at a location approximately 1 mile southwest of the proposed dredging site at Latitude 58.3728º N., Longitude 134.6637º W. in Auke Bay;

5. Remove by blasting 2,000 cubic yards of bedrock from 0.27 acres below the High Tide Line (approximate elevation +20.6 feet above the 0.0 foot contour) (HTL) and MHW;

6. Install below the MHW one 12 feet wide by 240 feet long concrete main float with five 6 feet wide by 42 feet long finger floats;

7. Install below the MHW one 16 feet wide by 180 feet long timber main float;

8. Install below the MHW one 16 feet wide by 140 feet long timber main float;

9. Install below the MHW one 16 feet wide by 226 feet long timber headwalk float;

10. Install below the MHW one 20 feet wide by 20 feet long gangway landing float;

11. Install below the MHW on 8 feet wide by 110 feet long aluminum gangway;

12. Install below the MHW (20) 16-inch diameter steel pipe piles, (6) 24-inch diameter steel pipe piles;

13. Discharge 8,800 cubic yards of shot rock and armor rock fill and 2,496 cubic yards of concrete planks into 0.35 acres below the HTL to construct a 12 feet wide by 208 feet long kayak launch ramp and a Mechanically Stabilized Earth (MSE) wall;

14. Discharge 1,900 cubic yards of armor rock fill material into 0.57 acres below the HTL to stabilize the dredge basin side slopes;

15. Temporary placement of 15,000 cubic yards of 4-inch minus shot rock fill into 0.56 acres below the HTL to construct a drill pad to place explosive charges for bedrock removal.

16. Temporary placement of 7,000 cubic yards of Class A shot rock (surcharge) fill material into 0.25 acres below the HTL in order to strengthen the soils and allow for settlement prior to construction of the MSE wall.

All work will be performed in accordance with the attached plan, sheets 1-15, dated March 2019.

Project Location: Section 23, T. 40 S., R. 65 E., Copper River Meridian; USGS Quad Map Juneau B-2; Latitude 58.385º N., Longitude 134.646º W.; Don D. Statter Harbor, in Juneau, Alaska.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **April 30, 2024**.

If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. This permit does not authorize the Permittee to take an endangered species, in particular the Humpback Whale *(Megaptera novaeangliae)* in the Mexico Distinct Population Segment (DPS) and Steller Sea Lion *(Eumetopias jubatus)* in the Western DPS. In order to legally take a listed species, the Permittee must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a BO under ESA Section 7, with "incidental take" provisions with which you must comply).

The enclosed Biological Opinion (BO) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Authorization under this permit is conditional upon compliance with all of the mandatory terms and conditions associated with incidental take of the enclosed BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute noncompliance with this permit. The NMFS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

2. Your use of the permitted activity must not interfere with the public's right to free navigation on all navigable waters of the United States.

3. You must install and maintain, at your expense, any safety lights and signals prescribed by the United States Coast Guard (USCG), through regulations or otherwise, on your authorized facilities. The USCG may be reached at the following address and telephone number: Commander (dpw), 17th Coast Guard District, Post Office Box 25517, Juneau, Alaska 99802; or by telephone at (907) 463-2272.

4. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers (Corps), to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorization required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a revaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Carl J Uchytil

Carl Uchytil
Port Director
City and Borough of Juneau

April 2nd, 2019
(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

FOR (DISTRICT COMMANDER)
Colonel Phillip J. Borders
Randal P. Vigil
South Branch, Regulatory Division

April 3, 2019
(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions have the transferee sign and date below.

(TRANSFEREE)

(DATE)

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation

DIVISION OF WATER
Wastewater Discharge Authorization Program

555 Cordova Street
Anchorage, Alaska 99501-2617
Main: 907.269.6285
Fax: 907.334.2415
www.dec.alaska.gov/water/wwdp

March 14, 2019

City and Borough of Juneau (CBJ)
Attention: Mr. Carl Uchytil
155 South Seward Street
Juneau, AK 99801

Re: City and Borough of Juneau, Harbor Dredging
POA-2008-782-M4, Auke Bay

Dear Mr. Uchytil:

In accordance with Section 401 of the Federal Clean Water Act of 1977 and provisions of the Alaska Water Quality Standards, the Department of Environmental Conservation (DEC) is reissuing the enclosed Certificate of Reasonable Assurance for placement of dredged and/or fill material in waters of the U.S., including wetlands and streams, associated with the dredging of harbor materials from Auke Bay, in Juneau, Alaska.

DEC regulations provide that any person who disagrees with this decision may request an informal review by the Division Director in accordance with 18 AAC 15.185 or an adjudicatory hearing in accordance with 18 AAC 15.195 – 18 AAC 15.340. An informal review request must be delivered to the Director, Division of Water, 555 Cordova Street, Anchorage, AK 99501, within 20 days of the permit decision. Visit http://dec.alaska.gov/commish/ReviewGuidance.htm for information on Administrative Appeals of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, PO Box 111800, Juneau, AK 99811-1800, within 30 days of the permit decision. If a hearing is not requested within 30 days, the right to appeal is waived.

By copy of this letter we are advising the U.S. Army Corps of Engineers of our actions and enclosing a copy of the certification for their use.

Sincerely,

James Rypkema
Program Manager, Storm Water and Wetlands

Enclosure: 401 Certificate of Reasonable Assurance

cc: (with encl.)
Randy Vigil, USACE, Juneau
Dick Sommerville
Kate Kanouse, ADF&G
USFWS Field Office Juneau
Mark Douglas, EPA Operations, Anchorage

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CERTIFICATE OF REASONABLE ASSURANCE

In accordance with Section 401 of the Federal Clean Water Act (CWA) and the Alaska Water Quality Standards (18 AAC 70), a Certificate of Reasonable Assurance, is reissued to CBJ, Attention: Mr. Carl Uchytil, at 155 South Seward Street, Juneau, Alaska 99801, for placement of dredged and/or fill material in waters of the U.S. including wetlands and streams in association with the dredging of harbor sediments in Auke Bay, Juneau, Alaska.

The work includes the following elements:

- From below the Mean High Water Mark (MHW) approximate elevation of +15.3 feet above the 0.0 foot contour) demolish and dispose of the existing 16 feet wide by 200 feet long concrete boat launch ramp and planks;
- From below the MHW, demolish and dispose of the existing 8 feet wide by 240 feet long timber boarding float, including (4) 12.75 diameter steel pipe piles;
- From below the MHW demolish and dispose of the existing 1,152 square feet timber boat haul-out pier, including (16) creosote treated timber piles.
- Dredge approximately 24,300 cubic yards of marine sediment from 1.47 acres below the MHW to provide sufficient water depth for vessels at all tidal ranges. The disposal of 30,375 cubic yards of dredged material is proposed through the discharge over 65 acres of the seafloor at a location about 1 mile southwest of the dredging site at Latitude 58.3728° N., Longitude -134.6637° W., in Auke Bay;
- Remove by blasting 2,000 cubic yards of bedrock from 0.27 acres below the high tide line (HTL – approximate elevation +20.6 feet above the 0.0 contour) and MHW;
- Install below the MHW one 12 feet wide by 240 feet long concrete main float with five 6 feet by 42 feet long finger floats;
- Below MHW install: one 12 feet wide by 180 feet long timber main float; one 16 feet wide by 140 feet long timber main float; one 16 feet wide by 226 feet long timber headwalk float; one 20 feet wide by 20 feet long gangway landing float; one 8 feet wide by 110 feet long aluminum gangway;
- Install below the MHW (20) 16-inch diameter steel pipe piles, (6) 24-inch diameter steel pipe piles;
- Discharge 8,800 cubic yards of shot rock and armor rock fill and 2,496 cubic yards of concrete planks into 0.35 acres below HTL to construct a 12 feet wide by 208 feet long kayak launch ramp;
- Discharge 1,900 cubic yards of armor rock fill material into 0.57 acres below the HTL to stabilize the dredge basin side slopes;
- Temporarily place 15,000 cubic yards of 4-inch minus shot rock fill into 0.56 acres below HTL to construct a drill pad to place explosive charges for bedrock removal.
- Temporary placement of 7,000 cubic yards of Class A shot rock (surcharge) fill material into 0.25 acres below the HTL in order to strengthen the soils and allow for settlement prior to construction of the Mechanically Stabilized Earth (MSE) wall.

A state issued water quality certification is required under Section 401 because the proposed activity will be authorized by a U.S. Army Corps of Engineers permit (POA-2008-782-M4) and a discharge of pollutants to waters of the U.S. located in the State of Alaska may result from the proposed activity. Public notice of the application for this certification was given as required by 18 AAC 15.180 in the Corps Public Notice POA-2008-782-M4 posted from August 7, 2017 to September 6, 2017.

The proposed activity is located within Section 23, T. 40 S., R. 65 E., Copper River Meridian; Latitude 58.385° N., Longitude -134.646° W.; in Juneau, Alaska.

The Department of Environmental Conservation (DEC) reviewed the application and certifies that there is reasonable assurance that the proposed activity, as well as any discharge which may result, will comply with applicable provisions of Section 401 of the CWA and the Alaska Water Quality Standards, 18 AAC 70, provided that the following additional measures are adhered to.

1. Reasonable precautions and controls must be used to prevent incidental and accidental discharge of petroleum products or other hazardous substances. Fuel storage and handling activities for equipment must be sited and conducted so there is no petroleum contamination of the ground, subsurface, or surface waterbodies.
2. During construction, spill response equipment and supplies such as sorbent pads shall be available and used immediately to contain and cleanup oil, fuel, hydraulic fluid, antifreeze, or other pollutant spills. Any spill amount must be reported in accordance with Discharge Notification and Reporting Requirements (AS 46.03.755 and 18 AAC 75 Article 3). The applicant must contact by telephone the DEC Area Response Team for Southeast Alaska (907) 465-5340 during work hours or 1-800-478-9300 after hours. Also, the applicant must contact by telephone the National Response Center at 1-800-424-8802.
3. Construction equipment shall not be operated below the ordinary high water mark if equipment is leaking fuel, oil, hydraulic fluid, or any other hazardous material. Equipment shall be inspected on a daily basis for leaks. If leaks are found, the equipment shall not be used and pulled from service until the leak is repaired.
4. All work areas, material access routes, and surrounding wetlands involved in the construction project shall be clearly delineated and marked in such a way that equipment operators do not operate outside of the marked areas.
5. Natural drainage patterns shall be maintained, to the extent practicable, without introducing ponding or drying.
6. Excavated or fill material, including overburden, shall be placed so that it is stable, meaning after placement the material does not show signs of excessive erosion. Indicators of excess erosion include: gullying, head cutting, caving, block slippage, material sloughing, etc. The material must be contained with siltation best management practices (BMPs) to preclude reentry into any waters of the U.S., which includes wetlands.
7. Fill material (including dredge material) must be clean sand, gravel or rock, free from petroleum products and toxic contaminants in toxic amounts.

8. All dredging shall be conducted so as to minimize the amount of dredge material and suspended sediments that enter Auke Bay. Appropriate Best Management Practices (BMPs) will be employed to minimize sediment loss and turbidity generation during dredging. BMPs may include, but are not limited to, the following:

    - Eliminating multiple bites while the bucket is on the seafloor
    - No stockpiling of dredged material on the seafloor
    - No seafloor leveling
    - Slowing the velocity (i.e., increasing the cycle time) of the ascending loaded clamshell bucket through the water column
    - Pausing the dredge bucket near the bottom while descending and near the water line while ascending
    - Placing filter material over the barge scuppers to clear return water
    - If dewatering runoff is discharged from the barge, silts must be removed prior to direct or indirect discharge to Auke Bay.

This certification expires five (5) years after the date the certification is signed. If your project is not completed by then and work under U.S. Army Corps of Engineers Permit will continue, you must submit an application for renewal of this certification no later than 30 days before the expiration date (18 AAC 15.100).

Date: March 14, 2019

James Rypkema, Program Manager
Storm Water and Wetlands

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

March 28, 2019

MEMORANDUM FOR: Jolie Harrison
Office of Protected Resources
Permits and Conservation Division

FROM: Jon Kurland
Assistant regional Administrator for Protected Resources

SUBJECT: Modifications to the AKR-2018-9770 Biological Opinion for the City and Borough of Juneau Docks and Harbors Department, Statter Harbor Improvements Project in Juneau, Alaska

The February 22, 2019 Biological Opinion (BiOp) for this project states that during Phase III A, monitoring and reporting requirements include the following: "A minimum of three PSOs will be observing the action area at all times: one PSO would be placed at a vantage point providing total coverage of the monitoring zones and for observation zones larger than 500 m, at least two other additional PSOs will be placed at the outermost float or other similar vantage point in order to observe the extent of the observation zone." The final Incidental Harassment Authorization (IHA) for this project requires "Two observers must be on site to actively observe the shutdown and monitoring zones during all pile removal, one observer during dredging, and four observers during blasting."

The monitoring zones for pile removal and dredging are small enough that the requirements in the IHA are adequate to effectively monitor these zones. The activities of the project have not changed, and adopting the monitoring requirements as stated in the IHA would not change the conclusions in the BiOp. Therefore, the threshold for reinitiating consultation has not been met.

Please direct any follow-up questions to David Gann at (907) 586-7285 david.gann@noaa.gov.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

City and Borough of Juneau Docks and Harbors Department
Statter Harbor Improvements Project
Juneau, Alaska

NMFS Consultation Number: AKR-2018-9770

Action Agencies: **US Army Corps of Engineers**
NMFS Office of Protected Resources

Affected Species and Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely To Jeopardize the Species?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Steller Sea Lion, Western DPS (*Eumetopias jubatus)*	Endangered	Yes	No	No
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	Threatened	Yes	No	N/A

Consultation Conducted By: National Marine Fisheries Service, Alaska Region

Issued By:

for James W. Balsiger, Ph.D.
Regional Administrator

Date: February 22, 2019

Accessibility of this Document

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TERMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
BA	Biological Assessment
BMPs	Best management practices
CBJ	City and Borough of Juneau
CBJ D&H	City and Borough of Juneau Docks and Harbors Department
CFR	Code of Federal Regulations
CV	Curriculum vitae
CY	Cubic yard(s)
DPS	Distinct Population Segment
EDPS	Eastern Distinct Population Segment
ESA	Endangered Species Act
ESCA	Endangered Species Conservation Act
ft	feet
FMP	Fishery Management Plan
GOA	Gulf of Alaska
HTL	High tide line
IHA	Incidental Harassment Authorization
IPCC	Intergovernmental Panel on Climate Change
ITS	Incidental Take Statement
m	Meter(s)
MDPS	Mexico Distinct Population Segment
MHW	Mean high water
mi	Mile(s)
min	Minute(s)
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MSE	mechanically stabilized earth
NMFS	National Marine Fisheries Service
NPS	National Park Service
PBFs	Physical or biological features
PCE	Primary constituent element
PND	PND Engineers, Inc.
PR1	Office of Protected Resources, NMFS Headquarters
PRD	Protected Resources Division, Alaska NMFS
PSO	Protected Species Observers
PTS	Permanent Threshold Shifts
RPA	Reasonable and Prudent Alternative
SEL	Sound Exposure Level
SPL	Sound Pressure Level
SSL	Steller sea lion
SSV	Sound source verification

TTS	Temporary Threshold Shifts
USACE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
WDPS	Western Distinct Population Segment
WNP	Western North Pacific
ZOE	Zone of Exclusion
ZOI	Zone of Influence

1. INTRODUCTION

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. § 1536(a)(2)) requires each Federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR §402.14(a)). Federal agencies may fulfill this general requirement informally if they conclude that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat, and NMFS or the USFWS concurs with that conclusion (50 CFR §402.14(b)(1)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS and/or USFWS provide an Opinion stating how the Federal agency's action is likely to affect ESA-listed species and their critical habitat. If incidental take is reasonably certain to occur, section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking, specifies those reasonable and prudent measures necessary to minimize such impact, and sets forth terms and conditions to implement those measures.

In this document, the action agencies are the US Army Corps of Engineers (USACE), which proposes to authorize construction activities associated with the Statter Harbor Improvements Project, and the NMFS Office of Protected Resources, Permits and Conservation Division (PR1), which proposes to permit Marine Mammal Protection Act (MMPA) Level A take (*i.e.*, take by injury or mortality) and Level B take (*i.e.*, take by harassment) of Steller sea lions (SSL) and humpback whales in conjunction with the first phase of this project, and may potentially include forthcoming MMPA permits associated with the later phases. The consulting agency for this proposal is NMFS's Alaska Region. This document represents NMFS's Biological Opinion (Opinion) on the effects of this proposal on endangered and threatened species.

The Opinion and ITS were prepared by NMFS in accordance with section 7(b) of the ESA (16 U.S.C. §§ 1531, et seq.), and implementing regulations at 50 CFR 402.

The Opinion and ITS are in compliance with the Data Quality Act (44 U.S.C. § 3504(d)(1) *et seq*.) and underwent pre-dissemination review.

1.1 Background

This Opinion considers the effects of construction activities associated with the Statter Harbor Improvements Project in Juneau, Alaska. These actions may affect the Mexico Distinct Population Segment (MDPS) of humpback whales (*Megaptera novaeangliae*) and Western Distinct Population Segment (WDPS) of Steller sea lions *(Eumetopias jubatus).*

This Opinion is based on information provided in the Revised Incidental Harassment Authorization (IHA) Application (PND Engineers 2018d); the Proposed Incidental Harassment Authorization Federal Register Notice (83 FR 52394); the Revised Biological Assessment for the Statter Harbor Improvements Project Phases III & IV (PND Engineers 2018b); the updated project proposals; email and telephone conversations between NMFS Alaska Region and NMFS PR1 staff; and other sources of information. A complete record of this consultation is on file at NMFS's Juneau, Alaska office.

1.2 Consultation History

On February 12, 2018, NMFS PR1 received a request from the City and Borough of Juneau Docks and Harbors Department (CBJ D&H) for an IHA to take marine mammals incidental to harbor improvement projects in Statter Harbor, Alaska. The USACE designated PND Engineers, Inc. (PND) as the non-federal representative on November 14, 2017 (USACE 2017) and submitted a request to initiate section 7 consultation to NMFS Protected Resources Division (PRD) on February 14, 2018. After discussions with NMFS PR1, the USACE submitted a revised IHA application on March 9, 2018. On April 12, 2018, PRD submitted a 30-day review letter outlining insufficiencies in the initiation package and requesting additional information. PND submitted an additional revision to the IHA to PR1 on August 8, 2018. The application was deemed adequate and complete by PRD on September 18, 2018. PR1 submitted a section 7 initiation request to PRD on September 26, 2018. PRD initiated joint consultation with PR1 and USACE on September 26, 2018., Consultation was held in abeyance for 38 days due to a lapse in appropriations and resulting partial government shutdown. Consultation resumed on January 28, 2019.

2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). "Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification (50 CFR 402.02). "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

This action includes Phases III and IV of the Statter Harbor Improvements Project. The proposed project location is at Statter Harbor within Auke Bay in Juneau, Alaska (Figure 1). This project will include dredging and blasting, dredged material disposal, installation of commercial charter floats (including the installation of steel pipe piles), demolition and disposal of the existing boat launch ramp and boat haul out dock (including removal of steel and creosote treated timber piles), new kayak launch ramp, new retaining wall, new permanent moorage floats, and uplands improvements including a completed bus circulation area and parking pad.

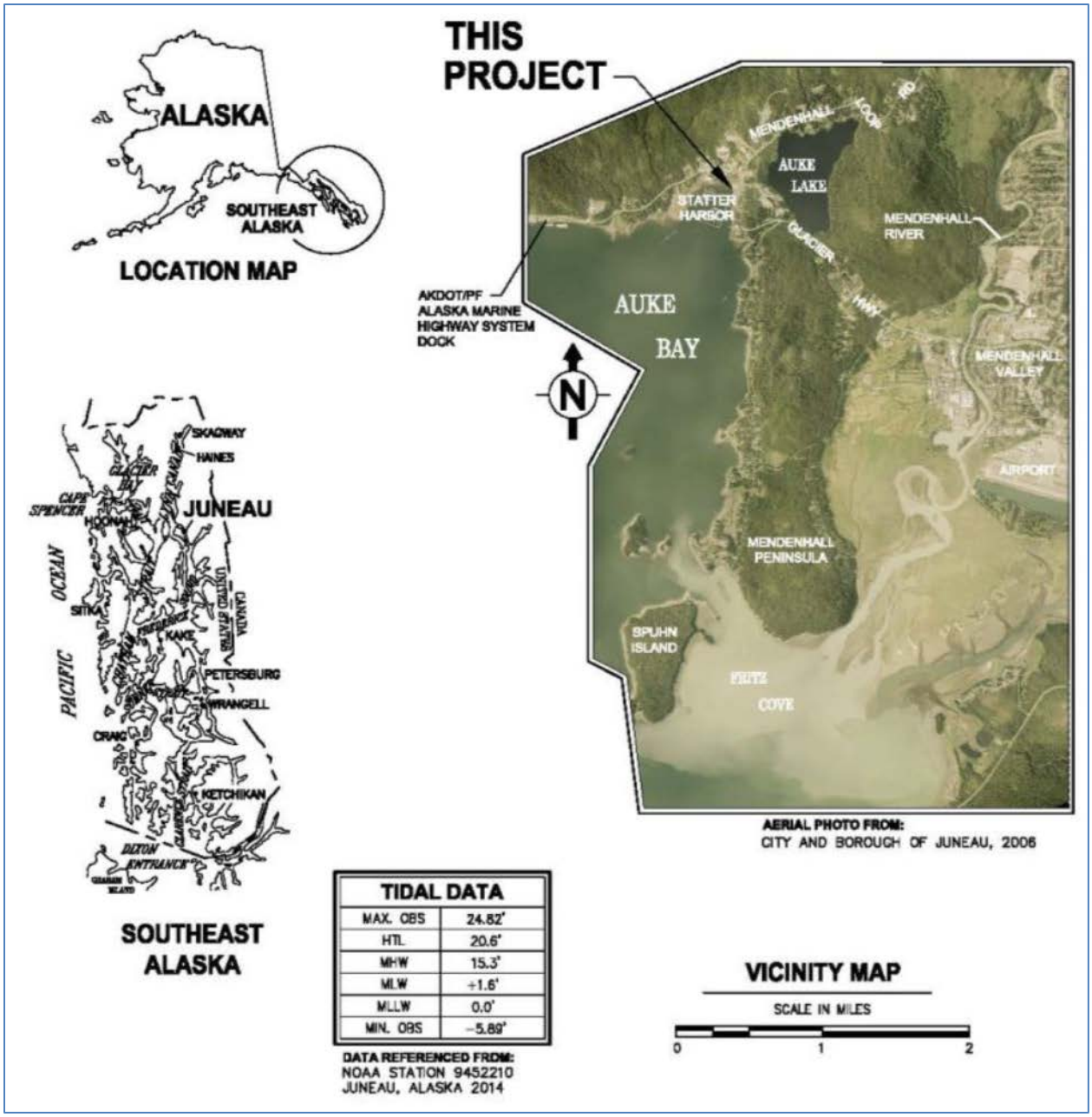


Figure 1. Vicinity Map of Statter Harbor Improvements Project (PND Engineers 2018b)

2.1.1 Proposed Activities

The proposed Statter Harbor improvements associated with this consultation will be constructed in a total of four phases: Phase III A; Phase III B; Phase III C, and Phase IV, over a total of three winter construction seasons, potentially concluding in 2022.

2.1.1.1 Phase III A

Phase III A includes demolition and disposal of the existing boat launch ramp and timber haulout pier, dredging of the planned harbor basin with offshore disposal, excavation of bedrock within the basin by blasting from a temporary fill pad, and construction of a mechanically stabilized

earth (MSE) wall. Phase III A is expected to begin October 2019 and be completed in the spring of 2020. PR1 is currently proposing to issue an IHA for take specific to Phase III A only, and will respond to IHA applications associated with future phases of the proposed action after they are submitted.

Demolition and Disposal

Phase III A includes demolition and upland disposal of the existing 16-foot (4.9-meter) by 200-foot (61-meter) concrete boat launch ramp and planks, an 8-foot (2.4-meter) by 240-foot (73.2-meter) boarding float, four (4) 12.75-inch (3.2-decimeter) diameter steel pipe piles, 1,152 square feet (107.0 square meters) of timber boat haulout pier, and sixteen (16) 12-inch (3.7-meter) to 16-inch (4.9-meter) creosote-treated timber piles. Demolition of the existing timber boat haulout pier and boat launch ramp will be performed with track excavators, loaders, crane barges, crane dead-pulling (preferred method), vibratory hammer (if needed), various hand tools, and labor forces.

Dredging and Dredge Disposal

The project includes 24,300 cubic yards (18,578.7 cubic meters) of dredging in the existing harbor. When the material is removed from the ground it will take up more space in the barge due to increased water content and fluff. To account for this, a conservative factor of 1.25 has been applied to the dredged volume, resulting in up to 30,375 cubic yards (23,223.4 cubic meters) of material to be disposed of.

A Sampling and Analysis Plan (PND Engineers 2016)) was developed for the dredge area and was implemented in October of 2016. The sample results indicated the material did not contain any contaminants above the regulatory screening levels and thus is suitable for in-water disposal. The USACE issued a determination of in-water suitability of disposal materials under POA-2008-782-M4.

Dredging will be performed by either an excavator or a crane with clamshell from a flat deck or derrick barge. The barge will be fixed in place to allow the excavator access to an area and periodically repositioned to gain access to new areas. It is anticipated that the barge would need to be repositioned once per day, or less. Once material is removed from the seafloor, it will be placed into a second belly dump dredge barge where the material will dewater and then be towed by a tug to the disposal site to be deposited.

The original target location provided by the Alaska Department of Fish and Game (ADF&G) for the disposal site for dredged material (just outside of the harbor) was latitude 58° 22' 22.08" N and longitude 134° 39'49.32" W. The USACE MPFate model was utilized to determine the barge release necessary to place the material within the target disposal location and to determine what the resulting mound may look like. The MPFate model simulates multiple dredged material placements to estimate the resulting bathymetry change within and around the placement site (USACE 2014). Due to limitations and uncertainties in the MPFate model, an overall footprint of approximately 40 acres was conservatively determined and an additional 200-foot (61.0-meter) buffer added, resulting in a 65-acre (26.3-hectare) disposal site. Based on conversations with ADF&G, the goal is to minimize the disposal footprint. Thus, in order for the material to situate in the specified disposal location, the barge release target location was changed and now is 58°

22' 19" N, 134° 39' 58" W. Actual disposal times and current conditions during disposal will vary depending on the contractor and site conditions. The coordinates for the corners of the proposed site are as follows (see Figure 2):

Northwest corner: 58° 22' 30.37" N, 134° 40' 7.03" W
Northeast corner: 58° 22' 30.39" N, 134° 39' 35.64" W
Southeast corner: 58° 22' 12.64" N, 134° 39 '34.98" W
Southwest corner: 58° 22' 12.42" N, 134° 40' 5.82" W

Blasting and Excavation

A geotechnical investigation, including borehole samples and test probing, was performed by PND in 2016 and revealed shallow bedrock within the harbor basin. The design depth, necessary for safe navigation, is 16 feet (4.9 meters) below mean lower low water (MLLW) with an additional 1-foot (0.3-meter) overdredge allowance. Test probing showed that the top-of-rock elevations within the dredge basin range from approximately 4 feet below MLLW to depths greater than the design elevation (17 feet (5.2 meters) below MLLW with overdredge allowance).

During construction, the dredging will be conducted first to remove the overburden from the bedrock. A survey will then be conducted to determine the exact extent of bedrock to be removed. The estimated amount of rock excavation is 1,761 cubic yards (2,000 cubic yards permitted volume to account for uncertainty) based on preconstruction surveys. Temporary fill to confine the blast will be placed using conventional construction equipment. Of the total 15,000 CY of fill placed, all will be below MHW. After blasting, this temporary fill will be removed and stockpiled in uplands for later use.

Alaska Seismic and Environmental prepared a General Blast Plan and Analysis and a SPL and SEL Isopleth Distances report (Appendix D of the CBJ D&H Request for an IHA (PND Engineers 2018d)) detailing the bedrock removal plan and how the exclusion zones for each hearing group were determined. The selected methodology for the blast is to perform two blasts. Each blast will be approximately one second in duration. Both blasts will consist of several detonations separated by millisecond delays. The number of charges will vary depending on conditions after overburden is removed, but is anticipated to be between 50 and 75 holes per blast. Individual charge size will depend on conditions after holes are drilled; maximum charge size (explosive weight) detonated per 8-milliseconds delay period will be limited to 93.5 pounds (42.4 kilograms).

Individual charge amounts and other hole-loading details will be determined by the contractor's blaster-in-charge and blasting consultant after holes are drilled. This allows for safe and appropriate loading decisions to be made based on rock features, such as voids, seams, fractures, and other discontinuities encountered during drilling.

After blasting, the temporary fill will be removed with excavators, loaded into dump trucks, and stockpiled in the uplands to be reused during the MSE wall construction. The blasted material will be excavated, separated from the temporary fill, and hauled offsite to an uplands disposal site.

MSE Wall

The MSE wall will be constructed with track excavators, loaders, vibratory drum rollers, dump trucks, various hand tools, and labor forces. Excavated material will be placed into dump trucks and hauled off-site. The concrete retaining wall blocks will be set in place one course at a time. Imported fill will be delivered by dump truck, spread behind the blocks in lifts, and compacted with vibratory rollers to meet design grades and compaction requirements. A layer of geotextile fabric will be placed behind the wall on the compacted fill with each course of blocks. A total of 6,800 cubic yards (5,199 cubic meters) of shot rock material will be placed below the HTL behind the MSE wall.

A 5-foot (1.5-meter) thick armored dredge basin slope will require an additional 650 cubic yards (497 cubic meters) of armor rock material, and a lower 2-foot (0.6-meter) thick slope will require an additional 1,350 cubic yards (1,032.1 cubic meters) of material. Total fill material placed below the HTL is not expected to exceed 8,800 cubic yards (6,728.1 cubic meters). All work in intertidal zones will be performed during low tides so that all material will be placed above current water levels.

2.1.1.2 Phase III B

New infrastructure to be installed during phase III B includes 9,136 square feet (848.8 square meters) of timber floats supported by twenty (20) 16-inch (4.1-decimeter) diameter steel pipe piles and an 800 square-foot gangway (74.3 square-meter). Pile driving will be conducted from a floating barge, utilizing a down the hole hammer to drill rock sockets and a vibratory hammer to install piles. Use of impact hammers is not anticipated, and will only be used for piles that encounter soils too dense to penetrate with the vibratory equipment. The floats will be unloaded from a barge and placed in the water. Piles will be driven as each float section is installed to hold the floats in place. CBJ D&H will specify the use of vibratory pile driving equipment as the primary installation method for the project. Phase III B is scheduled for October 2020 – May 2021, subject to funding.

2.1.1.3 Phase III C

Phase III C is primarily an uplands improvement, which also includes a small amount of in-water construction for a new kayak launch ramp. Phase III C generally consists of completing the MSE wall, an uplands bus circulation area and parking pad, and a 12-foot (3.7-meter) by 208-foot (63.4-meter) kayak launch ramp.

The kayak ramp will be constructed with track excavators, loaders, vibratory drum rollers, dump trucks, various hand tools and labor forces. The existing ground will be excavated and material will be placed into dump trucks and then hauled off-site. Imported fill will be delivered by dump truck, spread in lifts and compacted with vibratory rollers to meet design grades and compaction requirements. The new concrete ramp planks will be placed on the compacted sub-base. To the maximum extent possible, all work will be performed during low tides and all material placed above the water level. Phase III C is scheduled for October 2021 through spring 2022, subject to funding.

2.1.1.4 Phase IV

Phase IV consists of six 24-inch steel pipe piles and 4,140 square feet (385 square meters) of concrete moorage floats. The action area extends 5,050 meters from the project area as a result of the sound levels generated during drilling and vibratory pile driving activities. Pile driving will be conducted from a stationary barge platform, utilizing a down the hole hammer to drill rock sockets and a vibratory hammer to install piles. Impact hammers shall only be allowed for piles that encounter soils too dense to penetrate with the vibratory equipment. The floats will be unloaded from a barge and placed in the water. Piles will be driven as each float section is installed to hold the floats in place. CBJ D&H will specify the use of vibratory pile driving equipment as the primary installation method for the project during contract solicitation. Phase IV is anticipated to begin fall 2022, subject to funding.

2.1.2 Mitigation Measures

The proposed project intends to avoid impacts to marine mammals and the marine environment to the extent practicable, but some impacts cannot be avoided entirely, as this project is dependent upon maritime access and construction activity. While the IHA contains mitigation measures that address all marine mammals, this Opinion deals exclusively with the mitigation measures for listed species that fall under the purview of the ESA- specifically MDPS humpback whales and WDPS Steller sea lions. The following measures and BMP's will be incorporated by the applicant in order to avoid, reduce intensity, or otherwise minimize potential impacts:

- The harbor improvement structures are designed to limit contaminant releases and will be maintained in a manner that manages pollutants and debris streams to avoid incidental introduction of deleterious materials into Auke Bay.
- Harbor improvement structures were designed to provide barrier-free migration and vertical movement for marine and estuarine fish in Auke Bay.
- Fuels, lubricants, chemicals and other hazardous substances will be stored above the ordinary high water mark to prevent spills.
- Properly sized equipment will be used to drive piles.
- Oil booms will be readily available for containment should any releases occur.
- To prevent spills or leakage of hazardous material during construction, standard spill-prevention measures will be implemented during construction. The Contractor will provide and maintain a spill clean-up kit on-site at all times. If the total aggregate capacity of aboveground oil storage containers is greater than 1,320 gallons the Contractor will be required to prepare and implement a Spill Prevention Control and Countermeasure Plan as required by law.
- The contractor will monitor equipment and gear storage areas for drips or leaks regularly, including inspection of fuel hoses, oil drums, oil or fuel transfer valves and fittings, and fuel storage that occurs at the project site. Equipment will be maintained and stored properly to prevent spills.

- During construction, activities which may attract marine mammals, such as fish cleaning and carcass disposal, will be managed in concert with the CBJ Docks and Harbor staff to eliminate mammal attractants to the project area where possible.
- If contaminated or hazardous materials are encountered during construction, all work in the vicinity of the contaminated site will be stopped until a corrective action plan is devised and implemented to minimize impacts on surface waters and organisms in the project area.
- Marine mammal observers will monitor permitted activities in accordance with protocols reviewed and approved by NMFS in phase specific monitoring plans developed during the IHA process. Mitigation measures for Phase III A have been developed and are shown below. Phase III B and Phase IV will have specific mitigation measures developed during the IHA process. Phase III C will not undergo the IHA process, as this phase is not anticipated to result in take, provided the mitigation measures in Section 2.1.2.2 are used.

2.1.2.1. Mitigation Measures for Phase III A

Protected species observers (PSOs) will monitor permitted activities in accordance with protocols reviewed and approved by NMFS in phase specific monitoring plans developed during all current and future IHA processes. Future phases of the project will require specific mitigation measures developed according to their corresponding IHAs. For Phase III A, CBJ D&H will employ the following standard mitigation measures:

- Conduct a briefing between construction supervisors, crews, and the marine mammal monitoring team prior to the start of construction, and when new personnel join the work, explain responsibilities, communication procedures, marine mammal monitoring protocols, and operational procedures.
- For in-water and over-water heavy machinery work, if a marine mammal comes within 10 m, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions. This 10 m shutdown zone encompasses the Level A harassment zone for pile removal and dredging.
- Work may only occur during daylight hours and during weather conditions when visual monitoring of marine mammals can be conducted.
- If take reaches the authorized limit for an authorized species, activity for which take is authorized will be stopped as these species approach the monitoring zones to avoid any additional take.

The following measures will apply to CBJ D&H's mitigation requirements:

<u>Establishment of Monitoring Zones for Level B Harassment</u>

CBJ D&H will establish Level B harassment monitoring zones, or zones of influence (ZOI), which are areas where sound pressure levels (SPLs) are equal to or exceed the 120 dB rms threshold during vibratory removal and dredging. Similar harassment monitoring zones will be

established for the TTS isopleths associated with each functional hearing group for blasting activities. Monitoring zones provide utility for observing by establishing monitoring protocols for the areas adjacent to the shutdown zones (Level A harassment zones). Monitoring zones enable PSOs to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus help prepare for a potential cease of activity should the animal approach the shutdown zone. The Level B monitoring zones and Level A shutdown zones are depicted in Table 1 and Figure 2.

Table 1. Shutdown and Monitoring Zones

Activity	Monitoring Zones (Distance by species)		Shutdown Zones
	Humpback whales	Steller sea lions	All species
Vibratory Removal – Steel	1,820 m	1,820 m	10 m
Vibratory Removal – Timber	1,360 m	1,360 m	10 m
Dredging	110 m	110 m	10 m
Blasting (PTS)	380 m	95 m	N/A
Blasting (TTS)	2,120 m	280 m	N/A

In general, PSOs will monitor for the presence of humpback whales and Steller sea lions within these zones and will order a shutdown of the specified activities if a humpback whale or sea lion is spotted in or approaching these zones. As shown, the largest Level B zone for Phase III A is 2,120 m, making it unlikely that PSOs would be able to view the entire harassment area. Thus, during blasting, listed species may be exposed to noise levels of concern. To account for this, PSOs will record observed Level B exposures and extrapolate the number of whales and sea lions exposed (i.e. number of takes) based upon the number observed within the monitoring zone and the percentage of the Level B harassment zone that was visible.

Pre-Activity Monitoring

Prior to the start of daily in-water activity, or whenever a break in activity of 30 minutes or longer occurs, the PSO will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be considered cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, activity cannot proceed until the animal has left the zone or has not been observed for 15 minutes. When a marine mammal permitted for Level B take is present in the Level B harassment zone, or if the entire zone cannot be observed and permitted marine mammal presence is extrapolated, activities may begin and Level B take will be recorded. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level B and shutdown zone will commence.

For blasting, the TTS zone will be monitored for a minimum of 30 minutes prior to detonating the blasts. If a marine mammal is sighted within the TTS zone, blasting will be delayed until the zone is clear of marine mammals for 30 minutes. This will continue as long as practicable within the constraints of the blasting design, but not beyond sunset on the same day, as the charges cannot lay dormant for more than 24 hours, which may force the detonation of the blast in the presence of marine mammals. Charges will be laid as early as possible in the morning.

Proposed Phase III A Monitoring and Reporting

Requests for incidental harassment authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both for compliance and for ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (e.g., presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (e.g., source characterization, propagation, ambient noise); (2) affected species (e.g., life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure;
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (e.g., marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); or
- Mitigation and monitoring effectiveness.

Visual Monitoring

Monitoring for blasting activities would be conducted for 30 minutes pre-blast and 1 hour post-blast. All other monitoring would be conducted 30 minutes before, during the entire construction activity, and 30 minutes after construction activities. In addition, PSOs must record all incidents of marine mammal occurrence, regardless of distance from activity, and must document any behavioral reactions in concert with distance from construction activities.

PSOs would be land-based or float-based observers. PSOs will be stationed at locations that provide adequate visual coverage for shutdown and monitoring zones. Potential observation locations are depicted in Figures 2 and 3 of the applicant's Marine Mammal Mitigation and Monitoring Plan (Appendix B of the Statter Harbor Improvements Project Phase III A IHA (PND Engineers 2018d)). A minimum of three PSOs will be observing the action area at all times: one PSO would be placed at a vantage point providing total coverage of the monitoring zones and for observation zones larger than 500 m, and at least two other additional PSOs will be placed at the outermost float or other similar vantage point in order to observe the extent of the observation zone. Optimal observation locations will be selected based on visibility and the type of work occurring. All PSOs will be trained in marine mammal identification and behaviors and are required to have no other project-related tasks while conducting monitoring. In addition,

monitoring will be conducted by qualified PSOs, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. The applicant must adhere to the following conditions when selecting PSOs:

- Independent PSOs must be used (i.e., not construction personnel).
- At least one PSO must have prior experience working as a marine mammal observer during construction activities.
- Other PSOs may substitute education (degree in biological science or related field) or training for experience.
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience working as a PSO during construction.
- The applicant must submit PSO CVs for approval by NMFS.

The applicant must ensure that PSOs have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols.
- Experience or training in the field identification of marine mammals, including the identification of behaviors.
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
- Writing skills sufficient to prepare a report of observations.
- Expected content of this report should include,- but is not limited to,- the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior.
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

The PSO will have the following equipment to aid in determining the location of observed listed species, to take action if listed species enter the shutdown zone, and to record these events:

  - Binoculars
  - Range finder
  - GPS
  - Compass
  - Two-way radio communication with construction foreman/superintendent
  - A log book of all activities, which will be made available to USACE and NMFS upon request at any time

A draft marine mammal monitoring report shall be submitted to NMFS within 90 days after the completion of construction activities. It will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report must include:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., percent cover, visibility);
- Water conditions (e.g., sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from construction activity;
- Distance from construction activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

If no comments are received from NMFS within 30 days, the draft report will constitute the final report. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as a serious injury or mortality, CBJ D&H would immediately cease the specified activities and report the incident to PR1, PRD, and the Alaska Regional Stranding Hotline at 1-877-925-7773. The report would include the following information:

- Description of the incident;
- Environmental conditions (e.g., Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with CBJ D&H to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA and ESA compliance. The CBJ D&H would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that CBJ D&H discovers an injured or dead marine mammal at any time in the action area, the CBJ D&H would immediately report the incident to PR1, PRD, and the Alaska Regional Stranding Hotline at 1-877-925-7773. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with the CBJ D&H to determine whether modifications in the activities are appropriate.

2.1.2.2 Mitigation Measures for Phase III C

Most of the construction activities during Phase III C will occur in the uplands. However, there is the potential for a small amount of fill to be placed in-water during construction of the kayak ramp. In the event that any in-water work will be required, CBJ D&H will employ the following standard mitigation measures in order to minimize the risk of harm to listed species for this phase of the proposed project:

1. The applicant will monitor a 110 m exclusion zone around the proposed placement of fill. Fill disposal activities will be shut down if listed species appear likely to enter the exclusion zone.

2. The project will incorporate measures to control erosion and minimize turbidity effectively.

There are no interdependent or interrelated activities associated with this action. All activities that would not occur but for the action are addressed in this Opinion.

2.2 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For this reason, the action area is typically larger than the project area and extends out to a point where no measurable effects from the proposed action occur.

The action area for this Opinion will include all proposed activities outlined in Section 2.1.1. We define the action area for this consultation to include the area within which project-related noise levels are ≥120 dB re 1 μPa (rms) (i.e., the point where no measureable effect from the project would occur). Noise levels associated with drilling in Phase IV will extend further than other components of the proposed action, thus the action area extends 5,050 meters from the project site (red boundary in Figure 2) where drilling related noise reaches 120 dB, which encompasses all other phases as well as the dredged material disposal site. The action area also includes the transit area for vessels involved in construction, and traffic lanes during operation of the harbor improvements.

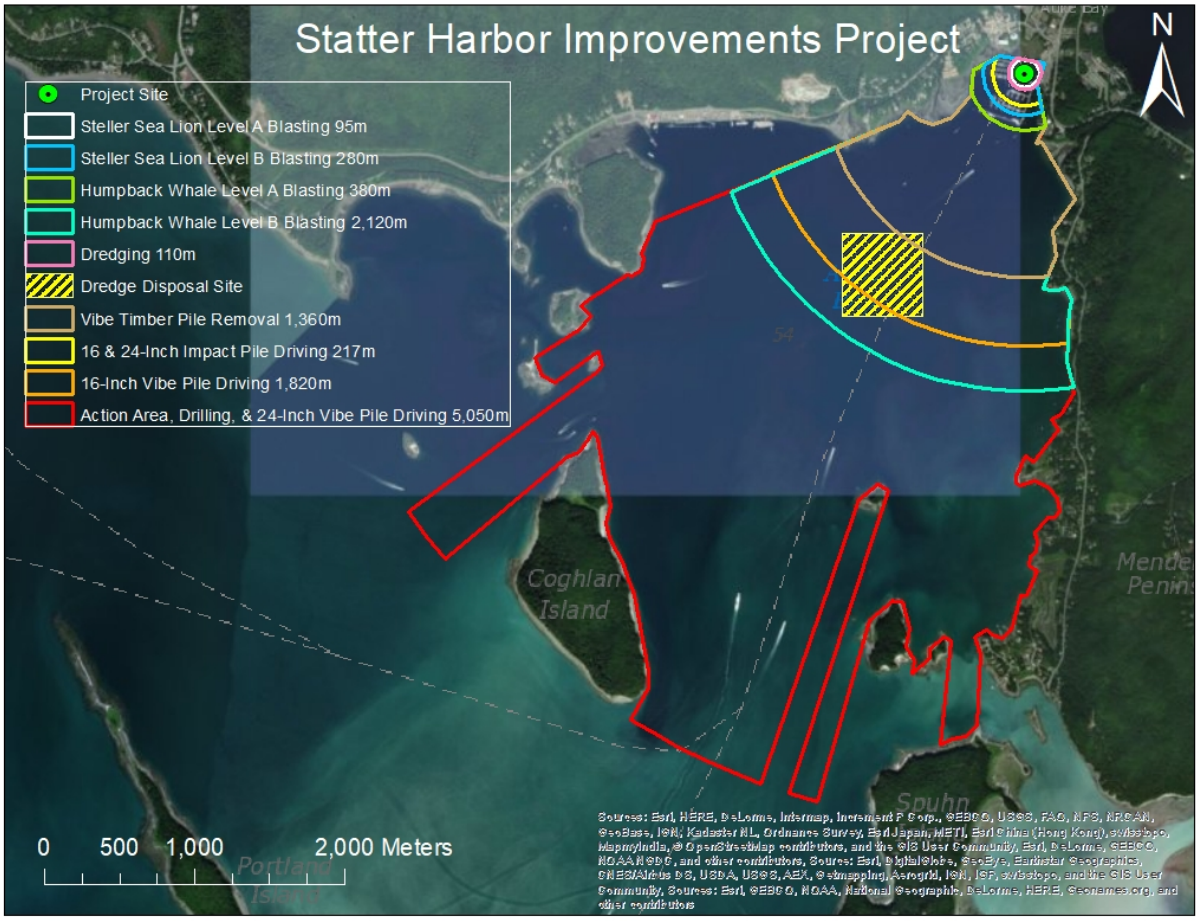


Figure 2. Statter Harbor Improvements Project Action Area

3 APPROACH TO THE ASSESSMENT

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"To jeopardize the continued existence of a listed species" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). As NMFS explained when it promulgated this definition, NMFS considers the likely impacts to a species' survival as well as likely impacts to its recovery. Further, it is possible that in certain, exceptional circumstances, injury to recovery alone may result in a jeopardy biological Opinion (51 FR 19926, 19934 ((June 2, 1986)).

Under NMFS's regulations, the destruction or adverse modification of critical habitat "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (50 CFR 402.02).

The designation of critical habitat for WDPS Steller sea lions uses the term primary constituent element (PCE) or essential features. The subsequent critical habitat regulations (81 FR 7414, Feb. 11, 2016) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological Opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

We use the following approach to determine whether the proposed action described in Section 2.1 is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Identify those aspects (or stressors) of the proposed action that are likely to have direct or indirect effects on listed species or critical habitat. As part of this step, we identify the action area – the spatial and temporal extent of these direct and indirect effects.
- Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action. This section describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery. We determine the rangewide status of critical habitat by examining the condition of its PBFs - which were identified when the critical habitat was designated. Species and critical habitat status are discussed in Section 4 of this Opinion.
- Describe the environmental baseline including: past and present impacts of Federal, state, or private actions and other human activities *in the action area*; anticipated impacts of proposed Federal projects that have already undergone formal or early section 7

consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 5 of this Opinion.

- Analyze the effects of the proposed actions. Identify the listed species that are likely to co-occur with these effects in space and time and the nature of that co-occurrence (these represent our *exposure analyses*). In this step of our analyses, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to stressors and the populations or subpopulations those individuals represent. NMFS also evaluates the proposed action's effects on critical habitat features. The effects of the action are described in Section 6 of this Opinion with the exposure analysis described in Section 6.2 of this Opinion.
- Once we identify which listed species are likely to be exposed to an action's effects and the nature of that exposure, we examine the scientific and commercial data available to determine whether and how those listed species are likely to respond given their exposure (these represent our *response analyses*). Response analysis is considered in Section 6.3 of this Opinion.
- Describe any cumulative effects. Cumulative effects, as defined in NMFS's implementing regulations (50 CFR 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate section 7 consultation. Cumulative effects are considered in Section 7 of this Opinion.
- Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat. In this step, NMFS adds the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to assess whether the action could reasonably be expected to: (1) appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) reduce the value of designated or proposed critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 4). Integration and synthesis with risk analyses occurs in Section 8 of this Opinion.
- Reach jeopardy and adverse modification conclusions. Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 9. These conclusions flow from the logic and rationale presented in the Integration and Synthesis Section 8.
- If necessary, define a reasonable and prudent alternative to the proposed action. If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action.

4 RANGEWIDE STATUS OF THE SPECIES AND CRITICAL HABITAT

Two species of marine mammals listed under the ESA under NMFS's jurisdiction may occur in the action area— western Distinct Population Segment (WDPS) Steller sea lions and Mexico DPS humpback whales. No critical habitat occurs within the action area. This Opinion considers the effects of the proposed action on these species (Table 2).

Table 2. Listing status and critical habitat designation for marine mammals considered in this Opinion.

Species	Status	Listing	Critical Habitat
Steller Sea Lion, WDPS (*Eumetopias jubatus*)	Endangered	May 5, 1997, 62 FR 24345	August 27, 1993, 58 FR 45269
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	Threatened	September 8, 2016, 81 FR 62260	Not designated

4.1 Species and Critical Habitat Not Likely to Be adversely Affected

On August 27, 1993, NMFS designated critical habitat for Steller sea lions based on the location of terrestrial rookery and haulout sites, spatial extent of foraging trips, and availability of prey items (58 FR 45269). Designated critical habitat is listed in 50 CFR § 226.202, and includes: 1) a terrestrial zone that extends 3,000 ft (0.9 km) landward from the baseline or base point of each major rookery and major haulout; 2) an air zone that extends 3,000 ft (0.9 km) above the terrestrial zone of each major rookery and major haulout, measured vertically from sea level in California and Oregon; 3) an aquatic zone that extends 3,000 ft (0.9 km) seaward in state and federally managed waters from the baseline or basepoint of each major rookery and major haulout in Alaska that is east of 144° W longitude; 4) an aquatic zone that extends 20 nm (37 km) seaward in state and federally managed waters from the baseline or basepoint of each major rookery and major haulout in Alaska that is west of 144° W longitude; and 5) three special aquatic foraging areas in Alaska: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area.

The action area does not overlap Steller sea lion critical habitat. The Benjamin Island haulout is the closest designated critical habitat to the action area and is over 25 km northwest of the project area (Figure 3). We do not expect the project to affect Steller sea lion critical habitat.

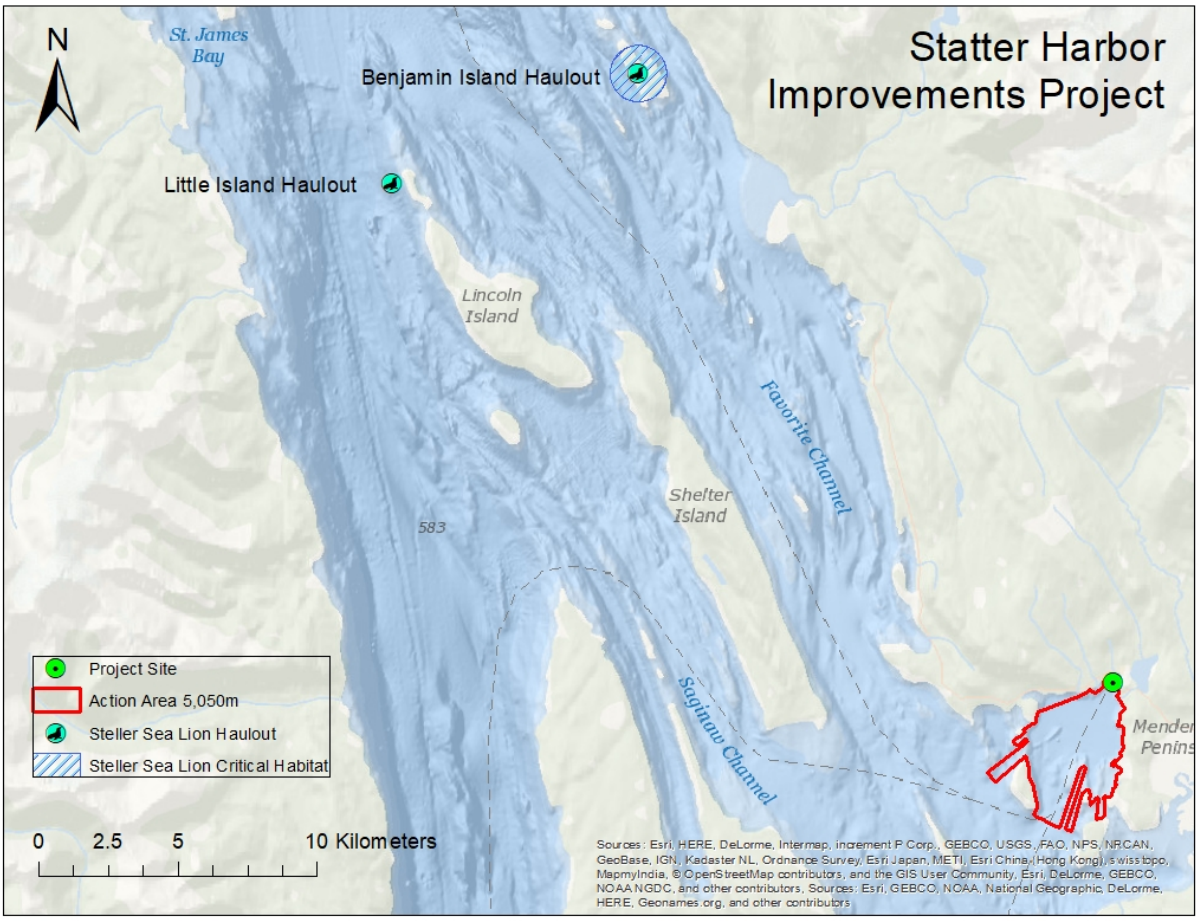


Figure 3. Steller Sea Lion Critical Habitat near Auke Bay in relation to Statter Harbor Project Site

4.2 Climate Change

In accordance with NMFS guidance on analyzing the effects of climate change (Sobeck 2016), NMFS assumes that climate conditions will be similar to the status quo throughout the length of the direct and indirect effects of this project. We present an overview of the potential climate change effects on WDPS Steller sea lions and Mexico DPS humpback whales and their habitat below.

There is widespread consensus within the scientific community that atmospheric temperatures on earth are increasing and that this will continue for at least the next several decades (Watson and Albritton 2001, Oreskes 2004). There is also consensus within the scientific community that this warming trend will alter current weather patterns and patterns associated with climatic phenomena, including the timing and intensity of extreme events such as heat waves, floods, storms, and wet-dry cycles. Warming of the climate system is explicit, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level (Pachauri and Reisinger 2007).

The Intergovernmental Panel on Climate Change (IPCC) estimated that average global land and sea surface temperature has increased by 0.6°C (±0.2) since the mid-1800s, with most of the change occurring since 1976. This temperature increase is greater than what would be expected given the range of natural climatic variability recorded over the past 1,000 years (Crowley 2000). The IPCC reviewed computer simulations of the effect of greenhouse gas emissions on observed climate variations that have been recorded in the past and evaluated the influence of natural phenomena such as solar and volcanic activity. Based on their review, the IPCC concluded that natural phenomena are insufficient to explain the increasing trend in land and sea surface temperature, and that most of the warming observed over the last 50 years is likely to be attributable to human activities (Stocker *et al.* 2013).

Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century (Watson and Albritton 2001). Climate change is projected to have substantial direct and indirect effects on individuals, populations, species, and the structure and function of marine, coastal, and terrestrial ecosystems in the foreseeable future (Houghton 2001, McCarthy 2001, Parry 2007). Climate change would result in increases in atmospheric temperatures, changes in sea surface temperatures, increased ocean acidity, changes in patterns of precipitation, and changes in sea level (Stocker *et al.* 2013).

The indirect effects of climate change on WDPS Steller sea lions and Mexico DPS humpback whales would likely include changes in the distribution of temperatures suitable for many stages of their life history, the distribution and abundance of prey, and the distribution and abundance of competitors or predators.

4.3 Status of Listed Species

This Opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' current "reproduction, numbers, or distribution" as described in the definition of "jeopardy" under 50 CFR 402.02.

This section consists of narratives for both of the endangered and threatened species that occur in the action area and that may be adversely affected by the proposed action. In each narrative, we present a summary of information on the population structure and distribution of the species to provide a foundation for the exposure analyses that appear later in this Opinion. Then we summarize information on the threats to the species and the species' status given those threats to provide points of reference for the jeopardy determinations we make later in this Opinion. That is, we rely on a species' status and trend to determine whether or not an action's direct or indirect effects are likely to increase the species' probability of becoming extinct.

After the *Status* subsection of each narrative, we present information on feeding, prey selection, diving, and social behavior of the different species because those behaviors help determine how certain activities may impact each species. We also summarize information on the vocalization and hearing of the species to inform our assessment of how the species are likely to respond to sounds produced from the proposed activities.

More detailed background information on the status of these species can be found in a number of published documents including stock assessment reports on Alaska marine mammals (Muto et al. 2017b), and recovery plans for humpback whales (NMFS 1991a) and Steller sea lions (NMFS 2008b).

4.3.1 Mexico DPS Humpback Whales

4.3.1.1 Population Structure and Status

The humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as endangered. NMFS recently conducted a global status review and changed the status of humpback whales under the ESA. The globally listed species was divided into 14 DPSs, four of which are endangered, one is threatened, and the remaining nine are not listed under the ESA (81 FR 62260; September 8, 2016).

Wade et al. (2016) analyzed humpback whale movements throughout the North Pacific Ocean between winter breeding areas and summer feeding areas, using a comprehensive photo-identification study of humpback whales in 2004-2006 during the SPLASH project (Structure of Populations, Levels of Abundance and Status of Humpbacks). A multi-strata mark recapture model was fit to the photo-identification data using a six-month time-step, with the four winter areas and the six summer areas defined to be the sample strata. The four winter areas corresponded to the four North Pacific DPSs: Western North Pacific (WNP), Hawaii, Mexico, and Central America. The analysis was used to estimate abundance within all sampled winter and summer areas in the North Pacific, as well as to estimate migration rates between these areas. The migration rates were used to estimate the probability that whales from each winter/breeding area were found in each of the six feeding areas. The probability of encountering whales from each of the four North Pacific DPSs in various feeding areas is summarized in Table 3 below (NMFS 2016a).

Table 3. Probability of encountering humpback whales from each DPS in the North Pacific Ocean (columns) in various feeding areas (on left). Adapted from Wade et al. (2016).

Summer Feeding Areas	**North Pacific Distinct Population Segments**			
	Western North Pacific DPS (endangered)[1]	**Hawaii DPS (not listed)**	**Mexico DPS (threatened)**	**Central America DPS (endangered)[1]**
Kamchatka	100%	0%	0%	0%
Aleutian I/Bering/Chukchi	4.4%	86.5%	11.3%	0%

Summer Feeding Areas	North Pacific Distinct Population Segments			
	Western North Pacific DPS (endangered)[1]	Hawaii DPS (not listed)	Mexico DPS (threatened)	Central America DPS (endangered)[1]
Gulf of Alaska	0.5%	89%	10.5%	0%
Southeast Alaska / Northern BC	0%	93.9%	6.1%	0%
Southern BC / WA	0%	52.9%	41.9%	14.7%
OR/CA	0%	0%	89.6%	19.7%

[1]For the endangered DPSs, these percentages reflect the 95% confidence interval of the probability of occurrence in order to give the benefit of the doubt to the species and to reduce the chance of underestimating potential takes.

Whales from the WNP, Mexico, and Hawaii DPSs overlap on feeding grounds off Alaska, and are not visually distinguishable. All waters off the coast of Alaska may contain ESA-listed humpbacks. Critical habitat has not been designated for the WNP or Mexico DPSs (NMFS 2016a).

The Mexico DPS is comprised of approximately 3,264 (CV=0.06) animals (Wade *et al.* 2016) with an unknown population trend. The abundance of humpback whales has increased in Southeast Alaska, though a trend for the Southeast Alaska portion of the Mexico DPS cannot be estimated from the data because of differences in methods and areas covered (Muto et al 2018).

4.3.1.2 Distribution

Humpback whales migrate seasonally between warmer, tropical or sub-tropical waters in winter months (where they reproduce and give birth to calves) and cooler, temperate or sub-Arctic waters in summer months (where they feed) (see Figure 4). In their summer foraging areas and winter calving areas, humpback whales tend to occupy shallower, coastal waters; during their seasonal migration however, humpback whales disperse widely in deep, pelagic waters and tend to avoid shallower coastal waters (Winn and Reichley 1985).

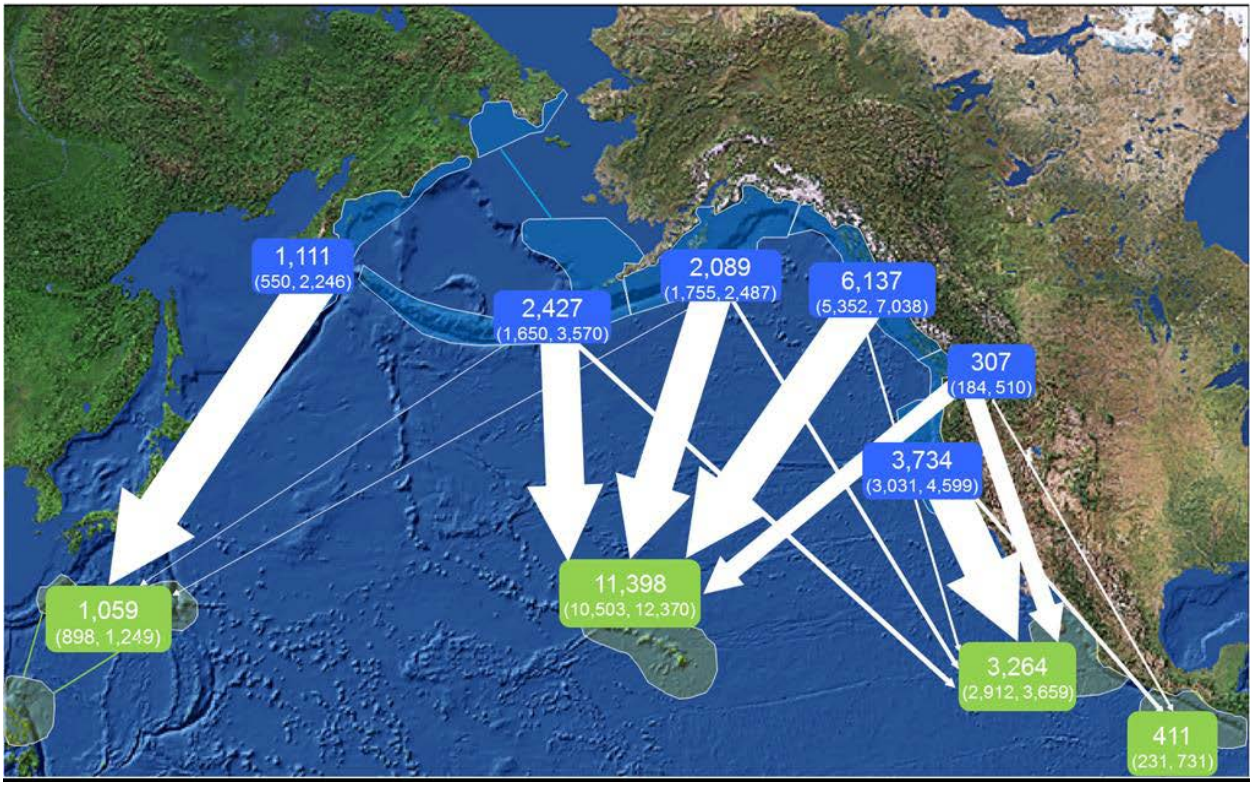


Figure 4. Abundance by summer feeding areas (blue), and winter breeding areas (green), with 95% confidence limits in parentheses. Migratory destinations from feeding area to breeding area are indicated by arrows with width of arrow proportional to the percentage of whales moving into winter breeding area (Wade et al. 2016).

Humpback whale populations in Southeast Alaska have been steadily increasing in recent decades. The Southeast Alaska-specific rate of increase is approximately 5.6% annually (Calambokidis et al. 2008) and the latest estimate of abundance for Southeast Alaska and northern British Columbia is between 3,005 and 6,137 humpback whales, depending on the modeling approach employed. As previously mentioned, humpback whales in Southeast Alaska are 94% comprised of the Hawaii DPS (not listed) and 6% of the Mexico DPS (threatened; Wade *et al.* 2016). Given Wade *et al.* (2016), we use 6% in this analysis to approximate the percentage of observed humpbacks that are from the Mexico DPS. WNP DPS humpback whales are not anticipated to occur in Southeast Alaska (Table 3).

Humpback whales are present in Southeast Alaska in all months of the year. Most Southeast Alaska humpback whales winter in low latitudes, but some individuals have been documented over-wintering near Sitka and Juneau (Moran et al. 2018) (J.R. Morana 2017). Late fall and winter whale habitat in Southeast Alaska appears to correlate with areas that have over-wintering herring (such as lower Lynn Canal, Tenakee Inlet, Whale Bay, Ketchikan, and Sitka Sound), none of which are in the action area (Baker et al. 1985, Straley 1990). However, the aggregation of some herring in the action area (inner Auke Bay) has the potential to provide a habitat where whales may feed on small volumes of fish and rest to conserve energy between foraging opportunities.

4.3.1.3 Threats to the Species

Natural Threats

There is limited information on natural phenomena that kill or injure humpback whales. Humpback whales are killed by orcas (Whitehead and Glass 1985, Dolphin 1987b, Florezgonzalez et al. 1994, Naessig and Lanyon 2004), and are probably killed by false killer whales and sharks. Calves sometimes remain protected near mothers or within a group and lone calves have been known to be protected by presumably unrelated adults when confronted with attack (Ford and Reeves 2008).

Harmful algal blooms are a potential stressor for humpback whales. Out of 13 marine mammal species examined in Alaska, domoic acid was detected in all species examined with humpback whale showing 38% prevalence. Saxitoxin was detected in 10 of the 13 species, with the highest prevalence in humpback whales (50%) and bowhead whales (32%) (Lefebvre et al. 2016). The occurrence of the nematode *Crassicauda boopis* appears to increase the potential for kidney failure in humpback whales and may be preventing some populations from recovering (Lambertsen 1992).

Anthropogenic Threats

Three human activities are known to threaten humpback whales: whaling, entanglement (principally in in commercial fishing gear), and ship strikes.

Whaling

Historically, commercial whaling represented the greatest threat to every population of humpback whales and was ultimately responsible for listing humpback whales as an endangered species. From 1900 to 1965, nearly 30,000 whales were taken in modern whaling operations in the Pacific Ocean. Prior to that, an unknown number of humpback whales were taken (Perry et al. 1999). In 1965, the International Whaling Commission banned commercial hunting of humpback whales in the Pacific Ocean.

There were no reported takes of humpback whales by subsistence hunters in Alaska or Russia for the 2011-2015 period (Muto et al. 2018a). One humpback whale was taken illegally by Alaska Native subsistence hunters near Toksook Bay in western Alaska in 2016, and while it could have been a member of the Mexico DPS or Western North Pacific DPS, it was more likely from the non-listed Hawaii DPS (NMFS unpublished data; Wade et al. 2016).

Entanglement

Humpback whales are also killed or injured during interactions with commercial fishing gear and other entanglements, although the evidence available suggests that these interactions may not have significant, adverse consequence for humpback whale populations in Southeast Alaska. From 1979-2008 on the Canadian Atlantic coast, 1,209 whales were recorded entangled, 80% of which were humpback whales (Benjamins et al. 2012). Along the Pacific coast of Canada, 40 humpback whales have been reported as entangled between 1980 and 2011, four of which are known to have died (Ford et al. 2009, COSEWIC (Committee on the Status of Endangered Wildlife in Canada) 2011). A photography study of humpback whales in Southeast Alaska in 2003 and 2004 found at least 53% of individuals showed some kind of scarring from entanglement (Neilson et al. 2005).

The minimum estimate of the mean annual mortality and serious injury rate incidental to U.S. commercial fisheries for the Central North Pacific stock- which includes whales from the Hawaii DPS, Mexico DPS, and Western North Pacific DPS- in 2012-2016 is 9.9 humpback whales, based on observer data from Alaska (0.2 in federal fisheries + 5.5 in the state-managed Southeast Alaska salmon drift gillnet fishery), observer data from Hawaii (0.9), and Marine Mammal Authorization Program (MMAP) fishermen self-reports and reports, in which the commercial fishery is confirmed, to the NMFS Alaska Region stranding network. (Muto et al. 2018).

Strandings of humpback whales entangled in fishing gear or with injuries caused by interactions with gear are another source of mortality data. The mean annual human-caused mortality and serious injury rate for 2011-2015 based on fishery and gear entanglements reported in the NMFS Alaska Regional Office stranding database is 0.4. The minimum average annual mortality and serious injury rate due to interactions with all fisheries in 2011-2015 is 18 Central North Pacific humpback whales (8.5 in commercial fisheries + 0.7 in recreational fisheries + 0.3 in subsistence fisheries + 8.8 in unknown fisheries) (Muto et al. 2018).

Entanglements in marine debris reported to the NMFS Alaska Region stranding network account for a minimum mean annual mortality and serious injury rate of 2.8 Central North Pacific humpback whales in 2011-2015 (Muto et al. 2018).

Ship Strike

Ship strikes and other interactions with vessels unrelated to fisheries occur frequently with humpback whales (Muto et al. 2018). Neilson et al. (2012) summarized 108 large whale ship-strike events in Alaska from 1978 to 2011, 25 of which are known to have resulted in the whale's death. Eighty-six percent of these reports involved humpback whales. Most ship strikes of humpback whales are reported from Southeast Alaska (Muto et al. 2018).

In 2017, there were seven reported vessel strikes to humpback whales in Alaska (https://alaskafisheries.noaa.gov/sites/default/files/17strandings.pdf). Between 2010 and 2014 the minimum mean annual mortality and serious injury rate due to ship strikes reported in Alaska for humpback whales was 2.7 whales (Muto et al. 2017a). These incidents account for a very small fraction of the total humpback whale population (Laist et al. 2001).

Vessel collisions with humpback whales remain a significant management concern, given the increasing abundance of humpback whales foraging in Alaska, as well as the growing presence of marine traffic in Alaska's coastal waters. Based on these factors, injury and mortality of humpback whales as a result of vessel strike will continue into the future (NMFS 2006).

4.3.1.4 Reproduction and Growth

Humpbacks give birth and presumably mate on low-latitude wintering grounds in January to March in the Northern Hemisphere. Females attain sexual maturity at 5 years in some populations and exhibit a mean calving interval of approximately two years (Clapham 1992, Barlow and Clapham 1997). Gestation is about 12 months, and calves probably are weaned by the end of their first year (Perry et al. 1999).

4.3.1.5 Feeding and Prey Selection

Humpback whales tend to feed on summer grounds and not on winter grounds. However, some opportunistic winter feeding has been observed at low latitudes (Perry et al. 1999). Humpback whales engulf large volumes of water and then filter small crustaceans and fish through their fringed baleen plates.

Humpback whales are relatively generalized in their feeding compared to some other baleen whales. In the Northern Hemisphere, known prey includes: euphausiids (krill); copepods; juvenile salmonids; Arctic cod; walleye pollock; pteropods; and cephalopods (Johnson and Wolman 1984, Perry et al. 1999). Foraging is confined primarily to higher latitudes (Stimpert et al. 2007). Feeding by humpback whales is observed most of the year in Auke Bay.

4.3.1.6 Diving and Social Behavior

In Hawaiian waters, humpback whales remain almost exclusively within the 1800 m isobath and usually within water depths less than 182 meters. Maximum diving depths are approximately 170 m (558 ft) (but usually <60 m [197 ft]), with a very deep dive (240 m [787 ft]) recorded off Bermuda (Hamilton et al. 1997). They may remain submerged for up to 21 min (Dolphin 1987a). Dives on feeding grounds ranged from 2.1-5.1 min in the north Atlantic (Goodyear unpublished manuscript). In Southeast Alaska average dive times were 2.8 min for feeding whales, 3.0 min for non-feeding whales, and 4.3 min for resting whales, with the deepest dives to 148m (Dolphin 1987a), while whales observed feeding on Stellwagen Bank in the North Atlantic dove <40m (Hain et al. 1992). Because most humpback whale prey is likely found above 300m, most humpback dives are probably relatively shallow. Hamilton et al. (1997) tracked one possibly feeding whale near Bermuda to 240 m depth.

In a review of the social behavior of humpback whales, Clapham (1996) reported that they form small, unstable social groups during the breeding season. During the feeding season they form small groups that occasionally aggregate on concentrations of food. Feeding groups are sometimes stable for long periods of time. There is good evidence of some territoriality on feeding (Clapham 1994, 1996) and calving areas (Tyack 1981).

4.3.1.7 Vocalization and Hearing

While there is no direct data on hearing in low-frequency cetaceans, the functional hearing range is anticipated to be between 7 Hz to 35 kHz (Watkins 1986, Au et al. 2006, Southall et al. 2007a, Ciminello et al. 2012, NMFS 2016b). Baleen whales have inner ears that appear to be specialized for low-frequency hearing. In a study of the morphology of the mysticete auditory apparatus, Ketten (1997) hypothesized that large mysticetes have acute infrasonic hearing.

Humpback whales produce a wide variety of sounds ranging from 20 Hz to 10 kHz. During the breeding season males sing long, complex songs, with frequencies in the 20-5000 Hz range and intensities as high as 181 dB (Payne 1970, Winn et al. 1970, Thompson et al. 1986). Source levels average 155 dB and range from 144 to 174 dB (Thompson et al. 1979). The songs appear to have an effective range of approximately 10 to 20 km. Animals in mating groups produce a variety of sounds (Tyack 1981, Silber 1986b).

Social sounds in breeding areas associated with aggressive behavior in male humpback whales are very different than songs and extend from 50 Hz to 10 kHz (or higher), with most energy in components below 3 kHz (Tyack and Whitehead 1983, Silber 1986a). These sounds appear to have an effective range of up to 9 km (Tyack and Whitehead 1983).

Humpback whales produce sounds less frequently in their summer feeding areas. Feeding groups produce distinctive sounds ranging from 20 Hz to 2 kHz, with median durations of 0.2-0.8 seconds and source levels of 175-192 dB (Thompson et al. 1986). These sounds are attractive and appear to rally animals to the feeding activity (D'Vincent et al. 1985, Sharpe and Dill 1997).

In summary, humpback whales produce at least three kinds of sounds:

1. Complex songs with components ranging from at least 20 Hz–24 kHz with estimated source levels from 144– 174 dB; these are mostly sung by males on the breeding grounds (Winn et al. 1970, Richardson et al. 1995, Au et al. 2000, Frazer and Mercado 2000, Au et al. 2006);
2. Social sounds in the breeding areas that extend from 50Hz – more than 10 kHz with most energy below 3kHz (Tyack and Whitehead 1983, Richardson et al. 1995); and
3. Feeding area vocalizations that are less frequent, but tend to be 20 Hz–2 kHz with estimated sources levels in excess of 175 dB re 1 Pa at 1m (Thompson et al. 1986, Richardson et al. 1995).

4.3.2 Status of WDPS Steller Sea Lions

The Steller sea lion (*Eumetopias jubatus*) is classified within the Order Carnivora, Suborder Pinnipedia, Family Otariidae, and Subfamily Otariinae. The Steller sea lion is the only extant species of the genus *Eumetopias*.

In the 1950s, the worldwide abundance of Steller sea lions was estimated at 240,000 to 300,000 animals, with a range that stretched across the Pacific Rim from southern California, Canada, Alaska, and into Russia and northern Japan. In the 1980s, annual rates of decline in the range of what is now recognized as the western population were as high as 15 percent. The worldwide Steller sea lion population declined by over 50 percent in the 1980s, to approximately 116,000 animals (Loughlin 1992). By 1990, the U.S. portion of the population had declined by about 80 percent relative to the 1950s. On April 5, 1990, NMFS issued an emergency interim rule to list the Steller sea lion as threatened (55 FR 12645). On November 26, 1990, NMFS issued the final rule to list Steller sea lions as a threatened species under the ESA (55 FR 49204).

NMFS reclassified Steller sea lions as two distinct population segments under the ESA in 1997 based on demographic and genetic dissimilarities—the western and eastern stock (62 FR 24345 (NMFS 1997)) (NMFS 1997). At that time, the WDPS, extending from Japan around the Pacific Rim to Cape Suckling in Alaska (144° W; Figure 5), was listed as endangered due to its continued decline and lack of recovery (NMFS 1997).

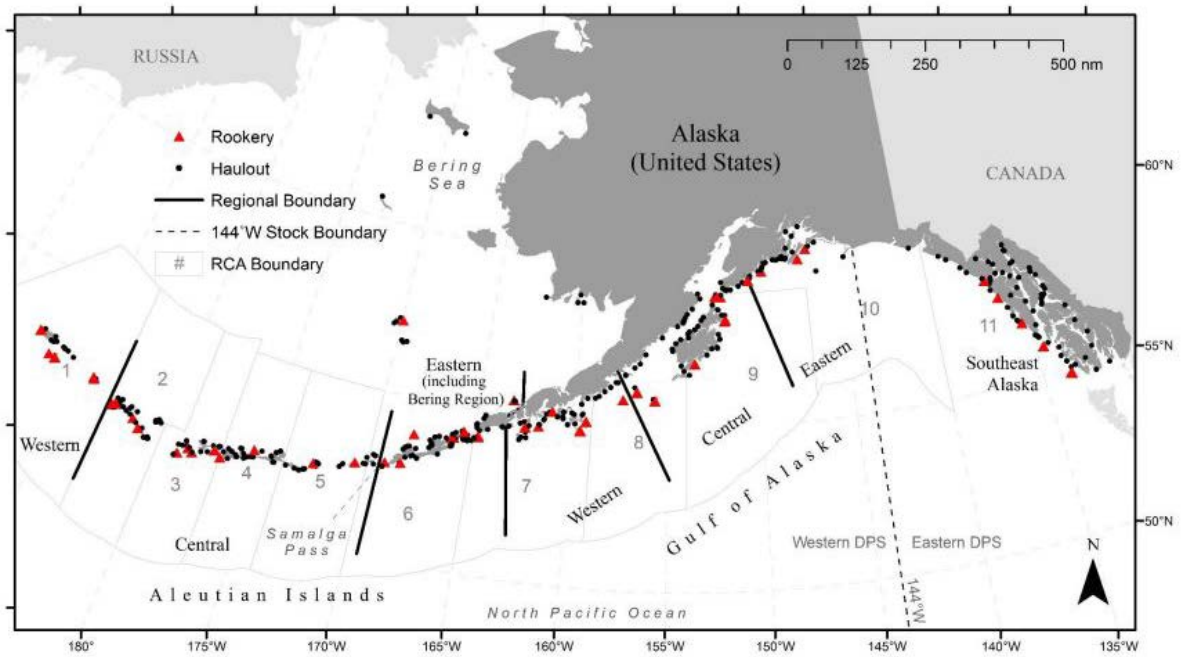


Figure 5. Map of Alaska showing the NMFS Steller sea lion survey regions, rookery, and haulout locations. The line (144°W) separating primary breeding rookeries of the eastern and western distinct population segments (EDPS vs WDPS) is also shown (Fritz et al. 2016).

The eastern Distinct Population Segment (EDPS), extending from Cape Suckling (144° W) east to British Columbia and south to California, was listed as threatened because of concern over WDPS animals ranging into the east, the larger decline overall in the U.S. population, human interactions, and the lack of recovery in California (NMFS 1997). The EDPS continued to recover, however, and NMFS removed the EDPS from the list of threatened species on November 4, 2013 (78 FR 66140 (NMFS 2013)), since the recovery criteria in the Steller Sea Lion Recovery Plan (NMFS 2008b) were achieved and the stock no longer met the definition of a threatened species under the ESA. Because the EDPS is no longer listed under the ESA, this Opinion does not analyze effects of the proposed action on that DPS.

In Alaska, population decline spread and intensified east and west of the eastern Aleutians in the 1980s. Between 1991 and 2000, overall counts of Steller sea lions at trend sites decreased 40%, an average annual decline of 5.4% (Loughlin and York 2000). In the 1990s, counts decreased more at the western (western Aleutians: -65%) and eastern edges (eastern and central GOA: -56% and -42%, respectively) of the U.S. range than they did in the center (range of -24% to -6% from the central Aleutians through the western Gulf of Alaska; (Fritz et al. 2008)). The decline continued in the WDPS until about 2000.

More recently, WDPS Steller sea lions have shown an increasing trend in abundance in much of their range. The 2016 Stock Assessment Report for WDPS Steller sea lions indicates a minimum population estimate of 50,983 individuals (Muto et al. 2017b). The population trend of non-pup WDPS Steller sea lions from 2000-2014 varies regionally, from -8.71 percent per year in the Western Aleutians to +5.07 percent per year in the eastern Gulf of Alaska. Despite incomplete surveys conducted in 2006 and 2007, the available data indicate that overall WDPS Steller sea lions have at least been stable since 2004 (when the last complete assessment was done),

although declines continue in the western Aleutian Islands. Overall, WDPS Steller sea lion pup and non-pups counts were estimated to be increasing at about 2 percent per year from 2000-2015 (Muto et al. 2017b).

4.3.2.1 Distribution

Movement of Steller sea lions between the WDPS and EDPS may affect population dynamics and patterns of underlying genetic variation. Studies have confirmed movement of animals across the 144° W boundary (Fritz et al. 2013), (Jemison et al. 2013), (Pitcher et al. 2007), and (Raum-Suryan et al. 2002). Jemison et al (2013) found regularly occurring temporary movements of WDPS Steller sea lions across the 144 W longitude boundary, and some WDPS females have given birth at White Sisters and Graves Rocks rookeries and have likely emigrated permanently. The vast majority of these sightings have been in northern Southeast Alaska, north of Frederick Sound. Fritz et al (2013) estimated an average annual breeding season movement of WDPS Steller sea lions to southeast Alaska of 917 animals.

Within the action area, Steller sea lions are anticipated to be predominantly from the EDPS; however, WDPS animals may be found there as well. Although there are no known Steller sea lion haulouts or rookeries directly inside the action area, the Benjamin Island haulout (over 25 km northwest of the action area) and Little Island (over 28 km northwest of the action area) are likely the predominant haulouts used by the Steller sea lions that are found transiting into and out of the action area. From 2000-2018, 280 unique branded individuals were documented at the Benjamin Island haulout. Of these, three individuals were from the WDPS and the remaining 277 were from the EDPS. During the same time period, 105 unique branded individuals were documented at the Little Island haulout. Of these, three individuals were from the WDPS and the remaining 102 were from the EDPS (personal communication, L. Jemison, ADF&G). Therefore, for purposes of this analysis, NMFS will assume that branded and unbranded animals follow similar movement patterns, and will consider 2% of the Steller sea lions in the action area to be from the endangered WDPS and the remaining 98% to be from the unlisted EDPS.

4.3.2.2 Threats to the Species

Brief descriptions of threats to Steller sea lions follow. More detailed information can be found in the Steller sea lion Recovery Plan (available at: http://alaskafisheries.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf), the Stock Assessment Reports (available at: http://www.nmfs.noaa.gov/pr/sars/species.htm), and the most recent Alaska Groundfish Biological Opinion (NMFS 2014a).

Natural Threats

Killer Whale Predation

The Steller Sea Lion Recovery Plan (NMFS 2008b) ranked predation by killer whales as a potentially high threat to the recovery of the WDPS. Steller sea lions in both the eastern and western stocks are eaten by killer whales (Dahlheim and White 2010).

Relative to other WDPS sub-regions, transient killer whale abundance and predation on Steller sea lions has been well studied in the Prince William Sound and Kenai Fjords portion of the eastern GOA. Steller sea lions represented 33% and 5% of the remains found in deceased killer

whale stomachs in the GOA, depending on the specific study results (Heise et al. 2003). The abundance of transient killer whales in the eastern GOA was estimated to be 18 (Matkin et al. 2012). Nineteen transient killer whales were identified in Kenai Fjords from 2000 through 2005 and killer whale predation on six pup and three juvenile Steller sea lions was observed. It has been estimated that 11% of the Steller sea lion pups born at the Chiswell Island rookery (in the Kenai Fjords area) were preyed upon by killer whales from 2000 through 2005. GOA transient killer whales were concluded to have a minor impact on the recovery of the sea lions in the area (Maniscalco et al. 2007). Steller sea lion pup mortality was studied using remote video at Chiswell Island. Pup mortality up to 2.5 months postpartum averaged 15.4%, with causes varying greatly across years (2001–2007). They noted that high surf conditions and killer whale predation accounted for over half the mortalities. Even at this level of pup mortality, the Chiswell Island Steller sea lion population has increased (Maniscalco et al. 2008).

Other studies in the Kenai Fjords/Prince William Sound region have also found evidence for high levels of juvenile Steller sea lion mortality. Based on data collected post-mortem from juvenile Steller sea lions implanted with life history tags, 12 of 36 juvenile Steller sea lions were confirmed dead, at least 11 of which were likely killed by predators (Horning and Mellish 2012). Horning and Mellish (2012) estimated that over half of juvenile Steller sea lions in this region are consumed by predators before age 4 yr. They suggested that low juvenile survival due to predation, rather than low natality, may be the primary impediment to recovery of the WDPS of Steller sea lions in the Kenai Fjords/Prince William Sound region.

Shark Predation

Steller sea lions may also be attacked by sharks, though little supporting evidence exists. The Steller Sea Lion Recovery Plan did not rank shark predation as a threat to the recovery of the WDPS (NMFS 2008b). Sleeper shark and sea lion home ranges overlap (Hulbert et al. 2006). A significant increase in the relative abundance of sleeper sharks occurred during 1989–2000 in the central GOA; however, samples of 198 sleeper shark stomachs found no evidence of Steller sea lion predation (Sigler et al. 2006). Sigler *et al.* (2006) sampled sleeper shark stomachs collected in the GOA near sea lion rookeries when pups may be most vulnerable to predation (i.e., first water entrance and weaning) and found that fish and cephalopods were the dominant prey. Tissues of marine mammals were found in 15 percent of the shark stomachs, but no Steller sea lion tissues were detected (Sigler et al. 2006). One study suggests that predation on Steller sea lions by sleeper sharks may be occurring: approximately 27% of observed events of predation on juvenile Steller sea lions could be attributed to Pacific sleeper sharks. Although these observations do not constitute proof of attacks on live Steller sea lions by Pacific sleeper sharks, these data indicate that Pacific sleeper sharks could be considered as a possible source of mortality of juvenile Steller sea lions in the GOA and Prince William Sound (Horning 2014).

Disease and Parasites

The Steller Sea Lion Recovery Plan (NMFS 2008b) ranked diseases and parasites as a low threat to the recovery of the WDPS. There is no new information on disease in the WDPS relative to the information in the BiOp for the Fishery Management Plan (FMP) for the Gulf of Alaska (FMP BiOp) (NMFS 2010).

Environmental Variability and Drivers in the Bering Sea and Gulf of Alaska/North Pacific

The Steller Sea Lion Recovery Plan ranks environmental variability as a potentially high threat to recovery of the WDPS (NMFS 2008b). The Bering Sea and Gulf of Alaska are subjected to large-scale forcing mechanisms that can lead to basin-wide shifts in the marine ecosystem resulting in significant changes to physical and biological characteristics, including sea surface temperature, salinity, and sea ice extent and amount. Physical forcing affects food availability and can change the structure of trophic relationships by impacting climate conditions that influence reproduction, survival, distribution, and predator-prey relationships at all trophic levels (Wiese et al. 2012). Populations of Steller sea lions in the GOA and Bering Sea have experienced large fluctuations due to environmental and anthropogenic forcing (Mueter et al. 2009b). As we work to understand how these mechanisms affect various trophic levels in the marine ecosystem, we must consider the additional effects of global warming, which are expected to be most significant at northern latitudes (IPCC 2013b).

Anthropogenic Threats

Fishing Gear and Marine Debris Entanglement

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked interactions with fishing gear and marine debris as a low threat to the recovery of the WDPS. Helker *et al.* (2015) report 352 cases of serious injuries to EDPS Steller sea lions from interactions with fishing gear between 2009 and 2013, mostly from troll gear and other marine debris. Raum-Suryan *et al.* (2009) found 386 animals either entangled in marine debris or having ingested fishing gear over the period 2000-2007 in Southeast Alaska and northern British Columbia.

The estimated mean annual mortality and serious injury rate in U.S. commercial fisheries in 2011-2015 is 31 Steller sea lions from the WDPS (31 from observer data + 0.2 from stranding data). No observers have been assigned to several fisheries that are known to interact with WDPS Steller sea lions; thus, the estimated mortality and serious injury is likely an underestimate of the actual level (Muto et al. 2018).

Competition between Commercial Fishing and Steller Sea Lions for Prey Species

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked competition with fisheries for prey as a potentially high threat to the recovery of the WDPS. Substantial scientific debate surrounds the question about the impact of potential competition between fisheries and Steller sea lions. It is generally well accepted that commercial fisheries target several important Steller sea lion prey species (NRC 2003) including salmon species, Pacific cod, Atka mackerel, pollock, and others. These fisheries could be reducing sea lion prey biomass and quality at regional and/or local spatial and temporal scales such that sea lion survival and reproduction are reduced. NMFS (2014) analyzes this threat in detail.

Subsistence/Native Harvest

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked subsistence harvest as a low threat to the recovery of the WDPS. The most recent subsistence harvest data were collected by the Alaska Department of Fish and Game through 2008 and by the Ecosystem Conservation Office of the Aleut Community of St. Paul through 2009. The mean annual subsistence take from the WDPS in Alaska over the 5-year period from 2004 through 2008, combined with the mean take over the 2005–2009 period from St. Paul, was 199 Steller sea lions/year (Muto et al. 2018a).

Illegal Shooting

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked illegal shooting as a low threat to the recovery of the WDPS. Illegal shooting of sea lions was thought to be a potentially significant source of mortality prior to the listing of sea lions as threatened under the ESA in 1990. The NMFS Alaska Stranding Program documents 60 Steller sea lions with suspected or confirmed firearm injuries from 2000 – 2016 in Southeast Alaska (NMFS 2017b).

On November 6, 2018, two men were sentenced in federal court for harassing and killing Steller sea lions with shotguns. The sentencing case as the result of a federal investigation after 15 Steller Sea lions were found dead along the sand bars at the mouth of Copper River during the opening of the 2015 Copper River salmon gillnet season.

Mortality and Disturbance from Research Activities

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked effects from research activities as a low threat to the recovery of the WDPS. Mortalities may occur incidental to marine mammal research activities authorized under ESA and MMPA permits issued to a variety of government, academic, and other research organizations. Between 2011 and 2015, there were three mortalities resulting from research on the WDPS of Steller sea lions (Muto et al 2018).

Vessel Disturbance

Vessel traffic, in the form of sea lion research, tourism, and other marine vessel traffic, may disrupt sea lion feeding, breeding, or aspects of sea lion behavior. The Steller Sea Lion Recovery Plan (NMFS 2008) ranked disturbance from these sources as a low threat to the recovery of the WDPS. Disturbance from these sources are not likely having population level effects in the WDPS.

Risk of Vessel Strike

NMFS Alaska Region Stranding Program has records of at least four occurrences of Steller sea lions being struck by vessels in Southeast Alaska; three were near Sitka, one was south of Juneau. Vessel strike is not considered a major threat to Steller sea lions.

Toxic Substances

The Steller Sea Lion Recovery Plan ranked the threat of toxic substances as medium (NMFS 2008). The risk of spills associated with this project is being well-mitigated, and sediment testing for this project indicates contaminant levels are below thresholds of concern (PND Engineers, 2018).

Climate Change and Ocean Acidification

Marine ecosystems are susceptible to impacts from climate change and ocean acidification linked to increasing global anthropogenic CO_2 emissions. As discussed in the Groundfish Fisheries Management Plan Opinion (FMP)(NMFS 2010), there is strong evidence that ocean pH is decreasing, ocean temperatures are increasing, and that this warming is accentuated in the Arctic. Scientists are working to understand the impacts of these changes to marine ecosystems; however, the extent and timescale over which WDPS Steller sea lions may be affected by these changes is unknown. Readers are referred to the discussion on climate change in Section 4.1.6 of the Groundfish FMP Opinion (NMFS 2010) and to the discussion on ocean acidification in

Section 7.3 of the Final Environmental Impact Statement for the Steller sea lion protection measures (NMFS 2014c).

Reproduction and Growth

Detectable changes in a population's birth rate may provide insight into the nature of the factors controlling Steller sea lion population dynamics. While this has been broadly recognized and the focus of many studies, few empirical data exist to directly infer birth rate in wild Steller sea lions. The best data for inferring WDPS Steller sea lion birth rate are available for the central Gulf of Alaska (GOA) where collections from the 1970s and 1980s provide direct measurements and a basis for comparing birth rates in the central GOA over time. The numerous models developed from these historic collections yield generally consistent results: the decline of Steller sea lions in the central GOA in the 1980s was driven by low juvenile survival and the continued decline in the 1990s was likely driven by reduced birth rate.

Several models have demonstrated the relevance of spatial heterogeneity in vital rates (birth rate, death rate, population growth rate) among subpopulations in the WDPS of Steller sea lion. As such, vital rates from one Steller sea lion subpopulation may not be applicable to another, especially where the rate and direction of population growth diverge. Another common conclusion from the age-structured modeling studies is that the fraction of juveniles in the non-pup counts is an important variable for inferring changes in vital rates over time (Muto et al. 2017b). Many studies have concluded that the available count data do not provide insight into the relative contribution of survival and birth rate in current Steller sea lion population trends. However, Holmes *et al.* (Holmes 2007) included information on changes in the juvenile fraction of the population to help estimate vital rate changes in the central GOA sea lion population. This information improves the ability to estimate vital rate changes in the absence of sightings of known–age individuals.

The best available data from the eastern GOA suggest that birth rate is similar to pre-decline birth rates, while the best available data from the central GOA suggest that the birth rate continues to decline steadily relative to 1976 levels. Therefore, birth rate, an important parameter driving population trends, is not consistent across the WDPS and is highest in the eastern portion of the WDPS Steller sea lion range (Muto et al. 2017b)

Feeding and Prey Selection

Steller sea lions consume a variety of demersal, semi-demersal, and pelagic prey, indicating a potentially broad spectrum of foraging styles, probably based primarily on availability. Overall, the available data suggest two types of distribution at sea by Steller sea lions: 1) less than 20 km (12 mi) from rookeries and haulout sites for pups, juveniles, and adult females with pups, and 2) much larger areas (greater than 20 km [12 mi]) where these and other Steller sea lions may range to find optimal foraging conditions once they are no longer tied to rookeries and haulout sites for nursing and reproduction. Large seasonal differences in foraging ranges have been observed associated with seasonal movements of prey (Merrick et al. 1997).

The seasonal ecology of Steller sea lions in Southeast Alaska has been studied by relating the distribution of sea lions to prey availability (Womble et al. 2005, Womble et al. 2009). Figure 6 depicts a likely seasonal foraging strategy for Steller sea lions in Southeast Alaska. These results

suggest that seasonally aggregated high-energy prey species, such as eulachon and herring in late spring and salmon in summer and fall, influence the seasonal distribution of Steller sea lions in some areas of Southeast Alaska. Similarly, the Status Review of Southeast Alaska Pacific Herring (NMFS 2014d) generalizes that sea lions forage on herring aggregations in winter, on spawning herring and eulachon in spring, and on various other species throughout the year. Herring fishery managers use the presence of sea lions on the spring spawning grounds as an indicator that spawning is imminent, even though herring are in deeper adjacent waters for weeks prior to sea lion arrival (Kruse 2000).

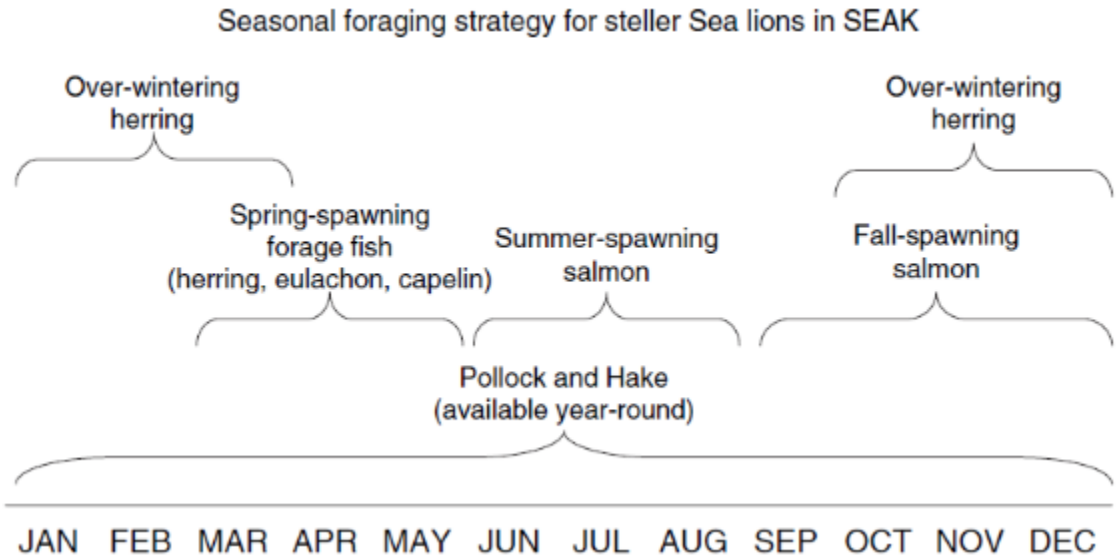


Figure 6. Seasonal foraging ecology of SSL. Reproduced with permission from Womble et al. 2009.

The action area and surrounding waters contain abundant sources of prey species, which draw Steller sea lions in to forage year-round.

Diving and Social Behavior

Steller sea lions are very vocal marine mammals. Roaring males often bob their heads up and down when vocalizing. Adult males have been observed aggressively defending territories. Steller sea lions gather on haulouts year-round and rookeries during the breeding season and regularly travel as far as 250 miles to forage for seasonal prey. However, females with pups likely forage much closer to their rookery. Diving is generally to depths of 600 feet or less and diving duration is usually 2 minutes or less.

Vocalization and Hearing

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. NMFS categorizes Steller sea lions in the otariid pinniped functional hearing group, with an applied frequency range between 60 Hz and 39 kHz in water (NMFS 2016b). Steller sea lions have similar hearing thresholds in-air and underwater to other otariids. In-air hearing ranges from 0.250-30 kHz, with their best hearing sensitivity at 5-14.1 kHz (Mulsow and Reichmuth 2010). An underwater audiogram shows the typical mammalian U-shape. Higher hearing thresholds, indicating poorer sensitivity, were observed for signals below 16 kHz and above 25 kHz (Kastelein et al. 2005).

5 ENVIRONMENTAL BASELINE

The "environmental baseline" includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). We also consider natural factors that contribute to the current status of the species, its habitat, and ecosystem in the action area.

5.1 Stressors on Mexico DPS Humpback Whales

Disturbance and risk of vessel strike from transiting vessels, competition for prey, effects from climate change, risk of entanglement, and the risk of oil spills (or other hazardous materials) could be sources of stress to humpback whales in the action area. A short description and summary of the effects of these stressors are presented below. More detailed analyses are available in the most recent humpback whale recovery plan (NMFS 1991b) and ESA Status Review (Bettridge et al. 2015).

5.1.1 Vessel Disturbance and Strike

Vessel-based recreational activities, commercial fishing, shipping, whale-watching, the Alaska Marine Highway System (AMHS), and general transportation occur within the action area regularly. All of these sources of vessel traffic increase underwater noise and contribute to the risk of vessel-whale collisions.

Vessel strikes are a leading cause of mortality in large whales. Neilson *et al.* (2012) reported the following summary statements about humpback whale and vessel collisions in Southeast Alaska.

- Most vessels that strike whales are less than 49 ft long
- Most collisions occur at speeds over 13 knots
- Most collisions occur between May and September
- Calves and juveniles appear to be at higher risk of collisions than adult whales

Further, the authors used previous locations of whale strikes to produce a kernel density estimation. The high risk areas shown in red in Figure 7 are also popular whale-watching destinations (Neilson et al. 2012). Although some of the risk factors for ship strike exist in Auke Bay (there are many vessel transits between May-Sept, with vessels less than 49 feet traveling over 13 knots), the action area is not identified as an area of high risk in this analysis.

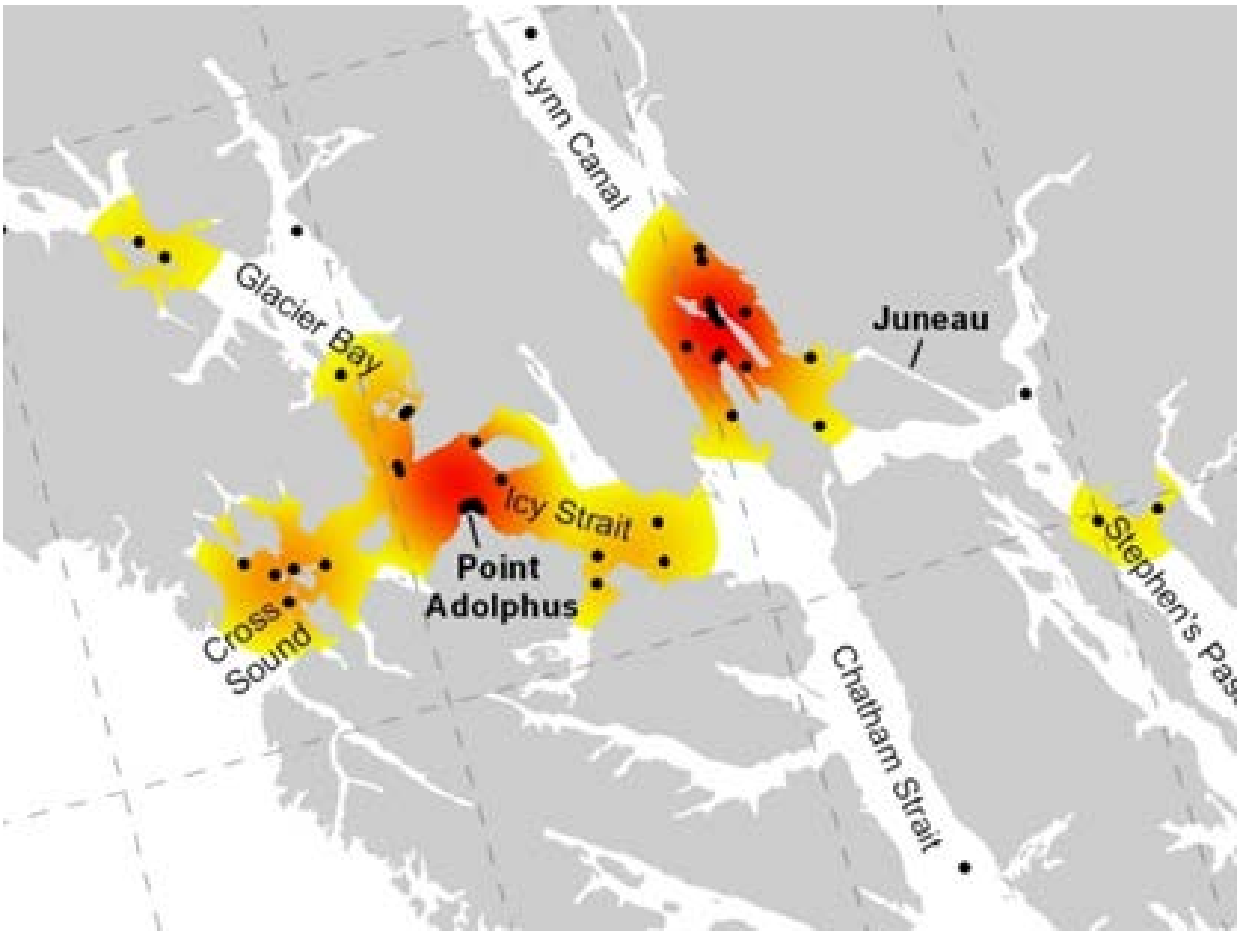


Figure 7. High Risk Areas for Vessel Strike in northern Southeast Alaska. Used with permission from (Neilson et al. 2012).

NMFS implemented regulations to minimize harmful interactions between ships and humpback whales in Alaska (see 50 CFR §§ 216.18, 223.214, and 224.103(b)). These regulations require that all vessels:

a. Not approach within 100 yards of a humpback whale, or cause a vessel or other object to approach within 100 yards of a humpback whale,

b. Not place vessel in the path of oncoming humpback whales causing them to surface within 100 yards of vessel,

c. Not disrupt the normal behavior or prior activity of a whale, and

d. Operate vessel at a slow, safe speed when near a humpback whale. Safe speed is defined in regulation (see 33 CFR § 83.06).

Since 2011, cruise lines, pilots, NMFS, and National Park Service (NPS) biologists have worked together to produce weekly whale sightings maps to improve situational awareness for cruise ships and state ferries in Southeast Alaska. In 2016, NMFS and NPS launched Whale Alert, another voluntary program that receives and shares real-time whale sightings with controlled access to reduce the risk of ship strike and contribute to whale avoidance.

In addition to these voluntary marine mammal viewing guidelines, many of the marine mammal viewing tour boats voluntarily subscribe to even stricter approach guidelines by participating in the Whale SENSE program. NMFS implemented Whale SENSE Alaska in 2015, which is a voluntary program developed in collaboration with the whale-watching industry that recognizes companies who commit to responsible practices. More information is available at https://whalesense.org/.

5.1.2 Competition for Prey

Competition for prey between humpback whales, other marine life, and humans may exist. Humpback whales feed on schooling fish, including species that are harvested by humans commercially or for personal use. Given the recent positive abundance trends for humpback whales discussed in Section 4.3.1.2 and the relatively small scale of the action area compared to commercial and personal use fishing grounds, NMFS expects any competition for prey in the action area to be insignificant.

5.1.3 Climate Change

Overwhelming data indicate the planet is warming (IPCC 2014), which poses a threat to most Arctic and Subarctic marine mammals.

Climate change has the potential to impact species abundance, geographic distribution, migration patterns, timing of seasonal activities (IPCC 2014), and species viability into the future. Climate change is also expected to result in the expansion of low oxygen zones in the marine environment(Gilly et al. 2013) Though predicting the precise consequences of climate change on highly mobile marine species, such as many of those considered in this opinion, is difficult (Simmonds and Isaac 2007), recent research has indicated a range of consequences already occurring.

The indirect effects of climate change would result from changes in the distribution of temperatures suitable for the distribution and abundance of prey and the distribution and abundance of competitors or predators. For example, variations in the localized recruitment of herring in or near the action area caused by climate change could change the distribution and localized abundance of humpback whales. However, we have no information to indicate that this has happened to date. Warmer waters could favor productivity of some species of forage fish, but the impact on recruitment of important prey fish of humpback whales is unpredictable. Recruitment of large year-classes of gadids (e.g., pollock) and herring has occurred more often in warm than cool years, but the distribution and recruitment of other fish (e.g., osmerids) could be negatively affected (NMFS 2008a).

5.1.4 Entanglement

Entanglement of cetaceans in fishing gear and other human-made material is a major threat to their survival worldwide. Other materials also pose entanglement risks including marine debris, mooring lines, anchor lines, and underwater cables. While in many instances, marine mammals may be able to disentangle themselves (see Jensen et al. 2009), other entanglements result in lethal and sublethal trauma to marine mammals including drowning, injury, reduced foraging, reduced fitness, and increased energy expenditure (van der Hoop et al. 2016).

Entangled marine mammals may drown or starve due to being restricted by gear, suffer physical trauma and systemic infections, or be hit by vessels due to an inability to avoid them. Entanglement can include many different gear interaction scenarios, but the following have occurred with humpback whales:

- Gear loosely wrapped around the marine mammal's body that moves or shifts freely with the marine mammal's movement and does not indent the skin can result in disfigurement.
- Gear that encircles any body part and has sufficient tension to either indent the skin or to not shift with marine mammal's movement can cause lacerations, partial or complete fin amputation, organ damage, or muscle damage and interfere with mobility, feeding, and breathing. Chronic tissue damage from line under pressure can compromise a whale's physiology. Fecal samples from entangled whales had extremely high levels of cortisols (Rolland et al. 2005), an immune system hormone. Extended periods of pituitary release of cortisols can exhaust the immune system, making a whale susceptible to disease and infection.

The NMFS Alaska Marine Mammal Stranding Network database has records of 199 large whale entanglements between 1990 and 2016. Of these, 67% were humpback whales. Most humpbacks get entangled with gear between the beginning of June and the beginning of September, when they are on their nearshore foraging grounds in Alaska waters. Between 1990 and 2016, 29% of humpback entanglements were with pot gear and 37% with gillnet gear. Longline gear comprised only 1–2% of all humpback fishing gear interactions.

5.1.5 Pollution

A number of intentional and accidental discharges of contaminants pollute the marine waters of Alaska annually. Intentional sources of pollution, including domestic, municipal, and industrial wastewater discharges, are managed and permitted by the Alaska Department of Environmental Conservation (ADEC). Pollution may also occur from unintentional discharges and spills.

According to the ADEC's most recent list of impaired waterbodies, there are no impaired waterbodies in the action area[1]. However, marine water quality in the action area can be affected by discharges from shipyard and other industrial activity, treated sewer system outflows, vessels operating in marine waters, and sediment runoff from paved surfaces and disturbed areas (HDR 2017).

[1] ADEC. Division of Water. Impaired Waters Map. Available at http://www.arcgis.com/home/webmap/viewer.html?webmap=5987f5c7a33846b19b9097dddcf8332a accessed December 2018.

A search of the ADEC Contaminated sites database[2] showed that there are four land-based active contaminated sites in the vicinity of Auke Bay. These include the FAA Coghlan Island station site (Hazard ID 4176); a failed 550-gallon underground home heating oil tank (Hazard ID 4536); the Glacier Highway Battery Dump Site (Hazard ID 4636); and the Auke Bay RV Park (Hazard ID 26824). Clean-up is in progress at the four sites.

5.2 Stressors on WDPS Steller Sea Lions

Disturbance from vessel transit, competition for prey, effects from climate change, risk of entanglement, and the risk of oil spills (or other hazardous materials) could be sources of stress to Steller sea lions in the action area. Short descriptions and summaries of the effects of these stressors are presented below. A more detailed analysis is available in a recent biological Opinion of the effects of Alaska Groundfish fisheries (NMFS 2014) and the SSL recovery plan (NMFS 2008).

5.2.1 Vessel Disturbance and Strike

Vessel-based recreational activities, commercial and charter fishing, shipping, and general transportation occur within the action area regularly. All of which increase ambient in-air and underwater noise and pose risk of vessel-whale collisions. NMFS provides a voluntary framework for vessel operators to follow a code of conduct to reduce marine mammal interactions including:

- remain at least 100 yards from marine mammals,
- time spent observing individual(s) should be limited to 30 minutes, and
- vessels should leave the vicinity if they observe Steller sea lion behaviors such as these:
    - Increased movements away from the disturbance, hurried entry into the water by many animals, or herd movement towards the water; or
    - Increased vocalization, aggressive behavior by many animals towards the disturbance, or several individuals raising their heads simultaneously.

These guidelines can be viewed at https://alaskafisheries.noaa.gov/pr/mm-viewing-guide.

Although there are documented occurrences of Steller sea lions being struck by vessels in Southeast Alaska (see Section 4.3.2), vessel strike has not been documented in the action area and is not considered a major threat to Steller sea lions.

5.2.2 Competition for Prey

Competition for prey species could exist between Steller sea lions and other marine life and Steller sea lions and commercial fishing. NMFS (2008) noted there are commercial fisheries that

[2] ADEC. Division of Spill Prevention and Response. Contaminated Sites Map. Available at http://www.arcgis.com/home/webmap/viewer.html?webmap=315240bfbaf84aa0b8272ad1cef3cad3&center=-131.656975,55.344914&level=15&marker=-131.656975,55.344914,,Click%20on%20arrow%20to%20get%20information%20about%20this%20site accessed December 2018.

target key Steller sea lion prey, including Pacific cod, salmon, and herring in the eastern portion of their range. It was recognized that in some regions, fishery management measures appear to have reduced this potential competition (e.g., no trawl zones and gear restrictions on various fisheries in southeast Alaska) and in others a very broad distribution of prey and a lack of seasonal overlap between fisheries and prey preference by sea lions may minimize competition as well. Given the recent abundance trends discussed above in Section 4.3.2 and the relatively small scale of the action area compared to nearby fishing grounds, NMFS expects any competition for prey in the action area to be insignificant.

5.2.3 Climate Change

The Steller Sea Lion Recovery Plan ranks environmental variability as a potentially high threat to recovery of the western DPS (NMFS 2008). The Bering Sea and Gulf of Alaska are subjected to large-scale forcing mechanisms that can lead to basin-wide shifts in the marine ecosystem resulting in significant changes to physical and biological characteristics, including sea surface temperature, salinity, and sea ice extent and amount. Physical forcing affects food availability and can change the structure of trophic relationships by impacting climate conditions that influence reproduction, survival, distribution, and predator-prey relationships at all trophic levels in or near the action area. Populations of Steller sea lions in the Gulf of Alaska and Bering Sea have experienced large fluctuations due to environmental and anthropogenic forcing (Mueter et al. 2009). As we work to understand how these mechanisms affect various trophic levels in the marine ecosystem, we must consider the additional effects of global warming, which are expected to be most significant at northern latitudes (Mueter et al. 2009a, IPCC 2013a)

The effects of climate changes to the marine ecosystems of the Gulf of Alaska, including Lynn Canal, and how they may affect Steller sea lions are uncertain. Warmer waters could favor productivity of some species of forage fish, but the impact on recruitment of important prey fish of Steller sea lions is unpredictable. Recruitment of large year-classes of gadids (e.g., pollock) and herring has occurred more often in warm than cool years, but the distribution and recruitment of other fish (e.g., osmerids) could be negatively affected (NMFS 2008).

5.2.4 Entanglement

Although the Steller Sea Lion Recovery Plan (NMFS 2008b) ranked interactions with fishing gear and marine debris as a low threat to the recovery of the western DPS, it is likely that many entangled sea lions may be unable to swim to shore once entangled, may die at sea, and may not be available to count (Loughlin 1986, Raum-Suryan et al. 2009). Based on data collected by ADF&G and NMFS, Helker *et al.* (2016) reported Steller sea lions to be the most common species of human-caused mortality and serious injury between 2011 and 2015. There were 468 cases of serious injuries to eastern DPS Steller sea lions from interactions with fishing gear and marine debris. While these cases are attributed to the eastern DPS because they occurred east of 144° W, eastern and western DPS animals overlap in Southeast Alaska, and these takes may have been western DPS animals. Raum-Suryan et al. (2009) observed a minimum of 386 animals either entangled in marine debris or having ingested fishing gear over the period 2000-2007 in Southeast Alaska and northern British Columbia. Over the same period, there were 241 cases of mortality and serious injury reported for the western DPS: 31 in U.S. commercial fisheries, 1.4 in unknown fisheries (commercial, recreational, or subsistence), 2 in marine debris, 2.6 due to other

causes (arrow strike, entangled in hatchery net, illegal shooting, research), and 204 in subsistence harvest. These animals mostly interacted with observed trawl (13) longline (2.8) troll (1), and gillnet (15) fisheries, typically resulting in death (Muto et al. 2018b).

The minimum estimated mortality rate of western Steller sea lions incidental to all U.S. commercial fisheries is 32 sea lions per year, based on PSO data (31) and stranding data (1.4) where PSO data were not available. Several fisheries that are known to interact with the western DPS have not been observed reaching the minimum estimated mortality rate (Muto et al. 2018b).

5.2.5 Pollution

The risk of oil spills or other hazardous materials to Steller sea lions is similar to humpback whales. For more information, please see Section 5.1.5 above.

6 EFFECTS OF THE ACTION

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02).

This biological Opinion relies on the best scientific and commercial information available. We try to note areas of uncertainty, or situations where data is not available. In analyzing the effects of the action, NMFS gives the benefit of the doubt to the listed species by minimizing the likelihood of false negative conclusions (concluding that adverse effects are not likely when such effects are, in fact, likely to occur).

We organize our effects analysis using a stressor identification – exposure – response – risk assessment framework for the proposed activities.

We conclude this section with an *Integration and Synthesis of Effects* that integrates information presented in the *Status of the Species* and *Environmental Baseline* sections of this Opinion with the results of our exposure and response analyses to estimate the probable risks the proposed action poses to endangered and threatened species.

6.1 Project Stressors

Based on our review of the Biological Assessment (ADOT&PF 2017a), the IHA application (ADOT&PF 2017b), the proposed notice for issuing the IHA (NMFS 2018), personal communications, and other available literature as referenced in this Opinion, our analysis recognizes that the proposed construction activities during the Statter Harbor Improvement Project may cause these primary stressors:

1. in-water sound fields produced by impulsive noise sources such as: impact pile driving and blasting;
2. in-water sound fields produced by continuous noise sources such as: vibratory pile removal, vibratory pile driving, dredging, drilling, and vessels;
3. in-air sound fields produced by impulsive noise sources such as: impact pile driving and blasting;
4. risk of vessels striking marine mammals;
5. seafloor disturbance from drilling activities, pile driving and placement of fill; and
6. indirect effects such as: increased disturbance from whale watching vessels.

Most of the analysis and discussion of effects to WDPS Steller sea lions and Mexico DPS humpback whales from this action will focus on exposure to in water impulsive and continuous noise sources because these stressors will likely have the most direct impacts on listed species.

6.1.1 Stressors Expected to Have a Nominal Affect on ESA-listed Species

Based on a review of available information, we determined which of the possible stressors may occur, but for which the likely effects are discountable or insignificant. A discountable effect is one that is extremely unlikely to occur. Insignificant effects are responses that are incapable of being detected, measured, or evaluated (NMFS 2014b). If the impact will likely be negative, but the consequences are so minute that a person could not measure or detect such responses, then it is appropriate to conclude insignificant effects.

6.1.1.1 In-Air Noise

NMFS uses the following thresholds for in-air sound pressure levels from broadband sounds that cause Level B behavioral disturbance under section 3(18)(A)(ii) of the MMPA:

- 100 dB re 20μPa_{rms} for non-harbor seal pinnipeds

Temporary fill will be placed to confine the blasts and mitigate noise from the blasting portion of this project. While WDPS Steller sea lions may be exposed to in-air noise from the pile driving activities, a standard sound attenuation model suggests that sound generated from impact pile driving would attenuate to the 100db rms criterion within 158 feet from the pile, and in-air noise from vibratory driving would fall below 100 db rms threshold altogether (NMFS 2017a). Since 100 bd is below the level that could harm Steller sea lions, this in-air noise impact is expected to be minimal. There are no surveyed haulouts within the action area, and any WDPS Steller sea lions exposed to the project sound would only be exposed after swimming into the action area. Any WDPS Steller sea lion close enough to the sound source to be considered a 'take' from in-air noise associated with pile driving would already have been accounted for by in-water take, or avoided due to the proposed mitigation measures.

6.1.1.2 Vessel strike

The possibility of vessel strike associated with the proposed action is extremely unlikely. Tug towing operations for construction occur at relatively low speed limits (5 knots), and the maximum transit speed for tug and barge is anticipated to be 8–10 knots. Once vessels get to the construction site, they will be anchored. Skiffs may transport workers very short distances and low speeds from shore to the work platform. Due to the common presence of commercial and recreational vessels in the action area and habituation of marine mammals to regular vessel traffic, the use of slow-moving tugboats and barges associated with construction of the project is not anticipated to adversely affect ESA-listed species.

Although risk of vessel strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the Recovery Plan for this species states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated (e.g., near rookeries or haulouts) (NMFS 2008b). Since 2000, there have been four reported ship strikes of Steller sea lions within Alaska, with three occurring in Southeast Alaska.

Although Statter Harbor has high volumes of vessel traffic, the likelihood of a vessel strike as a result of the proposed action is low. When vessels are required to transport workers to the work platform, they will be transported by skiff at low speeds across very short distances from the shore. In addition, all vessels will be required to observe the Alaska humpback whale approach regulations (100 yards), which will further reduce the likelihood of interactions.

In general, the association in space and time of project-related vessels and humpback whales and Steller sea lions is highly unlikely because 1) vessel traffic associated with the proposed action will be minimal, and 2) the duration of operations is limited to fall and winter months when the majority of humpbacks migrate from the area. In addition, NMFS's regulations for approaching humpback whales require that vessels not approach within 100 yards. All of these factors limit the risk of strike. We conclude the probability of strike occurring is extremely unlikely and therefore effects are minor.

6.1.1.3 Disturbance to seafloor

A Sampling and Analysis Plan was developed for the dredge area and was implemented in October of 2016. The sample results indicated the material did not contain any contaminants above the regulatory screening levels and thus is suitable for in-water disposal. USACE issued a determination of in-water suitability of disposal materials under POA-2008-782-M4 (PND Engineers 2018b).

Neither the Auke Bay coastline nor the submerged habitats in the Statter Harbor action area are pristine marine environments, however the Dredge Material Characterization Report (Appendix C of CBJ D&H IHA Request (PND Engineers 2018a)) that summarizes testing results from the 2015 sampling program found that all contaminants of concern are below Alaska Department of Environmental Conservation (ADEC) screening levels (PND Engineers 2018b).

During drilling, pile removal, and pile installation, a temporary and localized increase in turbidity and sedimentation near the seafloor is possible in the immediate area surrounding each pile. In general, turbidity associated with pile installation is expected to be localized to about a 25-ft radius around the pile (Everitt et al. 1980).

Considering local currents, tidal action, and implementation of best management practices, any potential water quality exceedances would likely be temporary and highly localized. The local tides and currents would disperse suspended sediments from pile driving operations at a moderate to rapid rate depending on tidal stage.

Therefore, the impact from increased turbidity levels would be negligible to humpback whales and Steller sea lions, and would not cause a disruption of behavioral patterns that would rise to the level of harassment. Therefore, we conclude that the effects from this stressor are so small that they are not measurable.

6.1.1.4 Indirect effects of increased disturbance from whale watching vessels

Although the project does not propose to increase the number of whale watching vessels in the area, the new staging areas and separate launch facilities propose to alleviate current congestion and separate conflicting uses by providing a separate moorage for the existing commercial sightseeing fleet. The new moorage facility is specifically intended to serve the existing commercial fleet, including whale-watching, sightseeing and charters. This action is expected to increase efficiency and could ultimately make it easier for more whale-watching boats to function out of the harbor and/or for boats to operate more efficiently and run more tours from the harbor. Juneau-area humpback whales already experience relatively high levels of vessel activity from the existing whale-watching and charter industries and any increase to the overall

vessel traffic near humpback whales and Steller sea lions could contribute to impacts to listed humpback whales and Steller sea lions through increased noise, harassment, displacement, pollution, etc.; however, these incremental effects are not likely to be measurable or distinguishable from existing impacts because they are so few in number the addition of added vessels, cumulatively, would only be a minor increase.

6.1.2 Stressors Likely to Adversely Affect ESA-listed Species

The following stressors are likely to adversely affect MDPS humpback whales and WDPS Steller sea lions: underwater noise from pile removal, blasting, pile driving, rock drilling, and dredge and fill operations. These stressors will be analyzed below in the *Exposure Analysis.*

6.1.2.1 Acoustic thresholds

As discussed in Section 2, *Description of the Proposed Action*, CBJ D&H intends to conduct construction activities that would introduce acoustic disturbance.

Non-explosive Sources

Since 1997, NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater and in-air sounds that might result in impacts to marine mammals (70 FR 1871). NMFS recently developed comprehensive guidance on sound levels likely to cause injury to marine mammals through onset of permanent and temporary thresholds shifts (PTS and TTS; Level A harassment), also known as permanent or temporary hearing loss (81 FR 51694). NMFS is in the process of developing guidance for behavioral disruption (Level B harassment). However, until such guidance is available, NMFS uses the following conservative thresholds of underwater sound pressure levels[3], expressed in root mean square[4] (rms), from broadband sounds that cause behavioral disturbance, and referred to as Level B harassment under section 3(18)(A)(ii) of the Marine Mammal Protection Act (MMPA):

- impulsive sound: 160 dB re 1 μPa_{rms}
- continuous sound: 120 dB re 1μPa_{rms}

Under the PTS/TTS Technical Guidance, NMFS uses the following thresholds for underwater sounds that cause injury, referred to as Level A harassment under section 3(18)(A)(i) of the MMPA (NMFS 2016b). These acoustic thresholds are presented using dual metrics of cumulative sound exposure level (L_E) and peak sound level (PK) for impulsive sounds and L_E for non-impulsive sounds:

[3] Sound pressure is the sound force per unit micropascals (μPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 μPa, and the units for underwater sound pressure levels are decibels (dB) re 1 μPa.

[4] Root mean square (rms) is the square root of the arithmetic average of the squared instantaneous pressure values.

Table 4. PTS Onset Acoustic Thresholds for Level A Harassment (NMFS 2016b).

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	**Non-impulsive**
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of $1\mu Pa^2s$. The subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Explosive Sources

Based on the best available science for explosive sources, NMFS uses the acoustic and pressure thresholds indicated in Table 5 to predict the onset of behavioral harassment, PTS, tissue damage, and mortality:

Table 5. Explosive acoustic and pressure thresholds for marine mammals.

Group	Level B harassment		Level A harassment	Serious injury		Mortality
	Behavioral (multiple detonations)	TTS	PTS	Gastro-intestinal tract	Lung	
Low-freq cetacean	163 dB SEL	168 dB SEL or 213 dB SPL_{pk}	183 dB SEL or 219 dB SPL_{pk}	237 dB SPL	$39.1M^{1/3}$ $(1+[D/10.081])^{1/2}$ Pa-sec	$91.4M^{1/3}$ $(1+[D/10.081])^{1/2}$ Pa-sec
Otariidae	183 dB SEL	188 dB SEL or 226 dB_{pk}	203 dB SEL or 232 dB SPL_{pk}			
M = mass of the animals in kg D = depth of animal in m						

In addition, NMFS uses the following thresholds for in-air sound pressure levels from broadband sounds that cause Level B behavioral disturbance under section 3(18)(A)(ii) of the MMPA:

- 100 dB re 20μPa_{rms} for non-harbor seal pinnipeds

The MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment] (16 USC § 1362(18)(A)).

While the ESA does not define "harass," NMFS recently issued guidance interpreting the term "harass" under the ESA as: to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (Wieting 2016).

As described below, we anticipate that exposures to listed marine mammals from noise associated with the proposed action may result in disturbance and potential injury. Due to the use of mitigation measures discussed in detail in Section 2.1.2 above, it is unlikely but possible that PTS could occur from blasting. CBJ D&H is requesting authorization of Level A takes associated with the blasting activities, but no mortalities are anticipated.

6.2 Exposure Analysis

As discussed in the *Approach to the Assessment* section of this Opinion, exposure analyses are designed to identify the listed resources that are likely to co-occur with these effects in space and time and the nature of that co-occurrence. In this step of our analysis, we try to identify the number, age (or life stage), and sex of the individuals that are likely to be exposed to an action's effects, and the populations or subpopulations those individuals represent.

As discussed in Section 2.1.2 above, PND proposed mitigation measures as part of the proposed action that should avoid or minimize exposure of MDPS humpback whales and WDPS Steller sea lions to stressors. The monitoring zones shown in Table 1 enable PSOs to be aware of and communicate the presence of marine mammals in the action area outside the shutdown zone and prepare for a potential cease of activity should an animal approach the shutdown zone. For blasting, the TTS zone (also known as the Level B harassment zone) will be monitored for a minimum of 30 minutes prior to detonating the blasts. If a marine mammal is sighted within the TTS zone, blasting will be delayed until the zone is clear of marine mammals for 30 minutes.

6.2.1 Exposure to noise from Phase III A non-explosive activities

MDPS humpback whales and WDPS Steller sea lions may be present within the waters of the action area during the time that the in-water work is being conducted and could be exposed to temporarily elevated underwater noise levels resulting in harassment.

Temporarily elevated underwater noise during pile driving activities (including vibratory pile driving and removal, impact pile driving, socketing, and anchoring) has the potential to result in Level B (behavioral) harassment of marine mammals. Level A harassment (resulting in injury) is not expected to occur as a result of the proposed non-explosive activities because shutdown zones will be implemented (Table 1 and Figure 2) and the marine mammal monitoring plan in the *Mitigation Measures* will reduce the potential for exposure to levels of underwater noise above the injury threshold established by NMFS.

For this analysis we estimated take by considering: 1) acoustic thresholds above which the best available science indicates listed marine mammals will be behaviorally harassed or incur some degree of hearing impairment; 2) the area that will be ensonified above these levels in a day; 3) the expected density or occurrence of listed marine mammals within these ensonified areas; and 4) and the number of days of activities.

6.2.1.1 Distances to Level A and Level B Sound Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed or experience TTS (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment

Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be

difficult to predict (Southall et al. 2007b, Ellison et al. 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa rms for continuous or non-impulsive (*e.g.*, vibratory pile-driving, drilling) and above 160 dB re 1 μPa rms for non-explosive impulsive (*e.g.*, impact pile-driving) or intermittent (*e.g.*, scientific sonar) sources (see Table 4).

CBJ D&H's proposed construction activity for Phase III A includes the use of continuous (vibratory pile driving and drilling) and possible impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa rms thresholds for Level B behavioral harassment are applicable.

Level A Harassment

NMFS's Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016b) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups based on hearing sensitivity as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). CBJ D&H's proposed activity includes the use of non-impulsive (vibratory pile driving and drilling) and possible impulsive (impact pile driving) sources. The Level A thresholds for the onset of PTS are provided in Table 4 and are applicable here.

Calculating the ensonified area

This section describes the operational and environmental parameters of the activity that allow NMFS to estimate the area ensonified above the acoustic thresholds.

When the NMFS Technical Guidance (NMFS 2016b) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, NMFS developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. Because of some of the assumptions included in the methods used for these tools, it's anticipated that isopleths produced are typically going to be overestimates to some degree, which may result in an overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available. For stationary sources, the NMFS User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. When using the subset of variables from the NMF User Spreadsheet shown in Table 6, the calculated isopleths are summarized below in Table 7.

Table 6. NMFS User Spreadsheet Inputs.

Spreadsheet Tab Used	Timber removal	Steel removal	Dredging
	A.1: Vibratory Pile Driving	A.1: Vibratory Pile Driving	A: Stationary: Non-impulsive, Continuous
Source Level (Single Strike/shot SEL)			
Source Level (RMS SPL)	152	156.2	150.5
Weighting Factor Adjustment (kHz)	2.5	2.5	2
a) Number of strikes/detonations in 1 h			
a) Activity Duration (h) within 24-h period			11
Propagation (xLogR)	15	15	15
Distance of source level measurement (m)+	10	7	1
# of piles/shots in a 24 h period	16	4	
Duration to drive (remove) a single pile (min)	20	20	

Table 7. NMFS User Spreadsheet Generated Outputs

User Spreadsheet Output		
Activity	PTS Isopleth (meters)	
	Low-Frequency Cetaceans	Otariid Pinnipeds
Timber removal	5.2	0.2
Steel Removal	2.8	0.1
Dredging	0.7	0.0
	Level B Behavioral Harassment Isopleth (meters)	
Timber removal	1359.36	
Steel removal	1813.14	
Dredging	107.98	

Vibratory removal

The closest known measurements of vibratory pile removal similar to this project are from the Kake Ferry Terminal project for vibratory extraction of an 18-in steel pile. The extraction of 18-in steel pipe pile using a vibratory hammer resulted in underwater noise levels reaching 156.2 dB RMS at 7 m (Denes et al. 2016). The pile diameters for the proposed project are smaller, thus the use of noise levels associated with the pile extraction at Kake may be somewhat conservative. For timber pile removal, the Seattle Pier 62/63 sound source verification report contains an appendix with source measurements at different distances for 63 individual pile removals (WSDOT, 2015). When the data are normalized to 10 m, the median source level is 152 dB RMS at 10 m.

Dredging

For dredging, sound source data was used from bucket dredging operations in Cook Inlet, Alaska (Dickerson et al. 2001). Dredging in that project consisted of six distinct events, including the bucket striking the channel bottom, bucket digging, winch in/out as the bucket is lowered/raised, dumping of the material on the barge and emptying the barge at the disposal site. Although the waveform of the bucket strike has a high peak sound pressure with rapid rise time and rapid decay (characteristics typical of an impulsive sound source), the duration of the source signal was longer than what is often considered for an impulsive sound source, about 50 seconds, which is the approximate duration of one continuous noise signal from the dredging equipment. The events following the initial waveform impulse were of longer duration and were non-impulsive in form and therefore dredging was analyzed as a continuous source. Dickerson et al (2001) took 104 SPL rms measurements for the first five distinct phases of the dredging cycle and averaged them, including the impulse in the waveform of the dredge making contact with the substrate. These averages were distance corrected to determine an average SPL of 150.5 dB rms at 1 m for the bucket dredging process, with an assumed maximum duration of up to 50 seconds of non-impulsive, continuous noise.

6.2.2 Exposure to noise from Phase III A blasting activities

NMFS computed cumulative sound exposure impact zones from blasting information provided by PND (Alaska Seismic & Environmental, 2018). Peak source levels of the confined blasts were calculated based on Hempet et al. (2007), using a distance of eight feet and a weight of 95 pounds for a single charge. The total charge weight is defined as the product of the single charge weight and the number of charges. For the Statter Harbor Project, the number of charges is 75. Explosive energy was then computed from peak pressure of the single maximum charge, using the pressure and time relationship of a shock wave found in Urick (1983). Due to time and spatial separation of each single charge by a distance of eight feet, the accumulation of acoustic energy is added sequentially, assuming the transmission loss follows cylindrical spreading within the matrix of charges. The SEL from each charge at its source can then be calculated, followed by the received SEL from each charge. Since the charges will be deployed in a grid of 8 ft by 8 ft apart, the received SELs from different charges to a given point will vary depending on the distance of the charges. Without specific information regarding the layout of the charges, the modeling assumes a grid of 8 by 9 charges with an additional three charges located in the three peripheral locations. Among the various total sound exposure levels calculated, the largest value, SELtotal (max) is selected to calculate the impact range. Using the pressure versus time relationship above, the frequency spectrum of the explosion can be computed by taking the Fourier transform of the pressure (Weston, 1960). Frequency specific transmission loss of acoustic energy due to absorption is computed using the absorption coefficient, α (dB/km), summarized by François and Garrison (1982a, b). Seawater properties for computing sound speed and absorption coefficient were based on NMFS Alaska Fisheries Science Center report of mean measurements in Auke Bay (Sturdevant and Landingham, 1993). The transmission loss that is required for the received levels to reach below the specific SELthresholds were calculated using the sonar equation:

$$TL = SELtotal(m) - SELthreshold$$

where SELthreshold is the Level A harassment threshold of marine mammals. The distances, R, where such transmission loss is achieved were computed numerically by combining both geometric transmission loss, and transmission loss due to frequency-specific absorption. A spreading coefficient of 20 is assumed to account for acoustic energy loss from the sediment into the water column.

PR1 modeled the Statter Harbor detonation impact zone using USACE's nominal curve fit, and included frequency weighting using spectral analysis of exponential decaying functions, and frequency-specific absorption (Guan 2018). The following inputs were used to calculate the zones in Table 8:

Single charge SEL: 226.21 dB re 1 μPa^2-s.

Cumulative SEL for outer charges: 235.08 – 236.02 re 1 μPa^2-s
The highest cumulative SEL of 236.02 re 1 μPa^2-s was used for impact zone modeling.

SPL_pk at source: 265.3 dB re 1 µPa

Frequency weighted source SELcum (dB re 1 μPa^2-s):

LF	OW
234.71	230.67

The outputs from this model are summarized in Table 8 below.

Table 8. Modeling Results – Impact Zones (m) for blasting

Species	Mortality	Lung injury	GI Tract injury	PTS: SELcum	PTS: SPLpk	TTS: SELcum	TTS: SPLpk
Humpback whale	3.9975	9.3445	26.0142	380	206.64	2120	412.3
Steller sea lion	13.9502	32.6100	26.0142	20	93	280	92.302

Table 8 shows the isopleths in meters for mortality, injury (lung and gastro-intestinal tract), Level A harassment (PTS), and Level B harassment (TTS) associated with blasting activities for both humpback whales and Steller sea lions in the action area.

6.2.3 Exposure to noise from Phase III B and Phase IV activities

6.2.3.1 Down-Hole Drilling

The closest known measurements of down-hole drilling similar to this project are from the Kodiak ferry terminal reconstruction project (Denes et al. 2016). The source level was measured to be 171.5 dB at 12.9 m and was found to drop off to <120 dB at 4.25 miles (6.846 km). This sound source verification (SSV) is for 24-in steel piles, but will be applied to both 24 and 16-in piles for the Statter Harbor project. The Denes et al. study used the 90th percentile to calculate

the 120dB isopleth. However, in a previous consultation, (PND Engineers 2018c) an email between PND and NMFS concluded it was more appropriate to use the 5,050m mean distance instead.

6.2.3.2 Vibratory Pile Driving

The closest known measurements of vibratory pile driving comparable to the 16-in steel piles used in Phase IIIB of this project are from the Kake Ferry Terminal project for vibratory extraction of an 18-in steel pile. The extraction of 18-in steel pipe pile using a vibratory hammer resulted in underwater noise levels reaching 156.2 dB RMS at 7 m (Denes et al. 2016). The pile diameters for the proposed Statter Harbor project are smaller, thus the use of noise levels associated with the pile extraction at Kake may be somewhat conservative, but are the levels that will be used here.

For 24-inch piles sound source data was used for 24-inch piles driven in Kodiak, Alaska (Denes et al. 2016). According to the study the installation of 24-inch steel pipe piles using a vibratory hammer resulted in underwater noise levels reaching 160.6 dB rms at 9.9 m.

6.2.3.3 Impact Pile Driving

For both 16 and 24-inch piles, sound source data was used for 24-inch piles driven in Kodiak, Alaska (Denes et al. 2016). According to the study the installation of 24-inch steel pipe piles using a vibratory hammer resulted in underwater noise levels reaching 180.1 dB rms at 9.9 m.

The practical spreading model was used by PND to generate the Level B harassment zones for piling and drilling activities during Phase IIIB and Phase IV. Practical spreading, a form of transmission loss, is described in detail below.

Pile driving and drilling generate underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$$TL = B * \log10(R_1/R_2), \text{ where}$$

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the seafloor bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log[range]). A practical spreading value of 15 is often used under conditions where water increases with depth as the receiver moves away from the shoreline,

resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions.

Utilizing the practical spreading loss model, underwater noise will fall below the behavioral effects threshold of 120 dB rms for marine mammals at a maximum radial distance of 1,820 meters for vibratory pile driving of 16-in steel piles, and 5,050 meters for both vibratory pile driving of 24-in piles and for drilling. Underwater noise will fall below the behavioral effect threshold of 160 dB rms for marine mammals at a maximum radial distance of 220 meters for impact pile driving. Thus, the Level B harassment zones are established (Table 9) for each of these sound sources. Beyond these distances, NMFS anticipates no behavioral disturbance to listed marine mammals.

Table 9. Phase III B and Phase IV Level B zones calculated using the practical spreading model.

Source	Level B Zones (meters)
Vibratory Pile Driving	
24-inch steel installation (6 piles)	5,050
16-inch steel installation (20 piles)	1,820
Impact Pile Driving	
24 and 16-inch installation (26 piles)	220
Socketing Pile Installation (Drilling)	
24 and 16-inch steel installation (26 piles)	5,050

6.2.4 Exposure to noise from Phase III C activities

In-water fill placement activities (including the placement of the MSE wall and kayak ramp) are assumed to have similar noise levels to dredging activities, and a similar shutdown zone of 108 m (see Table 7) because they utilize similar (or identical) equipment performing similar (or identical) activities. In the event that in-water work is required during this phase of the project, CBJ D&H will employ the mitigation measures and shutdown zones listed in Section 2.1.2.2.

NMFS has determined that if the appropriate mitigation measures listed in Section 2.1.2.2 are employed, the construction activities would be shut down before exposure of the marine mammal to the stressor, and this phase of the project is not likely to adversely affect MDPS humpback whales or WDPS Steller sea lions.

6.2.5 Estimating marine mammal occurrence

Information about the presence, density, or group dynamics of marine mammals informs the take calculations in Section 10. Reliable densities are not available for Statter Harbor or the Auke Bay area. Generalized densities for the North Pacific would not be applicable given the high variability in occurrence and density at specific inlets and harbors. Therefore, the applicant consulted opportunistic sightings data from oceanographic surveys in Auke Bay and sightings

from the Auke Bay Marine Station observation pier for this specific harbor to arrive at a number of animals expected to occur within the harbor per day (PND Engineers 2018b). NMFS agrees with these numbers. For humpback whales, it is assumed that a maximum of two animals per day are likely to occur in the action area. For Steller sea lions, the potential maximum daily occurrence of animals is 121 individuals within the harbor.

6.3 Response Analysis

As discussed in the *Approach to the Assessment* section of this Opinion, response analyses determine how listed species are likely to respond after being exposed to an action's effects on the environment or directly on listed species themselves. Our assessments try to detect the probability of lethal responses, physical damage, physiological responses (particular stress responses), behavioral responses, and social responses that might result in reducing the fitness of listed individuals. Ideally, our response analyses consider and weigh evidence of adverse consequences, beneficial consequences, or the absence of such consequences.

6.3.1 Responses to major noise sources

Loud underwater noise can result in physical effects on the marine environment that can affect marine organisms. Possible responses by MDPS humpback whales and WDPS Steller sea lions to the impulsive and continuous sound produced by pile installation and removal, drilling, dredge and fill activities, and blasting include:

- Physical Response
  - Auditory threshold shifts (or hearing loss)
  - Non-auditory physiological effects
- Behavioral responses
  - Auditory interference (masking)
  - Tolerance or Habituation
  - Change in dive, respiration, or feeding behavior
  - Change in vocalizations
  - Avoidance or Displacement
  - Vigilance

As described in the *Exposure Analysis*, MDPS humpback whales and WDPS Steller sea lions are anticipated to occur in the action area and are anticipated to overlap with noise associated with pile installation/pile driving and removal, drilling, blasting, and dredge and fill activities. We assume that some individuals are likely to be exposed and respond to these impulsive and continuous noise sources.

Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, and masking (Richardson et al. 1995, Gordon et al. 2007, Nowacek et al. 2007, Southall et al. 2007b). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and

duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range.

Richardson et al. (1995) described zones of increasing intensity of effect that might be expected to occur, in relation to distance from a source and assuming that the signal is within an animal's hearing range. The first zone is the area within which the acoustic signal would be audible (potentially perceived) to the animal, but not strong enough to elicit any overt behavioral or physiological response. The next zone corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. Third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (i.e., when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

The effects of pile installation, pile removal, drilling, or dredging on marine mammals are dependent on several factors, including the type and depth of the animal; the pile size and type, and the intensity and duration of the pile removal or dredging sound; the substrate; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile removal and dredging activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the frequency, received level, and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. The characteristics of dredging noise are such that there is a clear impulse peak from the impact of the dredge making contact with the substrate, but then there is a prolonged period of sound which is the noise of the continual operation of the dredge delving the sediment. As such, dredging is treated in this analysis as a continuous source despite the impulse at the beginning of the waveform characterizing dredging noise. In addition, substrates that are soft (e.g., sand) would absorb or attenuate the sound more readily than hard substrates (e.g., rock), which may reflect the acoustic wave. Soft porous substrates would also likely require less time to extract the pile or dredge the substrate, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

6.3.1.1 Physical Responses

Auditory Threshold Shifts

Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak et al. 1999). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time(Southall et al. 2007a). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges(Kryter 1985).

When PTS occurs, there is physical damage to the sound receptors in the ear (i.e., tissue damage), whereas TTS represents primarily tissue fatigue and is reversible (Southall et al., 2007). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury(Ward 1997). Therefore, NMFS does not consider TTS to constitute auditory injury.

Relationships between TTS and PTS thresholds have not been studied in marine mammals—PTS data exists only for a single harbor seal(Kastak et al. 2008)—but are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several dB above that which induces mild TTS: a 40-dB threshold shift approximates PTS onset(Kryter et al. 1966), whereas a 6-dB threshold shift approximates TTS onset (e.g., Southall et al., 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as bombs) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall et al., 2007). Generally, given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur. This premise holds true for the proposed action.

TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals.

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (i.e., recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during a time when communication is critical for successful mother/calf interactions could have more serious impacts.

Humpback whales and Steller sea lions have the potential to experience auditory threshold shifts due to project activities in the action area. As discussed throughout the *Response Analysis* of this Opinion, we expect individuals may experience TTS (and potentially for Steller sea lions to experience PTS during blasting). The thresholds for the Statter Harbor project are shown in Tables 7, 8, and 9. These instances of exposure assume a uniform distribution of animals and do not account for avoidance. The implementation of mitigation measures to reduce exposure to high levels of noise related to the Statter Harbor project, the short duration of construction activities, and movement of animals reduce the likelihood that exposure to project related noise would cause a behavioral response that may affect vital functions (reproduction or survival), or would result in temporary threshold shift (TTS) or permanent threshold shift (PTS).

Non-auditory Physiological effects

In addition to PTS and TTS, there is a potential for non-auditory physiological effects or injuries that might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (e.g., change in dive profile as a result of an avoidance reaction) caused by exposure to sound. These impacts can include neurological effects, internal bubble formation, resonance effects, and other types of organ or tissue damage (Cox et al. 2006). The CBJ D&H's activities involve the use of explosives, which have been associated with these types of effects. The underwater explosion will send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. The shock wave and blast noise are of most concern to marine animals. The effects of an underwater explosion on a marine mammal depends on many factors, including the size, type, and depth of both the animal and the explosive charge; the depth of the water column; and the standoff distance between the charge and the animal, as well as the sound propagation properties of the environment. Potential impacts can range from brief effects (such as behavioral disturbance), tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to death of the animal (DON 2001). Non-lethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of individual or cumulative sublethal injuries (DoN, 2001). Immediate lethal injury would be a result of massive trauma to internal organs as a direct result of proximity to the point of detonation (DoN 2001). Generally, the higher the level of impulse and pressure level exposure, the more severe the impact to an individual.

Injuries resulting from a shock wave take place at boundaries between tissues of different density. Different velocities are imparted to tissues of different densities, and this can lead to their physical disruption. Blast effects are greatest at the gas-liquid interface . Gas-containing organs, particularly the lungs and gastrointestinal (GI) tract, are especially susceptible (Yelverton et al. 1973). In addition, gas-containing organs including the nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble. Intestinal walls can bruise or rupture, with subsequent hemorrhage and escape of gut contents into the body cavity. Less severe GI tract injuries include contusions, petechiae (small red or purple spots caused by bleeding in the skin), and slight hemorrhaging (Yelverton et al., 1973).

Because the ears are the most sensitive to pressure, they are the organs most sensitive to injury . Sound-related damage associated with blast noise can be theoretically distinct from injury from the shock wave, particularly farther from the explosion. If an animal is able to hear a noise, at some level it can damage its hearing by causing decreased sensitivity (Ketten 1995). Sound-related trauma can be lethal or sublethal. Lethal impacts are those that result in immediate death or serious debilitation in or near an intense source and are not, technically, pure acoustic trauma (Ketten 1995). Sublethal impacts include hearing loss, which is caused by exposures to perceptible sounds. Severe damage (from the shock wave) to the ears includes tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear. Moderate injury implies partial hearing loss due to tympanic membrane rupture and blood in the middle ear. Permanent hearing loss also can occur when the hair cells are damaged by one very loud event, as well as by prolonged exposure to a loud noise or chronic exposure to noise. The level of impact from blasts depends on both an animal's location and, at outer zones, on its sensitivity to the residual noise (Ketten 1995).

The above discussion concerning underwater explosions only pertains to open water detonations in a free field without mitigation. However, given the low weight of the charges and small size of the detonation (relative to the large open water detonations just discussed) in conjunction with monitoring and mitigation measures discussed in Section 2.1.2, the CBJ D&H's two blasting events are not likely to have any of the injury or mortality effects just described on marine mammals in the project vicinity. Instead, NMFS considers that the CBJ D&H's blasts are most likely to cause behavioral harassment and may cause TTS in a few individual marine mammals, as discussed below.

Stress Response

An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (Seyle 1950). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (Moberg 1987). Increases in the circulation of glucocorticoids are also equated with stress (Romano et al. 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well studied through controlled experiments and for both laboratory and free-ranging animals (Holberton et al. 1996). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Romano et al. 2002) and, more rarely, studied in wild populations. Rolland et al.

(Rolland et al. 2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC 2003).

Humpback whales and Steller sea lions have the potential to experience non-auditory physiological effects due to project activities in the Statter Harbor project action area. As discussed throughout the *Response Analysis* of this opinion, we expect individuals may experience TTS (and potentially for Steller sea lions to experience PTS during blasting), may experience masking, and may exhibit behavioral responses from project activities. Therefore, we expect ESA-listed whales and pinnipeds may experience stress responses. If whales and pinnipeds are not displaced and remain in a stressful environment (within the ZOI pile driving activities, e.g.), we expect the stress response will dissipate shortly after the cessation of pile driving. Similarly, if whales or pinnipeds are exposed to sounds from the construction activities, we expect a stress response could accompany a brief startle response. However, in any of the above scenarios, we do not expect significant or long-term harm to individuals from a stress response.

6.3.1.2 Behavioral Responses

Behavioral disturbance may include a variety of effects, including subtle changes in behavior (e.g., minor or brief avoidance of an area or changes in vocalizations), and more sustained and/or potentially severe reactions (e.g. displacement from or abandonment of high-quality habitat). Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (e.g., species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (Southall et al., 2007). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison et al. 2012), and can vary depending on characteristics associated with the sound source (e.g., whether it is moving or stationary, number of sources, distance from the source). Please see Appendices B-C of Southall et al. (2007) for a review of studies involving marine mammal behavioral responses to sound.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel (24-hour) cycle. Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall et al., 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall et al., 2007). Note that there is a difference between multi-day substantive behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Auditory Masking

Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (e.g., those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson 1995). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (e.g., snapping shrimp, wind, waves, precipitation) or anthropogenic (e.g., shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (e.g., signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (e.g., sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age, or TTS hearing loss), and existing ambient noise and propagation conditions.

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is man-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

For the pile driving/removal sound generated from the proposed construction activities, sound will consist of low frequency impulsive and continuous noise depending on if they are using an impact or vibratory hammer. Lower frequency anthropogenic sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. This could affect communication signals used by low frequency mysticetes when they occur near the noise band and thus reduce the communication space of animals (Clark et al. 2009) and cause increased stress levels (Foote et al. 2004, Holt et al. 2009). However, marine mammals are thought to be able to compensate for masking by adjusting their acoustic behavior by shifting call frequencies, and/or increasing call volume and vocalization rates. For example, blue whales are found to increase call rates when exposed to seismic survey noise in the St. Lawrence Estuary (Di Lorio and Clark. 2010). In addition, the sound localization abilities of marine mammals suggest that, if signal and noise come from different directions, masking would not be as severe as the usual types of masking studies might suggest (Richardson et al. 1995).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as at the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (e.g., from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

Noise from pile driving/removal and drilling activity is relatively short-term. It is possible that pile driving/removal and drilling noise resulting from this proposed action may mask acoustic signals important to western DPS Steller sea lions and Mexico DPS humpback whales, but the short-term duration, limited affected area, and pauses between operations would limit the impacts from masking. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for in Tables 7, 8, and 9, and which have already been taken into account in the exposure analysis.

Habituation

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a "progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial," rather than as, more generally, moderation in response to human disturbance (Bejder et al. 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson et al., 1995; NRC 2003; Wartzok et al., 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997). Observed responses of wild marine mammals to loud, intermittent sound sources (typically seismic airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Richardson et al., 1995).

This information indicates marine mammal tolerance of underwater sounds, and we anticipate that some humpback whales and Steller sea lions exposed to low frequency underwater sounds from construction activities in the action area may tolerate construction and/or demolition noise and show no apparent response. More information is needed in order to determine if the learned processes of habituation or sensitization are occurring over time as animals experience repeated exposures.

Change in dive, respiration, or feeding behavior

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant(Lusseau and Bejder 2007). This highlights the importance of assessing the context of the acoustic effects alongside the received levels anticipated. Severity of effects from a response to an acoustic stimuli can likely vary based on the context in which the stimuli was received, particularly if it occurred during a biologically

sensitive temporal or spatial point in the life history of the animal. There are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely, and may consist of increased or decreased dive times and surface intervals, as well as changes in the rates of ascent and descent during a dive(Frankel and Clark 2000). Variations in dive behavior may reflect interruptions in biologically significant activities (e.g., foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (e.g., bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (Croll et al. 2001). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Rates of respiration naturally vary with different behaviors, and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (Kastelein et al. 2001) .

As a result of using this kind of analyses to consider humpback whales' and Steller sea lions' behavioral decisions, we would expect these animals to continue foraging in the face of moderate levels of disturbance. For example, humpback whales, which only feed during part of the year and must satisfy their annual energetic needs during the foraging season, may continue foraging in the face of disturbance in the action area. Similarly, a humpback cow accompanied by her calf is less likely to flee or abandon an area at the cost of her calf's survival. By extension, we assume that animals that choose to continue their pre-disturbance behavior would have to cope with the costs of doing so, which will usually involve physiological stress responses and the associated energetic costs (Frid and Dill. 2002, MMS 2008). Therefore, it is likely some change in dive, respiration, or feeding behavior of WDPS Steller sea lions and MDPS humpback whales may occur in the action area, but we do not expect much change in these behaviors.

Change in vocalizations

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. In some cases, animals may cease sound production during production of aversive signals (Bowles et al. 1994).

In addition to these behavioral responses, whales alter their vocal communications when exposed to anthropogenic sounds. Communication is an important component of the daily activity of animals and ultimately contributes to their survival and reproductive success. Animals communicate to find food (Marler et al. 1986, Elowson et al. 1991), acquire mates (Ryan 1985), assess other members of their species (Parker 1974, Owings et al. 2002), evade predators (Greig-smith 1980), and defend resources (Zuberbuhler et al. 1997). Human activities that impair an animal's ability to communicate effectively might have significant effects on the survival and reproductive performance of animals experiencing the impairment.

At the same time, most animals that vocalize have evolved with an ability to make adjustments to their vocalizations to increase the signal-to-noise ratio, active space, and recognizability of their vocalizations in the face of temporary changes in background noise (Cody and Brown 1969, Brumm 2004, Patricelli and Blickley 2006). A few studies have demonstrated that marine mammals make the same kind of vocal adjustments in the face of high levels of background noise. For example, two studies reported that some mysticete whales stopped vocalizing – that is, adjusted the temporal delivery of their vocalizations – when exposed to active sonar (Miller et al. 2000, Melcon et al. 2012). Melcón et al. (2012) reported that during 110 of the 395 d-calls (associated with foraging behavior) they recorded during mid-frequency active sonar transmissions, blue whales stopped vocalizing at received levels ranging from 85 to 145 dB, presumably in response to the sonar transmissions. These d-calls are believed to attract other individuals to feeding grounds or maintain cohesion within foraging groups (Oleson et al. 2007).

Humpback whales have been observed to increase the length of their songs in the presence of potentially masking signals (Miller et al. 2000, Fristrup et al. 2003). Change in humpback vocalization may happen within the project area, but to a minimal extent due to the mitigation measures put in place to reduce in-water noise.

Avoidance or displacement

Avoidance is the displacement of an individual from an area or migration path because of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson et al., 1995). For example, gray whales (*Eschrictius robustus*) are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme et al. 1984). Avoidance may be short-term, with animals returning to the area once the noise has ceased (e.g., Bowles et al., 1994). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (Blackwell et al. 2004).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (e.g., directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus 1996). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (Evans and England 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves 2008), and whether individuals are solitary or in groups may influence the response.

Avoidance is one of many behavioral responses whales and Steller sea lions exhibit when exposed to pile driving/removal, blasting, dredge and fill, and drilling noise. Other behavioral responses include evasive behavior to escape exposure or continued exposure to a sound that is painful, noxious, or that they perceive as threatening, which we would assume would be accompanied by acute stress physiology; increased vigilance of an acoustic stimulus, which would alter their time budget (that is, during the time they are vigilant, they are not engaged in other behavior); and continued pre-disturbance behavior with the physiological consequences of continued exposure. This avoidance behavior is expected to occur with the Steller sea lions in the action area.

Vigilance

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (i.e., when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fish and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (Beauchamp and Livoreil 1997). In addition, chronic disturbance can cause population declines through reduction of fitness (e.g., decline in body condition) and subsequent reduction in reproductive success, survival, or both (Harrington and Veitch 1992). However, Ridgway et al. (Ridgway et al. 2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a five-day period did not cause any sleep deprivation or stress effects.

Humpback whales and Steller sea lions have the potential to exhibit each of these behavioral responses (auditory interference (masking); tolerance or habituation; change in dive, respiration, or feeding behavior; change in vocalizations; avoidance or displacement; increased vigilance) due to project activities in the action area.

6.3.2 Anticipated Effects on Habitat

The proposed activities at the project area would not result in permanent negative impacts to habitats used directly by marine mammals, but may have potential short-term impacts to food sources, such as forage fish, and may affect acoustic habitat. There are no known foraging hotspots or other ocean bottom structure of significant biological importance to Steller sea lions

present in the marine waters of the action area during the construction window. There is an occurrence of foraging in the action area for humpback whales. While humpbacks are known to feed in Statter Harbor, this is a small portion of the overall area designated as important. The small portion of the area affected by the construction noise, in conjunction with the short temporal scale of construction activity, make it unlikely the effects of the construction will significantly alter the foraging habitat of humpbacks in Southeast Alaska. Therefore, the main impact issue associated with the proposed action would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document. The primary potential acoustic impacts to marine mammal habitat are associated with elevated sound levels produced by pile installation, pile removal, dredging, and blasting in the area.

Short-term turbidity increases would likely occur during in-water construction work, including pile driving and pile removal. The physical resuspension of sediments could produce localized turbidity plumes that could last from a few minutes to several hours. In general, turbidity associated with pile installation is expected to be localized to about a 25 ft radius around the pile (Everitt et al. 1980). Contaminated sediments are not expected at the project site but any that do occur would be tightly bound to the sediment matrix. Because of the relatively small work area, any increase in turbidity would be limited to the immediate vicinity of the project site and adjacent portion of the bay. There is little potential for pinnipeds or cetaceans to be exposed to increased turbidity during construction operations. Therefore, exposure to re-suspended contaminants is expected to be negligible since sediments would not be ingested and any contaminants would be tightly bound to them.

Considering local currents, tidal action, and implementation of BMPs, any potential water quality exceedances would likely be temporary and highly localized. The local tides and currents would disperse suspended sediments from pile driving operations at a moderate to rapid rate depending on tidal stage.

6.3.3 In-water Construction Effects on Potential Prey (Fish)

Construction activities would produce continuous (i.e., vibratory pile driving and removal, drilling, and dredging) and impulsive (impact pile driving and blasting) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of impulsive sounds such as pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (Scholik and Yan 2001, 2002; Popper and Hastings 2009). Sound pulses at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson et al., 1992; Skalski et al., 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality.

The most likely impact to fish from pile installation/removal and dredging activities in the action area would be temporary behavioral avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. While impacts from blasting to fish are more severe, including barotrauma and mortality, the blast will last approximately one second on each of the two days,

making the duration of this impact short term. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the short timeframe for the project.

6.3.4 Effects on Potential Fish Foraging Habitat

The area likely impacted by the project is relatively small compared to the available habitat in Auke Bay. Avoidance by potential prey of the immediate area due to the temporary loss of this foraging habitat is also possible. The duration of fish avoidance of this area after construction activity stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity in Auke Bay.

Given the short daily duration of sound associated with individual construction activities and the relatively small areas being affected, the proposed action is not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. Thus, any impacts to marine mammal habitat are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

6.3.5 Responses to vessel traffic and noise

MDPS humpback whales and WDPS Steller sea lions are anticipated to occur in the action area and are anticipated to overlap with noise associated with vessel transit. We assume that some individuals are likely to be exposed and respond to this continuous noise source.

Materials and equipment would be transported to the project site by barge. While work is conducted in the water, anchored barges will be used to stage construction materials and equipment. Vessel speed, course changes, and sounds associated with their engines may be considered stressors to listed humpback whales.

We anticipate low level exposure of short-term duration to listed marine mammals from vessel noise. If animals do respond, they may exhibit slight deflection from the noise source, engage in low-level avoidance behavior, short-term vigilance behavior, or short-term masking behavior, but these behaviors are not likely to result in adverse consequences for the animals. The nature and duration of response is not anticipated to be a significant disruption of important behavioral patterns such as feeding or resting. During the period of construction, the action area is not considered high quality habitat for humpback whales or Steller sea lions, so avoidance of the area is not likely to adversely affect these species**.**

The small number of vessels involved in the action, the short duration of exposure due to the transitory nature, and vessels following the Alaska Humpback Whale Approach Regulations and marine mammal code of conduct should prevent close approaches and additional harassment of Steller sea lions and humpback whales. The impact of vessel traffic on MDPS humpback whales and WDPS Steller sea lions is not anticipated to reach the level of harassment under the ESA.

7 CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Climate change, as well as some continuing and future non-Federal activities expected to contribute to climate change, are reasonably certain to occur within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 5.0).

There are currently no other known or anticipated state or private activities reasonably certain to occur in the action area that may affect listed species and are not subject to section 7 consultation. We searched for information on non-Federal actions reasonably certain to occur in the action area. We did not find any information about non-Federal actions other than what has already been described in the Environmental Baseline (Section 5 of this opinion). While the proposed project is designed to relieve current user congestion within the harbor, it is not anticipated to result in an increase in marine traffic in the action area. We expect fisheries, harvest, noise, pollutants and discharges, scientific research, and ship strike will continue into the future. We expect moratoria on commercial whaling and bans on commercial sealing will remain in place, aiding in the recovery of ESA-listed whales and pinnipeds.

8 INTEGRATION AND SYNTHESIS

The Integration and Synthesis section is the final step of NMFS's assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to formulate the agency's biological Opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of the survival or recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) result in the adverse modification or destruction of critical habitat as measured through potential reductions in the value of designated critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species (Section 4).

As we discussed in the *Approach to the Assessment* section of this Opinion, we begin our risk analyses by asking whether the probable physical, physiological, behavioral, or social responses of endangered or threatened species are likely to reduce the fitness of endangered or threatened individuals or the growth, annual survival or reproductive success, or lifetime reproductive success of those individuals.

8.1 WDPS Steller Sea Lion Risk Analysis

The Steller sea lion recovery plan (NMFS 2008) lists recovery criteria that should be accomplished in order to downlist the WDPS from endangered to threatened and to delist the WDPS. More details and exact specifications can be found in the plan, but these criteria generally include an increased population size, requirements that any two adjacent sub-regions cannot be declining significantly, reducing the threats to sea lion foraging habitat, reducing intentional killing and overutilization, and others. NMFS concludes that WDPS Steller sea lion response from the proposed activities will not impede progress towards these recovery criteria due to the low anticipated level of harassment, no anticipated injury or mortality, and no significant effects to habitat.

Exposure to in-air noise, vessel noise from transit, disturbance to the seafloor, potential for increased disturbance from whale watching vessels and potential for vessel strike may occur, but these are likely to be negligible due to the small marginal increase in such activities relative to the environmental baseline, mitigation measures in place to reduce approach distances, and the transitory nature of vessels and construction activities. Adverse effects from vessel strike are very unlikely because of the few additional vessels introduced by the action and the unlikelihood of these type of interactions.

Steller sea lions' probable response to this project (pile driving and removal, drilling, blasting and dredge and fill activities) after implementation of the mitigations measures in Section 2.1.2 includes brief startle reactions or short-term behavioral modification, such as those listed in Section 6.3.1.2. These reactions and behavioral changes are expected to subside quickly when the exposures cease. The primary mechanism by which these behavioral changes could affect the fitness of individual animals is through the animals' energy budget, time budget, or both (see Section 6.3.1.2). Even if some WDPS Steller sea lions were exposed to the stressors from construction activities associated with this project, the individual and cumulative energy costs of the behavioral responses are not likely to reduce the energy budgets of Steller sea lions, and their

probable exposure to noise sources is not likely to reduce their fitness because project related noise is relatively short-term, in a limited affected area, and pauses between operations would limit the impacts.

Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (NMFS 2008a). The endangered WDPS Steller sea lion population is increasing at 2.17 percent per year. NMFS does not anticipate any effects from this action on the reproductive success of Steller sea lions. As discussed in the *Description of the Action* section, this action area does not overlap with sea lion rookeries. As a result, the probable responses to this project are not likely to reduce the current or expected future reproductive success of WDPS Steller sea lions or reduce the rates at which they grow, mature, or become reproductively active.

Commercial fishing likely affects prey availability throughout much of the WDPS's range, and causes a small number of direct mortalities each year. Predation has been considered a potentially high level threat to this DPS, and may remain so. Subsistence hunting occurs at fairly low levels for this DPS. Illegal harvest is also a continuing threat, but it probably does not occur at levels that are preventing recovery. Ship strikes do not seem to be of concern for this species due to its maneuverability and agility in water. Despite exposure to construction activities and ferry and vessel operations for decades, the increase in the number of WDPS Steller sea lions suggests that the stress regime these sea lions are exposed to has not prevented them from increasing their numbers and expanding their use of the action area.

Therefore, exposures associated with the proposed action are not likely to reduce the abundance, reproduction rates, or growth rates (or increase variance in one or more of these rates) of the populations those individuals represent. While a single individual may be exposed multiple times during the project, both the short duration of sound generation and the implementation of mitigation measures to reduce exposure to high levels of sound reduce the likelihood that exposure would cause a behavioral response that may affect vital functions, or cause TTS or PTS. Cumulative effects of future state or private activities in the action area are likely to affect Steller sea lions at a level comparable to present. The current and recent population trends for WDPS Steller sea lions indicate that these levels of activity are not hindering population growth.

As a result of all of the above factors, this project is not likely to appreciably reduce WDPS Steller sea lions' likelihood of surviving or recovering in the wild.

8.2 MDPS Humpback Whale Risk Analysis

Our consideration of probable exposures and responses of listed whales to construction activities associated with the proposed action is designed to help us assess whether those activities are likely to increase the extinction risks or jeopardize the continued existence of MDPS humpback whales.

Exposure to in-air noise, vessel noise from transit, disturbance to the seafloor, potential for increased disturbance from whale watching vessels and potential for vessel strike may occur, but these are likely to be negligible due to the small marginal increase in such activities relative to

the environmental baseline, mitigation measures in place to reduce approach distances, and the transitory nature of vessels and construction activities. Adverse effects from vessel strike are very unlikely because of the few additional vessels introduced by the action and the unlikelihood of these type of interactions.

Humpback whales' probable response to the proposed action includes brief startle reactions or short-term behavioral modification. These reactions and behavioral changes are expected to subside quickly when the exposures cease. The primary mechanism by which the behavioral changes we have discussed affect the fitness of individual animals is through the animals' energy budget, time budget, or both (the two are related because foraging requires time). Large whales such as humpbacks have an ability to store substantial amounts of energy, which allows them to survive for months on stored energy during migration and while in their wintering areas, and their feeding patterns allow them to acquire energy at high rates. The individual and cumulative energy costs of the behavioral responses discussed are not likely to reduce the energy budgets of humpback whales, and their probable exposure to noise sources is not likely to reduce their fitness.

As discussed in the *Description of the Action* and *Status of the Species* sections, this action does not overlap in space or time with humpback whale breeding. Some MDPS humpback whales feed in Southeast Alaska in the summer months, but they migrate to Mexican waters for breeding and calving in winter months. As a result, the probable responses to the proposed action are not likely to reduce the current or expected future reproductive success of Mexico DPS humpback whales or reduce the rates at which they grow, mature, or become reproductively active. Noise from the proposed action could discourage MDPS whales from feeding in the action area during some construction activities, but humpback whale feeding in the action area is not common, and any such effects would be brief and the affected whales would likely find other comparable foraging opportunities in the vicinity.

Therefore, these exposures are not likely to reduce the abundance, reproduction rates, or growth rates (or increase variance in one or more of these rates) of the populations those individuals represent. The short duration of sound generation and implementation of mitigation measures to reduce exposure to high levels of sound reduce the likelihood that exposure would cause a behavioral response that may affect vital functions, or cause TTS or PTS. Cumulative effects of future state or private activities in the action area are likely to affect humpback whales at a level comparable to present.

The strongest evidence supporting the conclusion that the proposed action will likely have minimal impact on MDPS humpback whales is the estimated annual growth rate of the humpback whale populations in the North Pacific (5-7%). While there is no accurate estimate of the maximum productivity rate for humpback whales, it is assumed to be 7% (Wade and Angliss 1997, Allen and Angliss 2015). Despite exposure to pile driving operations for decades, a small number of humpback whale entanglements in fishing gear, a subsistence take of one humpback whale in 2006, and a humpback whale taken illegally near Toksook Bay in western Alaska in 2016, this increase in the number of listed whales suggests that the stress regime these whales are exposed to has not prevented them from increasing their numbers.

As a result of all the above factors, this project is not likely to appreciably reduce MDPS humpback whales' likelihood of surviving or recovering in the wild.

9 CONCLUSION

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS's biological Opinion that the proposed action is not likely to jeopardize the continued existence of WDPS Steller sea lions (*Eumetopias jubatus*) or MDPS humpback whales (*Megaptera novaeangliae*).

10 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species unless there is a special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (16 USC § 1532(19)). “Incidental take” is defined as take that results from, and not the purpose of, the carrying out of an otherwise lawful activity (50 CFR 402.02). Based on recent NMFS guidance, the term “harass” under the ESA means to: “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering” (Wieting 2016). The MMPA defines “harassment” as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment] (16 U.S.C. §1362(18)(A)). For this consultation, USACE and PR1 anticipate that any take will be by harassment only.

Under the terms of Section 7(b)(4) and Section 7(o)(2) of the ESA, taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement (ITS).

Section 7(b)(4)(C) of the ESA provides that if an endangered or threatened marine mammal is involved, the taking must first be authorized by Section 101(a)(5) of the MMPA. Accordingly, the terms of this incidental take statement and the exemption from Section 9 of the ESA become effective only upon the issuance of MMPA authorization to take the marine mammals identified here. Absent such authorization, this incidental take statement is inoperative.

The terms and conditions described below are nondiscretionary. USACE and PR1 have a continuing duty to regulate the activities covered by this ITS. In order to monitor the impact of incidental take, USACE and PR1 must monitor and report the progress of the action and its impact on the species as specified in the ITS (50 CFR 402.14(i)(3)). If USACE or PR1 (1) fails to require the authorization holder to adhere to the terms and conditions of the ITS through enforceable terms that are added to the authorization, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

10.1 Amount or Extent of Take

Section 7 regulations require NMFS to estimate the number of individuals that may be taken by proposed actions or utilize a surrogate (e.g., other species, habitat, or ecological conditions) if we cannot assign numerical limits for animals that could be incidentally taken during the course of an action (50 CFR § 402.14 (i)(1)).

10.1.1 WDPS Steller Sea Lions

Based on the distances to Level A and Level B sound thresholds calculated in Section 6.2.1.1, and the estimate of marine mammal occurrence calculated in Section 6.2.5 of the *Exposure Analysis* for the proposed activities, we expect a maximum of 6,750 Steller sea lions may be behaviorally harassed by noise from pile installation/removal, blasting, and dredge and fill activities, and we assume that 2% (135) of those individuals are from the WDPS. We expect 1 Level A take and 134 Level B takes (see Table 10). We are reasonably certain this take will occur.

10.1.2 MDPS Humpback Whales

Based on the distances to Level A and Level B sound thresholds calculated in Section 6.2.1.1, and the estimate of marine mammal occurrence calculated in Section 6.2.5 of the *Exposure Analysis* for the proposed activities, we expect a maximum of 148 humpback whales may be behaviorally harassed by noise from pile installation/removal, blasting, and dredge and fill activities, and we assume that 6.1% (9) of those individuals are from the MDPS. We expect all 9 to be Level B take (see Table 10). We are reasonably certain this take will occur.

Table 10. Summary of instances of acoustic exposure associated with the proposed action's activities reasonably certain to result in the incidental take of humpback whales and Steller sea lions by behavioral harassment

Source	Estimated Duration		Mexico DPS Humpback Whales	Western DPS Steller Sea Lions
	Hours per Day	Ant. Days of Effort		
Pile Removal	8 hours	10	2	25
Dredging	11 hours	30-45	0	5
In-Water Fill Placement and Removal	11 hours	15	0	2
Dredge Disposal	0.25 hours	30-45	0	0
Pile Driving and Drilling	12 hours	45	6	98
Blasting (Level A)	<1 second	2	0	1
Blasting (Level B)	<1 second	2	1	4
		Total Takes	**9**	**135**

10.2 Effect of the Take

The only takes authorized during the proposed action are takes by acoustic harassment. No serious injuries or mortalities are anticipated or authorized as part of this proposed action. This consultation has assumed that exposure to major noise sources might disrupt one or more behavioral patterns that are essential to an individual animal's life history. However, any behavioral responses of these whales and pinnipeds to major noise sources and any associated disruptions are not expected to affect the reproduction, survival, or recovery of these species.

In Section 9 of this Opinion, NMFS determined that the level of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to Mexico DPS humpback whales or Western DPS Steller sea lions.

10.3 Reasonable and Prudent Measures (RPMs)

"Reasonable and prudent measures" are those actions necessary or appropriate to minimize the impacts, i.e., amount or extent, of incidental take. (50 CFR 402.02). These are nondiscretionary measures.

The RPMs included below, along with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. NMFS concludes that the following RPMs are necessary and appropriate to minimize or to monitor the incidental take of Mexico DPS humpback whales and Western DPS Steller sea lions resulting from the proposed action.

1. This ITS is valid only for the activities described in this Opinion, and which have been authorized under section 101(a)(5) of the MMPA.
2. The taking of Mexico DPS humpback whales and Western DPS Steller sea lions will be by incidental harassment only. The taking by serious injury or death is prohibited and will result in the modification, suspension, or revocation of the ITS.
3. USACE and PR1 will implement a monitoring program that includes all items described in the mitigation measures section of this Opinion (Section 2.1.2) and allows NMFS AKR to evaluate the exposure estimates contained in this Opinion and that underlie this ITS.
4. USACE and PR1 will submit a final report to NMFS AKR that evaluates the mitigation measures and the results of the monitoring program.

10.4 Terms and Conditions

"Terms and conditions" implement the reasonable and prudent measures (50 CFR 402.14(i)(2)). These must be carried out for the exemption in section 7(o)(2) to apply.

In order to be exempt from the prohibitions of section 9 of the ESA, USACE and PR1 must comply with the following terms and conditions, which implement the RPMs described above and the mitigation measures set forth in Section 2.1.2 of this Opinion. USACE and PR1 has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14).

Partial compliance with these terms and conditions may result in more take than anticipated, and may invalidate this take exemption. These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

To carry out RPM #1, USACE, NMFS PR1, or their authorization holder must undertake the following:

1. USACE and NMFS PR1 shall require their permitted operators to possess a current and valid Incidental Harassment Authorization issued by NMFS under section 101(a)(5) of

the MMPA, and any take must occur in compliance with all terms, conditions, and requirements included in such authorizations.

To carry out RPM #2, USACE, NMFS PR1, or their authorization holder must undertake the following:

A. Conduct the action as described in this document including all mitigation measures and observation and shut-down zones.

B. The taking of any marine mammal in a manner other than that described in this ITS must be reported immediately to NMFS AKR, Protected Resources Division at 907-586-7638.

C. In the event that the proposed action causes a take of a marine mammal that results in a serious injury or mortality (e.g. ship-strike, stranding, and/or entanglement), immediately cease operations and immediately report the incident to NMFS AKR, Protected Resources Division at 907-586-7638 and/or by email to Jon.Kurland@noaa.gov, David.Gann@noaa.gov, the NMFS Alaska Regional Stranding Coordinator at 907-271-3448 or Barbara.Mahoney@noaa.gov, and NMFS Permits, Conservation and Education Division at 301-427-8401 or Sara.Young@noaa.gov.

   Following a prohibited take, USACE will be required to reinitiate consultation under 50 CFR 402.16, and any subsequent activities causing incidental take will not be exempt from the take prohibitions of ESA section 9. NMFS will work with USACE to determine what is necessary to minimize the likelihood of further prohibited take and ensure ESA compliance.

To carry out RPM #3, USACE, NMFS PR1, or their authorization holder must undertake the following:

A. The impact zones must be fully observed by qualified PSOs during all in-water work, in order to document observed incidents of harassment as described in the mitigation measures associated with this action.

B. If take of Steller sea lions or humpback whales approaches the number of takes authorized in the ITS, USACE will notify NMFS by email, attn: David.Gann@noaa.gov and request reinitiation of consultation

To carry out RPM #4, USACE, NMFS PR1, or their authorization holder must undertake the following:

A. Adhere to all monitoring and reporting requirements as detailed in the IHA issued by NMFS under section 101(a)(5) of the MMPA.

B. Submit a project specific report within 90 days of the conclusion of the project that analyzes and summarizes marine mammal interactions during this project to the Protected Resources Division, NMFS by email to David.Gann@noaa.gov. This report must contain the following information:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., percent cover, visibility);

- Water conditions (e.g., sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from construction activity;
- Distance from construction activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

11 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). For this project, NMFS AKR recommends:

1. Disposal of any fish, shellfish, or other animal, or waste parts of fish, shellfish, or other animal, in or around Statter Harbor system waters, should be prohibited 48 hours prior to blasting activities so as to not attract Steller sea lions and other pinnipeds such as harbor seals. Heavy duty plastic insulated waste bins should be installed at all designated fish cleaning stations in Statter Harbor in order to prevent ESA-listed marine mammals from becoming habituated to the area during construction activities, and permanently after project completion.
2. CBJ D&H should install informational signs designed by NMFS but constructed and supplied by CBJ D&H with a public message about Alaska Humpback Whale Approach Regulations. These signs should be located near where whale watching vessels dock. NMFS expects this effort will minimize harassment of humpback whales by informing tourists of the importance of these regulations, thereby decreasing the pressure on whale watching companies to be aggressive in pursuit of whales in the action area, not only for the duration of this project, but also into the future.
3. Project vessel crews should participate in the WhaleAlert program to report real-time sightings of whales while transiting in the waters of Southeast Alaska and to minimize the risk of vessel strikes. More information is available at https://alaskafisheries.noaa.gov/pr/whale-alert.

In order to keep NMFS's Protected Resources Division informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, USACE and NMFS PR1 should notify NMFS of any conservation recommendations they implement in their final action.

12 REINITIATION OF CONSULTATION

As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this Opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this Opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount of incidental take is exceeded, section 7 consultation must be reinitiated immediately.

13 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act (DQA)) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Opinion addresses these DQA components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility

This document records the results of an interagency consultation. The information presented in this document is useful to NMFS, USACE, and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

This consultation will be posted on the NMFS Alaska Region website http://alaskafisheries.noaa.gov/pr/biological-Opinions/. The format and name adhere to conventional standards for style.

Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01 et seq.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the literature cited section. The analyses in this Opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA implementation, and reviewed in accordance with Alaska Region ESA quality control and assurance processes.

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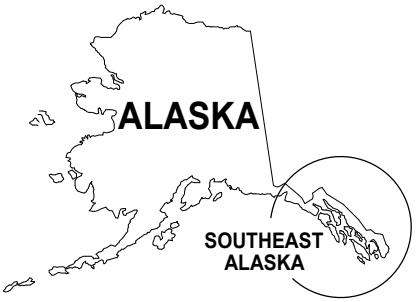
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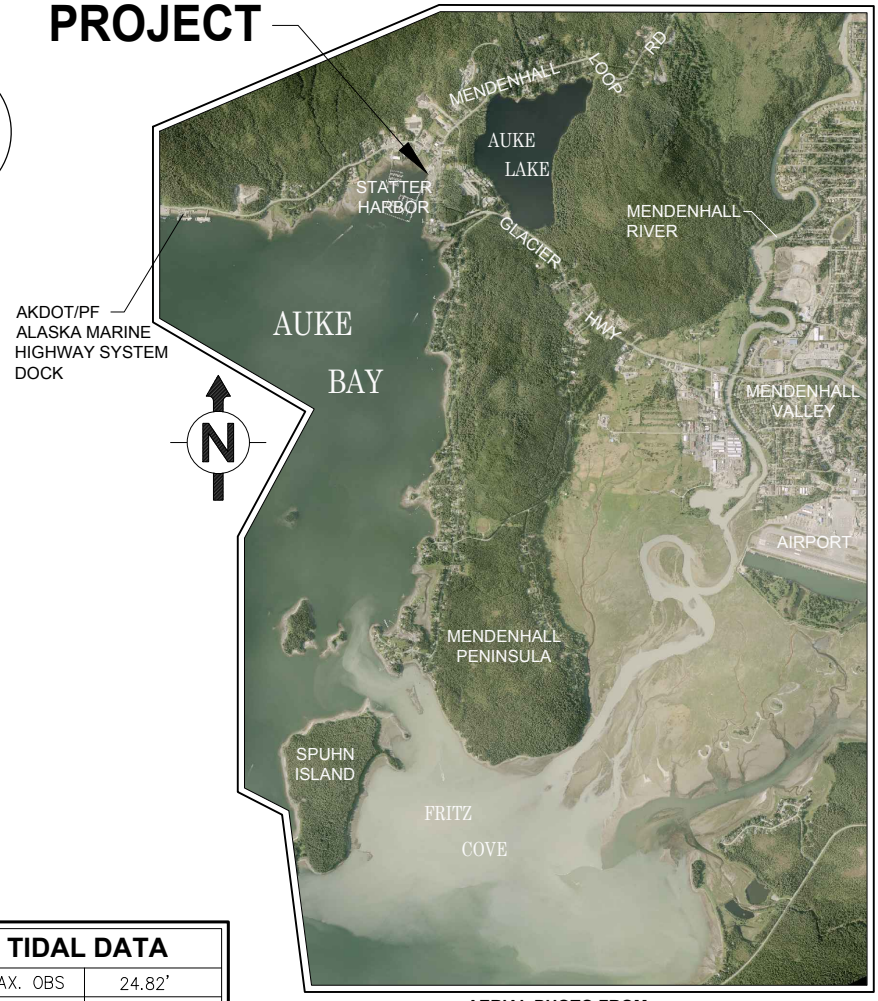
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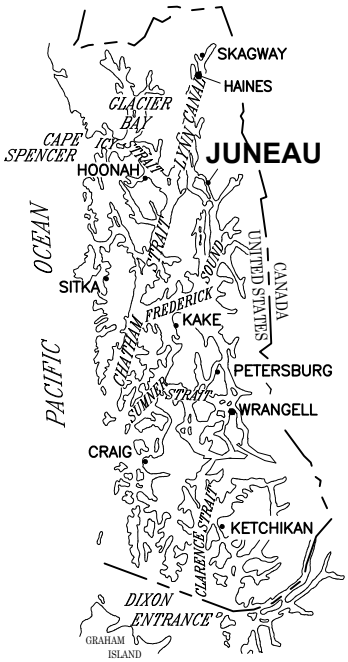
LOCATION MAP

THIS PROJECT



AKDOT/PF
ALASKA MARINE
HIGHWAY SYSTEM
DOCK

AERIAL PHOTO FROM:
CITY AND BOROUGH OF JUNEAU, 2006



SOUTHEAST ALASKA

TIDAL DATA	
MAX. OBS	24.82'
HTL	20.6'
MHW	15.3'
MLW	+1.6'
MLLW	0.0'
MIN. OBS	−5.89'

DATA REFERENCED FROM:
NOAA STATION 9452210
JUNEAU, ALASKA 2014

VICINITY MAP

SCALE IN MILES

0 1 2

PURPOSE:

THE PROJECT PURPOSE IS TO IMPROVE SAFETY AND REDUCE CONGESTION BY INCREASING HARBOR EFFICIENCY THROUGH INCORPORATION OF IMPROVEMENT PLANS IDENTIFIED IN THE STATTER HARBOR MASTER PLAN.

DATUM:

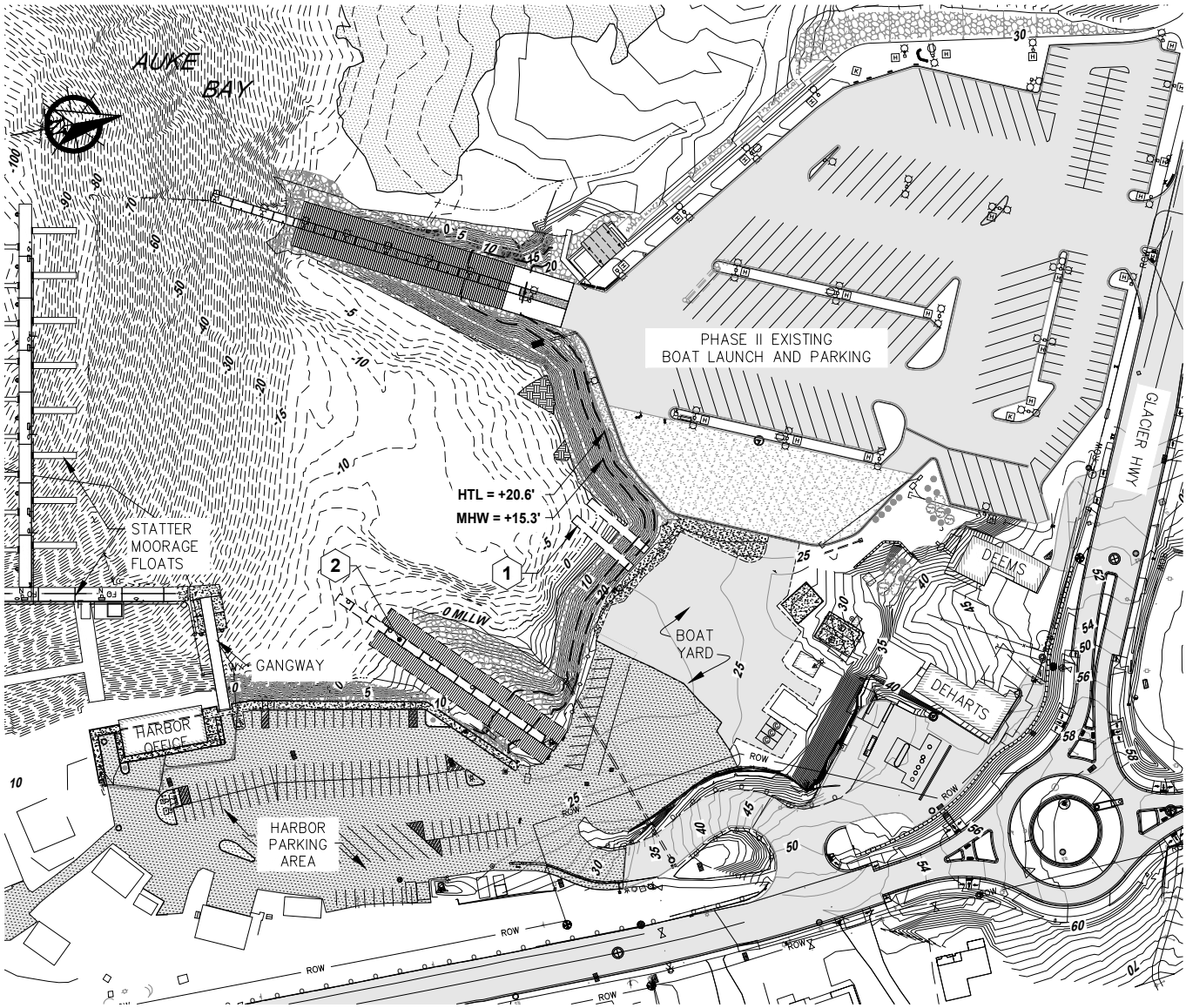
MLLW = 0.0' HTL = +20.6'

VICINITY MAP

PND PROJECT NO. 152069

STATTER HARBOR IMPROVEMENTS PHASE III

APPLICANT: CITY AND BOROUGH JUNEAU/ DOCKS AND HARBORS
FILE NO.:
WATERWAY: AUKE BAY
PROPOSED ACTIVITY: HARBOR IMPROVEMENTS
SEC. 23 **T.** 40 S **R.** 65 E **M** COPPER RIVER MERIDIAN
LAT.: 58.3852° N **LONG.:** 134.6461° W
DATE: MARCH, 2019



EXISTING CONDITIONS
DEMOLITION PLAN

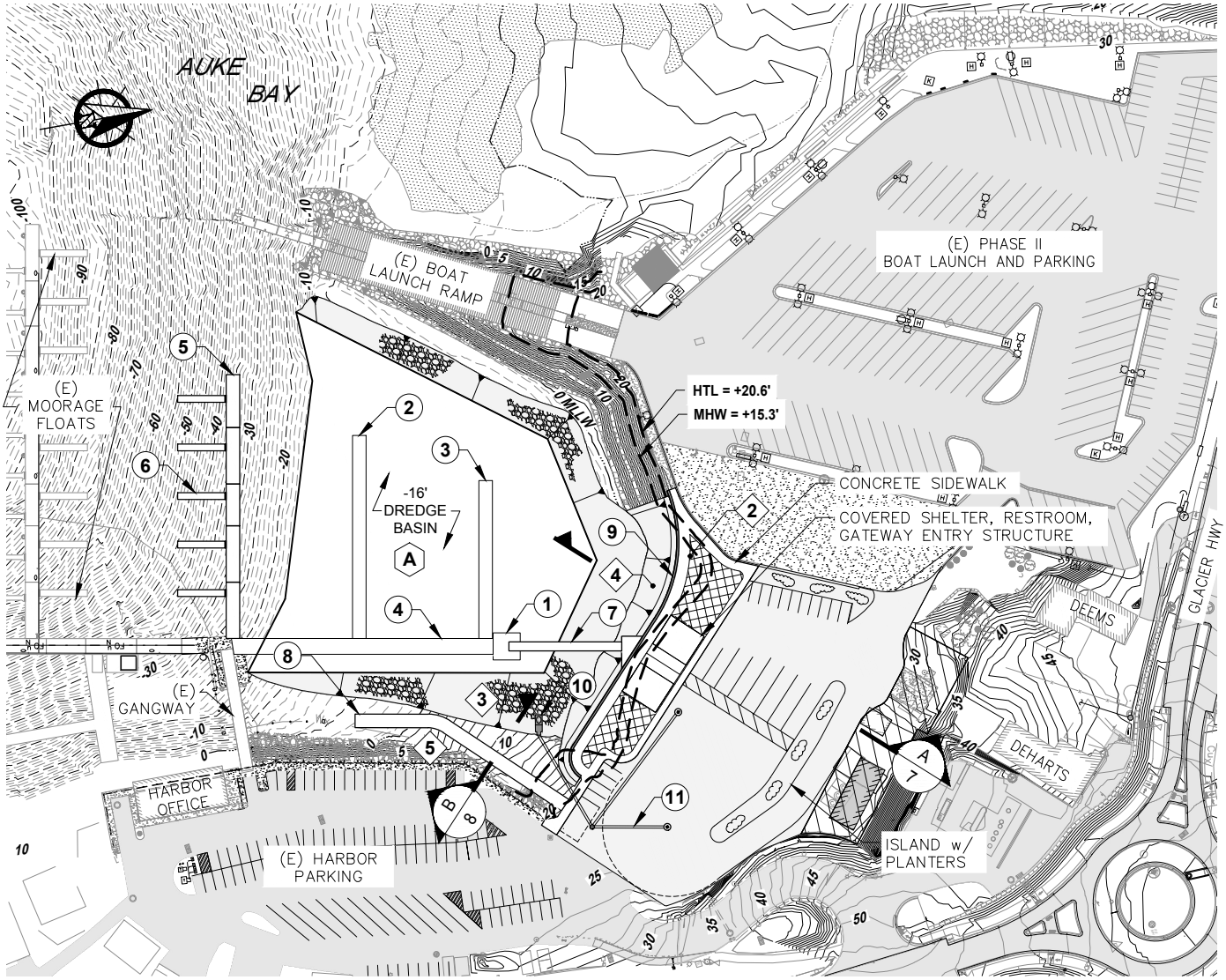
SCALE IN FEET
0 80 160 FT.

DEMOLITION SUMMARY

ITEM	DESCRIPTION
1	REMOVE AND DISPOSE EXISTING TIMBER BOAT HAUL-OUT PIER (1,152 SF) INCLUDING (16) EACH TIMBER PILES.
2	REMOVE AND DISPOSE (2) EXISTING 16' WIDE x 186' LONG, CONCRETE PLANK LAUNCH RAMPS; 8' WIDE x 240' TIMBER BOARDING FLOAT; (4) 12.75"ø STEEL PIPE PILES AND CONCRETE ABUTMENT.

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GENERAL SITE PLAN

SCALE IN FEET
0 75 150 FT.

LEGEND

(1) (A) (C) PROPOSED IMPROVEMENTS, SEE SHEET 4 FOR DESCRIPTIONS

(E) = EXISTING

STATTER HARBOR IMPROVEMENTS PHASE III

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PROPOSED STRUCTURAL IMPROVEMENTS SUMMARY - BELOW HTL

SYMBOL	ITEM	PILE SIZE DIA. (INCH)	PILE QUANTITY
1	GANGWAY LANDING FLOAT – 20' x 20'	16	20
2	TIMBER MAINWALK FLOAT – 16' x 180'		
3	TIMBER MAINWALK FLOAT – 16' x 140'		
4	TIMBER HEADWALL FLOAT – 16' x 226'		
5	CONCRETE MAIN FLOAT – 12' x 240'	24	6
6	(6) FINGER FLOATS – 6' X 42'	N/A	
7	ALUMINUM GANGWAY – 8' X 100'	N/A	
8	KAYAK LAUNCH RAMP – 12' x 208'	N/A	
9	CONCRETE MSE RETAINING WALL – 280 LF	N/A	
10	CONCRETE STORM DRAIN OUTFALL	N/A	
11	STORM DRAIN PIPE	N/A	

NOTE:
TOTAL AREA OF OVER WATER COVERAGE: APPROX. 17,400 SF
TOTAL PILES: APPROX. 26

MATERIAL SCHEDULE - BELOW HTL

SYMBOL	ITEM	VOLUME (CY)
A	DREDGE MATERIAL – OFFSHORE DISPOSAL	30,375
B	MSE RETAINING WALL FILL – (INCLUDING PORTION OF SURCHARGE FILL TO REMAIN)	8,000
C	DREDGE BASIN SLOPE ARMOR ROCK – CLASS II	1,900
D	MSE RETAINING WALL SLOPE ARMOR ROCK – CLASS III	800
E	KAYAK RAMP – CONCRETE PLANKS AND ARMOR ROCK	2,496

PROPOSED DREDGING; BEDROCK REMOVAL SUMMARY

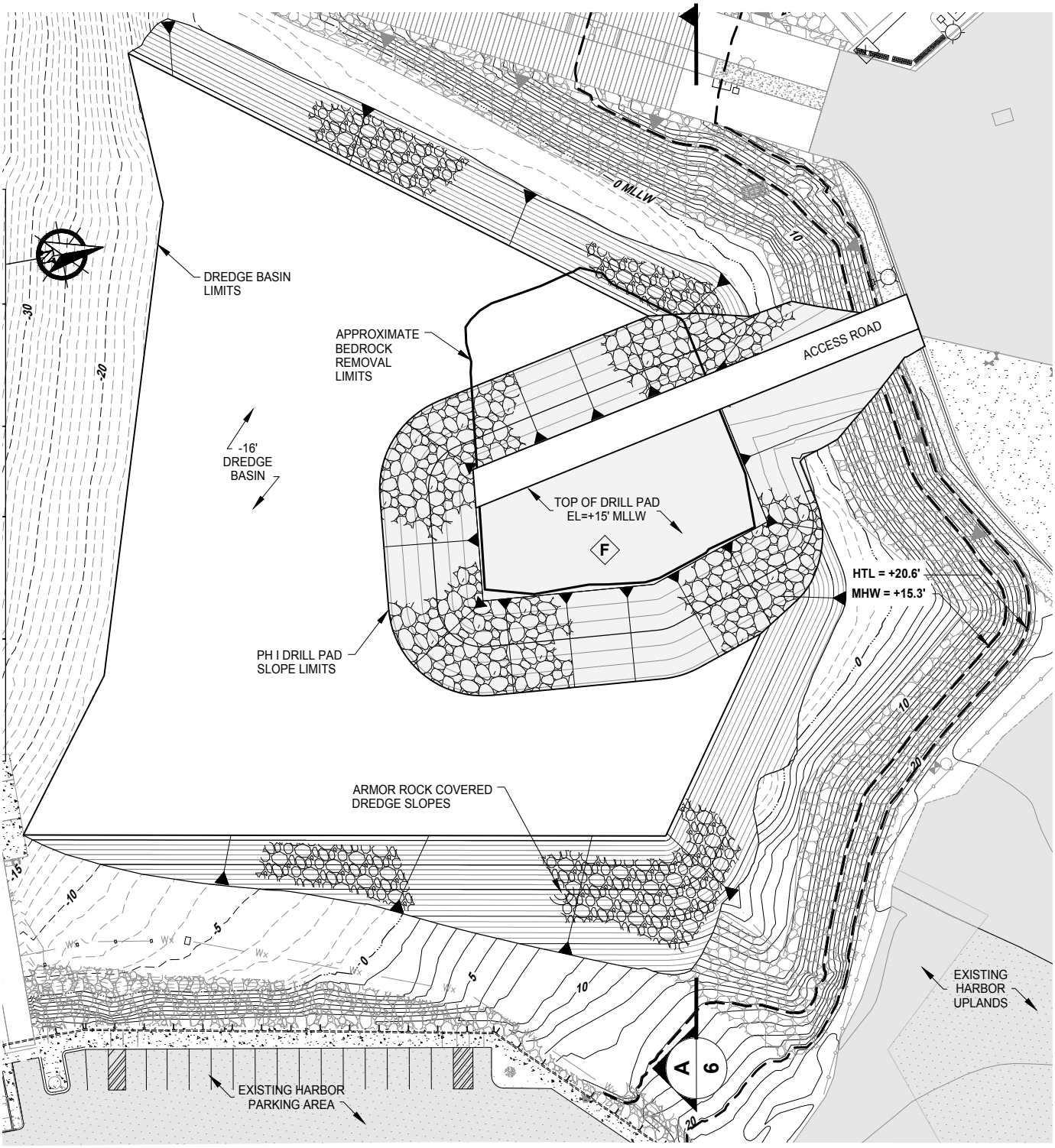
SYMBOL	ITEM	VOLUME (CY)
A	DREDGING	24,300
B	BEDROCK REMOVAL	2,000

TEMPORARY FILL MATERIAL SCHEDULE

SYMBOL	ITEM	VOLUME (CY)
F	TEMPORARY BLAST PAD – CLASS A SHOT ROCK	15,000
G	TEMPORARY SURCHARGE FILL – CLASS A SHOT ROCK	7,000

STATTER HARBOR IMPROVEMENTS PHASE III

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DATE: MARCH, 2019



BEDROCK REMOVAL SITE PLAN
PHASE I

LEGEND

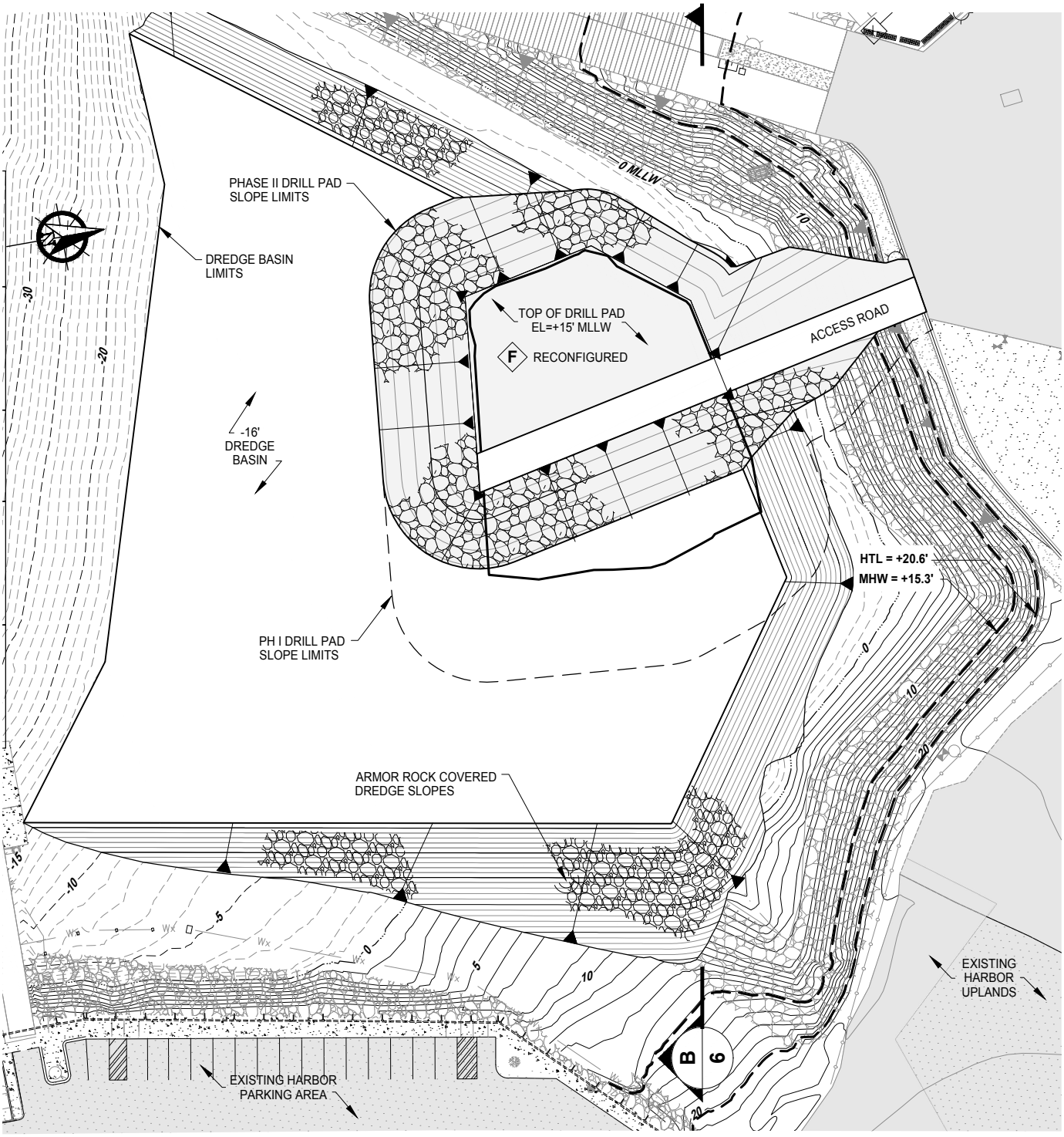
F — PROPOSED IMPROVEMENTS, SEE SHEET 4 FOR DESCRIPTIONS

SCALE IN FEET

0 60 120 FT.

STATTER HARBOR IMPROVEMENTS PHASE III

APPLICANT: CITY AND BOROUGH JUNEAU/ DOCKS AND HARBORS
FILE NO.:
WATERWAY: AUKE BAY
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DATE: MARCH, 2019



BEDROCK REMOVAL SITE PLAN
PHASE II

LEGEND

F — PROPOSED IMPROVEMENTS, SEE SHEET 4 FOR DESCRIPTIONS

SCALE IN FEET

0 60 120 FT.

STATTER HARBOR IMPROVEMENTS PHASE III

APPLICANT: CITY AND BOROUGH JUNEAU/ DOCKS AND HARBORS
FILE NO.:
WATERWAY: AUKE BAY
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PROFILE - PHASE I DRILL PAD - VIEW SOUTH

A/4

SCALE IN FEET
0 25 50 FT.

PROFILE PHASE II DRILL PAD - VIEW SOUTH

B/5

SCALE IN FEET
0 25 50 FT.

LEGEND

F — PROPOSED IMPROVEMENTS, SEE SHEET 4 FOR DESCRIPTIONS

STATTER HARBOR IMPROVEMENTS PHASE III

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A/3 **TYPICAL SITE SECTION**

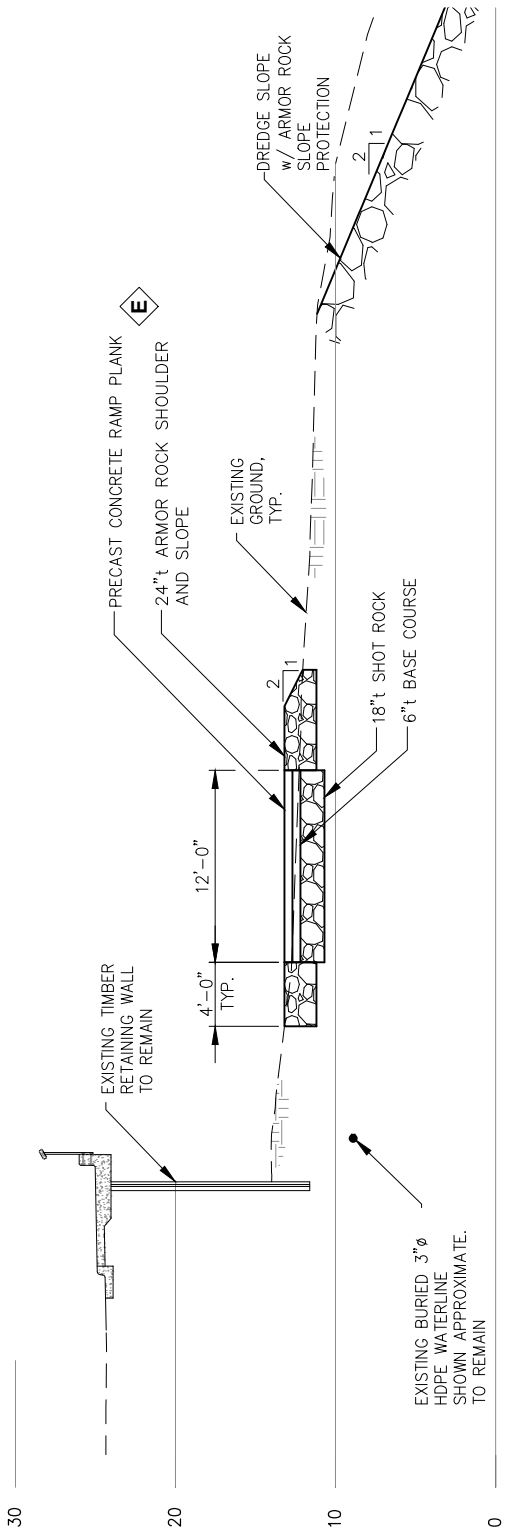
STEP 1: SURCHARGE EXCAVATION
TYPICAL SECTION

STATTER HARBOR IMPROVEMENTS PHASE III

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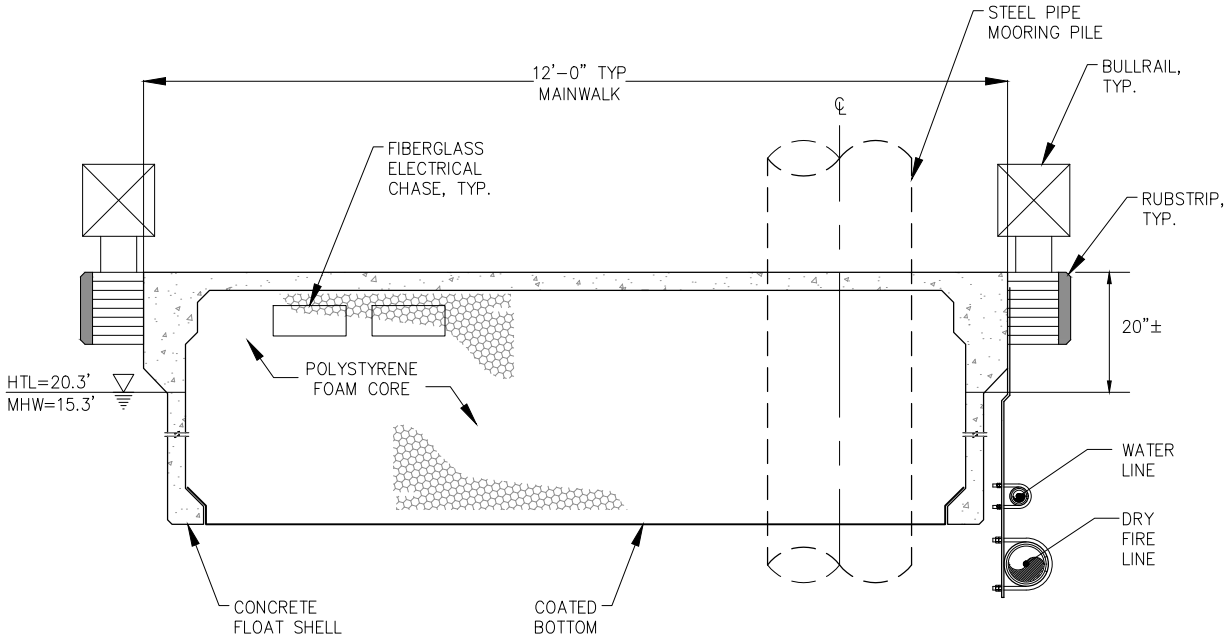
B/3 KAYAK LAUNCH RAMP TYPICAL SECTION

LEGEND

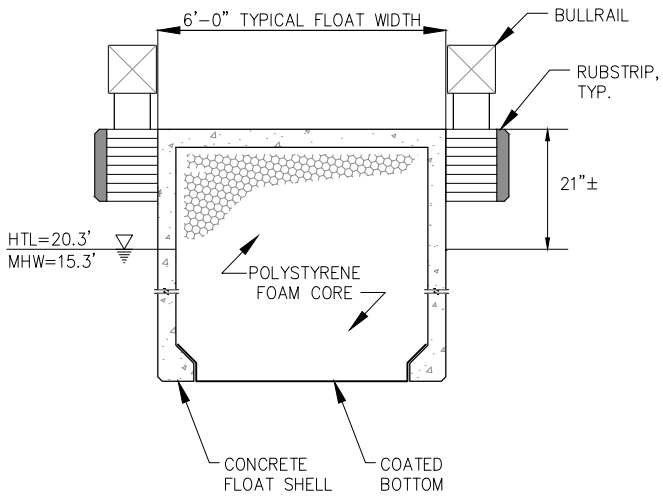
E PROPOSED IMPROVEMENTS, SEE SHEET 4 FOR DESCRIPTIONS

STATTER HARBOR IMPROVEMENTS PHASE III

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NEW MAINWALK FLOAT SECTION



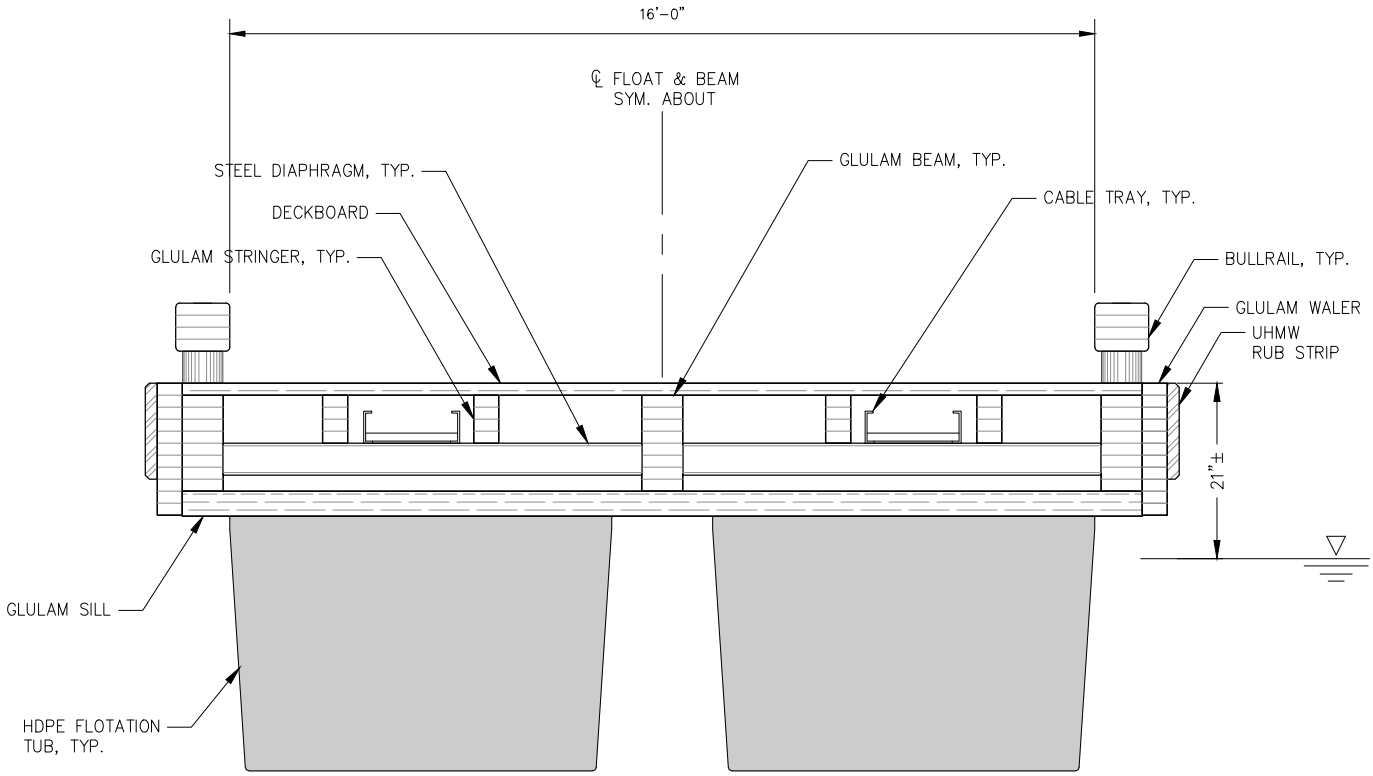
NEW FINGER FLOAT SECTION

CONCRETE MOORAGE FLOAT

TYPICAL SECTIONS

STATTER HARBOR IMPROVEMENTS PHASE III

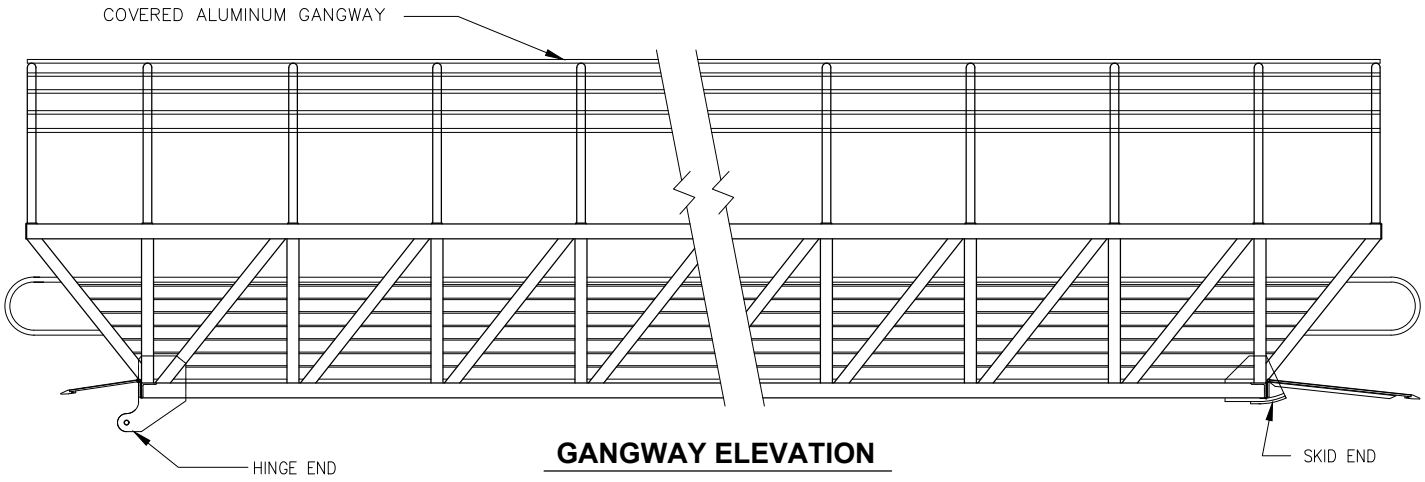
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WATERWAY: AUKE BAY
PROPOSED ACTIVITY: HARBOR IMPROVEMENTS
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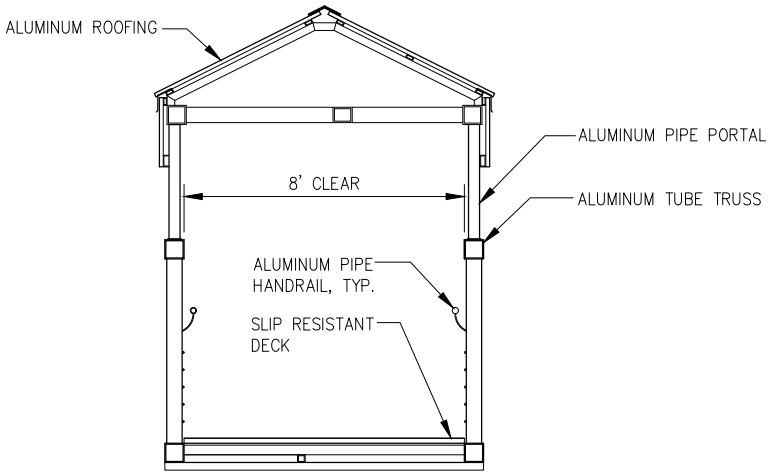
TIMBER MOORAGE FLOATS
TYPICAL SECTION

STATTER HARBOR IMPROVEMENTS PHASE III

APPLICANT: CITY AND BOROUGH JUNEAU/ DOCKS AND HARBORS
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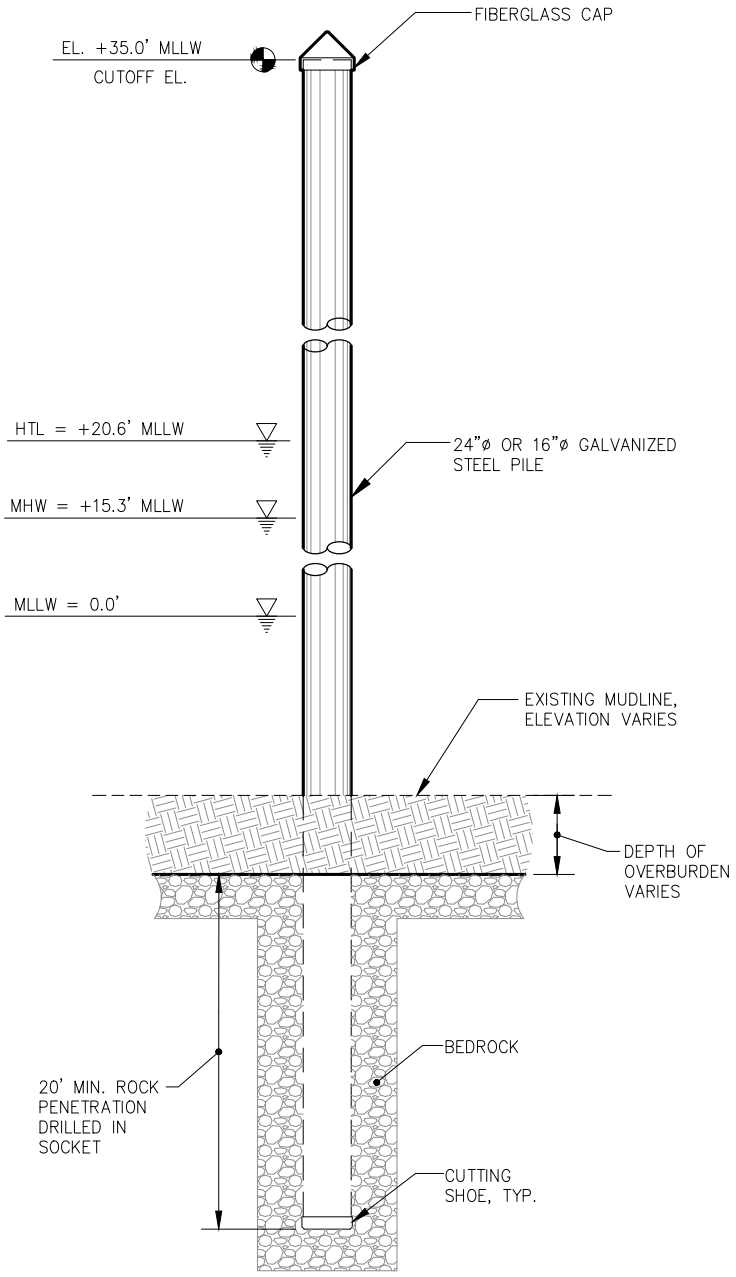
GANGWAY ELEVATION



GANGWAY TYPICAL SECTION

STATTER HARBOR IMPROVEMENTS PHASE III

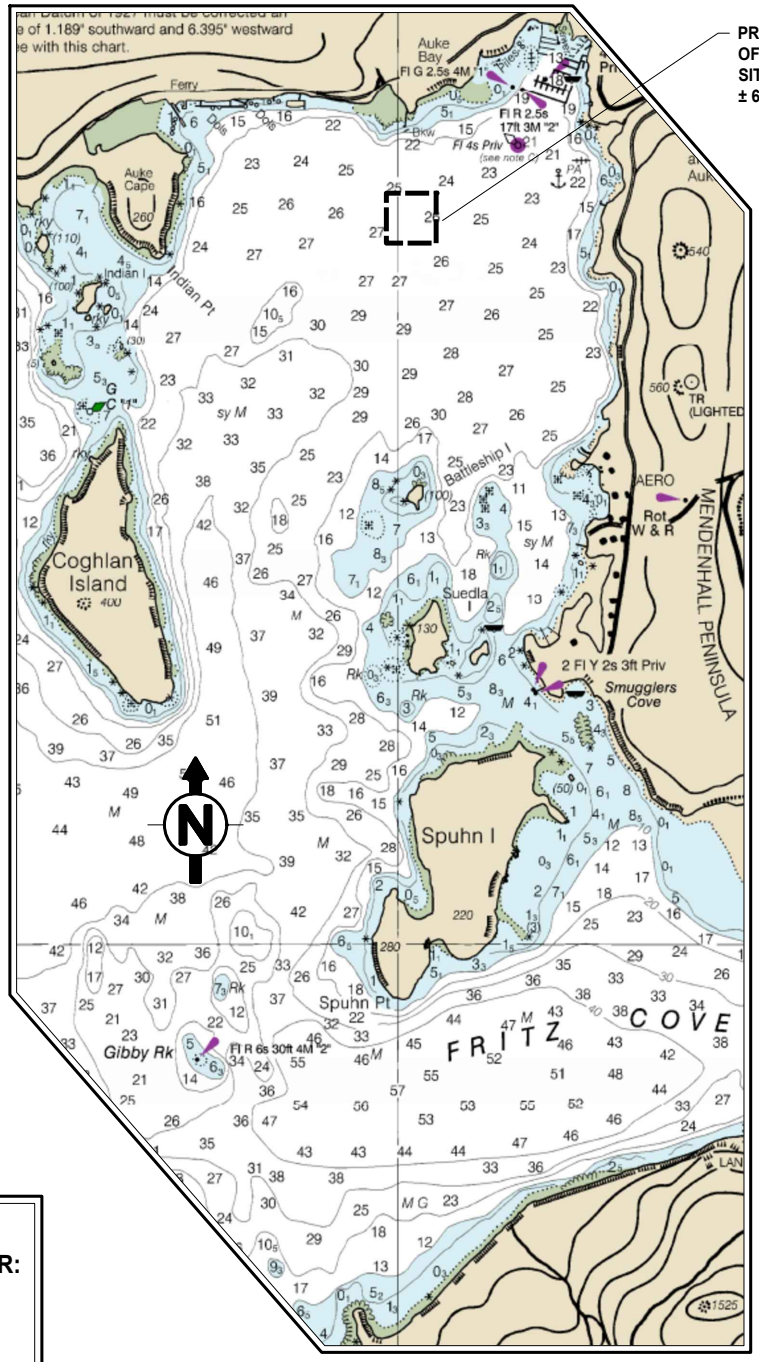
APPLICANT: CITY AND BOROUGH JUNEAU/ DOCKS AND HARBORS
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STEEL PIPE PILE
DETAILS

STATTER HARBOR IMPROVEMENTS PHASE III

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DATE: MARCH, 2019



BATHYMETRY FROM: NOAA 17315 GASTINEAU CHANNEL AND TAKU INLET

OFFSHORE DISPOSAL SITE CENTER:

LAT: N 58°22'22.08"

LONG: W 134°39'49.32"

NOTE:
CENTER LOCATION APPROXIMATE

OFFSHORE DISPOSAL SITE PLAN

SCALE IN MILES

0 ½ 1

STATTER HARBOR IMPROVEMENTS PHASE III

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SECTION 01010 - SUMMARY OF WORK

PART 1 – GENERAL

1.1 GENERAL

A. The WORK to be performed under this contract shall consist of furnishing all plant, tools, equipment, materials, supplies, manufactured articles, labor, transportation and services, including fuel, power, water, and essential communications, and performing all WORK, or other operations required for the fulfillment of the contract in strict accordance with the Contract Documents. The WORK shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The WORK generally consists of various quantities of mobilization, demolition, salvage and disposal, excavation and embankment, storm drain utilities, base course, asphalt concrete paving, concrete seawalks, sidewalks, curbs and gutters, handrail, landscaping, lighting, and other miscellaneous related improvements and appurtenances.

1.3 SITE OF THE WORK

A. The site of the WORK is located in Juneau, Alaska at Statter Harbor.

1.4 BEGINNING AND COMPLETION OF THE WORK

A. Time is the essence of the contract. All WORK shall be completed in accordance with the following schedule:

WORK DESCRIPTION	COMPLETION DATE
Substantial Completion for all other Work	May 31, 2026
All WORK under the Contract Documents	June 30, 2026

1.5 CONTRACT METHOD

A. The WORK hereunder will be constructed under a unit-price contract.

1.6 WORK BY OTHERS

A. The CONTRACTOR's attention is directed to the fact that work may be conducted at the site by other contractors during the performance of the WORK under this Contract. The CONTRACTOR shall conduct its operations so as to cause a minimum of interference with the work of such other contractors, and shall cooperate fully with such contractors to provide continued safe access to their respective portions of the site, as required to perform work under their respective contracts.

B. Interference With Work On Utilities: The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK so as to minimize interference with said relocation, altering, or other rearranging of facilities.

1.7 CONTRACTOR USE OF PROJECT SITE

A. The CONTRACTOR's use of the Project site shall be limited to its construction operations, including on-site storage of materials. The CONTRACTOR shall coordinate with the Harbormaster for confirmation of staging areas and prescribed work areas as shown on the plans.

1.8 OWNER USE OF THE PROJECT SITE

A. The OWNER may utilize all or part of the existing site during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate and coordinate with the ENGINEER to facilitate the OWNER's operations and to minimize interference with the CONTRACTOR's operations at the same time. In any event, the OWNER shall be allowed access to the Project site during the period of construction.

B. To the extent possible and as safety will allow, the project site shall remain active and available to the public. The CONTRACTOR shall conduct operations to minimize interference with use of the facilities at all times. The CONTRACTOR shall erect/install safety barriers and establish exclusion zones as necessary during work operations. The CONTRACTOR shall coordinate with the OWNER and the ENGINEER all required restrictions and any other WORK that may affect public use a minimum of 48 hours in advance or longer as specified elsewhere in the Contract Documents.

1.9 PROJECT MEETINGS

A. Pre-Construction Conference

1. Prior to the commencement of WORK at the site, a Pre-Construction Conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR's Project manager, its superintendent, and its Subcontractors as the CONTRACTOR deems appropriate. Other attendants will be:

   a. ENGINEER and the Inspector.
   b. Representatives of OWNER.
   c. Governmental representatives as appropriate.
   d. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

2. Unless previously submitted to the ENGINEER, the CONTRACTOR shall bring one copy each of the following:

   a. Plan of Operation.
   b. Project Overview Bar Chart Schedule.
   c. Procurement schedule of major equipment and materials and items requiring long lead time.
   d. Shop Drawing/Sample/Substitute or "Or Equal" submittal schedule.
   e. Name and telephone number of CONTRACTOR's Project Supervisor.

3. The purpose of the Pre-Construction Conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date.

   The CONTRACTOR should be prepared to discuss all of the items listed below:

   a. Status of CONTRACTOR's insurance and bonds.
   b. CONTRACTOR's tentative schedules.

c. Transmittal, review, and distribution of CONTRACTOR's submittals.
d. Processing applications for payment.
e. Maintaining record documents.
f. Critical WORK sequencing.
g. Field decisions and Change Orders.
h. Use of Project site, office and storage areas, security, housekeeping, and OWNER's needs.
i. Major equipment deliveries and priorities.
j. CONTRACTOR's assignments for safety and first aid.

4. The OWNER will preside at the Pre-Construction Conference and will arrange for keeping and distributing the minutes to all persons in attendance.

5. The CONTRACTOR and its Subcontractors should plan on the conference taking no less than 2 hours. The items listed in paragraph 3 will be covered as well as reviewing the plans and specifications, in extensive detail, with the ENGINEER and the OWNER.

B. Progress Meetings

1 The CONTRACTOR shall schedule and hold regular on-site progress meetings at least monthly and at other times as requested by the ENGINEER, or as required by progress of the WORK. The CONTRACTOR, ENGINEER, and all subcontractors active on the site must attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

2. The ENGINEER shall preside at the meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR is required to present any issues which may impact its work, with a view to resolve these issues expeditiously.

1.10 DEFINITIONS APPLICABLE TO TECHNICAL SPECIFICATIONS. The following words have the meaning defined in the Technical Portions of the WORK:

Furnish - means to supply and deliver to the site, to unload and unpack ready for assembly, installation, testing, and start-up.

Indicated - is a word used to direct the CONTRACTOR to information contained on the drawings or in the Specifications. Terms such as "shown," "noted," "scheduled," and "specified" also may be used to assist in locating information but no limitation of location is implied or intended.

Install - defines operations at the site including assembly, erection, placing, anchoring, applying, shaping to dimension, finishing, curing, protecting, and cleaning, ready for the OWNER's use.

Installer - a person or firm engaged by the CONTRACTOR or its subcontract or any subcontractor for the performance of installation, erection, or application work at the site. Installers must be expert in the operations they are engaged to perform.

Provide - is defined as furnish and install, ready for the intended use.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used) **END OF SECTION**

SECTION 01025 – MEASUREMENT AND PAYMENT

PART 1 – GENERAL

A. Payment for the various items of the Bid Schedule, as further specified herein, shall include all compensation to be received by the CONTRACTOR for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of WORK being described, as necessary to complete the various items of the WORK all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of permits and cost of compliance with the regulations of public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA).

B. No separate payment shall be made for any WORK item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of WORK.

C. In addition to other incidental items of WORK listed elsewhere in the contract, the following items shall also be considered as incidental to other items of WORK under this contract:

1. Removal and replacement of survey monuments and markers disturbed during construction, whether shown on the Plans or not.

2. Re-vegetating areas disturbed during construction.

3. Trench excavation and bedding as required for all piping, structures, and vault installations.

4. Adjusting fire hydrant to finish grade.

5. Erosion and pollution control in accordance with local, state and federal standard, including floating sediment booms.

6. Temporary shoring of trenches or bracing of existing facilities as required for constructing any/all improvements.

7. Maintenance of all services through the Project area, including water, storm, garbage pickup, mail delivery, other deliveries and emergency vehicles.

8. All traffic control, including flaggers and preparation of satisfactory Traffic Control Plans.

9. Minor grading of fill materials as required to match existing grades and maintain positive surface drainage.

10. Minor changes in grades to fit field conditions.

11. Miscellaneous connecting and attachment hardware as required installing new equipment.

12. Excavating, bedding, and backfilling for all pipes and conduits for water, storm drain and electrical systems including manholes, cleanouts, valve boxes and junction boxes.
13. Accommodating the OWNER's salvage operations as required.
14. Coordination with trash and utility services as required.
15. Coordinating and scheduling all construction activities around Owner operations.

PART 2 – PAY ITEMS

DIVISION 1 – GENERAL REQUIREMENTS

1.1 MOBILIZATION (Pay Item No. 1505.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Mobilization shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.

B. Payment for Mobilization under shall be made at the amount shown on the Bid Schedule under Pay Item No. 1505.1, which payment shall constitute full compensation for all WORK described in Section 01505 - Mobilization, as shown on the Plans and as directed by the ENGINEER.

C. Partial payments shall be made as the WORK progresses as follows:

1. When 5% of the total original contract amount is earned from other pay items, 50% of the amount bid for Mobilization, or 5% of the original contract amount, whichever is lesser, shall be paid.

2. When 10% of the total original contract amount is earned from other pay items, 95% of the amount bid for Mobilization, or 10% of the original Contract amount, whichever is lesser, shall be paid.

3. Upon completion of all WORK on the Project, payment of any remaining amount bid for Mobilization shall be paid.

1.2 EROSION AND SEDIMENT CONTROL (Pay Item No. 1570.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Erosion and Sediment Control shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.

B. WORK under this Pay Item includes obtaining all necessary permits for storm water control as required by Alaska Department of Conservation and the Environmental Protection Agency. This includes Storm Water Pollution Prevention Plan preparation and maintenance as required and obtaining an Alaska Construction General Permit. Furnishing, installing and maintaining all measures required by these permits shall be included under this pay item.

C. Payment for Erosion and Sediment Control shall be made at the amount shown on the Bid Schedule under Pay Item No. 1570.1, which payment shall constitute full compensation for all WORK described in Section 01570 - Erosion and Sediment Control, as shown on the Plans and as directed by the ENGINEER.

DIVISION 2 – SITE WORK

2.1 DEMOLITION, SALVAGE AND DISPOSAL (Pay Item No. 2060.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Demolition, Salvage and Disposal shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the Contract Documents and as shown on the Plans.

B. Payment for Demolition, Salvage and Disposal shall be made at the amount shown on the Bid Schedule under Pay Item No. 2060.1, which payment shall constitute full compensation for all WORK described in Section 02060 – Demolition, Salvage and Disposal, as shown on the Plans, and as directed by the ENGINEER.

2.2 UNUSABLE EXCAVATION (Pay Item No. 2202.1) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Unusable Excavation shall be based on the number of cubic yards of material in place as determined by the average end area method utilizing original ground profiles and design template neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements. Excavation outside of the lines, grades and typical sections indicated in the plans or as directed by the ENGINEER shall not be included in the quantities for pay purposes.

B. Payment for Unusable Excavation shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.1, which payment shall constitute full compensation for all WORK described in Section 02202 - Excavation and Embankment, as shown on the plans and as directed by the ENGINEER.

2.3 USABLE EXCAVATION (Pay Item No. 2202.2) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Usable Excavation shall be based on the number of cubic yards of material in place as determined by the average end area method utilizing original ground profiles and design template neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements. Excavation outside of the lines, grades and typical sections indicated in the plans or as directed by the ENGINEER shall not be included in the quantities for pay purposes.

B. Placement of Usable Excavation, as determined by the ENGINEER, into the fill prism as embankment within the project limits shall not be measured directly for payment, but shall be considered incidental this item of WORK.

C. Payment for Usable Excavation shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.2, which payment shall constitute full compensation for all WORK described in Section 02202 - Excavation and Embankment, as shown on the plans and as directed by the ENGINEER.

2.4 CLASS A SHOT ROCK BORROW (Pay Item No. 2202.3) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Class A Shot Rock Borrow shall be based on the number of cubic yards of material in place as determined by the average end area method, based upon final design template neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements.

B. Class A Shot Rock Borrow placed outside of the lines, grades and typical sections indicated in the Plans or as directed by the ENGINEER shall not be included in the borrow quantities for pay purposes.

C. Payment for Class A Shot Rock Borrow shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2202.3, which payment shall constitute full compensation for all WORK described in Section 02202 - Excavation and Embankment, as shown on the Plans and as directed by the ENGINEER.

2.5 BASE COURSE, GRADING D-1 (Pay Item No. 2204.1) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Base Course, Grading D-1 shall be based on the number of cubic yards of material in place as determined by the average end area method based on design neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements.

B. Base course placed outside of the lines, grades and typical sections indicated in the plans or as directed by the ENGINEER shall not be included in the quantities for pay purposes.

C. Payment for Base Course, Grading D-1 shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2204.1, which payment shall constitute full compensation for all WORK described in Section 02204 – Base Course, as shown on the plans and as directed by the ENGINEER.

2.6 BASE COURSE, GRADING A (Pay Item No. 2204.2) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Base Course, Grading A shall be based on the number of cubic yards of material in place as determined by the average end area method based on design neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements.

B. Base course placed outside of the lines, grades and typical sections indicated in the plans or as directed by the ENGINEER shall not be included in the quantities for pay purposes.

C. Payment for Base Course, Grading A shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2204.2, which payment shall constitute full compensation for all WORK described in Section 02204 – Base Course, as shown on the plans and as directed by the ENGINEER.

2.7 CLASS II ARMOR ROCK (Pay Item No. 2205.1) PRICE BASED ON QUANTITY, CUBIC YARD

A. Measurement for payment for Class II Armor Rock shall be based on the number of cubic yards of material in place as determined by the average end area method, based upon original ground sections and final design template neat lines. Where impractical to measure by the average end area method, the ENGINEER may approve other acceptable methods involving three-dimensional measurements.

B. Armor rock placed outside of the lines, grades and typical sections indicated in the Plans or as directed by the ENGINEER shall not be included in the quantities for pay purposes.

C. Payment for Class II Armor Rock shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2205.1, which payment shall constitute full compensation for all WORK described in Section 02205 –Armor Rock, as shown on the Plans and as directed by the ENGINEER.

2.8 ADJUST EXISTING CLEANOUT TO FINISH GRADE (Pay Item No. 2402.1) PRICE BASED ON QUANTITY, EACH

A. Adjust Existing Cleanout to Finish Grade shall be measured per each, complete in place, including any required extensions, all in accordance with the requirements of the Contract Documents.

B. Payment for Adjust Existing Cleanout to Finish Grade shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2402.1, which payment shall constitute full compensation for all WORK described in Section 02402 – Sanitary Sewer Manholes and Cleanouts, as shown on the Plans and as directed by the ENGINEER.

2.9 ADJUST EXISTING PUMP STATION TO FINISH GRADE (Pay Item No. 2402.2) PRICE BASED ON LUMP SUM

A. Measurement for payment for Adjust Existing Pump Station to Finish Grade shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in place, including any required extensions, all in accordance with the requirements of the Contract Documents.

B. Payment for Adjust Existing Pump Station to Finish Grade shall be made at the amount shown on the Bid Schedule under Pay Item No. 2402.2, which payment shall constitute full compensation for all WORK described in Section 02402 – Sanitary Sewer Manholes and Cleanouts, as shown on the Plans and as directed by the ENGINEER.

2.10 [ ] - INCH [ ] STORM DRAIN PIPE (Pay Item Nos. 2501.1, 2501.2) PRICE BASED ON QUANTITY, LINEAR FOOT

A. Measurement for Payment for [ ] – Inch [ ] Storm Drain Pipe shall be per actual linear foot installed, complete in place, including all trenching, bedding, backfill, coupling bands, bends and other items necessary for the proper joining of the culvert pipe sections all in accordance with the requirements of the Contract Documents.

B. Drain pipes for culverts shall be measured by the staked length, from center to center of structures or to ends of pipe if no structure is present.

C. Excavation, bedding and backfill shall not be measured for payment, but shall be considered incidental to other WORK.

D. Dissimilar pipe couplings and pipe segments required to connect to existing pipes shall not be measured for payment, but shall be considered incidental to other WORK.

E. Payment for 18-Inch CPP Storm Drain Pipe shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2501.1, which payment shall constitute full compensation for all WORK described in Section 02501 – Storm Sewer Pipe, as shown on the plans and as directed by the ENGINEER.

F. Payment for 6-Inch PVC Storm Drain Pipe shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2501.2, which payment shall constitute full compensation for all WORK described in Section 02501 – Storm Sewer Pipe, as shown on the plans and as directed by the ENGINEER.

2.11 STORM DRAIN CATCH BASIN, TYPE IV (Pay Item No. 2502.1) PRICE BASED ON QUANTITY, EACH

A. Storm Drain Catch Basin, Type IV shall be measured per each, complete in place, including all earthwork, concrete collars, frames and covers all in accordance with the requirements of the Contract Documents.

B. Payment for Storm Drain Catch Basin, Type IV shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2502.1, which payment shall constitute full compensation for all WORK described in Section 02502 – Storm Sewer Manholes, Inlets, and Catch Basins, as shown in the plans and as directed by the ENGINEER.

2.12 DECK DRAIN (Pay Item No. 2502.2) PRICE BASED ON QUANTITY, EACH

A. Deck Drain shall be measured per each, complete in place, including all earthwork, collars, frames and covers all in accordance with the requirements of the Contract Documents.

B. Payment for Deck Drain shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2502.2, which payment shall constitute full compensation for all WORK described in Section 02502 – Storm Sewer Manholes, Inlets, and Catch Basins, as shown in the plans and as directed by the ENGINEER.

2.13 RECONSTRUCT EXISTING MANHOLE TO FINISH GRADE (Pay Item No. 2502.3) PRICE BASED ON QUANTITY, EACH

A. Reconstruct Existing Manhole to Finish Grade shall be measured per each, complete in place, including any required extensions, all in accordance with the requirements of the Contract Documents.

B. Payment for Reconstruct Existing Manhole to Finish Grade shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2502.3, which payment shall constitute full compensation for all WORK described in Section 02502 – Storm Sewer Manholes, Inlets and Catch Basins, as shown on the Plans and as directed by the ENGINEER.

2.14 ADJUST EXISTING MANHOLE TO FINISH GRADE W/ FRAME AND GRATE (Pay Item No. 2502.4) PRICE BASED ON QUANTITY, EACH

A. Adjust Existing Manhole to Finish Grade w/ Frame and Grate shall be measured per each, complete in place, including any required extensions, frame and grate, all in accordance with the requirements of the Contract Documents.

B. Payment for Adjust Existing Manhole to Finish Grade w/ Frame and Grate shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2502.4, which payment shall constitute full compensation for all WORK described in Section 02502 – Storm Sewer Manholes, Inlets and Catch Basins, as shown on the Plans and as directed by the ENGINEER.

2.15 TRENCH DRAIN (Pay Item No. 2502.5) PRICE BASED ON LUMP SUM

A. Measurement for payment for Trench Drain shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in place, including all concrete, rebar, formwork, frames and covers in accordance with the requirements of the Contract Documents.

B. Payment for Trench Drain shall be made at the amount shown on the Bid Schedule under Pay Item No. 2502.5, which payment shall constitute full compensation for all WORK described in Section 02502 – Storm Sewer Manholes, Inlets, and Catch Basins, as shown in the plans and as directed by the ENGINEER.

2.16 1-INCH HDPE WATER PIPE (Pay Item No. 2601.1) PRICE BASED QUANTITY, LINEAR FOOT

A. Measurement for payment for 1-Inch HDPE Water Pipe shall be per actual linear foot installed, complete in place, including all fittings, joint restraints, geotextile fabric, clamps, connections, transitions, trenching, bedding and backfill, and other miscellaneous appurtenances, all in accordance with the requirement of the Contract Documents.

B. Payment for 1-Inch HDPE Water Pipe shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2601.1, which payment shall constitute full compensation for all WORK described in Section 02601 – Water System, as shown on the Plans and as directed by the ENGINEER.

2.17 YARD HYDRANT (Pay Item No. 2601.2) PRICE BASED ON LUMP SUM

A. Measurement for payment for Yard Hydrant shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed complete, including concrete pad, all in accordance with the requirements of the Contract Documents and as shown on the Plans.

B. Payment for Yard Hydrant shall be made at the amount shown on the Bid Schedule under Pay Item No. 2601.2, which payment shall constitute full compensation for all WORK described in Section 02601 – Water System, as shown on the Plans and as directed by the ENGINEER.

2.18 ADJUST EXISTING VALVE BOX TO FINISH GRADE (Pay Item No. 2602.1) PRICE BASED ON QUANTITY, EACH

A. Adjust Existing Valve Box to Finish Grade shall be measured per each, complete in place, including any required extensions, all in accordance with the requirements of the Contract Documents.

B. Payment for Adjust Existing Valve Box to Finish Grade shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2602.1, which payment shall constitute full compensation for all WORK described in Section 02602 – Valves, as shown on the Plans and as directed by the ENGINEER.

2.19 CONSTRUCTION SURVEYING (Pay Item No. 2702.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Construction Surveying shall be based on the completion of the entire WORK as a Lump Sum Pay Unit, complete, all in accordance with the requirements of the Contract Documents.

B. Payment for Construction Surveying shall be made at the amount shown on the Bid Schedule under Pay Item No. 2702.1, which payment shall constitute full compensation for all WORK described in Section 02702 - Construction Surveying, as shown on the Plans, and as directed by the ENGINEER.

2.20 SIGNAGE (Pay Item No. 2718.1) PRICED BASED ON LUMP SUM

A. Measurement for payment for Signage shall be based on the completion of the entire WORK as a Lump Sum Pay Unit, furnished and installed, including signs, posts, bases, and other appurtenant materials complete, all in accordance with the requirements of the Contract Documents and as shown on the Plans.

B. Payment for Signage shall be made at the amount shown on the Bid Schedule under Pay Item No. 2718.1, which payment shall constitute full compensation for all WORK described in Section 02718 - Signage, as shown on the Plans, and as directed by the ENGINEER.

2.21 PAINTED TRAFFIC MARKINGS (Pay Item No. 2720.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Painted Traffic Markings shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete including all striping and ADA symbol markings, all in accordance with the requirements of the Contract Documents and as shown on the plans.

B. Payment for Painted Traffic Markings shall be made at the amount shown on the Bid Schedule under Pay Item No. 2720.1, which payment shall constitute full compensation for all WORK described in Section 02720 – Painted Traffic Markings, as shown on the plans and as directed by the ENGINEER.

2.22 1-ft THICK MSE WALL BLOCKS (Pay Item No. 2726.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for 1-ft Thick MSE Wall Blocks shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in place and in accordance with the requirements of the Contract Documents.

B. Payment for 1-ft Thick MSE Wall Blocks shall be made at the amount shown on the Bid Schedule under Pay Item No. 2726.1, which payment shall constitute full compensation for all WORK described in Section 02726 – MSE Wall as shown on the plans and as directed by the ENGINEER.

2.23 A.C. PAVEMENT, TYPE II, CLASS B, 3-INCH THICK (Pay Item No. 2801.1) PRICE BASED ON QUANTITY, TON

A. A.C. Pavement, Type II, Class B shall be placed as shown in the plans and shall be measured for payment by the Ton.

B. No measurement shall be made for asphalt concrete pavement that exceeds the neat line quantity, as determined by the nominal design thickness multiplied by the actual area paved, using a conversion factor of 125 pounds per square yard per inch of thickness.

C. All resealing of joints with existing pavement, including those resealed after the pavement has cooled to ambient temperatures, shall not be measured for payment, but shall be considered incidental to other WORK under the contract.

D. Tack Coat applied to existing joint surfaces, along edges of gutters prior to placement of A.C. pavement shall be considered incidental to other WORK under Pay Item No. 2801.1.

E. Joint Sealant applied to existing joint surfaces and along edge of gutters subsequent to placement of A.C. pavement, shall be considered incidental to other WORK under Pay Item No. 2801.1.

F. Asphalt Pavement required for reconstructed collars around manholes and water valves, if any, shall be considered incidental to other WORK under this Section.

G. Payment for A.C. Pavement, Type II, Class B shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 2801.1, which payment shall constitute full compensation for all WORK described in Section 02801 – Asphalt Concrete Pavement as shown on the plans and as directed by the ENGINEER.

2.24 HANDRAIL (Pay Item No. 2892.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Handrail shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in place, all in accordance with the requirements of the Contract Documents.

B. Payment for Handrail shall be made at the amount shown on the Bid Schedule under Pay Item No. 2892.1, which payment shall constitute full compensation for all WORK described in Section 02892 – Handrail, as shown on the Plans and as directed by the ENGINEER.

2.25 PLANTING SOILS (Pay Item No. 2910.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Planting Soils shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in accordance with the requirements of the Contract Documents.

B. Payment for Planting Soils shall be made at the amount shown on the Bid Schedule under Pay Item No. 2910.1, which payment shall constitute full payment for all WORK described in Section 02910 – Planting Soils, as shown on the plans and as directed by the ENGINEER.

2.26 EXTERIOR PLANTS AND GENERAL LANDSCAPING (Pay Item No. 2930.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Exterior Plants and General Landscaping shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in accordance with the requirements of the Contract Documents.

B. Payment for Exterior Plants and General Landscaping shall be made at the amount shown on the Bid Schedule under Pay Item No. 2930.1, which payment shall constitute full compensation for all WORK described in Section 02930 – Exterior Plants, as shown in the plans and as directed by the ENGINEER.

2.27 LANDSCAPE MAINTENANCE (Pay Item No. 2970.1) PRICE BASED ON LUMP SUM

A. Measurement for payment for Landscape Maintenance shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete in accordance with the requirements of the Contract Documents.

B. Payment for Landscape Maintenance shall be made at the amount shown on the Bid Schedule under Pay Item No. 2970.1, which payment shall constitute full compensation for all WORK described in Section 02970 – Landscape Maintenance, as shown on the Plans and as directed by the ENGINEER.

DIVISION 3 – CONCRETE

3.1 6-INCH THICK COLORED CONCRETE (Pay Item No. 3303.1) PRICE BASED ON QUANTITY, SQUARE YARD

A. Measurement for payment for 6-Inch Thick Colored Concrete shall be per square yard installed, complete in place, including all concrete, rebar, formwork and finishing as required by the Contract Documents and as shown on the plans.

B. Payment for 6-Inch Thick Colored Concrete shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 3303.1, which payment shall constitute full

compensation for all WORK described in Section 03303 – Sidewalk, Curb and Gutter, as shown on the plans and as directed by the ENGINEER.

3.2 6-INCH THICK CONCRETE SIDEWALK (Pay Item No. 3303.2) PRICE BASED ON QUANTITY, SQUARE YARD

A. Measurement for payment for 6-Inch Thick Concrete Sidewalk shall be per square yard installed, complete in place, including all concrete, detectable tiles, rebar, formwork and finishing as required by the Contract Documents and as shown on the plans.

B. Payment for 6-Inch Thick Concrete Sidewalk shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 3303.2, which payment shall constitute full compensation for all WORK described in Section 03303 – Sidewalk, Curb and Gutter, as shown on the plans and as directed by the ENGINEER.

3.3 CURB AND GUTTER, TYPES I-V (Pay Item Nos. 3303.3) PRICE BASED ON QUANTITY, LINEAR FOOT

A. Measurement for payment for Curb and Gutter, Types I-V shall be per actual linear foot installed, complete in place, as required by the Contract Documents and as shown on the plans. Measurements shall be made along the face of the curb and shall be continuous across catch basins.

B. Payment for Curb and Gutter, Types I-V shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 3303.3, which payment shall constitute full compensation for all WORK described in Section 03303 – Sidewalk, Curb and Gutter, as shown on the plans and as directed by the ENGINEER.

3.4 CONCRETE WHEEL STOP (Pay Item No. 3303.4) PRICE BASED ON QUANTITY, EACH

A. Measurement for payment for Concrete Wheel Stop shall be measured per each, complete in place and in accordance with the requirements of the Contract Documents.

B. Payment for Concrete Wheel Stop shall be made at the Unit Price named in the Bid Schedule Pay Item No. 3303.4, which payment shall constitute full compensation for all WORK described in Section 03303 – Sidewalk, Curb and Gutter, as shown on the plans and as directed by the ENGINEER.

3.5 CONCRETE SEAWALK (Pay Item No. 3304.1) PRICE BASED ON QUANTITY, SQUARE YARD

A. Measurement for payment for Concrete Seawalk shall be per square yard installed, complete in place, including all concrete, rebar, formwork, finishing and light pole brackets, as required by the Contract Documents and as shown on the plans.

B. Payment for Concrete Seawalk shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 3304.1, which payment shall constitute full compensation for all WORK described in Section 03304 – Special Concrete Structures as shown on the plans and as directed by the ENGINEER.

3.6 CANTILEVERED CONCRETE SEAWALK (Pay Item No. 3304.2) PRICE BASED ON QUANTITY, SQUARE YARD

A. Measurement for payment for Cantilevered Concrete Seawalk shall be per square yard installed, complete in place, including all concrete, rebar, formwork, concrete fill above MSE blocks, finishing, and light pole brackets as required by the Contract Documents and as shown on the plans.

B. Payment for Cantilevered Concrete Seawalk shall be made at the Unit Price named in the Bid Schedule under Pay Item No. 3304.2, which payment shall constitute full compensation for all WORK described in Section 03304 – Special Concrete Structures as shown on the plans and as directed by the ENGINEER.

3.7 CONCRETE LANDSCAPE SEATWALL PLANTER (Pay Item No. 3304.3) PRICE BASED ON LUMP SUM

A. Measurement for payment for Concrete Landscape Seatwall Planter shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, including all concrete, formwork, reinforcement, finishing and benches complete in accordance with the requirements of the Contract Documents.

B. Payment for Concrete Landscape Seatwall Planter shall be made at the amount shown on the Bid Schedule under Pay Item No. 3304.3, which payment shall constitute full compensation for all WORK described in Section 03304 – Special Concrete Structures, as shown on the plans and as directed by the ENGINEER.

DIVISION 16 – ELECTRICAL

14.1 ELECTRICAL SYSTEM (Pay Item No. 16000.1) PRICE BASED ON LUMP SUM

A. Measurement for Electrical System shall be based upon the completion of the entire WORK as a Lump Sum Pay Unit, complete, including all electrical, lighting, and heat trace components and other miscellaneous appurtenances all in accordance with the requirements of the Contract Documents and as shown on the Plans.

B. Payment for Electrical System shall be made at the amount shown on the Bid Schedule under Item No. 16000.1, which payment shall constitute full payment for all WORK described in Division 16 Electrical, as shown on the Plans and as directed by the ENGINEER.

END OF SECTION

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 DEFINITION

A. "Cutting and Patching" is defined to include the cutting and patching of nominally completed and previously existing concrete, steel, wood and miscellaneous metal structures; piping and pavement, in order to accommodate the coordination of WORK, or the installation of other facilities or structures or to uncover other facilities and structures for access or inspection, or to obtain samples for testing, or for similar purposes.

1.2 REQUIREMENTS OF STRUCTURAL WORK

A. Structural WORK shall not be cut and patched in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.

B. Prior to cutting and patching the following categories of WORK, the CONTRACTOR shall obtain the ENGINEER's approval to proceed with:

1. Structural steel
2. Miscellaneous structural metals, including equipment supports, stair systems and similar categories of work
3. Structural concrete
4. Foundation construction including piles
5. Timber and primary wood framing and bullrails
6. Bearing and retaining walls
7. Structural decking
8. Pressurized piping, vessels and equipment
9. Concrete or timber floats

1.3 OPERATIONAL AND SAFETY LIMITATIONS

A. The CONTRACTOR shall not cut and patch operational elements and safety-related components in a manner resulting in a reduction of capacities to perform in the manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.

B. Prior to cutting and patching the following categories of WORK, the CONTRACTOR shall obtain the ENGINEER's approval to proceed with:

1. Sheeting, shoring and cross bracing
2. Operating systems and equipment
3. Water, moisture, vapor, air, smoke barriers, membranes and flashing
4. Noise and vibration control elements and systems
5. Control, communication, conveying and electrical wiring systems

1.4 VISUAL REQUIREMENTS

A. The CONTRACTOR shall not cut and patch WORK which is exposed on the exterior or exposed in occupied spaces, in a manner resulting in a reduction of visual qualities or resulting in substantial evidence of the cut and patch work, both as judged solely by the

ENGINEER. The CONTRACTOR shall remove and replace work judged by the ENGINEER to have been cut and patched in a visually unsatisfactory manner.

1.5 APPROVALS

A. Where prior approval of cutting and patching is required, the CONTRACTOR shall submit the request and obtain approval prior to performing the WORK. The request should include a description of why cutting and patching cannot reasonably be avoided; how it will be performed; how structural elements (if any) will be reinforced; products to be used; firms and tradespeople who will perform the WORK; approximate dates of the WORK; and anticipated results in terms of structural, operational, and visual variations from the original WORK.

PART 2 - PRODUCTS

2.1 MATERIALS USED IN CUTTING AND PATCHING

A. Except as otherwise indicated, the CONTRACTOR shall provide materials for cutting and patching which will result in equal-or-better WORK than the WORK being cut and patched, in terms of performance characteristics and including visual effects where applicable. The CONTRACTOR shall use material identical with the original materials where feasible.

B. Materials shall comply with the requirements of the Technical Specifications wherever applicable.

PART 3 - EXECUTION

3.1 PREPARATION

A The CONTRACTOR shall provide adequate temporary support for WORK to be cut to prevent failure.

B. The CONTRACTOR shall provide adequate protection of other WORK during cutting and patching.

3.2 INSTALLATION

A. The CONTRACTOR shall employ skilled tradespeople to perform cutting and patching. Except as otherwise indicated, the CONTRACTOR shall proceed with cutting and patching at the earliest feasible time and perform the WORK promptly.

B. The CONTRACTOR shall use methods least likely to damage WORK to be retained and WORK adjoining.

1. In general, where physical cutting action is required, the CONTRACTOR shall cut WORK with sawing and grinding tools, not with hammering and chopping tools. Openings through concrete work shall be core-drilled and all final edges shall be ground smooth to prevent wear.
2. Comply with the requirements of Technical Specifications wherever applicable.

3. Comply with the requirements of applicable sections of Division 2 where cutting and patching requires excavation and backfill.

C. The CONTRACTOR shall patch with seams which are as invisible as possible and comply with specified tolerances for the WORK.

D. The CONTRACTOR shall restore exposed seams of patched area; and, where necessary, extend finish restoration onto retained WORK adjoining, in a manner which will eliminate evidence of patching.

END OF SECTION

SECTION 01070 - ACRONYMS OF INSTITUTIONS

PART 1 - GENERAL

1.1 GENERAL

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms which may appear in these Specifications shall have the meanings indicated herein.

1.2 ACRONYMS

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturer's Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
ATM	Alaska Test Methods
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators International

BHMA	Builders Hardware Manufacturer's Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturer's Association
CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DCDMA	Diamond Core Drill Manufacturer's Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
FPL	Forest Products Laboratory
HI	Hydronics Institute
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IOS	International Organization for Standardization
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
MPTA	Mechanical Power Transmission Association
MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council

SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01090 - REFERENCE STANDARDS

PART 1 - GENERAL

1.1 GENERAL

A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the CONTRACTOR has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the WORK; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the CONTRACTOR.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all WORK specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents.

B. References herein to "Building Code" or "Uniform Building Code" shall mean Uniform Building Code of the International Conference of Building Officials (ICBO).

C. Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Conference of the Building Officials (ICBO). "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for bids, as adopted by the agency having jurisdiction, shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.

D. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought

to the attention of the ENGINEER for clarification and directions prior to ordering or providing any materials or furnishing labor. The CONTRACTOR shall bid for the most stringent requirements.

E. The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.

F. Applicable Standard Specifications: References in Contract Sections 02801 -Asphalt Concrete Pavement to Standard Specifications shall mean the Alaska Department of Transportation and Public Facilities "Standard Specifications for Highway Construction - 1998" and any supplements or amendments thereto.

G. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

H. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01300 - CONTRACTOR SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL

A. Whenever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the ENGINEER.

B. Within 14 days after the date of commencement as stated in the Notice of Award/Notice to Proceed, the CONTRACTOR shall submit the following items to the ENGINEER for review:

1. A preliminary schedule of Shop Drawing, Sample and proposed Substitutes or "Or-Equal" submittals.
2. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and the required date for receipt of the permit.
3. A complete progress schedule for all phases of the project.
4. All required Material Safety Data Sheets.
5. A staging and traffic maintenance plan, as required.
6. A plan for temporary erosion control and pollution control, as required.
7. A letter designating the CONTRACTOR's Superintendent, defining that person's responsibility and authority, and providing a specimen of his signature.
8. A letter designating the CONTRACTOR's safety representative and the person's responsibility and authority.

1.2 SHOP DRAWING SUBMITTAL

A. Wherever called for in the Contract Documents, or where required by the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER, for review, 4 copies of each shop drawing submittal unless otherwise indicated. Electronic submittal transmission may be allowed if approved in advance by the ENGINEER. The term " Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication and installation drawings, erection drawings, lists, graphs, operating instructions, catalog sheets, data sheets, and similar items.

B. All Shop Drawing Submittals shall be accompanied by the ENGINEER's standard submittal transmittal form. The form may be obtained in quantity from the ENGINEER. Any submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for resubmittal.

C. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. A multiple-page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the ENGINEER.

D. Except as otherwise provided herein, the ENGINEER will return prints of each submittal to the CONTRACTOR with its comments noted thereon, within 30 calendar days following their receipt by the ENGINEER. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submittal to the ENGINEER by the second submission of a submittal item. The OWNER reserves the right to withhold monies due to the CONTRACTOR to cover additional costs of the ENGINEER review beyond the second submittal. The ENGINEER's maximum review period for each submittal including all re-submittals will be 30 days per submission. In other words, for a submittal that requires two re-submittals before it is complete, the maximum review period for that submittal could be 90 days.

E. If 3 copies (or a single electronic transmission) of a submittal are returned to the CONTRACTOR marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.

F. If 3 copies (or a single electronic transmission) of a submittal are returned to the CONTRACTOR marked "MAKE CORRECTIONS NOTED," formal revision and resubmission of said submittal is not required.

G. If one copy (or a single electronic transmission) of the submittal is returned to the CONTRACTOR marked "AMEND-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

H. If one copy (or a single electronic transmission) of the submittal is returned to the CONTRACTOR marked "REJECTED-RESUBMIT," the CONTRACTOR shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the ENGINEER.

I. Fabrication of an item may be commenced only after the ENGINEER has reviewed the pertinent submittal and returned copies to the CONTRACTOR marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED." Corrections indicated on submittal shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the Contract requirements. Only a change order can alter the contract price, time, or requirements.

J. All CONTRACTOR shop drawing submittals shall be carefully reviewed by an authorized representative of the CONTRACTOR, prior to submission to the ENGINEER. Each submittal shall be dated, signed, and certified by the CONTRACTOR, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the ENGINEER of any CONTRACTOR submittal will be made for any items which have not been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the ENGINEER, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

K. The ENGINEER's review of CONTRACTOR shop drawing submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits

due to any errors in CONTRACTOR submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

1.3 SAMPLES SUBMITTAL

A. Whenever in the Specifications samples are required, the CONTRACTOR shall submit not less than 3 samples of each item or material to the ENGINEER for acceptance at no additional cost to the OWNER.

B. Samples, as required herein, shall be submitted for acceptance a minimum of 21 days prior to ordering such material for delivery to the job site, and shall be submitted in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the WORK.

C. All samples shall be individually and indelibly labeled or tagged, indicating thereon all specified physical characteristics and Supplier's names for identification and submitted to the ENGINEER for acceptance. Upon receiving acceptance of the ENGINEER, one set of the samples will be stamped and dated by the ENGINEER and returned to the CONTRACTOR, and one set of samples will be retained by the ENGINEER, and one set of samples shall remain at the job site until completion of the WORK.

D. Unless clearly stated otherwise, it is assumed that all colors and textures of specified items presented in sample submittal are from the manufacturer's standard colors and standard materials, products, or equipment lines. If the samples represent non-standard colors, materials, products or equipment lines, and their selection will require an increase in contract time or price, the CONTRACTOR will clearly indicate this on the transmittal page of the submittal.

1.4 TECHNICAL MANUAL SUBMITTAL

A. Using the outline provided in the Equipment Maintenance Summary Sheet (copy of which may be obtained from the ENGINEER), the CONTRACTOR shall include in the technical manuals for each item of mechanical, electrical, and instrumentation equipment, the following:

1. Complete operating instructions, including location of controls, special tools or other equipment required, related instrumentation, and other equipment needed for operation.
2. Lubrication schedules, including the lubricant SAE grade and type, temperature range of lubricants, and including frequency of required lubrication.
3. Preventive maintenance procedures and schedules.
4. Parts lists, by generic title and identification number, complete, with exploded views of each assembly.
5. Disassembly and reassembly instructions.
6. Name and location of nearest supplier and spare parts warehouse.
7. Recommended troubleshooting and startup procedures.
8. Reproducible prints of the record drawings, including diagrams and schematics, as required under the electrical and instrumentation portions of these Specifications.

9. Tabulation of proper settings for all pressure relief valves, (low/high) pressure switches and other related equipment protection devices.
10. Detailed test procedures to determine performance efficiency of equipment.
11. List of all electrical relay settings including alarm and contact settings.

B. The CONTRACTOR shall furnish to the ENGINEER 5 identical sets of technical manuals. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, 3-ring, loose-leaf vinyl plastic hard cover binder suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches. A table of contents shall be provided which indicates all equipment in the technical manuals.

C. All technical manuals shall be submitted in final form to the ENGINEER not later than the 75 percent of construction completion date. All discrepancies found by the ENGINEER in the technical manuals shall be corrected by the CONTRACTOR within 30 days from the date of written notification by the ENGINEER.

D. Incomplete or unacceptable technical manuals at the 75 percent construction completion point shall constitute sufficient justification to withhold payment for work completed beyond that period in accordance with Paragraph “Technical Manual Submittal” of Section 01700, “Project Closeout.”

1.5 SPARE PARTS LIST SUBMITTAL

A. The CONTRACTOR shall furnish to the ENGINEER 5 identical sets of spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which each manufacturer recommends be maintained by the OWNER in inventory at the plant site. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to facilitate the OWNER in ordering. The CONTRACTOR shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents. The spare parts lists shall be bound in standard size, 3-ring, loose leaf, vinyl plastic hard cover binders suitable for bookshelf storage. Binder ring size shall not exceed 2.5 inches.

1.6 RECORD DRAWINGS SUBMITTALS

A. The CONTRACTOR shall keep and maintain, at the job site, one record set of Drawings. On these, it shall mark all Project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the contract Drawings. Said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings, of the CONTRACTOR’s representation of as-built conditions, including all revisions made necessary by addenda, change orders, and the like shall be maintained up-to-date during the progress of the WORK.

B. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by Change Order Drawings or final Shop Drawings, and by including appropriate reference information describing the Change Orders by number and the Shop Drawings by manufacturer, drawing, and revision numbers.

C. Record Drawings shall be accessible to the ENGINEER at all times during the construction period and shall be delivered to the ENGINEER on the 20th working day of every third month after the month in which the Notice to Proceed is given as well as upon completion of the WORK.

D. Final payment will not be acted upon until the CONTRACTOR-prepared record drawings have been delivered to the ENGINEER.

1.7 PROGRESS SCHEDULES

A. The progress schedule shall be in Bar Chart or Critical Path Method (CPM) form, as required by the ENGINEER.

B. The progress schedule shall show the order in which the CONTRACTOR proposes to carry out the WORK and the contemplated date on which the CONTRACTOR and their subcontractors will start and finish each of the salient features of the work, including any scheduled periods of shutdown. The schedule shall also indicate any anticipated periods of multiple-shift work.

C. Upon substantial changes to the CONTRACTOR's progress schedule of work or upon request of the ENGINEER, the CONTRACTOR shall submit a revised progress schedule(s) in the form required. Such revised schedule(s) shall conform with the Contract Time and take into account delays which may have been encountered in the performance of the WORK. In submitting a revised schedule, the CONTRACTOR shall state specifically the reason for the revision and the adjustments made in his schedule or methods of operation to ensure the completion of all the WORK within the Contract Time.

1.8 PROPOSED SUBSTITUTES OR "OR-EQUAL" ITEM SUBMITTAL

A. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required. If the name is followed by the words "or-equal" indicating that a substitution is permitted, materials or equipment of other suppliers may be accepted by the ENGINEER if sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine that the material or equipment proposed is equivalent or equal to that named, subject to the following requirements:

1. The burden of proof as to the type, function, and quality of any such substitute material or equipment shall be upon the CONTRACTOR.

2. The ENGINEER will be the sole judge as to the type, function, and quality of any such substitute material or equipment and the ENGINEER's decision shall be final.
3. The ENGINEER may require the CONTRACTOR, to furnish at the CONTRACTOR's expense, additional data about the proposed substitute.
4. The OWNER may require the CONTRACTOR to furnish at the CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.
5. Acceptance by the ENGINEER of a substitute item proposed by the CONTRACTOR shall not relieve the CONTRACTOR of the responsibility for full compliance with the Contract documents and for adequacy of the substitute item.
6. The CONTRACTOR shall be responsible for resultant changes and all additional costs which the accepted substitution requires in the CONTRACTOR's work, the work of its subcontractors and of other contractors, and shall effect such changes without cost to the OWNER. This shall include the cost for redesign and claims of other contractor affected by the resulting change.

B. The procedure for review by the ENGINEER will include the following:

1. If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, the CONTRACTOR shall make written application to the ENGINEER on the "Substitution Request Form" for acceptance thereof.
2. Unless otherwise provided by law or authorized in writing by the ENGINEER, the "Substitution Request Form(s)" shall be submitted within the 21-day period after Notice of Award.
3. Wherever a proposed substitute material or equipment has not been submitted within said 21-day period, or wherever the submission of a proposed substitute material or equipment has been judged to be unacceptable by the ENGINEER, the CONTRACTOR shall provide material or equipment named in the Contract Documents.
4. The CONTRACTOR shall certify that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified, and be suited to the same use as that specified.
5. The ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. In no case will this reasonable time period be less than 30 days.
6. As applicable, no shop drawing submittals will be made for a substitute item nor will any substitute item be ordered, installed, or utilized without the ENGINEER's prior written acceptance of the CONTRACTOR's "Substitution Request Form" which will be evidenced by a Change Order.
7. The ENGINEER will record the time required by the ENGINEER in evaluating substitutions proposed by the CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not the ENGINEER accepts a proposed substitute, the CONTRACTOR shall reimburse the OWNER for the charges of the ENGINEER for evaluating each proposed substitute.

C. The CONTRACTOR's application using the "Substitution Request Forms" shall contain the following statements and/or information which shall be considered by the ENGINEER in evaluating the proposed substitution:

1. The evaluation and acceptance of the proposed substitute will not prejudice the CONTRACTOR's achievement of substantial completion on time.
2. Whether or not acceptance of the substitute for use in the WORK will require a change in any of the Contract Documents to adopt the design to the proposed substitute.
3. Whether or not incorporation or use of the substitute in connection with the WORK is subject to payment of any license fee or royalty.
4. All variations of the proposed substitute for that specified will be identified.
5. Available maintenance, repair, and replacement service and its estimated cost will be indicated.
6. Itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including cost of redesign and claims of other contractors affected by the resulting change.

1.9 MATERIAL CERTIFICATON SUBMITTAL

A. The ENGINEER may permit the use, prior to sampling, inspection and testing, of certain materials or assemblies when accompanied by manufacturer's material certifications stating that such materials or assemblies fully comply with the requirements of the Contract. The certification shall be signed by the manufacturer, and will specifically reference the material's compliance with the AASHTO, ASTM and/or CBJ Standards specified in the applicable Contract Documents.

B. Material Certifications shall be submitted to the engineer prior to incorporating the item into the WORK.

C. Materials or assemblies used on the basis of material certifications may be sampled, inspected and/or tested at any time, and if found not in conformity with these Specifications, will be subject to rejection whether in place or not.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

(SUBSTITUTION REQUEST FORM – next page)

City and Borough of Juneau

SUBSTITUTION REQUEST FORM

TO: _____ Project: _____
Contract No. _____
OWNER: _____

SPECIFIED ITEM:

Section	Page	Paragraph	Description
_____	_____	_____	_____

The undersigned requests consideration of the following:

PROPOSED SUBSTITUTION: _____
Attached data includes product description, specifications, drawings, photographs, performance and test data adequate for evaluation of the request. Applicable portions of the data are clearly identified.

The undersigned states that the following paragraphs, unless modified on attachments are correct:

1. The proposed substitution does not affect dimensions shown on Drawings and will not require a change in any of the Contract Documents.

2. The undersigned will pay for changes to the design, including engineering design, detailing, and construction costs caused by the requested substitution which is estimated to be $_____.

3. The proposed substitution will have no adverse affect on other contractors, the construction schedule (specifically the date of substantial completion), or specified warranty requirements.

4. Maintenance and service parts will be locally available for the proposed substitution.

5. The incorporation or use of the substitute in connection with the WORK is not subject to payment of any license fee or royalty.

The undersigned further states that the function, appearance, and quality of the Proposed Substitution are equivalent or superior to the Specified item.

Submitted by CONTRACTOR: _____
Signature _____
Firm: _____
By: _____
Title: _____
Date: _____
Attachments: _____

Reviewed by ARCHITECT/ENGINEER_____
☐ Accepted ☐ Accepted as Noted
☐ Not Accepted ☐ Received Too Late
Date: _____
Telephone: _____

END OF SECTION

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.1 DEFINITION

A. Specific quality control requirements for the WORK are indicated throughout the Contract Documents. The requirements of this Section are primarily related to performance of the WORK beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AT PLACE OF MANUFACTURE

A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the ENGINEER at the place of manufacture.

B. The presence of the ENGINEER at the place of manufacturer, however, shall not relieve the CONTRACTOR of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the CONTRACTOR, and said duty shall not be avoided by any act or omission on the part of the ENGINEER.

1.3 SAMPLING AND TESTING

A. Unless otherwise indicated, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, ATM, and AASHTO as applicable to the class and nature of the article or materials considered; however, the OWNER reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the ENGINEER will insure the OWNER that the quality of the workmanship is in full accord with the Contract Documents.

B. Any waiver by the OWNER of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial WORK, shall not be construed as a waiver of any requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the ENGINEER reserves the right to make independent investigations and tests, and failure of any portion of the WORK to meet any of the requirements of the Contract Documents, shall be reasonable cause for the ENGINEER to require the removal or correction and reconstruction of any such work in accordance with the General Conditions.

1.4 INSPECTION AND TESTING LABORATORY SERVICE

A. Inspection and testing laboratory service shall comply with the following:

1. OWNER will appoint, employ, and pay for services of an independent firm to perform inspection and testing or will perform inspection and testing itself unless specific quality control testing is required by the CONTRACTOR under these specifications.

2. The ENGINEER will perform inspections as specified in individual specification sections, unless specified otherwise.
3. Reports will be submitted by the independent firm to the ENGINEER in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
4. The CONTRACTOR shall cooperate with the ENGINEER or independent firm and furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
5. The CONTRACTOR shall notify ENGINEER 24 hours prior to the expected time for operations requiring inspection and laboratory testing services.
6. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the ENGINEER. The CONTRACTOR shall bear all costs from such retesting at no additional cost to the OWNER.
7. For samples and tests required for CONTRACTOR'S use, the CONTRACTOR shall make arrangements with an independent firm for payment and scheduling of testing. The cost of sampling and testing for the CONTRACTOR'S use shall be included in the Contract Price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Inspection: The CONTRACTOR shall inspect materials or equipment upon the arrival on the job site and immediately prior to installation, and reject damaged and defective items.

B. Measurements: The CONTRACTOR shall verify measurements and dimensions of the WORK, as an integral step of starting each installation.

C. Manufacturer's Instructions: Where installations include manufactured products, the CONTRACTOR shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

END OF SECTION

SECTION 01505 - MOBILIZATION

PART 1 - GENERAL

1.1 GENERAL

A. Mobilization shall include obtaining permits; moving onto the site of all plant and equipment; furnishing and erecting plants, temporary buildings, and other construction facilities; and implementing security requirements; all as required for the proper performance and completion of the WORK. Mobilization shall include the following principal items:

1. Moving on to the site of all CONTRACTOR's plant and equipment required for operations.
2. Providing all on-site communication facilities, including radios and cellular phones.
3. Obtaining all required permits other than those provided in the Contract Documents.
4. Having all OSHA required notices and establishment of safety programs.
5. Having the CONTRACTOR's superintendent at the job site full time.
6. Submitting initial submittals.

1.2 PAYMENT FOR MOBILIZATION

A. The CONTRACTOR's attention is directed to the condition that no payment for Mobilization, or any part thereof, will be approved for payment under the contract until all Mobilization items listed above have been completed as specified.

B. As soon as practicable after receipt of the Notice to Proceed, the CONTRACTOR shall submit a breakdown to the ENGINEER for approval, which shall show the estimated value of each major component of Mobilization. When approved by the ENGINEER, the breakdown will be the basis for initial progress payments in which Mobilization is included.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01520 - SECURITY

PART 1 - GENERAL

1.1 SECURITY PROGRAM

A. The CONTRACTOR shall:

1. Protect WORK, existing premises and OWNER's operations from theft, vandalism, and unauthorized entry.
2. Coordinate security with OWNER's operations at job mobilization.
3. Maintain program throughout construction period until OWNER's occupancy.

1.2 ENTRY CONTROL

A. The CONTRACTOR shall:

1. Control entry of persons and vehicles onto Project construction site and existing facilities.
2. Allow entry on the construction site only to authorized persons with proper identification.
3. Coordinate access of OWNER's personnel to site in coordination with CONTRACTOR's security forces.

B. OWNER will control entrance of persons and vehicles related to OWNER's operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01530 - PROTECTION AND RESTORATION OF EXISTING FACILITIES

PART 1 - GENERAL

1.1 GENERAL

A. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

B. All utility locates shall be the responsibility of the CONTRACTOR. CALL DIAL BEFORE YOU DIG for locates of all underground utilities within the WORK limits prior to any work.

C. The CONTRACTOR shall verify the exact locations and depths of all utilities and the CONTRACTOR shall make exploratory excavations of all utilities that may interfere with the WORK. All such exploratory excavations shall be performed as soon as practicable after award of the contract and, in any event, a sufficient time in advance of construction to avoid possible delays to the CONTRACTOR's WORK. Any utility or service in conflict with the WORK will be reburied by the CONTRACTOR prior beginning the WORK to avoid damage.

D. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

1.2 RIGHTS-OF-WAY

A. The CONTRACTOR shall not do any work that would affect any oil, gas, sewer, or water pipeline; any telephone, cable television, telegraph, or electric transmission line; any fence; or any other structure, nor shall the CONTRACTOR enter upon the rights-of-way involved until notified by the ENGINEER that the OWNER has secured authority therefore from the proper party. After authority has been obtained, the CONTRACTOR shall give said party due notice of its intention to begin work, if required by said party, and shall remove, shore, support or otherwise protect such pipeline, transmission line, ditch, fence, or structure or replace the same. When two or more contracts are being executed at one time on the same or adjacent land in such manner that work on one contract may interfere with that on another, the OWNER shall determine the sequence and order of the WORK. When the territory of one contract is the necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the OWNER to the CONTRACTOR so desiring, to the extent, amount, in the manner, and at the times permitted.

B. No such decision as to the method or time of conducting the WORK or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the WORK in Article 15 of the General Conditions of the contract.

1.3 PROTECTION OF SURVEY MONUMENTS, STREET AND/OR ROADWAY MARKERS

A. The CONTRACTOR shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other permanent marker points that will be disturbed by the construction operations have been properly referenced. All survey monuments, markers or points disturbed by the CONTRACTOR shall be accurately re-established, at the CONTRACTOR's expense unless provided for

elsewhere in the contract, after all street or roadway resurfacing has been completed. Re-establishment of all survey monuments shall be by a Registered Alaskan Land Surveyor.

1.4 RESTORATION OF PAVEMENT

A. General: All paved areas, including asphalt concrete berms, cut or damaged during construction shall be replaced with similar materials and of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. All temporary and permanent pavement shall conform to the requirements of the affected pavement owner. All pavements which are subject to partial removal shall be neatly saw cut in straight lines.

B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing promptly after backfilling and shall maintain such surfacing for the period of time fixed by said authorities before proceeding with the final restoration of improvements.

C. Permanent Resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the CONTRACTOR shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

D. Restoration of Sidewalks or Private Driveways: Wherever sidewalks or private roads have been removed for purposes of construction, the CONTRACTOR shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the CONTRACTOR shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

1.5 EXISTING UTILITIES AND IMPROVEMENTS

A. General: The CONTRACTOR shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

B. Utilities to be Moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the CONTRACTOR, be notified by the OWNER to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the CONTRACTOR shall notify the ENGINEER a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

C. Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the

CONTRACTOR shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the CONTRACTOR in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

D. OWNER's Right of Access: The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this contract.

E. Underground Utilities Indicated: Existing utility lines that are indicated or the locations of which are made known to the CONTRACTOR prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the CONTRACTOR.

F. Underground Utilities Not Indicated: In the event that the CONTRACTOR damages any existing utility lines that are not indicated or the locations of which are not made known to the CONTRACTOR prior to excavation, a written report thereof shall be made immediately to the ENGINEER. If directed by the ENGINEER, repairs shall be made by the CONTRACTOR under the provisions for changes and extra work contained in Articles 10, 11, and 12 of the General Conditions.

G. All costs of locating, repairing damage not due to failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not shown in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the WORK which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions of Articles 10, 11, and 12 of the General Conditions.

H. Approval of Repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.

I. Maintaining in Service: All oil and gasoline pipelines, power, and telephone, cable television or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the ENGINEER are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or is not discovered until after completion of the backfilling.

1.6 TREES WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

A. General: The CONTRACTOR shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or OWNER. All existing

trees and shrubs which are damaged during construction shall be trimmed or replaced by the CONTRACTOR or a certified tree company under permit from the jurisdictional agency and/or the OWNER. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.

B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be made close to the trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.

C. Replacement: The CONTRACTOR shall immediately notify the jurisdictional agency and/or the OWNER if any tree is damaged by the CONTRACTOR's operations. If, in the opinion of said agency or the OWNER, the damage is such that replacement is necessary, the CONTRACTOR shall replace the tree at its own expense. The tree shall be of a like size and variety as the tree damaged, or, the CONTRACTOR shall pay to the owner of said tree a compensatory payment acceptable to the tree owner, subject to the approval of the jurisdictional agency or OWNER.

1.7 PROTECTION OF EXISTING STRUCTURES

A. Compaction Equipment and Operations: The CONTRACTOR shall restrict its compaction operations as necessary to assure no damage occurs to adjacent buildings. This may require the use of smaller compaction equipment than is usually employed for trench backfill and roadway embankment compaction operations when in the vicinity of buildings sensitive to vibrating or other impact-type activities. It shall be the CONTRACTOR's responsibility to determine in which areas of the project the compaction operations must be restricted, to avoid damage to existing buildings. The CONTRACTOR is advised that some structures on the project, especially those founded on steep or unstable ground, and are especially sensitive to vibrations caused by heavy construction equipment. The foregoing restrictions on the size of, and magnitude of impact energy exerted by, compaction equipment will in no way relieve the CONTRACTOR from the compaction requirements as specified in other Sections of the contract.

B. The CONTRACTOR shall notify all affected businesses and other residents in advance of any operations that will cause vibrations that may damage belongings within the buildings. All property damage caused by the CONTRACTOR’s operations shall be repaired or replaced at CONTRACTOR’s expense.

PART 2 PRODUCTS – (Not Used)

PART 3 EXECUTION - (Not used)

END OF SECTION

SECTION 01550 - SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.1 HIGHWAY LIMITATIONS. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK. It shall be the CONTRACTOR's responsibility to construct and maintain any haul roads required for its construction operations.

1.2 TEMPORARY CROSSINGS

A. General: Continuous, unobstructed, safe, and adequate pedestrian access shall be provided to the harbor moorage float system, fire hydrants, commercial and industrial establishments, private residences, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 200 feet shall be provided. The CONTRACTOR shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time, as approved by the ENGINEER.

B. Temporary Bridges: Wherever necessary, the CONTRACTOR shall provide a suitable temporary bridge or other such facility to accommodate public access to the harbor at all times. All such temporary bridges shall be maintained in service until permanent gangway access is provided. The CONTRACTOR shall provide designs for such bridges and shall submit plans for conceptual approval.

1.3 MAINTENANCE OF TRAFFIC

A. General: Unless otherwise provided, the roadway undergoing improvements shall be kept open to all traffic by the CONTRACTOR. Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, alleyway, or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. The CONTRACTOR shall provide unimpeded access through the Project limits for emergency vehicles and make every effort to provide minimum delay to United States Postal Service vehicles and garbage collection vehicles.

B. The CONTRACTOR shall submit three (3) copies of a traffic control plan to the ENGINEER for approval a minimum of two (2) weeks prior to construction. The ENGINEER reserves the right to observe these traffic control plans in use and to make any changes as field conditions warrant. Any changes shall supersede these plans and be done solely at the CONTRACTOR's expense.

C. No street shall be closed to the public without first obtaining permission of the ENGINEER and proper governmental authority. Where so provided on the plans or otherwise approved by the ENGINEER, the CONTRACTOR may by-pass traffic over a detour route. When no longer required, the detour shall be removed and the approached obliterated.

D. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the ENGINEER or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the

WORK shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

E. The CONTRACTOR's equipment shall stop at all points of intersection with the traveling public unless satisfactory traffic control measures, approved in writing by the ENGINEER, are installed and maintained at CONTRACTOR's expense.

F. When the CONTRACTOR is required to maintain traffic through grading, roadway excavation and embankment areas, the construction shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times. The surface of the roadbed shall be properly crowned for drainage. In advance of other grading operations, sufficient fill shall be placed at culverts and bridges to permit traffic to cross unimpeded. Part width construction techniques shall be employed when the traffic is routed through roadway cuts or over embankments under construction. The material shall be excavated or placed in layers and the construction activities shall be alternated from one side to the other, with traffic routed over the side opposite the one under construction.

G. During the removal and laying of culvert pipe, a maximum time of one hour of road closure may be permitted, providing the removal and laying of the culvert pipe cannot be completed for one-half width of the roadway and provided that a detour cannot be constructed around the culvert being laid. Closure shall be scheduled so as not to delay buses and peak hour traffic. The CONTRACTOR shall post, at the site of the closure within view of the waiting public traffic, the time the closure started and the time the road will again be open to traffic. The CONTRACTOR shall notify the Fire and Police Departments of such closures prior to commencement of work.

H. At intervals of 48 hours and 24 hours prior to start up of construction operations, and at weekly intervals during the construction period, the CONTRACTOR shall advertise at City Hall the precise location, time of commencement, and proposed completion date of the WORK scheduled for the following week which will require detouring or otherwise effect public traffic. Detours shall be described in sufficient detail to efficiently inform the traveling public of the modified traffic pattern. The cost of these advertisements shall be considered incidental to other contract bid items. The CONTRACTOR will notify the property owners 24 hours prior to commencement of WORK.

I. When, in the opinion of the ENGINEER, conditions are such that the safety and/or convenience of the traveling public is adversely affected, the CONTRACTOR will be immediately notified in writing. The notice will state the defect(s) and the corrective action(s) required. In the event that the CONTRACTOR neglects to take immediate corrective action, the ENGINEER may suspend all work on the project until satisfactory corrective action is performed. In the event the CONTRACTOR does not take corrective action within 24 hours, the ENGINEER may order such work as deemed necessary for public convince and safety accomplished by outside forces. The cost of this work shall be deducted from any monies due or that may become due under the terms or the contract.

J. The CONTRACTOR shall bear all expense of maintaining the traffic over the section of road undergoing improvement, including dust control and snow plowing, and of constructing and maintaining such approaches, crossings, intersections, and other features as may be necessary, without direct compensation, except as provided below:

1. Special Detours. When the proposal contains a bid item for detours, the payment for such item shall cover all cost of constructing and maintaining such detour or

detours, including the construction of any and all temporary bridges and accessory features and the removal of the same, and obliteration of the detour road. Right-of-way for temporary highways or bridges will be furnished by the OWNER.

2. Maintenance of Traffic During Suspension of WORK. The CONTRACTOR shall make passable and shall open to traffic such portions of the Project and temporary roadways as may be agreed upon between the CONTRACTOR and the ENGINEER for the temporary accommodation of necessary traffic during the anticipated period of suspension. If the suspension is seasonal (winter shutdown), thereafter, and until an issuance of an order for the resumption of construction operations, the maintenance of the temporary route of line of travel agreed upon will be the responsibility of the OWNER. Prior to the OWNER accepting the Project for winter shutdown, the CONTRACTOR shall do all work necessary to provide a roadway surface and subgrade that will not require the OWER to perform additional maintenance work during the shutdown period, except for purpose of snow removal. If the WORK is suspended due to unfavorable weather, failure of the CONTRACTOR to correct conditions unsafe for the workers or the general public, failure to carry out provisions of the contract, or for failure to carry out orders of the ENGINEER, all costs for maintenance of traffic during the suspended period shall be borne by the CONTRACTOR. When WORK is resumed, the CONTRACTOR shall replace or renew any WORK or materials lost or damaged because of temporary use of the project; shall remove, to the extent directed by the ENGINEER, any WORK or materials used in the temporary maintenance; and shall complete the Project as though its prosecution had been continuous and without interference.

K. Traffic Control: All locations requiring redirection or stopping of the traveling public shall be properly signed and/or flagged by the CONTRACTOR. For the protection of traffic in public or private streets and ways, the CONTRACTOR shall provide, flaggers and provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights, and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," (MUTCD) published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1) with the current State of Alaska supplements.

L. The CONTRACTOR shall take all necessary precautions for the protection of the WORK and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The CONTRACTOR shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.

M. Special pedestrian detours are often necessary in areas adjacent to new construction or demolition of existing structures. The ENGINEER shall determine when walkways are required. Plans for walkways must be approved by the ENGINEER.

N. The CONTRACTOR shall remove traffic control devices when no longer needed, repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

O. Temporary Street Closure: If closure of any street is required during construction, the

CONTRACTOR shall apply in writing to the City Administrator and any other jurisdictional agency at least 30 days in advance of the required closure and again at 48 hours. A Detour and Traffic Control Plan shall accompany the application.

P. The CONTRACTOR shall notify the Police and Fire Departments and any other affected agency of all planned street closures. Notification shall consist of giving the time of commencement and proposed date of completion of work and names of street, schedule of operations, and routes of detours. Such notification shall be given at least 48 hours before such closure is to take effect.

Q. Temporary Driveway Closure: The CONTRACTOR shall maintain access to all residential, commercial and street approaches. Any temporary closures shall require prior approval by the ENGINEER. The CONTRACTOR shall notify the owner or occupant (if not owner-occupied) of the closure of the driveways to be closed more than one (1) eight-hour work day at least three (3) working days prior to the closure. The CONTRACTOR shall minimize the inconvenience and minimize the time period that the driveways will be closed. The CONTRACTOR shall fully explain to the owner/occupant how long the work will take and when closure is to start.

R. On-Site Cellular Phones: The CONTRACTOR shall maintain one active cellular phone at the project site at all times with the phone number provided to the City and Borough of Juneau Fire, Police and Public Works Departments. The cellular phone shall be carried by the person in charge of the field operations. The CONTRACTOR shall provide and allow the use of the CONTRACTOR's radio frequency to facilitate communication between the CONTRACTOR and the ENGINEER.

1.4 CONTRACTOR'S WORK AND STORAGE AREA

A. The CONTRACTOR shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the WORK.

B. Should the CONTRACTOR find it necessary to use any additional land for its camp or for other purposes during the construction of the WORK, it shall provide for the use of such lands at its own expense.

C. The CONTRACTOR shall construct and use a separate storage area for hazardous materials used in constructing the WORK.

1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: **Warning, Caution, Poisonous, Toxic, Flammable, Corrosive, Reactive, or Explosive**. In addition, whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.
2. The CONTRACTOR shall develop and submit to the ENGINEER a plan for storing and disposing of the materials above.
3. The CONTRACTOR shall obtain and submit to the ENGINEER a single EPA number for wastes generated at the site.
4. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.
5. The separate storage area shall be inspected by the ENGINEER prior to construction of the area, upon completion of construction of the area, and upon cleanup and removal of the area.

6. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.

1.5 PARKING

A. The CONTRACTOR shall direct its employees to park in areas as directed by the ENGINEER.

B. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01560 - TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 DUST ABATEMENT. The CONTRACTOR shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The CONTRACTOR shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the CONTRACTOR is relieved of further responsibility by the ENGINEER.

1.2 RUBBISH CONTROL. During the progress of the WORK, the CONTRACTOR shall keep the site of the WORK and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and waste materials of any nature occurring at the WORK site, and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.3 SANITATION

A. Toilet Facilities: Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

B. Sanitary and Other Organic Wastes: The CONTRACTOR shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the CONTRACTOR or organic material wastes from any other source related to the CONTRACTOR's operations shall be disposed of away from the site in a manner satisfactory to the ENGINEER and in accordance with all laws and regulations pertaining thereto.

1.4 CHEMICALS. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer. In addition, see the requirements set forth in paragraph 6.11 of the General Conditions.

1.5 CULTURAL RESOURCES

A. The CONTRACTOR's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called "cultural resources").

B. The CONTRACTOR shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, stop work immediately and notify the ENGINEER.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01570 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide for erosion and sediment control during construction in accordance with the requirements of the Alaska Department of Environmental Conservation (ADEC). All discharge of pollutants and sedimentation from onsite drainage shall be caught on-site.

B. Erosion and Sediment Control includes preparation and maintenance of a Storm Water Pollution Prevention Plan (SWPPP), control of erosion, sedimentation and discharge of pollutants, in accordance with the ADEC Construction General Permit (CGP).

C. The WORK under this Section includes providing all labor, materials, tools and equipment necessary to construct and maintain erosion control works; including but not limited to, silt fences, settling ponds, hay or straw bale check dams, ditches, etc.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials shall be suitable for the intended use and perform effectively to control silt and surface erosion. All materials shall remain the property of the CONTRACTOR.

PART 3 - EXECUTION

3.1 GENERAL

A. The CONTRACTOR is responsible to prepare, submit and maintain a SWPPP, as required by the CGP that is in accordance with their construction methodologies and sequences.

1. For projects disturbing greater than 1 Acre, this requirement shall include submission of a Notice of Intent (NOI) to ADEC prior to beginning of WORK. Copies of the NOI and SWPPP shall also be submitted to the ENGINEER within 5 days of submittal to ADEC.

2. For projects disturbing less than 1 acre, the SWPPP shall be submitted to the ENGINEER prior to the beginning of WORK; submittal to ADEC or an NOI are not required.

B. WORK at the Project site will not be permitted until the above documents are submitted to the ENGINEER and acceptance of this plan has been obtained from the governing agency or agencies (if required by the CGP).

C. The CONTRACTOR shall install temporary erosion control structures and devices as required by their SWPPP, prepared in accordance with the ADEC CGP. They shall be maintained in effective operating condition at all times. Prior to completion of work, the CONTRACTOR shall clean and remove all silt and debris from the settling pond and check dams.

D. Temporary erosion control structures shall remain in place until the project is completed and replaced by permanent erosion control WORK, protected by final stabilization or until the ENGINEER approves their removal.

E. The CONTRACTOR shall be responsible for meeting the requirements of all permits (including permits naming the OWNER, or other parties); therefore, shall be responsible for the quality of the run-off water from the Project site and for any fines and/or penalties resulting from the construction operation.

F. The CONTRACTOR shall submit NOT (Notice of Termination) at completion of the WORK and removal of all SWPPP items.

END OF SECTION

SECTION 01600 - MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL

A. The word "Products," as used herein, is defined to include purchased items for incorporation into the WORK, regardless of whether specifically purchased for project or taken from CONTRACTOR's stock of previously purchased products. The word "Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in Contract Documents, including "specialties," "systems," "structure," "finishes," "accessories," "furnishings," special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the WORK.

1.2 QUALITY ASSURANCE

A. Source Limitations: To the greatest extent possible for each unit of WORK, the CONTRACTOR shall provide products, materials, or equipment of a singular generic kind from a single source.

B. Compatibility of Options: Where more than one choice is available as options for CONTRACTOR's selection of a product, material, or equipment, the CONTRACTOR shall select an option which is compatible with other products, materials, or equipment already selected. Compatibility is a basic general requirement of product/material selections.

1.3 PRODUCT DELIVERY/STORAGE/HANDLING. The CONTRACTOR shall deliver, handle, and store products in accordance with manufacturer's written recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Delivery schedules shall be controlled to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, the CONTRACTOR shall ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other sources of loss.

1.4 TRANSPORTATION AND HANDLING

A. Products shall be transported by methods to avoid product damage and shall be delivered in undamaged condition in manufacturer's unopened containers or packaging.

B. The CONTRACTOR shall provide equipment and personnel to handle products, materials, and equipment by methods to prevent soiling and damage.

C. The CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.

1.5 STORAGE AND PROTECTION

A. Products shall be stored in accordance with manufacturer's written instructions, with seals and labels intact and legible. Sensitive products shall be stored in weather-tight climate controlled enclosures and temperature and humidity ranges shall be maintained within tolerances required by manufacturer's written instructions.

B. For exterior storage of fabricated products, they shall be placed on sloped supports above ground. Products subject to deterioration shall be covered with impervious sheet covering; ventilation shall be provided to avoid condensation.

C. Loose granular materials shall be stored on solid surfaces in a well-drained area and shall be prevented from mixing with foreign matter.

D. Storage shall be arranged in a manner to provide access for maintenance and inspection. The CONTRACTOR shall periodically inspect to assure products are undamaged and are maintained under required conditions.

1.6 MAINTENANCE OF STORAGE

A. Stored products shall be periodically inspected on a scheduled basis. The CONTRACTOR shall maintain a log of inspections and shall make said log available to the ENGINEER on request.

B. The CONTRACTOR shall verify that storage facilities comply with manufacturer's product storage requirements.

C. The CONTRACTOR shall verify that manufacturer-required environmental conditions are maintained continually.

D. The CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes does not occur.

E. For mechanical and electrical equipment, the CONTRACTOR shall provide a copy of the manufacturer's service instructions with each item and the exterior of the package shall contain notice that instructions are included.

F. Products shall be serviced on a regularly scheduled basis, and a log of services shall be maintained and submitted as a record document prior to acceptance by the OWNER in accordance with the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01700 - PROJECT CLOSE-OUT

PART 1 – GENERAL

1.1 FINAL CLEAN-UP. The CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final clean-up of the project site.

1.2 CLOSEOUT TIMETABLE. The CONTRACTOR shall establish dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract). Such dates shall be established not less than one week prior to beginning any of the foregoing items, to allow the OWNER, the ENGINEER, and their authorized representatives sufficient time to schedule attendance at such activities.

1.3 FINAL SUBMITTALS. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the ENGINEER for transmittal to the OWNER:

1. Written guarantees, where required.
2. Maintenance stock items; spare parts, special tools, where required.
3. Completed record drawings.
4. Certificates of inspection and acceptance by governing agencies having jurisdiction.
5. Releases from all parties who are entitled to claims against the subject Project, property, or improvement pursuant to the provisions of law.
6. Completed Certificate of Compliance and Release for all contractors involved in the WORK. Submit the original signed document to Matthew Sill, P.E., Port Engineer.

1.4 MAINTENANCE AND GUARANTEE

A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in Article 13 of the General Conditions.

B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the CONTRACTOR which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the CONTRACTOR shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.

C. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

1.5 BOND. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in Paragraph "Maintenance and Guarantee" above, and Article 13 of the General Conditions.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

SECTION 01700 - PROJECT CLOSE-OUT

CERTIFICATE OF COMPLIANCE AND RELEASE

PROJECT: _____
CONTRACT NO: _____

The CONTRACTOR must complete and submit this to the OWNER with respect to the entire contract.

Completed forms may be submitted upon completion of the Project. All requirements and submittals must be met before final payment will be made to the CONTRACTOR.

I certify that the following and any referenced attachments are true:

- All WORK has been performed, materials supplied, and requirements met in accordance with the applicable Drawings, Specifications, and Contract Documents.

- All Suppliers and Subcontractors have been paid in full with no claims for labor, materials or other services outstanding. If all Subcontractors and suppliers are not paid in full, please explain on a separate sheet.

- All employees have been paid not less than the current prevailing wage rates set by the State of Alaska (or U.S. Department of Labor, as applicable).

- All equal employment opportunity, certified payroll and other reports have been filed in accordance with the prime contract.

- The attached list of Subcontractors is complete (required from CONTRACTOR). The OWNER was advised and approved of all Subcontractors before WORK was performed and has approved any substitutions of Subcontractors.

I understand it is unlawful to misrepresent information in order to receive a payment which would otherwise be withheld if these conditions were not met. I am an authorized agent of this firm and sign this freely and voluntarily. The foregoing statements are true and apply to the following project contractor.

_____ Capacity: CONTRACTOR
Firm Name

_____ _____ _____
Signed Printed Name and Title Date

Return completed form to: Matthew Sill, P.E., Port Engineer, City and Borough of Juneau, 155 S. Seward Street, Juneau, AK 99801.

END OF SECTION

SECTION 01704 - FINAL CLEAN-UP AND SITE RESTORATION

PART 1 - GENERAL

1.1 DESCRIPTION. The WORK under this Section includes providing all supervision, labor, materials, tools and equipment necessary for final clean-up and restoration of all areas disturbed by construction activities, to a condition equal to, or better than, before construction started. This does not include clean-up or restoration incidental to, or directly provided for by, other construction items.

PART 2 - PRODUCTS

2.1 MATERIALS. Any materials required shall conform to the appropriate Section of these Specifications.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. The CONTRACTOR shall clean up all sites disturbed during construction of the project. This includes removal of all construction equipment, disposal of all excess materials, disposal of all rubbish and debris, removal of all temporary structures, and grading of the sites so that no standing water is evident.

END OF SECTION

SECTION 02060 – DEMOLITION, SALVAGE AND DISPOSAL

PART 1 - GENERAL

1.1 DESCRIPTION. WORK under this Section shall include all labor, materials, tools and equipment necessary for the demolition, salvage and proper offsite disposal or storage of all items as designated herein and as shown on the plans. The CONTRACTOR shall provide an appropriate disposal site for all items designated to be disposed. Demolition and disposal methods shall meet all local, state and federal regulations.

PART 2 - PRODUCTS (Not Used).

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine conditions on site with ENGINEER and OWNER prior to commencement of WORK.

B. Conduct demolition to minimize interference with adjacent structures and interruption to public services.

C. Cease operations immediately if adjacent structures appear to be in danger and notify ENGINEER. Do not resume operations until directed by ENGINEER.

D. The CONTRACTOR shall visit the site prior to bid to ascertain the conditions of the existing covered shelter and all requirements for dismantling and/or bracing/shoring to relocate, temporarily store during construction and reinstall the covered shelter in its existing condition or better at the location shown on the plans. The CONTRACTOR shall document the condition of all materials of the covered shelter, including the covering, framing, and fasteners prior to any dismantling or relocation activities and shall repair any damage caused during these activities to the satisfaction of the OWNER.

3.2 DEMOLITION, SALVAGE AND DISPOSAL

A. All items designated for salvage shall be delivered to an OWNER provided nearby uplands location.

B. Demolish and dispose all other incidental and miscellaneous items as required to complete the project.

C. Place construction signs and barricades as required to prevent public entry into WORK area.

D. Repair any damage to existing facilities designated to remain.

END OF SECTION

SECTION 02202-EXCAVATION AND EMBANKMENT

PART 1 - GENERAL

1.1 DESCRIPTION. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for excavation and embankment construction to the lines, grades and cross sections indicated in the Plans or as directed by the ENGINEER.

PART 2 - PRODUCTS

2.1 UNUSABLE EXCAVATION. All in situ excavation deemed unsuitable for use within a designated fill prism by the ENGINEER shall be Unusable Excavation, and shall consist of excavation and disposal of all materials, of whatever character, encountered in the WORK.

A. Disposal of unusable excavation to an off-site location provided by the CONTRACTOR shall be incidental to Unusable Excavation.

B. Work required to secure disposal sites, remove and dispose of all unusable excavation as directed by the ENGINEER shall be incidental to Unusable Excavation.

2.2 USABLE EXCAVATION. Usable Excavation shall be all excavated material designated for salvage and reuse by the ENGINEER.

A. Usable Excavation shall consist of suitable excavated existing base course and shot rock to the neat line limits shown on the Plans.

B. WORK required to place, compact and grade this material to the final lines, grades and limits as shown on the Plans shall be incidental to Usable Excavation.

2.3 CLASS A SHOT ROCK BORROW. Class A shot rock borrow shall consist of hard angular and blasted quarry rock having a percentage of wear of not more than 50 at 1000 revolutions, as determined by ASTM C535.

A. Class A Shot Rock Borrow shall meet the following gradation as determined by WAQTC FOP for AASHTO T 27/T 11.

SIEVE SIZE	% PASSING BY WEIGHT
4-Inch	100
2-Inch	60 – 90
No. 4	12 – 40
No. 200*	0 – 3
*Gradation shall be determined on that portion passing the 3-inch screen.	

B. Class A Shot Rock Borrow shall consist of stone material having its greatest dimension no longer than twice its smallest dimension.

C. Class A Shot Rock Borrow shall contain no muck, frozen material, roots, sod or other deleterious matter.

PART 3 - EXECUTION

3.1 MINING AREA AND ROAD CLEANING GUARANTEE

A. The CONTRACTOR shall be responsible for removal of dirt, mud, rocks and other debris from CBJ and State Right-of-Ways accumulated from the hauling and quarry operations. It is the intent that the traveled public way be kept as clean as practical to minimize dust and to avoid unsafe traffic conditions.

B. The Contractor shall be responsible for restoration of their mining area in accordance to the conditions of the material source used and mining plan submitted.

3.2 EXCAVATION

A. Clearing and grubbing in excavation areas must be completed prior to beginning excavation operations.

B. Excavations shall be reasonably smooth and uniform to the lines, grades and cross-sections shown in the Plans or as directed by the ENGINEER. Excavations shall be conducted to ensure that material outside of excavation limits remains undisturbed.

C. Excavations shall be protected from erosion and maintained to drain freely at all times.

D. Where excavation to the limits indicated on the Plans encounters unsuitable underlying material as determined by the ENGINEER, the CONTRACTOR shall remove the unsuitable material and backfill with approved material. The CONTRACTOR shall allow time to take the necessary cross section measurements before backfill is placed.

E. Excavated soils that do not meet the requirements for Usable Excavation shall be disposed of by the CONTRACTOR at a location provided by the CONTRACTOR. No material may be wasted without the prior approval of the ENGINEER

F. The CONTRACTOR is responsible for securing Unusable Excavation disposal sites if none are indicated on the Plans. The CONTRACTOR shall obtain the written permission of the Landowner for use of all disposal sites, and shall either obtain any required permits or assure that others have obtained them. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for the disposal sites. The cost of securing such sites shall be borne by the CONTRACTOR.

G. Disposal areas shall be uniformly graded to drain, with the outer limits feathered to blend with the existing ground. Disposal areas shall be seeded, capped with suitable material, or otherwise protected from long-term erosion.

H. Temporary storage of Usable Excavation is the responsibility of the CONTRACTOR, and no additional payment will be made.

1. Usable Excavation shall be stored on-site at a location approved by the ENGINEER. Usable Excavation shall be protected from erosion and sediment run-off in a manner consistent with the requirement of the CONTRACTOR’s Construction General Permit.

I. If the CONTRACTOR fails to comply with the provisions of any city ordinance or permit pertaining to disposal sites the Borough shall have the right, after giving 30 days written notice, to bring the disposal sites into compliance and collect the cost of the work from the CONTRACTOR, either directly or by withholding monies otherwise due under the Contract.

J. The CONTRACTOR shall conduct all operations to prevent contaminating Usable Excavation with Unusable Excavation or otherwise unsuitable material.

K. When frozen material is excavated and meets all other requirements for Usable Excavation, it shall be allowed to thaw and drain prior to placing in the embankment. This material will be considered Usable Excavation and no additional payment will be made.

L. The CONTRACTOR shall provide added care including bracing and shoring as required when excavating adjacent to existing retaining walls, fences and buildings. Damage caused to existing walls, fences and buildings by the CONTRACTOR shall be repaired at the CONTRACTOR's expense.

M. Where excavations occur adjacent to existing roadways or other paved surfaces designated to remain undisturbed the CONTRACTOR shall record existing surface elevations prior to excavating and take necessary measures to ensure pavement is not damaged and existing elevations and grades are maintained throughout the WORK and upon completion. Damage caused to existing pavements by the CONTRACTOR shall be repaired at the CONTRACTOR's expense.

N. After excavation to the sub-cut limit is complete and prior to placing geotextile fabric and backfilling, the bottom of the sub-cut shall be adequately compacted until a firm base for the backfill material is obtained.

3.3 EMBANKMENT

A. Embankments shall be constructed to a reasonably smooth and uniform shape conforming to the lines, grades and cross sections indicated on the Plans or as directed by the ENGINEER.

B. The underlying ground shall be properly prepared, graded, and compacted prior to placing embankment material. Clearing and grubbing in embankment areas must be completed prior to embankment operations. Debris shall be removed and surface depressions or holes shall be filled with suitable material to a level uniform surface and compacted before the embankment is constructed.

C. When embankment is to be placed on hillsides steeper than a 4:1 slope, new embankment is to be placed alongside existing embankments, or embankments are to be built half width at a time the foundation shall first be prepared by constructing benches of sufficient width to accommodate placing and compacting equipment. Each bench shall begin at the intersection of the original ground and the vertical side of the previous cut. Material so excavated and suitable for embankment construction shall be incorporated into the new embankment. Benching is incidental to other items in the contract and no direct payment will be made therefore.

D. Wherever an existing compacted roadway surface containing granular material lies within three feet of the new embankment surface, such existing roadway shall be scarified to a depth of six inches and incorporated into the first layer of embankment.

E. Embankments over swampy ground may be constructed by end dumping an initial lift of depth approved by the ENGINEER to support hauling and spreading equipment.

F. If continued hauling over a completed or partially completed embankment causes loss of stability as evidenced by pumping or rutting, or other damage, the CONTRACTOR shall repair the damaged embankment at its own expense and adjust its hauling equipment and procedures to avoid further damage.

G. The finish subgrade surface shall not vary more than 0.1-foot when tested using a 10-foot straightedge, or more than 0.1-foot from established grade. Additionally, the algebraic average of all deviations from established finished subgrade elevations taken at 100-foot intervals shall be less than 0.05-foot.

3.4 EMBANKMENTS CONSTRUCTED WITH MOISTURE DENSITY CONTROL.

A. Except for embankments constructed predominantly of rock fragments or boulders, all embankments shall be constructed with moisture density control. Embankments shall be placed in horizontal layers not to exceed eight inches in depth, loose measurement, for the full width of the embankment, except as required for traffic, and shall be compacted before the next layer is placed. Embankments shall be compacted at the approximate optimum moisture content to not less than 95% of the maximum density as determined by AASHTO T 180-D unless otherwise noted. Embankment materials may require drying or moistening to bring the moisture content near to optimum. In place field densities will be determined by ATM-213 or ATM-309 as required by the ENGINEER. Sufficient time shall be allowed between layers to allow for field density tests.

3.5 EMBANKMENTS CONSTRUCTED WITH CLASS A SHOT ROCK BORROW

A. Subgrades shall be constructed to the embankment tolerances described in paragraph 3.3 prior to placement of Class A Shot Rock Borrow. The CONTRACTOR shall place grade stakes at all changes in grade and at maximum 50-foot intervals prior to placing Class A Shot Rock Borrow.

B. Compaction equipment shall be utilized above elevation zero-feet MLLW for surcharge fill. Embankments shall be placed in horizontal layers not to exceed nine inches in depth, loose measurement, for the full width of the embankment, except as required for traffic, and shall be compacted before the next layer is placed. Compaction of embankments constructed with Class A Shot Rock Borrow shall be achieved by performing a minimum level of compactive effort consisting of six complete coverage passes with a 15-ton vibratory steel drum roller over the complete coverage area of any given lift with equipment suitably equipped by the manufacturer for compacting shot rock material. Compaction is not required for drill pads.

END OF SECTION

SECTION 02203 – TRENCHING

PART 1 - GENERAL

1.1 DESCRIPTION

A. WORK under this section includes providing all labor, materials, tools and equipment necessary for the excavation and backfill required for installation of pipelines, manholes vaults, diversion structures and other appurtenances; and for ground surface restoration, including pavement.

PART 2 - PRODUCTS

2.1 TRENCH EXCAVATION

A. Trench excavation shall consist of all material, of whatever nature, excavated from trenches or below structures within the limits described indicated in the Plans.

2.2 BEDDING

A. Stone for this WORK shall be hard angular quarry stones, having a percentage of wear of not more than 50 at 500 revolutions as determined by AASHTO T-96 or ASTM C535.

B. Bedding, Class A, shall be crushed rock material aggregate, free of muck, frozen material, lumps, organic material, trash, lumber or other debris, conforming to the following gradation:

SIEVE SIZE	% PASSING BY WEIGHT
1 1/2-Inch	100
3/8	35-65
No. 4	20-35
No. 200	0-6

C. Bedding, Class B, shall be crushed rock material, free of muck, frozen material, lumps, organic material, trash, lumber or other debris, conforming to the following gradation:

SIEVE SIZE	% PASSING BY WEIGHT
3-Inch	100
1-Inch	35-65
No. 4	20-35
No. 200	0-6

D. Crushed Aggregate Drain Rock shall be crushed stone or crushed gravel, consisting of sound, angular, tough, durable rock fragments of uniform quality, free from clay balls, vegetable matter, or other deleterious matters, and with no adherent films or coatings of dirt, clay, dust or other deleterious matter that could impede drainage. Wash the aggregate if necessary.

1. Crushed Aggregate Drain Rock shall meet the following requirements:

L.A. Wear,% AASHTO T 96	45, max.
Degradation Value ATM 313	50, min.
Sodium Sulfate loss,% AASHTO T 104	9, max. (5 cycles)
Fracture,% WAQTC FOP for AASHTO TP 61	90, min. (single face)

Drain Rock shall conform to the following gradation:

SIEVE SIZE	% PASSING BY WEIGHT
1-Inch	100
3/4-Inch	90-100
1/2-Inch	20-55
3/8-Inch	0-15
No. 200	0-1

2.3 BACKFILL

A. Backfill is defined as material placed above the level of bedding material. Backfill material consists of native material excavated from the trench that is determined by the ENGINEER to be suitable as backfill. Backfill material used within road prisms shall be granular material, non-frost susceptible, and shall be free of rocks larger than six inches, muck, frozen material, lumps, organic material, trash, lumber, or other debris. All backfill material available from trench excavation shall be utilized prior to the use of imported backfill.

2.4 IMPORTED BACKFILL

A. Imported Backfill shall consist of imported material and shall conform to the specifications for Class A Shot Rock Borrow Section 02202-Excavation and Embankment.

B. Material and installation costs of imported backfill shall be incidental to trenching, however there shall be no deduction from the Class A Shot Rock Borrow Pay Item for trenched areas.

2.5 EXCAVATABLE CONCRETE ENCASEMENT

A. Excavatable concrete encasement shall be a two-sack and sand per cubic yard mix with an 8” slump. Concrete materials shall conform to Section 03301-Structural Concrete.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Prior to excavating trenches, all necessary clearing and grubbing shall be completed in accordance with the provisions of Section 02201-Clearing and Grubbing.

B. Excavation for trenches shall conform to the lines and grades shown on the Plans. The CONTRACTOR shall also do any grading or other measures necessary to prevent surface water from entering the trench.

C. Excavation of any and all material more than two feet below the invert of a pipe or structure or as shown on the Plans shall be done only when ordered in writing by the ENGINEER. The material so excavated will be handled in the manner described below.

D. All excavated material suitable for use as backfill shall be piled in an orderly manner separately from unsuitable material, at a sufficient distance from the edge to prevent material from sloughing or sliding back into the trench; except that when the trench is in a traveled roadway the ENGINEER may require removal and temporary storage of excavated material elsewhere.

E. Material unsuitable for use as backfill shall be hauled to the overburden disposal site off the project, unless otherwise directed in writing by the ENGINEER. The CONTRACTOR is responsible for securing waste disposal sites if none are indicated on the plans. The CONTRACTOR shall obtain the written permission of the landowner for use of all disposal sites, and shall either obtain any required permits or assure that they have been obtained by others. If requested by the ENGINEER, the CONTRACTOR shall furnish the permit numbers of all required permits for the disposal sites. The cost of securing such sites shall be borne by the CONTRACTOR.

F. If the CONTRACTOR fails to comply with the provisions of any city ordinance or permit pertaining to waste disposal or disposal sites; the OWNER shall have the right, after giving 30 days written notice, to bring the disposal sites into compliance and collect the cost of the WORK from the CONTRACTOR, either directly or by withholding monies otherwise due under the Contract.

G. No more than 150 feet of trench shall be open in advance of laying of pipe, and not more than ten feet of trench shall remain open at the end of each working period. When the trench is in a traveled roadway, it shall be completely backfilled, in accordance with the Specifications, and opened to traffic at the end of each working period.

H. If explosives are used, the CONTRACTOR shall obtain all necessary permits and comply with all pertinent regulations. All utility companies shall be informed a minimum of 48 hours prior to the use of explosives in the vicinity of their facilities.

I. The CONTRACTOR shall protect and preserve all existing pavement throughout the entire construction period. No tracked equipment may be operated on any pavement without first protecting the pavement with pavement pads approved by the ENGINEER. All pavement which is damaged in any manner by the CONTRACTOR's operations shall be restored to original or better condition at the CONTRACTOR's expense.

J. Where required to prevent caving of the trench, or by any safety law or regulation, the CONTRACTOR shall furnish and install bracing and/or sheeting to protect the excavation. This bracing and/or sheeting shall be removed as trench backfill progresses.

K. The CONTRACTOR shall remove and dispose of all water entering the excavation. Disposal of water shall be done in a manner to prevent damage or nuisance to adjacent property, and in accordance with all applicable laws and regulations. Pumps shall be adequate to maintain a dry trench during the bedding, pipe installation, and initial backfill to an elevation at least one foot above the top of pipe. No backfill may be placed in

standing water under any circumstance, except when the plans and/or Specifications specifically permit installation of pipe in a wet trench.

L. Excavations for manholes and similar structures shall be per OSHA standards and large enough to provide proper working room. Any over depth excavation shall be backfilled with concrete or other approved material at the CONTRACTOR's expense.

M. The CONTRACTOR shall provide temporary support of existing structures, as necessary to protect the structures from settlement or other disturbances caused by construction activities. All structures disturbed by the CONTRACTOR's activities shall be returned to original condition, or better.

N. Trench excavation shall be completed above the tideline to the extent possible. In areas where the pipe vertical alignment calls for trench excavation below the high tide line the Contractor shall coordinate Work according to tidal schedules such that Work is not conducted within the water.

3.2 BEDDING

A. Bedding shall be placed in conformance with the lines and grades shown on the Plans and to the limits depicted in the Standard Details. Before placing any bedding material, the bottom of the trench shall be hand-raked ahead of the pipe laying operation to remove stones and lumps which will interfere with smooth and complete bedding of the pipe. The specified bedding material shall then be placed in layer(s) the full width of the trench, each layer not exceeding eight inches in thickness loose measure, and compacted to 95% of maximum density or as specified in the Plans, as determined by AASHTO T 180 D, until the elevation of the plan grade for the pipe invert is attained. The pipe bed shall then be fine-graded by hand and compacted as above. Bell holes shall be hand dug at the location of the joints and shall be of sufficient size to allow proper making of the joint and to prevent the collar or bell of the pipe from bearing on the bottom of the trench.

B. After the pipe has been laid and approved for covering, the specified bedding material shall be placed evenly on both sides of the pipe for the full width of the trench. Approval for covering does not imply final acceptance of the pipe, or relieve the CONTRACTOR in any way of responsibility to complete the project in conformance with the plans and Specifications. Bedding material shall be placed in layers. The thickness, loose measure, of the first layer shall be either one-half the outside diameter of the pipe plus two inches or eight inches, whichever is least. This layer shall be compacted as specified above to provide solid support to the underside of the pipe.

1. For pipe ten inches and smaller nominal diameter, the next layer shall be of the thickness required to complete placement of the bedding to a plane six inches above the pipe, after compaction as specified above.

2. For pipe twelve inches and larger, the bedding material shall be placed and compacted in layers not more than eight inches in thickness, loose measure, up to a plane six inches above the top of the pipe.

C. Bedding material compaction shall be achieved by performing a minimum level of compactive effort over the complete coverage area with equipment provided by the CONTRACTOR suitably equipped by the manufacturer for compacting bedding materials.

1. For each type of bedding material the minimum level of compactive effort shall be established by performing in place density tests in accordance with ATM 213-WAQTC FOP for AASHTO 310.

D. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements. All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

1. If, in the opinion of the ENGINEER, an area appears to have sub-standard compaction or the minimum level of compactive effort requires re-evaluation due to changing site or material conditions additional density tests may be called for by the ENGINEER. The results of such tests shall reestablish the minimum level of compactive effort as determined by the ENGINEER.

E. Bedding shall be considered incidental to all pipe, structures and utilities and shall be installed as shown in the Plans as part of other work.

3.3 BACKFILL

A. The trench shall be backfilled above the bedding material, as shown on the Plans, or in the Standard Details, with approved material saved from trench excavation. If there is not sufficient approved material from the excavation, the backfilling of the trench shall be completed utilizing suitable material from roadway excavation, or imported backfill. The backfill and/or suitable material from roadway excavation shall be compacted to 95% of maximum density or as specified in the Plans, as determined by AASHTO T 180-D. Lifts shall not exceed the lift 8 inches in thickness in loose measure unless otherwise directed by the Engineer. After backfilling of the trench is completed, any excess material from trench excavation shall be hauled to a CONTRACTOR furnished disposal site off the project.

B. Where trenches cross roadways, streets or driveways, backfilling shall be done immediately following excavation and laying of the pipe. All crossings shall be backfilled, compacted, and open to traffic at the end of each day's WORK. Major road crossings shall be excavated and backfilled in half widths of the traveled way so that at least one-half of the roadway is open to controlled traffic at all times during the WORK. All WORK performed within a right-of-way shall be done in conformance with the appropriate permits issued by the respective agency having jurisdiction over the right-of-way.

C. At least 24 hours prior to commencing backfilling operations, the CONTRACTOR shall notify the ENGINEER of the proposed method of compaction. No method will be approved until the CONTRACTOR has demonstrated, under actual field conditions, that such method will produce the degree of compaction required.

D. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements. All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

3.4 EXCAVATABLE CONCRETE ENCASEMENT

A. Excavatable Concrete Encasement shall placed in accordance with Section 03301- Structural Concrete to the dimensions as specified in the Plans. Concrete shall be manually worked between conduits in a manner approved by the Engineer.

3.5 ASPHALT CONCRETE PAVEMENT

A. Pavement to be removed shall be neatly saw cut full depth along straight lines. Only such pavement shall be removed as is necessary to excavate for the appurtenances unless otherwise indicated in the Plans or directed by the ENGINEER. The pavement shall be cut a sufficient distance outside the excavation to prevent damage to adjacent pavement by lifting or tearing the mat; minimum of 6 inches in all cases. All removed pavement shall be disposed of at the asphalt disposal stockpile in the CBJ/State Lemon Creek Gravel Pit.

B. After trench backfilling is complete, the edges of existing pavement shall be neatly saw cut vertically as shown on the Plans. All loose, cracked or undermined sections of existing pavement shall be removed. A tack coat shall be placed on the existing pavement edge just prior to placing new pavement.

C. Pavement shall be replaced in accordance with Section 02801 - Asphalt Concrete Pavement, and as shown on the Plans and Standard Details. Pavement shall be placed in all streets and highways as soon as possible after completion of backfilling. All trenched highway crossings shall be patched within five days from the date each trench is first opened, unless otherwise shown in the Contract Documents, or approved by the ENGINEEER. When weather conditions, unavailability of material, or time preclude placing permanent pavement with five days, temporary pavement shall be installed. Temporary paving will consist of at least a two inch thick layer of a pre-mixed, asphaltic surfacing material, and shall be installed and maintained flush with the existing surface until the permanent pavement is in place. Temporary pavement shall be removed prior to placing permanent pavement.

D. There shall be zero grade change perpendicular to the trench.

E. Permanently seal all asphalt to asphalt and asphalt to concrete joints with *Crafco Roadsaver 220* or approved equal after the permanent asphalt is in place. The CONTRACTOR shall repair all failed seals at joints during the 12 months after the date of final payment.

3.6 PORTLAND CEMENT CONCRETE

A. Portland cement concrete shall be replaced in accordance with Section 03301 – Structural Concrete and the details shown on the Plans or in Standard Details.

END OF SECTION

SECTION 02204 - BASE COURSE

PART 1- GENERAL

1.1 DESCRIPTION

A. The WORK under this section includes providing all labor, materials, tools and equipment necessary for furnishing and placing one or more layers of aggregate base or leveling course on a prepared surface to the lines and grades shown on the Plans.

PART 2- PRODUCTS

2.1 MATERIAL

A. Aggregate base course shall consist of crushed gravel or crushed stone, conforming to the quality requirements of AASHTO M 147. The aggregate shall be free from lumps, balls of clay, or other objectionable matter, and shall be durable and sound.

B. Base course material shall conform to one of the following gradations as specified:

BASE COURSE GRADATIONS
(Percent passing by weight)

Sieve Designation	A	B	C	C-1	D	D-1	E	E-1
4	100							
2	85-100	100						
1 1/2				100				
1			100	70-100		100		
3/4				60-90	100	70-100		100
3/8				45-75		50-80		
No. 4	30-60	30-70	40-75	30-60	45-80	35-65		45-80
No. 8				22-52		20-50		32-80
No. l0			25-55		30-65			
No. 40				8-30		8-30		
No. 200	0-6	3-10	4-10	0-6	4-12	0-6	0-6	0-6

C. For gradings C, D, & E, at least 50% by weight of the particles retained on the No. 4 sieve shall have at least one fractured face as determined by Alaska T-4.

D. For gradings A, C-1, D-1 & E-1, at least 70% by weight of the particles retained on a No. 4 sieve shall have at least one fractured face as determined by Alaska T-4.

PART 3- EXECUTION

3.1 CONSTRUCTION

A. The CONTRACTOR shall salvage and reuse all existing base course materials prior to providing new base course material.

B. No base course materials may be placed within defined surcharge limits as shown on the Plans prior to completion of the surcharge period and removal of surplus surcharge material.

C. Prior to placement of the base course, the underlying surface shall be prepared by dressing, shaping, wetting or drying, and compacting of the underlying material to a minimum density of 95% as determined by AASHTO T 180-D or as specified under Section 02202 – Excavation and Embankment. Surfaces shall be cleaned of all foreign substances and debris.

D. Any ruts or soft yielding spots that may appear shall be corrected by loosening and removing unsatisfactory material and adding approved material as required, reshaping, and recompacting the affected areas to the lines and grades indicated on the plans. If required by the ENGINEER, the CONTRACTOR shall proof load questionable areas with a loaded truck or other piece of equipment approved by the ENGINEER.

E. Blue tops shall be set to the top of base course. They shall be set by the CONTRACTOR at breaks in grade and on even grade at intervals not to exceed 50', with additional stakes at vertical curves.

F. Base course material shall be deposited and spread in a uniform layer to the required grades, and to such loose depth that when compacted to the density required, the thickness will be as indicated on the plans. Portions of the layer which become segregated shall be removed and replaced with a satisfactory mixture, or shall be remixed to the required gradation.

G. The maximum compacted thickness of any one layer shall not exceed six inches. If the required compacted depth exceeds six inches, the base shall be constructed in two or more layers of approximately equal thickness. Each layer shall be shaped and compacted before the succeeding layer is placed.

H. The base course shall be compacted to at least 95% of maximum density as determined by AASHTO T 180-D. In places not accessible to rolling equipment, the mixture shall be compacted with hand tamping equipment.

I. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and irregularities. If at any time the mixture is excessively moistened, it shall be aerated by means of blade graders, harrows, or other approved equipment, until the moisture content is such that the surface can be recompacted and finished as above.

J. The finished surface of the base course, when tested using a 10-foot straightedge, shall not show any deviation in excess of 3/8-inch between two contact points. The finish surface shall not vary more than 1/2-inch from established grade. Additionally, the algebraic average of all deviations from established grade of the finish base course surface elevations taken at 50-foot intervals shall be less than 0.02-foot.

K. The initial density test at any location will be paid for by the OWNER. If the initial test shows that the material compaction is not as specified, the CONTRACTOR shall modify the compaction methods used, as approved by the ENGINEER, and have the material retested until the tests show that the compaction meets the specification requirements.

All tests, after the initial test at any given location, shall be paid for by the CONTRACTOR.

END OF SECTION

SECTION 02205 – ARMOR ROCK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing a protective covering of armor rock stones, as shown on the Plans, and as directed by the ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stone for this work shall be hard angular quarry stones, having a percentage of wear of not more than 50 at 1000 revolutions as determined by ASTM C535. The least dimension of any piece of stone shall be not less than 1/3 of its greatest dimension. Stones shall meet the following gradation based on the number of stones method of grading as described below:

Class I
No more than 10% of the stones by total number shall weigh more than 50 pounds per piece and no more than 50% by total number of the stones shall weigh less than 25 pounds per piece. The stones shall be evenly graded.

Class II
No more than 10% of the stones by total number shall weigh more than 400 pounds per piece and no more than 15% by total number of the stones shall weigh less than 25 pounds per piece. The stones shall be evenly graded and a minimum of 50% by total number of the stones shall weigh 200 pounds or more per piece.

Class III
No more than 10% of the stones by total number shall weigh more than 1,400 pounds per piece and no more than 15% of the stones by total number shall weigh less than 25 pounds per piece. The stones shall be evenly graded and a minimum of 50% of the stones by total number shall weigh 700 pounds or more per piece.

B. Shoulder Barrier Rocks shall be blocky individual quarry stones with a cross-sectional length of 3’ minimum and 5’ maximum in every direction.

PART 3 - EXECUTION

3.1 GENERAL

A. Foundation or toe trenches and other necessary excavation shall be completed by the CONTRACTOR and approved by the ENGINEER before the placing of armor rock commences. Slopes to be protected with armor shall be free of brush, trees, stumps and other objectionable material, and shall be dressed to a reasonably smooth surface.

B. Unprotected embankment and slopes are subject to erosion from wave action at this site. Placement of armor rock shall be scheduled to provide protection against erosion of the underlying embankment and excavated slopes at all times.

C. Armor rock shall be uniformly placed to its full course thickness in one operation on prepared slopes and in such a manner to avoid displacing underlying material. Placement shall proceed up the slope from the toe. Placement by end dumping methods from the top of the slope will not be allowed.

D. Armor rock shall be placed and distributed by mechanical means to provide a uniform mass of stones. All armor rock shall be so placed and distributed that there are no large accumulation or area composed mainly of either the larger or smaller sizes of stones. Segregated areas consisting predominantly of smaller or larger stones shall be adjusted and redistributed by mechanical means.

E. All stones shall be placed uniformly to provide a relatively flat shoulder 'bench' as shown on the Plans. Sort and manipulate stones by mechanical equipment until acceptable by the ENGINEER. Adjacent stones shall be placed within one inch vertical tolerances of each other. Sort all stones prior to placement and place flat face at finish template plane. Manipulate, consolidate and tamp shoulder and slopes as required to achieve flat, uniform planes.

F. Undesirable voids shall be filled with smaller stones or spalls. The rock shall be manipulated sufficiently by means of an excavator, rock tongs, or other suitable equipment to secure a regular surface plane and mass stability.

G. Armor rock shall be placed in conjunction with the construction of embankment to prevent erosion and to prevent mixture of the underlying materials with the armor rock.

H. The CONTRACTOR shall provide a level compact area of sufficient size to dump and sort typical loads of armor rock material for routine inspection and approval prior to placement. The CONTRACTOR shall provide assistance, including mechanical equipment, at no additional cost to the OWNER or ENGINEER, as required to sort, measure, and inspect individual stones intended for final placement and for the purpose of determining if the riprap is within Specifications.

I. Shoulder barrier rocks shall be placed uniformly on top of base course at locations designated on the Plans and as directed by the ENGINEER.

J. Final acceptance of armor rock materials shall be in final location following field sorting, mechanical manipulation and placement.

END OF SECTION

SECTION 02402 – SANITARY SEWER MANHOLES AND CLEANOUTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing or reconstructing sanitary sewer manholes and cleanouts complete, in place. It shall also include raising or lowering existing sanitary sewer manholes and cleanouts to conform to the final grade as shown on the Drawings and Standard Details.

1.2 SUBMITTALS

A. Manholes: Shop Drawings showing method of construction and reinforcement, invert elevations, and overall dimensions.

B. Frames and Grates: Catalogue cuts and materials certification.

PART 2 - PRODUCTS

2.1 MANHOLES

A. All manholes shall consist of precast concrete sections, including integral base section, riser sections, cones, and flat slab tops and shall conform to ASTM C 478 and the dimensions shown on the Drawings. All precast sections shall have joints sealed with "RAM-NEK" or "RUB-R-NEK" gasketing material, or approved equal, installed as specified by the manufacturer. Cones shall be eccentric. Manhole steps shall be cast in all precast manhole sections. Pipe penetration gaskets shall be cast into all precast manholes. Grade rings shall be standard product, manufactured particularly for use in manhole construction, sized to fit the cones on which they are placed, and the wall thickness shall be not less than that of the cones. Grade rings shall be not less than two inches high, nor more than four inches high. Grade rings shall be *Infra*-Riser® or approved equal.

B. Portland cement concrete cast in place shall conform to Section 03302 – Concrete Structures.

2.2 FRAMES, GRATES, COVERS, AND LADDER RUNGS

A. Frames, grates, covers and ladder rungs shall conform to the plan dimensions and to the following Specification requirements for the designated materials:

B. All frames, grates, and covers shall be ductile iron, conforming to ASTM A 48, Class 30.

C. Carbon-steel castings shall conform to the requirements of AASHTO M 103. Grade shall be optional unless otherwise designated.

D. Malleable iron castings shall conform to the requirements of ASTM A 47. Grade shall be optional unless otherwise designated.

E. All manhole covers shall have the words "SEWER" cast into the top in approximately three inch text.

F. Structural steel shall conform to the requirements of AASHTO M 183.

G. Manhole steps shall be constructed of polypropylene conforming to ASTM D 4101 and shall meet current state and federal safety standards.

H. Galvanizing, where specified for these units, shall conform to the requirements of AASHTO M 111.

I. Frames and covers shall be load rated per AASHTO M-306.

2.3 MISCELLANEOUS

A. All pipes, bends and fittings used in cleanouts, drop connections, and pipe stubs for future connections to manholes shall conform to Section 02401 – Sanitary Sewer Pipe.

B. Bentonite-Cement sealing plaster shall consist of two parts bentonite, one part Type 3 cement, and one part sand, with sufficient water to obtain workable consistency.

C. Mortar shall consist of one part portland cement to two parts clean, well-graded sand which will pass a No. 4 screen. Admixtures may be used not exceeding the following percentages of weight of cement; hydrated lime, 10%; diatomaceous earth or other inert material, 5%. Consistency of mortar shall be such that it will readily adhere to the surface. Mortar mixed for longer than thirty minutes shall not be used. A non-shrink mortar may be submitted for approval as a substitute.

D. Grout shall be a non-shrink type approved by the ENGINEER.

E. Pipe penetration gasket through the manhole wall shall be cast-in-place Dura-Seal III, or approved equal, as manufactured by Dura-Tech, Inc., Kor-N-Seal Cavity O-Ring, or approved equal, as manufactured by NPC Inc. shall be used for filling the preformed void in the connection gasket.

F. Manhole exterior joint waterproofing shall be a Miradri system as manufactured by Carlisle including Miradri P-804 primer, Miradri 861 Membrane, and Miradri M-800 mastic, or approved equal that includes a membrane and adhesive system for positive water exclusion. The membrane shall extend at least 18” each side of manhole joints, except this width may be reduced to 9” each side of manhole joints if the joint is less than four feet below finished grade and the joint is above the maximum water table.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Portland cement concrete cast in place shall conform to the requirements of Division 3 – Concrete. Concrete shall not be placed under water. Running water shall not be permitted over newly poured concrete.

B. Manholes shall be constructed in a dry excavation on a six inch compacted (95%) base of D-1. The excavation shall be kept dry until the concrete or mortar has developed sufficient strength to prevent rupture by groundwater pressure.

C. Manhole inverts shall be formed as shown on the Drawings, either by laying pipe through and cutting out the top portion before completion of the base of the manholes, or by forming U-shaped channels in the concrete base section. Cut edges of pipe laid through the manhole shall be fully covered by concrete when the manhole invert is complete. The finished invert shall be smooth and true to grade. No mortar or broken pieces of pipe shall be allowed to enter the sewers.

D. Precast bases sections shall be set on a level base of six inches of compacted D-1, as shown in the Standard Details. Provisions shall be made to prevent flotation of the manhole.

E. All lifting holes shall be plugged with Bentonite-Cement sealing plaster and sealed with a Miradri System patch, or approved equal, to a minimum of six inches from the edges of the opening, as required to prevent leakage.

F. Adjustment of Existing Frame and Grates/Covers to Grade shall consist of raising or lowering the frame or ring casting one foot or less and providing the necessary adjusting rings, and mortar required to adjust the frame and grate to finish grade, with concrete collars at locations within AC pavement per CBJ Standard Detail 126-Concrete Collar, and heights per CBJ Standard Detail 205 – Manhole Heights.

G. Replacing Frame and Cover shall consist of removal and disposal of the existing frame, cover and adjustment bricks, blocks and mortar and replacing with a new frame and cover per the Drawings. The new frame and cover shall be adjusted to finish grade per CBJ Standard Detail 205 – Manhole Heights.

H. Reconstructing Manholes shall consist of one or more of the following:

1. The WORK necessary to bring the manhole frame and cover to grade when the cone and/or barrel section(s) must be removed for lowering.

2. The WORK necessary to raise the manhole frame and cover more than one foot.

3. The WORK necessary to reconstruct a portion of the manhole as specified with no change in line or grade.

4. The WORK necessary to tap one or more additional pipes into an existing manhole.

    a. CONTRACTOR shall remove or plug existing pipe as applicable, drill hole at new location required for installation of sewer under this contract, install pipe, seal the pipe penetration, form channeled inverts, install drop connections as required, and backfill as require.

    b. Connection to existing manholes shall be made in such a manner that the modified manhole is equal to a new manhole in appearance and performance. A channel, approximately two inches larger all around than the connecting pipe, shall be cut into the existing manhole base for gravity sewer. The new pipe shall be connected as shown on the Drawings and Standard Details. The rough-cut channel shall be finished to its final smooth and uniform shape with mortar. The existing sewer(s) shall be maintained in service and the fresh concrete and mortar surface shall be protected from the flowing sewage for a minimum of 24 hours.

I. After completion of the manhole, all plugs shall be completely removed from the sewers and all loose material shall be removed from the manhole.

J. Service connections shall not be installed into manholes unless otherwise shown on the Drawings or directed by the ENGINEER. Where service connections into manholes are allowed, the top of the service sewer pipe shall be 0.2 feet higher than the top of the downstream main sewer pipe. The manhole invert shall be channeled for the service connection sewers in the same manner as for main sewers.

K. Stubs for future construction shall consist of a section of pipe extending two feet outside the manhole wall, connected as shown on the Drawings and Standard Details. The manhole fillet shall be formed for future connection. The stubs shall be located as shown on the Drawings.

L. Drop construction at manholes shall be as shown on the Drawings and Standard Details.

M. The joint exterior waterproofing system shall be installed as recommended by the system manufacturer and as shown on the Drawings and Standard Details.

N. All manholes will be visually inspected by the ENGINEER; there shall be no evidence of leakage of water into any manhole from outside sources or any imperfections which may allow such leakage.

O. At least 25% of the completed manholes, as selected by the ENGINEER, shall be tested for water-tightness by the CONTRACTOR. The test shall be made, with all connecting pipes plugged, by filling the manhole with clean water to within two inches of the bottom of the cast iron frame. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test period of not less than two hours when the water table is not an adverse factor. For every manhole that fails to meet the test, four additional manholes shall be tested.

P. If the water table is an adverse factor, the manhole shall be pumped completely dry; all pipes plugged, and then checked for infiltration. The leakage rate shall not exceed three gallons per day per foot of depth, or fifty gallons per day, whichever is less, over a test period of not less than two hours.

Q. Cleanouts shall be constructed as shown on the Drawings and Standard Details. The frame shall be jointed to the riser pipe so that groundwater will be prevented from entering the sewer. Cleanouts shall be tested for watertightness along with the sewers to which they are connected.

R. The CONTRACTOR shall repair all imperfections and leaks disclosed by either visual inspection or testing. The method of repair shall be subject to the ENGINEER’s approval.

END OF SECTION

SECTION 02501 - STORM SEWER PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing pipe culverts and insulation Board in accordance with these Specifications and in reasonably close conformity with the lines and grades shown on the plans or established by the ENGINEER.

1.2 SUBMITTALS

A. Storm Sewer Pipe: Material certifications.

PART 2 - PRODUCTS

2.1 CORRUGATED POLYETHYLENE PIPE

A. Corrugated polyethylene pipe (CPP) shall be high density corrugated polyethylene, smooth interior pipe, and shall be manufactured in conformity with the latest AASHTO M-252 or AASHTO M-294, Type S Specification, and shall meet the requirements of ASTM D3350 Cell Classification 324420C, or ASTM D1248 type III, Class C, Category 4, Grade P33.

B. Pipe shall be joined with Hancor, Inc. Hi-Q Sure-Lok (bell-and-spigot) joint, or approved equal, meeting the requirements of AASHTO M294. The bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 lbs.

C. The bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell by the pipe manufacturer.

D. Fittings shall conform to AASHTO M252 or AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.

2.2 PVC PIPE CONDUIT

A. PVC Pipe Conduit shall have a standard dimension ration (SDR) of 35 and conform to ASTM D 3034. Before any PVC pipe is used on this Project, the CONTRACTOR shall supply certifications, signed by an authorized agent of the seller or manufacturer, stating that the material has been sampled, tested, and inspected in accordance with ASTM D 3034.

B. The pipe shall have integral wall bell and spigot joints conforming to ASTM D 3212. The bell shall consist of an integral wall section with a solid cross section elastomeric ring, factory assembled, securely locked in place to prevent displacement.

C. Flexible watertight connections, approved by the ENGINEER, shall be used at PVC pipe connections to manholes and other rigid structures.

2.3 INSULATION BOARD

A. Insulation board shall be Dow Chemical Company, Styrofoam Highload 40, or approved equal.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Excavation, Bedding, and Backfill shall conform to the requirements of Section 02203 – Trenching. All pipe shall have a minimum cover of 12 inches, unless otherwise shown on the Drawings or directed by the ENGINEER.

B. The pipe laying shall begin at the downstream end of the pipe. The lower segment of the pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of rigid pipe and outside circumferential laps of flexible pipe shall be placed facing upstream.

C. Paved or partially lined pipe shall be laid so that the longitudinal centerline of the paved segment coincides with the flow line. Elliptical and elliptically reinforced pipes shall be placed with the minor axis within five degrees of a vertical plane through the longitudinal axis of the pipe.

D. If the spelter coat or galvanized metal pipe is damaged during installation, the CONTRACTOR shall make necessary repairs to the spelter in accordance with AASHTO M 36, or replace the damaged section of pipe, at no additional cost to the OWNER.

E. Rigid conduits may be of bell and spigot or tongue and groove design unless one type is specified. Conduit sections shall be joined such that the inner surfaces are reasonably flush and even.

F. Joints shall be made with portland cement mortar, portland cement grout, rubber gaskets, plastic sealing compound, or by any combination of these types, or any other approved type, as may be specified.

G. Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the conduit and finished smooth on the inside. For grouted joints, molds or runners shall be used to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible, watertight seal. Joints in concrete pipe shall be thoroughly wetted before mortar or grout is applied.

H. Where portland cement mixtures are used, the completed joints shall be protected against rapid drying by a suitable curing method

I. Flexible conduits shall be firmly joined by approved coupling bands.

J. Conduit shall be inspected before any backfill is placed. Any pipe found to be substantially out of alignment, unduly settled, or damaged shall be taken up and relaid or replaced.

K. Installation of all pipes shall conform to the manufacturer's recommended procedures. These Specifications and the Drawings shall take precedence over the manufacturer's recommendations in the event of conflict, if more restrictive.

L. Four and six inch pipe culvert shall be installed as shown on the Drawings, unless otherwise directed by the ENGINEER. Other service pipe connections may be necessary, depending on whether unknown existing drainage pipes or drainages are encountered. Additional saddle tees shall be provided, as necessary, for storm service piping required in addition to those services shown on the Drawings. All bends, couplings and other fittings as necessary to connect to existing pipes or flows and to maintain a minimum cover of 12 inches shall be proved.

M. All storm service pipes to be stubbed out shall be capped and marked with a pressure treated two inch or four inch post extending from the cap to one inch above ground surface with the top six inches painted green.

N. All cut corrugations on CPP pipe shall be cleared of all water and completely grouted to prevent the accumulation of water.

O. Pipe Culvert w/Underdrain shall be constructed with two pipes as shown on the Drawings. The flowlines of the two pipes shall be along the same gradeline, unless otherwise shown on the Drawings or if pipe laterals connected to the storm drain pipe would conflict with the underdrain pipe. Where the lateral pipe would conflict with the underdrain pipe, the underdrain pipe shall be graded to pass beneath the lateral pipe along a length that will provide a minimum flow rate of 0.4%.

P. Insulation Board shall be installed in accordance with CBJ Standard 412.

END OF SECTION

SECTION 02502 – STORM SEWER MANHOLES, INLETS, AND CATCH BASINS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing or reconstructing manholes, inlets, and catch basins as shown on the Drawings and the Standard Details. It shall also include raising or lowering existing manholes to conform to the final grade as shown on the Drawings and Standard Details.

1.2 SUBMITTALS

A. Storm Sewer Manholes and Catch Basins

B. Frames and Grates: Catalogue cuts and material certifications.

PART 2 - PRODUCTS

2.1 JOINT MORTAR

A. Joint mortar shall be non-shrink-type, and shall consist of one part Portland cement and two parts approved sand with water as necessary to obtain the required consistency. Mortar shall be used within 30 minutes after its preparation. If mortar is submerged and cannot be kept dry until cured, a substitute approved by the ENGINEER shall be used.

2.2 FRAMES, GRATES, COVERS, AND LADDER RUNGS

A. Frames, grates, covers and ladder rungs shall conform to the plan dimensions and to the following Specification requirements for the designated materials:

1. All frames, grates, and covers shall be ductile iron, conforming to ASTM A 48, Class 30.

2. Carbon-steel castings shall conform to the requirements of AASHTO M 103. Grade shall be optional unless otherwise designated.

3. Malleable iron castings shall conform to the requirements of ASTM A 47. Grade shall be optional unless otherwise designated.

4. All manhole covers shall have the words “STORM DRAIN” cast into the top in approximately three-inch text.

5. Structural steel shall conform to the requirements of AASHTO M 183.

6. Manhole steps shall be constructed of polypropylene conforming to ASTM D 4101 and shall meet current state and federal safety standards.

7. Galvanizing, where specified for these units, shall conform to the requirements of AASHTO M 111.

8. Frames and covers shall be load rated per AASHTO M-306.

9. Trench Drain cover shall be THP-8-EZ Close Mesh Bolting w/Countersunk Land by Grating Pacific Trench and Inlet Systems, Hot-Dipped Galvanized.

10. Deck Drains shall be Zurn Z154 12” Square Top Prom-Deck Drain w/Heel-Proof Grate & Rotatable Frame – Hot-Dipped Galvanized.

2.3 REINFORCING STEEL

A. Reinforcing steel shall conform to the following applicable requirements:

1.	Deformed Billet-Steel Bar	AASHTO M 31 (ASTM A 615, grade 60)
2.	Welded Steel Wire Fabric	AASHTO M 55 (ASTM A 185)
3.	Cold-Drawn Steel Wire	AASHTO M 32 (ASTM A 82)
4.	Fabricated Steel Bar or Rod Mats	AASHTO M 54 (ASTM A 184)

2.4 CORRUGATED METAL UNITS

A. Corrugated metal units shall conform to plan dimensions. Steel units shall conform to AASHTO M 36 and aluminum units shall conform to AASHTO M 196. Polymer precoating shall conform to AASHTO M 245 for the type specified.

B. Branch stubs shall be corrugated pipe sections extending 12 inches from the inlet unit to match the connecting pipe size shown on the Drawings.

2.5 PRECAST CONCRETE UNITS

A. Precast concrete units shall conform to the requirements of AASHTO M 199, except that the absorption test will not be required.

B. Cracks in units will be cause for rejection. Honeycombed or patched areas in excess of 30 cumulative square inches will be cause for rejection.

C. Concrete shall conform to Section 03302 – Minor Concrete Structures.

D. Manhole steps shall meet current state and federal safety standards.

2.6 CORRUGATED POLYETHYLENE PIPE UNITS

A. The pipe used for these units shall conform to the requirements of Section 02501 – Storm Sewer Pipe.

B. The bottom plate shall be factory sealed to the barrel section, per pipe manufacturer's recommendations.

C. Branch stubs shall be corrugated polyethylene pipe sections extending 12 inches from the inlet unit to match the connecting pipe size shown on the Drawings and shall be factory connected to the barrel section.

2.7 INSULATION BOARD

A. A maximum of 6 inches of insulation board shall be required around buried storm drain pipe on three sides per ENGINEER direction where the depth of cover between storm drain pipes or manholes and water or wastewater lines is less than 5-feet.

B. Insulation board shall be *Dow Chemical Company, Styrofoam Highload 40*, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION

A. Existing storm flow shall not be impeded during construction.

B. On resurfacing contracts, the metal frames and gratings shall be adjusted to grade prior to placing the surface course unless otherwise approved in writing by the ENGINEER.

C. Excavation, bedding and backfilling shall conform to the requirements of Section 02203 – Trenching.

D. Manhole pipe connections shall be made as shown on the Drawings and as required by the manufacturer's recommendations. A snug, watertight seal shall be provided for each pipe connection.

E. All manholes shall be bedded in accordance with CBJ Standard Detail 303 – Storm Drain Manhole Types I & II.

F. Welding shall be done in accordance with the best modern practice and the applicable requirements of AWS D1.1 except as modified by AASHTO "Standard Specifications for Welding of Structural Steel Highway Bridges."

G. Metal frames shall be set over the cast-in-place concrete support structure with a maximum ¼-inch thick mortar bed.

H. Manholes located in asphalt paved roadways shall have a concrete collar installed below the ACP in accordance with CBJ Standard 126.

I. Manholes and catch basins shall be constructed in accordance with the Drawings and Standard Details. There shall be a minimum 16-inch catch constructed in the invert of the manholes or catch basins, unless otherwise specified. After the mortar is set, holding the pipe in place, the pipe shall be cut off evenly so that the pipe protrudes into the manhole or catch basin 1-inch minimum to 2-inches maximum.

J. When a pipe enters the manhole through a wall of a precast unit, the CONTRACTOR shall perform the cutting of the concrete and steel reinforcement in a manner that will not loosen the reinforcement in the wall. The steel reinforcement shall be cut flush with the wall face. All joints and openings cut in the walls shall be grouted.

K. Where indicated on the Drawings, a stub shall be provided for future connections to the manhole. The stub shall be sized and positioned as indicated. The end of the stub shall be capped or plugged in a manner approved by the ENGINEER to prevent water, earth, or other substances from entering pipe.

L. In case of poured-in-place manhole construction, if the CONTRACTOR elects to accomplish the manhole construction utilizing more than one continuous concrete pour, a keyed construction joint shall be used. These manholes shall have poured-in-place bases.

3.2 EXISTING STRUCTURES

A. Adjustment of Existing Frame Grates to Grade shall consist of raising or lowering the frame or ring casting one foot or less and providing the necessary adjusting rings, and mortar required to adjust the frame and grate to finish grade, as per CBJ Standard Detail 205 – Manhole Heights.

B. Replacing Frame and Covers shall consist of removal and disposal of the existing frame, cover and adjustment bricks, blocks and mortar and replacing with a new frame and cover per the Drawings and CBJ Standard Details. The new frame and cover shall be adjusted to finish grade per CBJ Standard Detail 205 – Manhole Heights.

C. Reconstructing Manholes shall consist of one or more of the following:

1. The WORK necessary to bring the manhole frame and cover to grade when the cone and/or barrel section(s) must be removed for lowering.

2. The WORK necessary to raise the manhole frame and cover more than one foot.

3. The WORK necessary to reconstruct a portion of the manhole as specified with no change in line or grade.

4. The WORK necessary to tap one or more additional pipes into an existing manhole.

5. Manholes shall be reconstructed to the required elevation and shall conform to CBJ Standard 303 except as noted. This WORK shall conform to the requirements above specified for new construction except that material may be reused as approved by the ENGINEER.

END OF SECTION

02601 – WATER SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section requires providing all labor, materials, tools and equipment necessary for the construction of the water system in its entirety, including furnishing and installing; all pipe, fittings, yard hydrant, transitions, flanges, marking tape, bedding, backfill, as well as performing all trenching, electrical continuity checks, flushing, testing, disinfection and other associated items, complete as shown in the Plans to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.

1.2 GENERAL REQUIREMENTS

A. The CONTRACTOR shall install the water pipe and fittings to the horizontal and vertical alignment shown on the Plans and shall complete all associated WORK described in this Section.

B. The CONTRACTOR is responsible for knowledge of all permits as well as local, state, and federal codes, standards, or statutes related to the WORK he performs. The CONTRACTOR shall install the system in compliance with such regulations and shall notify the ENGINEER immediately of any discrepancies.

C. All water system components shall have NSF 61 certification unless otherwise approved by the Engineer.

1. NSF 61 Annex G certified lead free products shall be provided where available.

D. All water system components shall have a minimum pressure rating of 150 p.s.i. unless otherwise specified.

1.3 REFERENCES

A.	ASME	American Society of Mechanical Engineers
B.	ASSE	American Society of Sanitary Engineering
C.	ASTM	American Society for Testing and Materials
D.	AWWA	American Water Works Association
E.	DIPRA	Ductile Iron Pipe Research Association
F.	NSF	National Sanitation Foundation
G.	PPI	Plastic Pipe Institute

1.4 SUBMITTALS

A. The Contractor shall review the Specification in its entirety and provide all required submittals to the ENGINEER prior to performing the associated WORK.

B. Submittals shall be compiled by the CONTRACTOR and submitted in accordance with Section 01300 Submittals.

C. On catalogue sheets with more than one item, clearly indicate which item shall be utilized.

D. Submittals for this Section shall include, but may not be limited to the following.

1.	Water pipe and fittings:	Material certifications and catalogue cut sheets.
2.	Waterline appurtenances:	Catalogue cut sheets.
3.	HDPE fusion technician:	Certificate of fitness issued in accordance with 49 CFR 192.285 by an appropriate agency.
4.	Flanges and backup rings:	Material certifications and shop drawings
5.	Steel Component:	Shop drawings per Section 05120-Metal Fabrication

6. Flushing, testing and disinfection plan.

7. Testing and Certification sheets for backflow prevention devices in accordance with CBJ municipal code.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE (DIP)

A. Ductile iron water pipe (DIP) shall conform to the requirements of AWWA C151, with cement mortar lining conforming to the requirements of AWWA C104. Standard Thickness Class 52 pipe shall be used unless otherwise shown on the Plans. Water pipe shall have an exterior bituminous coating conforming to the requirements of AWWA C110. All water pipe shall be clearly marked with the manufacturer's name, type, class and/or thickness as applicable. Lettering shall be legible and permanent under normal conditions of handling and storage.

2.2 DIP JOINTS

A. Unless otherwise shown on the Plans, or as specified below, pipe joints shall be push-on rubber gasket type conforming to the requirements of AWWA C111.

B. DIP placed within pipe casings shall have restrained joint connections.

C. Restrained joint water pipe shall be U.S. Pipe TR FLEX, U.S. Pipe field Loc Gasket, EBBA IRON "Mega-lug System," Griffin Snap Lock, Pacific State Lock Mechanical type, or approved equal. Restrained push-on joints for pipe shall be designed for a water working pressure of 250 psi and shall be capable of being deflected a minimum of 3 per joint, for pipe sizes through 18 inches, after assembly.

2.3 DIP FITTINGS

A. Fittings for all ductile iron water pipe and restrained joint water pipe shall be U.S. Pipe TR FLEX, push-on gasket fittings compatible with U.S. Pipe Field Loc Gasket, mechanical joint fittings with EBBA IRON "Mega-lug System" Griffin Snap Lock, Pacific State Lock Mechanical Type, or approved equal.

B. For connecting to existing water mains, the CONTRACTOR shall use a mechanical joint tee and a mechanical joint cut-in-sleeve similar to Clow F-1220 or Mueller H-843, or a cast iron coupling similar to Rockwell 431, or approved equal. The length of all sleeves and couplings shall equal or exceed the diameter of the pipe.

C. All valve clusters consisting of a tee and one or more valves, including fire hydrant legs, shall be monolithically restrained with EBBA Iron "Mega-lug System," or approved equal.

2.4 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. High Density Polyethylene Pipe (HDPE) and fittings shall be manufactured in accordance with AWWA C906. HDPE shall be manufactured from PE4710 polyethylene compounds that meet or exceed ASTM D3350 Cell Classification 445574. All HDPE pipe and fittings shall be certified by the NSF for potable water service. HDPE pipe and fitting material compound shall contain color and ultraviolet (UV) stabilizer meeting or exceeding the requirements of Code C per ASTM D3350.

B. HDPE waterline shall be SDR 11 unless otherwise noted.

C. HDPE fittings shall be PE4710 with the cell classification noted above. Fittings shall be molded unless otherwise approved by the engineer with pressure ratings at a minimum equal to that of the pipe. Fittings shall be butt fusion type unless otherwise noted on the plans or approved by the Engineer. Electro-fusion connections are allowed where shown on the Plans and elsewhere on a limited basis upon Engineer approval. Fittings and connections shall conform to the following:

1. Butt fusion fittings shall meet ASTM D3261

2. Electro-fusion fittings shall meet ASTM F1055

3. Socket fittings are not permitted.

D. Flanged pipe connections are allowed where shown on the Plans and elsewhere on a limited basis upon Engineer approval. Flanges shall be PE 4710, with a minimum Cell Classification as noted above. Flanges shall conform to ASTM D 3261 or ASTM F 2206 as applicable. Flanges shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Markings for molded or machined flanges shall be per ASTM D 3261. Fabricated flange adapters shall be per ASTM F 2206.

1. Back-up rings, shall be 316 stainless steel or polypropylene encapsulated where submerged and hot dip galvanized elsewhere unless otherwise noted in the Plans. Bolt-holes and bolt-circles shall conform to one of these standards: ASME B-16.5 Class 150, ASME B-16.47 Series A Class 150, ASME B-16.1 Class 125, or AWWA C207 Class 150 Series B, D, or E. The back-up ring shall provide a long-term pressure rating equal to the pressure class of the pipe or 250 psi, whichever is greater. The pressure rating shall be clearly marked on the back-up ring.

2. Bolts and associated hardware shall be 316 stainless steel where submerged and hot dip galvanized elsewhere unless otherwise noted in the Plans and provided in accordance with Section 05120 Metal Fabrication.

E. Service connections shall be electro-fusion saddles, sidewall fusion branch saddles, or manufactured tapping tees made from materials specified herein unless otherwise noted on the Plans or approved by the ENGINEER. When service connections require a change in pipe material, transitions shall be made with a 316 stainless steel threaded outlet unless otherwise noted in the Plans. Mechanical strap-on saddles shall only be permitted upon ENGINEER approval, and must be approved by the manufacturer for use on HDPE pipe. Mechanical strap-on saddles shall be entirely constructed of 316 S.S. unless otherwise noted or approved by the engineer. All service connections shall be installed per manufacturer's recommendations.

1. Service connection outlet shall be threaded IPS of the size noted in the Plans.

2. The size of a sidewall fusion saddle shall be as indicated on the plans. The saddle shall be made in accordance with ASTM D 3261 or ASTM F 2206. After installation, approximately ¼" of the PE pipe shall be visible beyond the saddle to confirm that proper surface preparation occurred. Saddle faces that do not provided ¼ inch of area beyond the saddle are not acceptable.

3. Tapping tees shall conform to ASTM D3261.

F. Transition fittings shall be full bore, butt fusion type IPS transitions of the size and material noted on the Plans.

1. Where transitioning to steel pipe transition shall be 316 stainless steel unless otherwise noted.

2. Where transitioning to copper, brass or bronze pipe transitions shall be red brass or silicon bronze.

2.5 HOT DIP GALVANIZED STEEL PIPE AND FITTINGS

A. Steel pipe and fittings shall be provided in accordance with Section 05120-Metal Fabrication and shall be NSF-61 listed. Steel fittings shall conform to AWWA C208 and shall be NSF 61 listed.

B. Steel flanges shall conform to AWWA C228 and C207 as applicable and shall be factory welded or onto pipe as noted in the plans per AWS recommendations. Flanges shall be provided in accordance with Section 05120-Metal Fabrication.

C. Bolts, nuts, and other miscellaneous hardware shall be hot dip galvanized unless otherwise noted in the Plans and shall be provided according to section 05120-Metal Fabrication.

2.6 STAINLESS STEEL PIPE AND FITTINGS

A. Stainless steel pipe and fittings shall be 316 stainless steel welded seamless pipe and shall be factory welded unless otherwise approved by the engineer. Pipe and Fittings shall conform to AWWA C220, C226 and Section 05120-Metal Fabrication. Stainless steel pipe and fittings shall be NSF 61 listed.

B. Stainless steel flanges shall be class 150 or greater, 316 stainless steel, conform to AWWA C228 and C207 as applicable and shall be factory welded onto pipe with 316 stainless steel rod as noted in the plans per AWS recommendations. Flanges shall be provided in accordance with Section 05120-Metal Fabrication.

1. CF8M will not be accepted as a suitable substitute for 316 ss. welded flanges

C. Where stainless steel pipe and flanges are submerged the pipe and flanges shall be factory welded to a complete assembly. Field welding of stainless steel pipe and fittings shall not be permitted.

D. Bolts, nuts, and other miscellaneous hardware shall be 316 S.S. unless otherwise noted in the Plans and shall be provided according to section 05120-Metal Fabrication.

2.7 BRASS AND BRONZE PIPE AND FITTINGS

A. All brass pipe and fittings shall be rated for 150 psi min.

B. The terms brass and bronze pipe are used interchangeably and shall be taken to mean threaded schedule 40 “red brass,” or bronze of any industry standard type unless otherwise noted.

C. Fittings shall be threaded or flanged where noted.

D. Flanges shall be of similar construction and performance standards as the flanged components to which they are connecting.

E. Pipe and fittings shall be NSF 61 listed.

2.8 PIPE LUBRICANT

A. The lubricant shall be suitable, and acceptable by the manufacturer and the City and Borough of Juneau Water Utility for lubricating the parts of the joint for assembly. The lubricant shall be non-toxic, "industrial food grade", shall not support the growth of bacteria, and shall have no deteriorating effects on the gasket material. It shall not impart taste or odor to the water in a pipe that has been flushed in accordance with AWWA C601, "Standard for Disinfecting Water Mains". The lubricant containers shall be labeled with the trade name or trademark and the pipe manufacturer's name where applicable."

2.9 THAW WIRE

A. Thaw wire and continuity straps shall be No. 2 copper wire, stranded, with HMWPE insulation and suitable for direct bury applications. Exothermic welding to attach continuity straps on DIP and fittings shall be “Cadweld” or approved equal and coated with bituminous coating.

2.10 UNDERGROUND MARKING TAPE

A. Underground marking tape for ductile iron, copper, or steel water pipe shall be blue, six inch wide, four mil thick, polyethylene tape with black lettering with the following wording: “Caution: Waterline Buried Below.” Marking tape shall be installed 12 inches above the top of all water pipe.

B. For HDPE water pipe the Contractor shall provide and install a detectable locator tape with black lettering with the following wording: “Caution: Waterline Buried Below.” The locator tape shall not be less than five (5) mil, foil backed, and six inch (6”) wide vinyl tape. The Contractor shall install the locator tape above and parallel to the axis of the utility with no breaks in continuity. The Contractor shall install the locator tape three feet (3’) below finish grade or two feet (2’) deep in the street structural section. Installation of the locator tape is considered incidental to Water System.

2.11 INSULATION BOARD

A. A maximum of 6 inches of insulation board shall be required around buried water pipe on three sides per Engineer direction where the depth of cover to top of pipe is less than five (5) feet, at storm drain crossings, in the proximity of manholes, vaults, or similar structures and elsewhere as shown on the plans or per Engineer direction.

B. Insulation board shall be *Dow Chemical Company, Styrofoam Highload 40*, or approved equal.

2.12 TIE RODS

A. Tie rods shall be threaded black iron or mild steel with a 12-mil minimum asphaltic coating and shall be located symmetrically around the perimeter of the pipe using anchorage lugs of standard manufacture for attachment where required. Unless otherwise shown on the Plans, the number and size of the rods shall be as shown on the table below:

PIPE SIZE	TIE ROD SIZE	NO. OF RODS
4" – 10"	¾"	2
12" – 16"	¾"	4
18" – 20"	¾"	6
22"	1"	4
24"	1"	6

2.13 CONCRETE

A. Concrete shall conform to Section 03301 – Structural Concrete unless otherwise indicated.

2.14 STEEL COMPONENTS

A. All steel components, hangers, supports, steel stands, mounting brackets, plates, other miscellaneous steel shapes and all hardware shall be 316 stainless steel or hot dip galvanized unless otherwise noted and provided in accordance with the provisions of Section 05120-Metal Fabrication.

2.15 YARD HYDRANT

A. Yard Hydrant shall be *Model 6805LF Series Sanitary Frost-Proof Yard Hydrant Lead Free* with stainless steel riser as manufactured by *Simmons Manufacturing* or approved equal.

B. Yard hydrant shall be installed with a vacuum breaker.

PART 3 - EXECUTION

3.1 GENERAL

A. The CONTRACTOR shall preserve and protect all existing utilities and other facilities including but not limited to: telephone, television, electrical, water and sewer utilities, surface or storm drainage, highway or street signs, mail boxes, and survey monuments.

B. The CONTRACTOR shall immediately notify the City and Borough of Juneau of utilities or other facilities damaged during construction and shall immediately repair or replace that which was damaged. The CONTRACTOR shall support and protect any underground utility conduits, pipes, or service lines where they cross the trench.

C. Where CBJ waterlines are specified to be "Hot Tapped" taps shall be performed by the CBJ Water Utility with their tools unless otherwise indicated in the Plans or directed by the ENGINEER. The CONTRACTOR shall coordinate his work as required to provide 48 hours minimum notice to the Utility.

1. The Contractor shall have tapping sleeve and valve installed per design prior to the arrival of the CBJ Water Utility.

2. The Utility shall have the authority to reject the installation of the tapping sleeve and valve should it deem the CONTRACTOR's work unsatisfactory. Should the Utility reject the installation the CONTRACTOR shall immediately take corrective action to the satisfaction of the Utility and the ENGINEER. The CONTRACTOR shall reschedule the WORK as required.

D. The CONTRACTOR shall give at least 48 hours notice to the City and Borough of Juneau Water and Wastewater Utility Divisions and the City and Borough of Juneau Harbors Department prior to:

1. Needing water or sewer main line locates;

2. Interruption of water service in any area; or

3. Use of water from any fire hydrant.

E. Any water service disruption shall be restored as soon as possible. The CONTRACTOR shall comply with the current policy on "Water and Sewer Line Locates" of the City and Borough of Juneau Public Works Department, Water and Wastewater Utilities Divisions. The CONTRACTOR shall notify all local radio stations and any major customers who will be affected of a planned water service disruption.

F. The CONTRACTOR is responsible for maintaining continuous water service at existing volume and pressure to all structures, with; existing, temporary or new piping, except as provided in this Section.

G. The CONTRACTOR shall review product cut sheets and installation instructions for all products and shall handle, install, test and operate all products per the manufacturer's recommendations to the extent required to perform the WORK. Unless otherwise approved in writing by the ENGINEER the CONTRACTOR shall not deviate from manufacturer's instructions or recommendations.

3.2 PIPE INSTALLATION

A. All water pipe and fittings shall be inspected for defects. Damaged pipe will be rejected and the CONTRACTOR shall immediately place all damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours.

B. Whenever it becomes necessary to cut a length of water pipe, the cut shall be made by abrasive saw or by special pipe cutter.

C. The water pipe shall be laid to the horizontal and vertical alignment shown on the Plans. When buried a minimum five foot cover shall be maintained from finish grade to top of water pipe, unless otherwise shown on the Plans. Fittings shall be installed at the location shown on the Plans and elsewhere upon ENGINEER approval.

D. Trench excavation, bedding, and backfill shall conform to the requirements of Section 02203 Trenching.

E. To prevent dirt, fluids, or other foreign material from entering the pipe and fittings during handling and installation, the open end of the pipe shall be protected by a water-tight plug at all times except when joining the next section of pipe.

F. Under no circumstances shall pipe deflections, either horizontal or vertical, exceed the manufacturer's printed recommendations. Where deflections would exceed the manufacturer's recommendations, fittings shall be used.

G. Existing water pipe and appurtenances to be removed or abandoned shall be as designated on the Plans or directed by the ENGINEER. Abandoned water services shall be plugged at the cut ends. Abandoned water pipes shall be removed as shown on the Plans, or mechanically plugged if not required to be removed.

H. All excavation, bedding and backfill shall be performed in accordance with the provisions of Section 02203-Trenching.

I. Suspended pipe shall be installed in a manner that adequately supports the pipe at all times per manufacturer's recommendations.

3.3 DUCTILE IRON PIPE INSTALLATION

A. Ductile iron water pipe shall be installed in accordance with the manufacturer's printed specifications and instructions, and in conformance with AWWA C151.

B. Water pipe shall be handled carefully to prevent damage to the pipe, pipe lining, or coating. Water pipe and fittings shall be loaded and unloaded using hoists and slings to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled. If any part of the coating or lining is damaged, repair thereof shall be made in a manner satisfactory to the ENGINEER at the CONTRACTOR's expense.

C. All pipe ends shall be square with the longitudinal axis of the water pipe and shall be reamed and smoothed to assure a good connection.

D. Vertical deflections to avoid obstructions that exceed allowable water pipe joint deflections shall be accomplished by the use of fittings and either joint restraints or vertical thrust blocking conforming to the Standard Details. Additional fittings to those indicated on the Plans will be required to accomplish these vertical deflections.

E. Concrete thrust blocks shall be furnished and installed in accordance with the Plans and Standard Details.

F. Pressurized water pipe ends shall be plugged and thrust blocks installed. Volume and bearing area of thrust blocks for end plugs shall be equal to applicable standards for bends greater than 45°.

G. All pipe fittings shall be restrained with EBBA Iron "Megalug System," or approved equal.

H. All joints within 50 feet of tees or bends equal to or greater than 45 shall be restrained joints.

I. Polyethylene encasement shall be required in areas as shown on the plans.

J. Polyethylene encasement shall be in the locations shown in the Plans and in conformance to the methods described in the most current edition of AWWAC105/ANSI A21.5 and DIPRA's "A Guide for the Installation of Ductile Iron Pipe" and "Polyethylene Encasement".

3.4 HDPE PIPE INSTALLATION

A. HDPE water pipe and fittings shall be joined using butt fusion unless otherwise specified in the Plans or approved by the ENGINEER. The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations by certified technicians. The CONTRACTOR shall submit a certificate of fitness issued by the pipe manufacturer for each technician prior to beginning fusion operations.

B. Saddle fusion shall be done in accordance with the manufacturer's recommendations and ASTM F 2620. Saddle fusion joints shall be made by qualified fusion technicians. If the CONTRACTOR intends to use saddle fusion joints testing of sample joints may be required per the direction of the ENGINEER in accordance with ASTM F905.

C. Electro-fusion joining shall be done in accordance with the manufacturer's recommended procedure and ASTM F 1290. The electro-fusion transformer unit shall be the type capable of reading the electronic barcode associated each fitting and storing the fuse input and result information electronically. The CONTRACTOR shall maintain the data recorded by the electro-fusion unit throughout the warranty period of the WORK. This information shall be provided to the ENGINEER upon request. Electro-fusion joints shall be made by a qualified technician.

D. Flange installation shall follow the guidelines of Plastic Pipe Institute Technical Note # 38.

E. Socket fusion joints are not permitted.

F. HDPE pipe sleeves shall be installed over ends of the pipe segments prior to fusing.

3.5 FLUSHING, TESTING AND DISINFECTION

A. Prior to; flushing, testing, disinfection or placement of any section of the water system into service, the procedures outlined by the manufacturers of the various system components shall be reviewed and followed as they apply unless otherwise approved in writing by the ENGINEER. Should any of the Items in **Part 3-Execution** herein jeopardize the integrity or warranty of the various components according to the manufacturers printed literature the CONTRACTOR shall consult with the ENGINEER prior to proceeding. Any damage incurred due to the failure to comply with this provision shall be repaired in a manner satisfactory to the ENGINEER at the CONTRACTOR's expense.

B. Prior to acceptance, the CONTRACTOR shall "Open-Bore" flush the water pipe then perform hydrostatic tests, electrical continuity tests, and disinfection and coliform tests. Testing may be done in any sequence. However, in the event the disinfection, coliform and continuity tests have been performed and repairs are made to the water

pipe system in order to pass the hydrostatic test, all previous tests and the "Open-Bore" flushing shall be repeated to the satisfaction of the ENGINEER.

C. The CONTRACTOR shall review the Plans and specifications prior to flushing and develop a testing and disinfection plan to review with the ENGINEER. Any saddles, connections or fittings the CONTRACTOR intends to permanently install on the system for the purpose of testing shall be identified and approved by the ENGINEER. The CONTRACTOR shall be responsible for supplying such appurtenances which shall conform to the applicable sections herein. The CONTRACTOR is responsible for performing all flushing testing and disinfection of the system in its entirety and shall plan his WORK accordingly.

3.6 OPEN-BORE FLUSHING

A. Open bore flushing is required of all installed water pipes to remove any foreign matter. The CONTRACTOR shall furnish, install and remove all pumps, fittings and pipes necessary to perform the flushing; shall provide all additional excavation and backfill; and shall dispose of all water and debris flushed from the water pipe. Flushing through fire hydrants, meters, backflow preventers, automatic control valves, reduced outlets or fittings shall not be permitted unless specifically authorized in writing by the ENGINEER. The CONTRACTOR shall notify the ENGINEER and the City and Borough of Juneau Water Utility, in writing, 48 hours in advance of any flushing operation. A flushing scheme and schedule shall be submitted by the CONTRACTOR for review and approval by the ENGINEER prior to flushing. The schedule for flushing must be approved by the City and Borough of Juneau Water Utility and all flushing operations shall be done in the presence of a City and Borough of Juneau Water Utility representative unless otherwise approved in writing. The CONTRACTOR shall be responsible for obtaining any permits necessary for flushing operations.

3.7 HYDROSTATIC TESTING

A. The CONTRACTOR shall hydrostatically test all newly installed water pipe as well any as affected existing pipe as determined by the ENGINEER.

B. The ENGINEER shall be present for all hydrostatic and leakage tests. The CONTRACTOR shall notify the ENGINEER at least 24 hours prior to any test and shall notify the ENGINEER at least two hours in advance of the scheduled time if the test is to be cancelled or postponed.

C. Sections to be tested shall be limited to 1,500 feet, unless otherwise approved in writing by the ENGINEER.

D. Hydrostatic testing shall be conducted after "Open-Bore" flushing, in accordance with the requirements of AWWA C600 or C901 and as stated hereafter. The CONTRACTOR shall furnish all assistance, equipment, labor, materials, and supplies necessary to complete the test to the satisfaction of the ENGINEER.

E. The CONTRACTOR shall suitably valve-off or plug the outlet to existing or previously tested water pipe prior to perform the required hydrostatic test.

F. The CONTRACTOR may install saddles, corporation stops or test ports on a limited basis to perform testing as required herein.

1. Test connections shall be identified in the CONTRACTOR's Flushing and Disinfection Plan.

G. Prior to testing, all air shall be expelled from the water pipe. If permanent air vents are not available to accommodate testing, the CONTRACTOR shall install corporation stops and blow-off lines so the air can be expelled as the line is filled with water as approved by the ENGINEER.

H. Systems comprised of multiple pipe materials may be tested together as approved by the ENGINEER.

I. Defective materials or poor quality of WORK, discovered as a result of the hydrostatic tests, shall be replaced by the CONTRACTOR. Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be repeated until a satisfactory test is obtained.

J. After completion of testing, all test and air pipes fittings, valves and other miscellaneous appurtenances installed for testing shall be removed unless otherwise approved by the ENGINEER. Corporation stops installed for testing shall remain and shall be closed in the presence of the ENGINEER.

3.8 DIP HYDROSTATIC TESTING PROCEDURE

A. The DIP hydrostatic test pressure shall be a minimum of 150 psi or 1½ times the operating pressure of the water pipe (measured at the highest elevation of the newly-installed water pipe), whichever is greater, unless otherwise directed by the ENGINEER. Acceptance pressure testing shall be done with all service lines installed, corporation stops open, and pressure against the closed curb stops, and outlet valves. The duration of each hydrostatic pressure test shall be one hour. Pumping will cease after the required test pressure has been reached. If the pressure remains constant for one hour without additional pumping, or pressure drop is less than five psi, that section of water pipe is acceptable.

B. If the pressure drops five (5) psi or more during the initial one hour hydrostatic pressure test, the CONTRACTOR shall conduct a leakage test. Leakage shall be determined by measuring "make-up" water necessary to restore the specified test pressure. The quantity of water lost from the water pipe shall not exceed the number of gallons per hour as determined by the following formula:

$$\frac{ND\sqrt{P}}{L} = 7400$$

L= Allowable leakage in gallons per hour

N= Summation of mechanical and push-on joints in length of water pipe tested

D= Diameter of water pipe in inches

P= Test pressure in pounds per square inch

C. Should the tested section fail to meet the pressure test as specified, the CONTRACTOR shall locate and repair the defects and then retest the water pipe as specified above. Any specific leakage point detected shall be corrected by the CONTRACTOR to the satisfaction of the ENGINEER regardless of the allowable leakage specified above.

D. If applicable, tests shall be performed with the auxiliary gate valves open and pressure against the hydrant. After the hydrostatic test has been successfully completed, each valve shall be tested by closing in turn and relieving the pressure beyond. This test of the valves will be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked. The CONTRACTOR shall verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.

3.9 HDPE HYDROSTATIC TESTING PROCEDURE

A. Testing shall be performed with water only. Compressed gas will not be accepted as a suitable test medium.

B. The hydrostatic test pressure shall be a minimum of 150 psi or 1½ times the operating pressure of the water pipe (measured at the highest elevation of the newly-installed water pipe), whichever is greater, unless otherwise directed by the ENGINEER. Acceptance pressure testing shall be done with all service lines installed, corporation stops open, and pressure against the closed curb stops and outlet valves. If appurtenances in the system have a maximum pressure rating lower than that specified above they will be isolated from the system by the CONTRACTOR and tested separately per manufacturer's recommendations as approved by the ENGINEER. If isolation cannot reasonably be performed as determined by the ENGINEER the test pressure for the system shall be equal to 95% of the maximum operating pressure of the lowest pressure rated component in the system.

C. Testing shall be performed with all parts of the system within the test section installed in their design location to the extent possible and reasonable as determined by the ENGINEER. All parts of the section to be tested shall be restrained from movement in case of failure.

D. HDPE hydrostatic testing shall be performed using the "pressure drop" method. The "make up water" test method will not be accepted. Testing shall be performed in accordance with ASTM F-2164 and the procedure described herein:

1. Fill the test section slowly with water ensuring all air is purged from the system. Filling should be performed from the point in the system lowest in elevation. If this point is inaccessible the CONTRACTOR shall take reasonable measures to ensure the system is purged of air prior to testing.

2. Allow the test section temperature to equalize throughout.

3. Slowly pressurize the test section to the test pressure as indicated in part B.

4. Add make-up water as necessary to maintain the test pressure for a minimum of 4 hours.

5. Reduce the pressure by 10 psi; this will be the test phase pressure.

6. Without increasing the pressure or adding make-up water monitor the system and visually inspect for leakage. A passing test is indicated if no visual leakage is observed and the pressure remains within 5% of the test phase pressure for a minimum of 1 hour.

E. If DIP fire hydrant assemblies are present in the system perform DIP test item # 3.9-D above.

F. If the test section fails, depressurize the system and repair defective areas.

G. The system must be allowed to "relax" for a minimum of 8 hours prior to retesting.

3.10 ELECTRICAL CONTINUITY

A. Electrical continuity is required for six inch or smaller D I water pipe and fire hydrant assemblies, and shall be provided by two electrical continuity straps installed on each side of the water pipe joint or fittings. Electrical continuity tests will be performed by the CONTRACTOR in the presence of the City and Borough of Juneau Water Utility unless otherwise approved. The testing shall be performed in a manner that is approved by the ENGINEER.

B. "All resilient seat gate valves 6 inch and smaller are required to have a thaw wire either bolted or cad welded to the valve body, and raised through the inside of the valve box, therefore making it available for both continuity testing, and thawing. An additional thaw wire will still need to be attached to the main, and coiled around the outside of the box according to the Plans.

If the initial testing of an installation within any Project phase fails, additional testing required shall be at the CONTRACTOR's expense. The CONTRACTOR will maintain a circuit of 300 amps DC current for a period of 90 seconds. Current loss, through the test circuit, shall not exceed 10%. Continuity test sections shall not exceed 500 lineal feet. All test leads brought up to the surface shall be removed to a depth of two feet below finish grade upon completion of the tests.

3.11 DISINFECTION

A. Disinfection by chlorination of all new water pipe shall be completed and a satisfactory bacteriological report obtained prior to placing the pipe in service. "Open-bore" flushing shall be completed before chlorination is begun.

B. Chlorine shall be applied by one of the following methods:

1. Liquid chlorine gas-water mixture;

2. Direct chlorine gas feed; or

3. Hypochlorite commercial products such as HTH, Perchloren, Macho-chlor, or approved equal.

The chlorinating agent shall be applied at the beginning of the section adjacent to the feeder connection, insuring treatment of the entire water pipe. Water shall be fed slowly into the new water pipe with chlorine applied in amounts to produce a dosage of 50 ppm. Application of the chlorine solution shall continue until the required residual

of not less than 50 ppm free chlorine is evident at all extremities of the newly constructed line.

C. The chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with a suitable device for regulating the rate of flow and the effective diffusion of gas within the water pipe. Hypochlorite products shall be placed or injected into the water pipe. During the chlorination process, all intermediate valves and accessories shall be operated. Valves shall be manipulated so that the strong chlorine solution in the water pipe being treated will not flow back into the pipe supplying the water.

D. The following table is to be used as a guide for chlorinating pipes by the calcium hypochlorite and water mixture method. The given dosage per 100 feet results in a chlorine solution of 40 to 50 ppm. This dosage takes into account that CONTRACTORs most frequently use granular HTH, which is 65% pure. If another chlorinating agent is used, the dosage must be adjusted.

PIPE DIAMETER	DOSAGE PER 100 FEET
4”	.60 oz.
6”	1.35 oz.
8”	2.75 oz.
10”	4.30 oz.
12”	6.19 oz.
16”	11.00 oz.
20”	17.00 oz.

E. A residual of not less than 50 ppm free chlorine shall be produced in all parts of the water pipe. After 24 hours detention there shall be a minimum free chlorine residual of 25 ppm in all parts of the water pipe. This residual shall then be neutralized in the pipe by injecting an approved reducing agent such as sulfur dioxide, sodium bisulfate, sodium sulfite or sodium thiosulfate.

F. After the water pipe system has been thoroughly flushed, samples will be taken at representative locations in the system by the ENGINEER, placed in sterile bottles, and submitted to an approved laboratory for bacteriological examination. The presence of bacteria in any sample shall be verified with a second sample at the same location. If verified, the pipe disinfection procedure shall be repeated and additional samples taken for bacteriological examination. Pipe disinfection shall be repeated, at the CONTRACTOR’s expense, until satisfactory results are obtained. The first testing sequence will be paid for by the OWNER. Any further testing and sampling required due to insufficient disinfection (positive coliform tests) will be paid for by the CONTRACTOR.

G. The water shall be flushed from the water pipe at its extremities, including all curb stops, until the replacement water chlorine residuals are equal to those of the permanent source of supply. The de-chlorinated water and water used for flushing shall be disposed of in a manner approved by the ENGINEER and in conformance with current requirements of the Alaska Department of Fish and Game, and the Alaska Department of Environmental Conservation.

3.12 BACKFLOW PREVENTION DEVICES

A. The contractor shall have all backflow prevention devices tested by a CBJ approved testing agency in accordance with the CBJ municipal code. Testing certifications shall be provided to the required CBJ agencies and the OWNER. Backflow prevention device testing shall be paid for by the CONTRACTOR. A list of approved testing agencies can be obtained from the CBJ Community Development Department.

PART 4 - ACCEPTANCE

4.1 CITY AND BOROUGH OF JUNEAU

A. Prior to acceptance the Contractor shall contact the City and Borough of Juneau Water Utility and have the meter enclosure, meter, and meter reading device inspected and tested by a City and Borough of Juneau Official.

B. Prior to acceptance the Contractor shall contact the City and Borough of Juneau Community Development Department and have all backflow prevention devices, pressure relief valves and other components as required per municipal code inspected by a CBJ building inspector.

C. Acceptance of the system shall be contingent upon the satisfaction of the CBJ officials with the installation and testing of their respective systems and components to the extent required by the Contract Documents.

END OF SECTION

SECTION 02602 - VALVES

PART 1 – GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing valves and valve boxes; thrust blocks; and for raising or lowering existing valve boxes to conform to the final grade, as shown on the Drawings and in conformance with the Standard Details.

B. The information in this Section is intended to provide specification for valves not directly specified in Section 02601 Water System. In the Instance of conflicting information that Section shall take precedence.

1.2 SUBMITTALS

A. Gate Valves: Catalogue cuts.

B. Butterfly Valves: Catalogue cuts.

C. Valve Boxes: Catalogue cuts.

PART 2 – MATERIALS

2.1 GATE VALVES

A. Gate valves for water pipes 12 inches and smaller shall be of the iron body, non-rising bronze stem, resilient-seated wedge-type. Valve shall be American AVK Company, Kennedy, M & H, or Mueller and shall meet or exceed the requirements of AWWA C515 and the specific requirements outlined in these Specifications.

B. Gate valves shall open counter-clockwise and be provided with two inch square wrench nut or hand wheel as designated in the Plans.

C. End connections shall be flanged, unless otherwise indicated on the Plans.

D. All internal ferrous metal surfaces shall be fully coated, holiday free, to a minimum thickness of four mils with a two part thermosetting epoxy coating. Said coating shall be non-toxic, impart no taste to water, protect all seating and adjacent surfaces from corrosion and prevent buildup of scale or tuberculation.

E. Gate valves, when attached to a restrained joint, shall have tie rods and one retainer gland for each joint. The size and number of tie rods shall conform to the requirements of Section 02601 – Water System.

F. The CONTRACTOR shall provide four detailed repair manuals for the gate valves supplied; and a letter of certification from the supplier verifying that all requirements of AWWA C515 and these Specifications have been met.

G. The CONTRACTOR shall provide one standard packing kit for every group of ten (and fraction thereof) of each size of gate valve.

2.2 BUTTERFLY VALVES

A. Butterfly valves shall be used with water pipe sizes larger than 12 inches and shall be manufactured to equal or exceed the latest revision of AWWA C504 and the specific requirements outlined in these Specifications.

B. Butterfly valves shall open counter-clockwise and be provided with two inch square wrench nuts, except that when installed within vault structures, a hand wheel shall be provided for each valve.

C. End connections shall be mechanical joint, unless otherwise indicated on the Drawings.

D. All internal ferrous metal surfaces shall be fully coated, holiday free, with a minimum of two coats of asphalt varnish approved by the ENGINEER. Said coating shall be non-toxic, impart no taste to water, protect all seating and adjacent surfaces from corrosion and prevent build-up of scale or tuberculation.

E. Butterfly valves, when attached to a restrained joint, shall have tie rods and a retainer gland for each joint.

F. The CONTRACTOR shall provide four detailed repair manuals for the butterfly valves supplied; and a letter of certification from the supplier verifying that all requirements of AWWA C504 and the Specifications have been met.

2.3 VALVE BOXES

A. Valve boxes for valves four inches or larger shall be of cast iron and be not less than 5¼-inch diameter, with an extension piece adjustable for elevation and with a cover marked “Water” or “W.” The valve box shall be sufficient length to be adjusted and equal amount above and below the finished grade as shown on the Standard Details. Boxes shall be dipped in coal tar pitch. The valve box shall be East Jordan Iron Works 8555 Slide 26T, 16T or 10T valve box top or approved equal..

2.4 UTILITY MARKERS

A. Utility markers for water valves shall be required where shown in the Plans. Utility markers shall be “Utility Marker CUM-375” as manufactured by Carsonite Division of AMETEK, blue in color, six feet in length including anchor kits and decals with each marker. Decals shall denote “WATER VALVE.”

2.5 VALVE ACCESS PADS

A. Valve access pads shall consist of materials corresponding to those shown on the Drawings and as specified for Hydrant Access Pads.

PART 3 – EXECUTION

3.1 VALVES

A. Valves shall be inspected upon delivery in the field in both open and closed positions prior to installation. Careful inspection shall be made for injury to the outer protective

coatings. At all places where the coating has been ruptured or scraped off, the damaged area shall be cleaned to expose the iron base, and then re-coated with two or more field coats of approved protective coating.

B. Valves shall be set on a firm base.

C. Valves shall be installed, in an open position, in the vertical plane passing through the pipe axis, in conformance with the manufacturer's recommendations and the AWWA Standards. Valve interiors shall be cleaned of all foreign matter.

D. After installation, all valves shall be subjected to field-testing and disinfected as outlined in Section 02601 – Water Pipe. Should defects in design, materials, or quality of work appear during these tests, the CONTRACTOR shall remove and replace the valve, or correct such defects, with the least possible delay, to the satisfaction of the ENGINEER.

E. All valve clusters consisting of a tee and one or more valves, including fire hydrant legs, shall be monolithically restrained with EBBA Iron "Mega-lug System" fittings, or approved equal. Each connecting pipe to the valve cluster or tee will be restrained to the cluster or tee.

3.2 VALVE BOXES

A. A valve box shall be installed over each valve, with the base section centered over the valve and resting on well-compacted backfill. The top section shall be set to allow equal movement of the telescoping section above and below finished grade, as shown on the Standard Details, unless otherwise directed by the ENGINEER. The top of the base section shall be on line with the nut at the top of the valve stem and the entire assembly shall be perpendicular to the water pipe.

B. Construct a concrete collar around each valve box within the roadway pavement limits. Sawcut through the total pavement depth following final paving and construct the concrete collar in accordance with CBJ Standard Detail 126 – Concrete Collar. No backfilling, except with concrete, will be permitted. Seal all sawcut grooves beyond the edge of concrete.

3.3 REPLACE VALVE BOXES

A. Replace Valve Boxes will include removal of the existing valve box down to the valve and replacing with a new valve box assembly conforming to Article 2.3 of this Section. The new valve box shall be installed in accordance with Article 3.2 of this Section.

3.4 ADJUST EXISTING VALVE BOXES

A. Adjust by raising or lowering to conform to the final grade, in accordance with the locations and details shown on the Drawings. The existing case iron valve box and cover shall be salvaged and reused. Where the valve box is of the adjustable-type construction, it shall be adjusted with adaptable extension pieces. Where the valve box is constructed with steel pipe, additional steel pipe shall be welded to the valve box to raise the cover; lowering shall be accomplished by cutting the existing steel pipe.

B. Where the existing valve box is tilted and/or far enough off center on the valve nut to make valve operation difficult, the CONTRACTOR shall plumb and center the valve box over the valve nut prior to strengthening or placement of base course material.

3.5 UTILITY MARKERS

A. Utility markers for water valves shall be installed at main line valve boxes at locations indicated on the plans and as directed by the ENGINEER. The position of the marker shall be as shown on the detail Drawing, or as directed by the ENGINEER.

END OF SECTION

SECTION 02702 – CONSTRUCTION SURVEYING

PART 1 – GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary to perform all surveying and staking necessary for the completion of the Project in conformance with the Drawings and Specifications and standard engineering and surveying practices, including all calculations required to accomplish the WORK.

B. The WORK shall include the staking, referencing and all other actions as may be required to preserve and restore land monuments and property corners which are situated within the Project area, and to establish monuments as shown on the Drawings.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. All surveying involving property lines or monuments shall be done by, or under the direction of, a Registered Land Surveyor licensed in the State of Alaska.

B. The OWNER will supply information relative to the approximate locations of monuments and corners, but final responsibility for locations, referencing, and restoration shall rest with the CONTRACTOR.

C. In the event the CONTRACTOR does not replace the survey monuments and property corners disturbed by the CONTRACTOR's operations, the OWNER may, after first notifying the CONTRACTOR, replace the monuments in question. The cost of such replacements shall be deducted from payments to the CONTRACTOR.

D. The CONTRACTOR shall provide the OWNER with a copy of all surveyors' notes, if requested by the ENGINEER, prior to each Pay Request payment for which payment for Pay Item No. 2702.1, Construction Surveying, is increased from the previous Pay Request payment.

E. The CONTRACTOR shall provide the OWNER with a copy of all surveyors' notes, prior to the request for final payment, and include the information on the record drawings.

F. The CONTRACTOR shall obtain all information necessary for as-built plan production, from actual measurements and observations made by its own personnel, including Subcontractors, and submit this information to the ENGINEER.

G. The CONTRACTOR shall use competent, qualified personnel and suitable equipment for the layout work required and shall furnish all stakes, templates, straightedges and other devices necessary for establishing, checking and maintaining the required points, lines and grades.

H. The CONTRACTOR shall perform all staking necessary to delineate clearing and/or grubbing limits; all cross sections necessary for determination of excavation and

embankment quantities, including intermediate and/or remeasure cross sections as may be required; all slope staking; all staking of culverts and drainage structures, including the necessary checking to establish the proper location and grade to best fit the conditions on site; the setting of such finishing stakes as may be required; the staking of right-of-way; the staking and layout of all structures including foundations, floats, retaining walls, piles, pile caps, deck and sub deck assemblies, railings, and gangways; referencing and other actions as may be required to preserve or restore land monuments and property corners; and all other staking necessary to complete the project.

I. Field notes shall be kept in standard bound notebooks in a clear, orderly and neat manner, consistent with standard engineering and surveying practices. The CONTRACTOR's field books shall be available for inspection by the ENGINEER at any time.

J. All field survey notes, including those which become source documentations from which quantities for payment are computed, shall be recorded by a notekeeper furnished by the CONTRACTOR. The notekeeper shall be thoroughly familiar with generally accepted standards of good survey notekeeping practice.

K. The ENGINEER may randomly spot-check the CONTRACTOR's surveys, staking and computations at the ENGINEER's discretion. After the survey or staking has been completed, the CONTRACTOR shall provide the ENGINEER with a minimum of 72 hours notice prior to performing any WORK, and shall furnish the appropriate data as required, to allow for such random spot-checking; however, the OWNER assumes no responsibility for the accuracy of the WORK.

L. The ENGINEER may make minor adjustments in grades and locations of improvements based on the staking information provided by the CONTRACTOR. The CONTRACTOR shall adjust the grade stakes as required to accommodate minor changes at no additional cost to the OWNER.

END OF SECTION

SECTION 02718 – SIGNAGE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing signs and support assemblies for the fire suppression system, gangways, approach dock, including attachment assemblies, hardware and all other miscellaneous appurtenances, complete as shown in the Plans to the satisfaction of the ENGINEER and in accordance with the requirements of the Contract Documents.

1.2 SUBMITTALS

A. Fabrication Shop Drawings for all signage and stands.

B. Attachment method details for CONTRACTOR devised attachments as specified in the Plans.

PART 2 - PRODUCTS

2.1 SIGNS

A. All sign panels shall be constructed of Engineer Grade sheeting, or better.

B. All sign background color shall be white reflective unless otherwise noted.

C. All sign material, thickness and reflective paint shall conform to Alaska DOT&PF Standard Specifications for Highway Construction, Section 615 – Standard Signs and to be provided in accordance with the Plans.

2.2 SUPPORT ASSEMBLIES

A. Support assemblies for signs shall be hot dip galvanized steel provided in accordance with Section 05120 Metal Fabrication unless otherwise noted.

1. Where not specifically identified in the plans support assembly or sign mounting details shall be developed by the CONTRACTOR and approved by the ENGINEER prior to the installation of the signage.

B. Strut shall be *Cooper B22SH Channel* or approved equal 12 gauge hot dip galvanized strut provided in accordance with Section 05120 Metal Fabrication.

C. All Hardware shall be 316 SS or hot dip galvanized unless otherwise noted in the plans and shall be provided in accordance with Section 05120 Metal Fabrication

PART 3 - EXECUTION

3.1 SIGNS

A. Sign assemblies shall be installed at locations shown on the Drawings. The exact location will be marked in the field by the ENGINEER. The CONTRACTOR shall notify the ENGINEER a minimum of seven days prior to installation of the signs.

END OF SECTION

SECTION 02720 – PAINTED TRAFFIC MARKINGS

PART 1 – GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and placing painted traffic markings as shown on the Drawings.

B. Details not shown on the Drawings shall be in conformity with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD) and the Alaska Traffic Manual Supplement published by the Alaska Department of Transportation and Public Facilities.

C. This WORK shall also include re-striping all paint markings to their original conditions, if damaged by the CONTRACTOR's operations.

1.2 SUBMITTALS

A. Submit Striping plan to engineer for approval.

B. Paint and glass spheres. Submit technical data including description, color, performance characteristics, and limitations.

PART 2 – PRODUCTS

2.1 MATERIAL

A. White and yellow traffic marking paint shall conform to AASHTO M 248, Type F.

B. Blue marking paint shall match CBJ Street Department disability blue marking paint.

C. Glass spheres for reflectorizing traffic paint shall conform to AASHTO M 247, Type I, and shall be supplied by a moisture resistant coating

PART 3 – EXECUTION

3.1 GENERAL

A. Lines shall be applied as solid, dashed or dotted stripes, either singly or in combination, as shown on the Drawings. Dashed lines shall be applied in a 40 foot cycle consisting of a ten foot dash and a 30 foot gap between dashes, unless otherwise shown on the Drawings. The CONTRACTOR shall use an accurate dashing mechanism, which is capable of being easily adjusted to retrace existing dashed markings or to apply new materials at the correct spacing. Dashed lines which are to be applied over plainly visible existing dished lines shall begin within six inches of the beginning of the existing dash, unless otherwise directed by the ENGINEER.

B. Gaps not marked as a result of template use for spray-applied auxiliary markings shall be filled with marking material after template removal.

C. Pavement markings shall be free of uneven edges, overspray, or other readily visible defects which detract from the appearance or function of the pavement markings.

D. Lines shall be sharp, well defined, and uniformly retroreflective. The width of the applied shall be the width specified plus or minus ¼-inch. Fuzzy lines, excessive overspray, or non-uniform applications are unacceptable. Lines shall be inspected at night by the ENGINEER to verify effective light reflection. Pavement markings which are improperly applied, located, or reflectorized shall be corrected. Lines applied with insufficient material quantities shall be properly reapplied. Improperly located lines shall be removed. New lines shall then be applied in the correct locations at the CONTRACTOR's expense, including the furnishing of approved materials.

E. Methods and equipment used for pavement preparation, marking removal shall be subject to the approval of the ENGINEER. Glass beads shall be kept dry during storage and prior to use.

F. Other construction WORK, such as shoulder paving, topsoil placement and grading, and seeding, shall be scheduled and performed in a manner to avoid damage to applied pavement markings.

G. Pavement marking materials shall not be applied to the reflector of a recessed pavement marker. The CONTRACTOR shall interrupt the application of the pavement marking line at each recessed pavement marker where marking material would otherwise be applied to the marker prismatic reflector. The maximum gap in the marked line at each marker shall be 18-inches. Pavement marking material applied to a prismatic reflector surface shall be removed by the CONTRACTOR, or the reflector shall be replaced a this expense the same working day. When the CONTRACTOR must most remove material from the reflector, the reflector's brightness shall be restored to its prior condition.

3.2 PAVEMENT PREPARATION

A. The CONTRACTOR shall clean all visible loose or foreign material from the surface to be marked. The pavement marking equipment shall be equipped with an air jet to remove all debris from the pavement in advance of the applicator gun. The air jet shall operate when marking material is being applied and be synchronized with marking material application.

B. Pavement markings shall be applied only when the surface is clean and dry. The CONTRACTOR shall power broom clean all surfaces where edge lines are to be applied. When required by the ENGINEER, other surfaces shall also be power broom cleaned.

C. Marking shall not be applied to Portland cement concrete until the concrete in the areas to be marked is clean of membrane curing material and is dry.

3.3 LAYOUT AND PREMARKING

A. The CONTRACTOR shall lay out the locations of all lines, words and other symbols to assure their proper placement. The layout and premarking lines shall be approved by the ENGINEER before marking operations are started. When applying longitudinal or transverse lines, the CONTRACTOR shall use existing lines, construction joints or premarking to guide this marking equipment.

B. Premarking shall be located from survey data or reference points and offset so as to parallel the theoretical edge of the marking lines at a maximum distance of one inch. Templates are required for the layout of arrows, words and other symbols. Premarking for longitudinal lines shall be placed at 40-foot intervals, and shall not exceed two inches in width or 12 inches in length. Premarking for auxiliary markings shall be located as shown on the Drawings or schematic forms provided by the ENGINEER.

3.4 LINE PLACEMENT TOLERANCE

A. Pavement marking lines shall be straight or smoothly curved, true to the alignment of the pavement, and shall not deviate laterally from the proper location at a rate of more than two inches in 100 feet. No deviation greater than three inches will be permitted.

3.5 LINE TYPES

A. Marking materials shall be applied at a minimum rate of 16.5 gallons per mile per four inch wide stripe, with a 20 mill minimum thickness, and shall, except for parking lot stall markings, be uniformly retroreflective. The minimum rate of application for broken traffic stripes shall be prorated.

B. Edge lines shall be continuous stripes, four inches in width. Center of stripe shall be located as shown on the Drawings.

C. Lane lines shall be four inch wide white stripes between contiguous lanes of pavement carrying traffic in the same direction. They shall be dashed unless specified solid. They shall be offset to the left of the longitudinal joint, if present, or the theoretical line lying between contiguous lanes, if a joint is not present. The nearer edge of the stripe shall be two inches to the left of the joint or line.

D. Centerlines shall be single or double yellow stripes between contiguous lanes of pavement carrying traffic in opposite directions. Centerline marking shall also include two way left-turn lane striping and the outline of left-turn island. Each stripe shall be four inches wide, sold or dashed.

E. Channelizing lines shall be continuous white stripes, eight inches wide.

F. Stop lines shall be solid white strips, 24-inches wide. Crosswalk lines shall be sold white strips, 24 or 12 inches wide as shown in the Plans.

G. Parking lot stall marking lines shall be continuous white stripes, four inches in width.

H. Lane arrows and letters shall be white markings, with a minimum rate of application of 0.01 gallon per square foot of markings.

3.6 EQUIPMENT AND APPLICATION OF PAINTED TRAFFIC MARKINGS

A. The markings shall be applied by machine methods acceptable to the ENGINEER. The paint machine shall be of the spray type capable of satisfactorily applying the paint under pressure with uniformity of feed through nozzles spraying directly upon the pavement. Each machine shall be capable of applying two separate stripes, either solid or skip, at the same time. Each paint tank shall be equipped with a mechanical agitator. Each nozzle

shall be equipped with satisfactory cutoff valves which will apply broken or skip lines automatically. Each nozzle shall have a mechanical bead dispenser that will operate simultaneously with the spray nozzle and distribute the beads in a uniform pattern at the rate specified. Each nozzle shall also be equipped with suitable line guides consisting of metallic shrouds or air blasts.

B. The paint shall be thoroughly mixed prior to application, and shall be applied when the air temperature is above 40° F and rising, to a clean and dry surface

C. Glass beads shall be applied at a minimum rate of 5.5 pounds of beads for each gallon of paint.

D. The painted area shall be protected from traffic until the paint is thoroughly dry.

END OF SECTION

SECTION 02726 –MSE WALL BLOCKS

PART 1 - GENERAL

1.1 DESCRIPTION. The Work under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing MSE (Mechanically Stabilized Earth) wall precast concrete facing blocks, in conformance with the Plans and Specifications.

1.2 SUBMITTALS.

A. MSE Wall Precast Concrete Facing Block product data sheet and concrete mix design.

B. MSE Wall construction plan indicating placement methods and sequencing for precast concrete facing units, wall backfill and compaction.

C. Independent Concrete Quality Control reports

1.3 INDEPENDENT CONTRACTOR QUALITY CONTROL TESTING

A. The CONTRACTOR shall provide independent quality control materials testing for the MSE Wall precast concrete facing blocks at the point of fabrication.

B. Air content, slump, unit weight and compressive strength specimens shall be sampled and tested in accordance with applicable ASTM Standards for each day of concrete pouring. Submit results to ENGINEER within 24 hours of testing.

PART 2 - PRODUCTS

2.1 MSE WALL PRECAST CONCRETE FACING BLOCKS

A. Available Manufacturers: Subject to compliance with requirements of WorldBlock, Inc., Landscaping blocks, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alaska Concrete Casting, or equal.

B. Concrete Units: ASTM C 1372, Normal Weight, except that units shall not differ in height more than plus or minus 1/16 inch from specified dimensions as shown on the plans.

1. Provide units that comply with ASTM C 1262 requirements for freeze-thaw durability.
2. Provide units that interlock with courses above and below by means of integral lugs or lips.

C. Shapes: Provide units of basic shape as shown on the drawing and dimensions that will produce facing units of the retaining wall having dimensions and profiles indicated without interfering with other elements of the Work and as follows:

1. Exposed Face: Machine-split textured, shaped face with deeply beveled vertical edges.
2 Batter: Provide units that offset from course below to provide a vertical batter of 1:12.

D. Precast Concrete Facing Blocks concrete shall conform to the following:

Minimum Cement Content (94 lb.sacks/cy)	7.0
Silica Fume in Lbs./cy	50
Maximum Water Content Ratio in Gal./Sack cement	5.0
Slump Range in Inches (before plasticizer)	4” max.
Entrained Air Range in Percentage	5-8 %
Coarse Aggregate (AASHTO Gradation)	No. 67
Fine Aggregate (AASHTO Gradation)	M-6
Minimum Design Strength, psi (f’c)	6,000

E. Hardware: All exposed picking hardware shall be hot dipped galvanized per Section 05120.

2.2 MSE WALL BACKFILL MATERIAL

A. Wall backfill material shall conform to Section 02202-Excavation and Embankment, Class A Shot Rock Borrow.

2.3 DELIVERY, STORAGE, AND HANDLING

A. Store and handle concrete units and accessories to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping, or other causes.

PART 3 - EXECUTION

3.1 The CONTRACTOR shall submit, for approval by the ENGINEER, MSE Wall construction plans prior to commencing Work on these items.

A. The wall blocks shall be placed in accordance with all details shown on the Plans. Care shall be taken to avoid damage to new and existing structures near the wall locations. Repair any and all damages to existing or better conditions.

B. Precast concrete wall blocks shall be placed on top of the underlying blocks as shown on the Plans and in such a manner that the blocks are interlocked to one another, effectively anchoring them and resulting in a stable block mass.

D. Special care shall be exercised during compaction near face of wall to prevent displacement of block units.

3.2 MSE WALL AS-BUILT TOLERANCES

A. Vertical alignment: ±1/4 ” over any 10’ distance.

B. Wall Batter: within 2 degrees of design batter.

C. Horizontal alignment: ±1/4 ” over any 10’ distance.

D. Corners, bends, curves ± 0.25ft. to theoretical location

E. Maximum horizontal gap between erected units shall be 1/4 inch.

END OF SECTION

SECTION 02801 – ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. WORK consists of the furnishing and mixing of aggregate, asphalt cement, and additives at a mixing plant and the hauling, spreading, and compaction of the asphalt concrete mixture on a previously prepared surface, all as specified in the contract and in conformance with the lines, grades and thicknesses shown on the Drawing.

B. Asphaltic concrete mix for this Project shall be Type II, Class B. See Table 02801-1.

TABLE 02801-1

ASPHALTIC CONCRETE MIX REQUIREMENTS		
DESIGN PARAMETERS	CLASS A	CLASS B
Stability, lbs.	1,800	1,800
Flow, 0.01 inch (0.25 mm)	8-14	8-14
Voids in total mix, percent	3-5	3-5
Compactions, number of blows each side of test specimen	75	50
Dust-asphalt ratio (1)	0.6-1.0	0.6-1.0
Percent oil content	5.3-6.2	5.3-6.2
Voids in the mineral aggregate (VMA) Minimum value		
Type I	13.0	12.0
Type II or IIA	14.0	13.0
Type III	15.0	14.0

(1) Dust-asphalt ratio is defined as the percent of material passing the U.S. No. 200 sieve divided by the percent of asphalt (calculated by weight of mix).

PART 2 - PRODUCTS

2.1 COMPOSITION OF ASPHALT CONCRETE MIXTURES - JOB MIX DESIGN

A. Asphalt concrete mixtures shall be composed of aggregate, asphalt cement, and required additives combined within the limits for the type and class specified in the contracts.

B. It is the CONTRACTOR's responsibility to insure that, in addition to the aggregate gradation requirements, the aggregate material meets all the requirements of this Section and asphalt concrete mixture meets the applicable design parameters, when tested according to ATM 417.

C. At least 15 days prior to the production of asphalt concrete pavement the CONTRACTOR shall submit a current mix design. The mix design shall be performed within six (6) months of the construction season. The following related items shall be submitted with the mix design:

1. Notification that aggregate proposed for the asphalt concrete mixture is available for sampling.

2. A letter stating the proposed gradation for the Trial Job Mix Design, gradations for individual stockpiles, and blend ratio for each aggregate stockpile.

3. A minimum of three (3) one-gallon samples of the asphalt cement proposed for use in the mixture, including name of product, manufacturer, test results as required, manufacturer's certificate of compliance, and a temperature viscosity curve for the asphalt cement.

4. A ½ pint sample of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current Materials Safety Data Sheet (MSDS).

5. The CONTRACTOR shall accompany the ENGINEER during sampling, and shall furnish all the assistance needed to assure that the ENGINEER obtains representative samples.

6. The mix design shall be 50 or 75 blow Marshall Method.

D. The ENGINEER will evaluate the gradation for the Trial Job Mix Design and suitability of the materials submitted. If the asphalt concrete mixture conforms to the design parameters specified in Table 02801-1 when tested according to ATM 417, the ENGINEER will approve the Trial Job Mix Design and specify a target value for the asphalt cement content, mixing temperature and additives.

E. If the Trial Job Mix Design does not conform to the design parameters specified in Table 02801-1, when tested by the ENGINEER, the CONTRACTOR shall submit in writing to the ENGINEER another proposed gradation for a second Trial Job Mix Design. Samples of aggregate and additional asphalt cement shall be obtained in the same manner as for the original Trial Job Mix Design. The ENGINEER shall evaluate and test the second Trial Job Mix Design and either approve or disapprove the design based on the contract requirements. The above procedure shall be repeated until the Trial Job Mix Design is approved.

F. If the CONTRACTOR proposes a change in source of aggregate material, source of asphalt cement, or a change in the gradation target values after production has started, the CONTRACTOR shall submit in writing the proposed gradation target values to the ENGINEER and request a new Trial Job Mix Design be evaluated for approval. The CONTRACTOR shall accompany the ENGINEER during sampling and shall furnish all assistance needed to assure that the ENGINEER obtains representative samples. Approval of the new Trial Job Mix Design and/or aggregate material will require testing and evaluation. Trial Job Mix Design test results will be available within 15 calendar days of submittal. If the asphalt concrete mixture conforms to the design parameters specified in Table 02801-1 when tested in accordance with ATM 417, the ENGINEER will develop a new target value for the asphalt cement content, mixing temperature and additives. The new target values for gradation and asphalt cement content will only be in effect on asphalt concrete mixture produced after the CONTRACTOR submittal of the new gradation target values for the Trial Job Mix Design.

G. The location and type of the mixing plant shall be included with the Trial Job Mix Design data. Asphalt concrete mixtures produced from different plants shall not be mixed.

H. All trial job mix designs as required will be assessed and paid for by the CONTRACTOR.

2.2 ASPHALT AGGREGATES

A. Aggregate for Plant Mix Asphalt Pavement:

1. Coarse Aggregate: Coarse aggregate (that material retained on the No. 4 sieve) shall be crushed stone and shall consist of sound, tough, durable rock of uniform quality. Rock shall be free of schist that cleaves along preferred foliation planes. Rock shall be free of platy mineral grains. Metamorphosed rock shall be free of slaty cleavage. All material shall be free from clay balls, vegetable matter or other deleterious matters. Coarse aggregate shall not be coated with dirt or other finely divided mineral matter. All asphalt aggregates shall be free of roots and wood. In addition, coarse aggregate shall meet the following requirements:

Nordic Abrasion Value	Nordic Abrasion Test Procedures[a]	16.0 Max.
Percent of Wear	AASHTO T 96	25 max.
Degradation Value	ATM 313	30 min.
Percent Sodium Sulfate Loss	AASHTO T 104	10 max.
Percent Fracture	WAQTC FOP for AASHTO TP 61	100 min. single face/ 80 min. double face

a. Nordic Abrasion Test Procedures will apply to both the coarse and intermediate aggregate for asphalt aggregate. Test procedures for Nordic Abrasion are available at AKDOT&PF SE Region Materials Laboratory.

2. Asphalt concrete aggregate shall not exceed eight percent thin - elongated pieces as determined by ATM 306.

3. Fine Aggregate: Fine aggregate (passing the No. 4 sieve) shall meet the quality requirements of AASHTO M 29. Fine aggregate angularity shall be 40 minimum as determined by AASHTO T 304.

4. The several aggregate fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting composite blend conforms to the grading requirements of Table 02801-2. Aggregates gradations shall be determined by ATM 301, except when the sample is obtained by extraction.

5. Asphalt aggregate may be a blend but shall be 80% mechanically crushed with no more than 20% natural sand.

6. The material furnished shall conform to the approved Job Mix Design within the tolerances specified, except the limits given in Table 02801-2 may not be exceeded.

Sieve Size	Tolerance % Passing
¾ inch	100
½ inch	± 6
⅜ inch	± 6
No. 4	± 6
No. 8	± 6
No. 16	± 5
No. 30	± 4
No. 50	± 4
No. 100	± 3
No. 200	± 1

TABLE 02801-2

ASPHALT CONCRETE AGGREGATE Percent Passing by Weight				
Sieve Design	Type I	Type II	Type II-A	Type III
1-inch	100			
3/4 inch	80-95	100	100	
½ inch	60-88	80-95	86-98	100
3/8 inch	48-77	60-87	74-86	80-95
No. 4	28-63	36-48	46-58	44-81
No. 8	14-55	19-35	29-41	26-70
No. 16	9-46	10-25	18-28	16-59
No. 30	6-39	7-21	11-19	9-49
No. 50	5-29	5-20	6-14	6-36
No. 100	4-18	4-15	3-9	4-22
No. 200	2-6	2-6	2-6	2-6

2.3 ASPHALT MATERIALS

A. The grade of asphalt cement material will be PG 58-22. The asphalt cement material shall conform to the applicable requirements of this Section and will be conditionally accepted at the source. If the material is to be conditionally accepted at the source, the CONTRACTOR shall provide a manufacture's certificate of compliance in accordance with this section and test results of the applicable quality requirements of this Section before the material is shipped. If there is a change in the source of the asphalt cement or if the kinematic viscosity (viscosity at 275°F) of the asphalt supplied for the Trial Job Mix Design by a factor of two (doubles or halves) or more, then operations shall be suspended while a new Trial Job Mix Design proposal is submitted for approval.

B. ASPHALT CEMENT

1. Asphalt cement shall be designated PG58-22 and conform to the requirements listed in Table 02801-3.

TABLE 02801-3

TEST FOR	SPECIFICATIONS	AASHTO TEST METHOD	SPECIFICATIONS
Penetration	(4ºC [39.2ºF], 200g, 60s), dmm RTFO Aged Residue *Note*	T 49	15+
Ductility	(7.2ºC [45ºF], 1 cm/min), cm (25ºC [77ºF], 5 cm/min), cm RTFO Aged Residue	T 51 T51	10+ 75+
Viscosity, (60ºC [140ºF]), P	Absolute, Original Binders Absolute, RFTO Aged Residue Kinematic, RTFO Aged Residue Absolute Ratio, Original/RTFO	T 202 T 202 T201 -	1,100+ 1,500-6,000 275+ 4.0-
Flash Point, Cleveland Open Cup	C(F) Original Binder	T 48	232º+(450º+)
Solubility in Trichloroethylene	%, Original Binder	T 44	99.0+

NOTE "RTFO Aged Residue" means the asphaltic residue obtained using the rolling thin film oven test (RTFO Test), AASHTO T 240.

C. CUT-BACK ASPHALTS

1. Cut-back asphalts shall conform to the requirements of AASHTO M 81 and M 82 except as follows:

   a. In Table 1 of M 82, reduce the minimum absolute viscosity on residue from distillation at 60ºC to 100, in the MC-30 and MC-250 columns, and revise the maximum distillate percentage by volume of total distillate at 225ºC for MC-30 to read: 35%.

D. EMULSIFIED ASPHALTS

1. CCS-1 cationic emulsified asphalts shall comply with the requirements listed in Table 020801-4.

2. CCS-1 Cationic Emulsified Asphalt shall conform to the requirements of AASHTO M 208.

TABLE 02801-4

TESTS ON EMULSION	
Viscosity @ 77ºF., SSF	30 max.
Storage Stability, 1 day, %	1 Max.
Demulsibility 35 ml. 0.8% SDS, %	25 min.
Particle Charge	Positive*
Sieve, % retained	0.10 max.
Distillation Oil by Vol. of Emulsion, %	5 max.
Distillation Residue by Wt. of Emulsion, %	45 min.
TESTS ON RESIDUE	
Penetration @ 77ºF.	100-200
Ductility @ 77ºF., 5 cm/min., cm	40 min.
Solubility in TCE, %	97.5 min.

* If particle charge test is inconclusive, material having a max. Ph value of 6.7 will be acceptable.

E. STORAGE AND APPLICATION TEMPERATURES

1. Asphalt materials required by the Specifications shall be stored and applied within the temperatures ranges indicated below:

TABLE 02801-5
STORAGE AND APPLICATION TEMPERATURES

Type and Grade of Material	Spray ºF	Mix ºF	Storage ºF
MC-30	85+		140 Max
MC-250	165+	165-220	240 Max
RC-800	200+		200 Max
CRS-2	125-175		100-175
CMS-2	125-175	120-160*	100-175
CSS-1	90-120	90-160*	50-125
AC-2.5	270+	235-280**	325 Max
AC-5	280+	250-295**	325 Max
AC-10	280+	250-315**	325 Max
STE-1	70-140	70-150	50-125
PG58-22		350 max	275-325°F

* Temperature of the emulsified asphalt in the pugmill mixture.
**As required to achieve Kinematic viscosity of 150-300 centistokes.

2.4 ANTI-STRIP ADDITIVES

A. Anti-strip agents shall be used in the proportions determined by ATM 414 and shall be included in the approved Trial Job Mix Design. At least 70% of the aggregate shall remain coated when tested in accordance with ATM 414.

2.5 PROCESS QUALITY CONTROL

A. The CBJ Docks and Harbors Department has the exclusive right and responsibility for determining the acceptability of all materials incorporated into the Project. It is expressly understood, however, that the CONTRACTOR is solely responsible for the sampling and testing of material for process control of the asphalt concrete mixture including

screening, crushing, blending, stockpiling of the aggregate, production of the asphalt concrete mixture and monitoring compaction of the asphalt concrete mixture.

B. The results of the acceptance testing performed by the ENGINEER may not be available to the CONTRACTOR until a period of at least seven working days has elapsed from the date of sampling.

PART 3 - EXECUTION

3.1 WEATHER LIMITATIONS

A. The asphalt concrete mixture shall not be placed on a surface with standing water, on an unstable roadbed when the base material is frozen, or when weather conditions prevent the proper handling or finishing of the mixture. No asphalt concrete, Type II mixture shall be placed unless the surface temperature is 40ºF or warmer and rising.

3.2 EQUIPMENT

A. All equipment shall be in good working order and free of asphalt concrete mix buildup. All equipment shall be available for inspection and demonstration 72 hours prior to placement of asphalt concrete.

B. Bituminous Mixing Plants:

1. Mixing plants shall conform to AASHTO M 156.

2. Proportioning (batch) scales shall not be used for weighing material for payment. Weigh scales used in conjunction with a storage silo may be used to weigh the final product for payment, provided the scales are certified.

C. Hauling Equipment:

1. Trucks used for hauling asphalt mixtures shall have tight, clean, smooth metal beds which have been thinly coated with a minimum amount of either paraffin oil, lime water solution approved by the ENGINEER. Diesel or fuel oil shall not be used.

2. Each truck shall have a watertight canvas cover of such size as to extend at least one foot over the sides and end of the truck bed and be adequately secured to protect the asphalt concrete mixture. The use of the canvas cover shall be at the ENGINEER's direction.

D. Asphalt Pavers:

1. Asphalt pavers shall be self-propelled units, provided with a heated vibratory screed. Grade and cross slope shall be controlled through the use of automatic grade and slope control devices. The paver screed control system shall be automatically actuated by the use of a string line, or minimum 30-foot long ski. The length of the string line shall be adjusted to produce the required surface smoothness.

2. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

3. The screed assembly shall produce a finished surface of the required smoothness, thickness, and texture without tearing, shoving, or displacing the asphalt concrete mixture. Screed extensions used for paving a constant width shall be heated and vibrated. Auger extensions shall be the same length as the rigid screed extensions.

4. The use of a pickup machine to transfer the asphalt mixture from a windrow to the paver hopper will be permitted, provided the pickup machine is capable of collection of the windrowed material without damage to the underlying course. The ENGINEER will not allow the continued use of the pickup machine if segregation, excessive temperature loss, or any detrimental effects are observed.

5. Paver hopper wings shall either be left in the top or down position throughout the paving operation. If the CONTRACTOR wishes to dump the wings during paving, the material on the wings and in the hopper shall not be incorporated into the finish mat or included in the quantity for payment.

6. The screed assembly shall have a joint compaction device and a joint edge restrainer.

E. Rollers

1. The CONTRACTOR shall supply a sufficient number and weight of rollers to compact the mixture to the required density while maintaining the pace of the paving operations. Rollers shall be of the static steel wheel, vibratory steel wheel, and pneumatic tire type, self propelled and capable of reversing without backlash. They shall be specifically designated to compact hot asphalt concrete mixtures. The use of equipment which results in crushing of the aggregate will not be permitted. Pneumatic tire rollers shall be fully skirted; shall be at least six (6) feet wide; and shall be configured so that the rear group of tires align to cover the spaces between the front group of tires. The roller shall have an operating weight per tire of at least 3,000 pounds. Tires shall be of equal size, a minimum of 20 inches in diameter, shall be inflated to at least 80 psi and maintained so that tire pressures do not vary more than 5 psi between any two (2) tires

3.3 PREPARATION OF EXISTING SURFACE

A. The existing surface shall be prepared in conformance with the Drawings and Specifications. Existing paved surfaces shall be cleaned of loose material by sweeping with a power broom, supplemented by hand sweeping, if necessary.

B. Contact surfaces of curbing, gutters, manholes, and other structures shall be coated with a thin, uniform coating of tack coat material in conformance with Section 02802 - Tack Coat prior to the asphalt mixture being placed.

C. Surfaces which have received a prime coat shall be allowed to cure such that the prime coat is not picked up by the haul vehicles. Surfaces which have received an emulsion tack coat shall be allowed to break prior to placement of asphalt concrete mixture.

D. The grading, shaping, and strengthening where applicable, of the road surface shall be as specified in Section 02204 - Base Course.

E. A string line installed by the CONTRACTOR at the direction of the ENGINEER will be the edges of paving.

F. Prior to paving over any existing pavement, the surface shall be thoroughly cleaned and an application of tack coat applied that will provide a strong bond between the two layers.

3.4 PREPARATION OF ASPHALT

A. A continuous supply of the asphalt cement shall be supplied to the mixer at a uniform temperature, within 25ºF of the Job Mix Design mixing temperature.

3.5 PREPARATION OF AGGREGATES

A. The aggregate for the asphalt concrete mixture shall be heated and dried to a temperature compatible with the mix requirements specified. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate and to avoid the presence of unburned fuel on the aggregate. Any asphalt concrete mixture in which soot or fuel is present shall be wasted and no payment made.

B. Drying operations shall reduce the aggregate moisture content to the extent that the moisture content of the asphalt concrete mixture, sampled at the point of acceptance for asphalt cement content, shall be no more than 0.5% (by total weight of mix), as determined by WAQTC FOP for AASHTO T 329 as described in ATM 407.

3.6 MIXING

A. The aggregate, asphalt cement additives shall be combined in the mixer in the amounts required by the Job Mix Design.

B. The materials shall be mixed such that a complete and uniform coating of the aggregate is obtained. For batch plants, dry aggregate shall be placed in motion immediately prior to the addition of asphalt cement. Wet mixing time shall be adequate to obtain 98% coated particles when tested in accordance with AASHTO T 195.

C. The temperature of the asphalt concrete mixture at the time of the mixing shall be as determined by the Job Mix Design.

3.7 TEMPORARY STORAGE OF ASPHALT CONCRETE MIXTURE

A. Temporary storing or holding of hot asphalt concrete mixture in silo type storage bins will be permitted.

B. All the asphalt concrete mixture drawn from the silo type storage bins shall conform to all of the requirements for asphalt concrete mixtures as if loaded directly into hauling equipment from the mixing plant. Signs of visible segregation, heat loss, changes from the Job Mix Design, change in the characteristics of asphalt cement, lumpiness or stiffness of the mixture will be cause for rejection.

C. Unsuitable asphalt concrete mixture shall be disposed of by the CONTRACTOR at no cost to the OWNER.

3.8 SPREADING AND PLACING

A. Asphalt pavement designated to be thicker than 2¼-Inches shall be paved in two equal lifts.

B. The CONTRACTOR shall submit a Paving Plan for the ENGINEER's review a minimum of five (5) working days prior to initiating the paving operation. The Paving Plan shall consist of, but not be limited to, the following:

1. Paving schedule to include sequence of operations.

2. Paving schedule distributed to residents within the Project boundary.

3. Operational details to include:

   a. Plant operating capacity and target production rate.
   b. Number and capacity of trucks, cycle time, and delivery rate.
   c. The manufacturer and model of the paver and pickup machine, to include information on grade followers, sensors, operating speed and production rate of the pavers.
   d. Number, type, weight, and operating speed of rollers.
   e. Location of longitudinal joints.
   f. Method of constructing transverse joints.
   g. Construction plan for paving intersections and driveways.
   h. The manufacturers, model number, and the last certified calibration date for the CONTRACTOR's nuclear densometer gauge.

C. The asphalt concrete mixture shall be laid upon a surface approved by the ENGINEER, spread and struck off to the required compacted thickness. Asphalt pavers shall be used to distribute the asphalt concrete mixture in lanes of such widths as to hold to a practical minimum the number of longitudinal joints required, subject to the requirements of this Section.

D. When laying asphalt concrete mixtures, the paver shall be operated at uniform forward speeds consistent with the delivery of asphalt concrete mix to avoid unnecessary stopping and starting of the paver.

E. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the asphalt concrete mixture shall be spread, raked and luted by hand tools. For such areas the asphalt concrete mixture shall be placed to the required compacted thickness.

F. Any asphalt concrete mixture which is observed to be contaminated or segregated will be rejected.

G. When the section of roadway being paved is open to traffic, adjacent traffic lanes shall be paved to the same elevation within 24 hours unless prevented by weather or other factors beyond the CONTRACTOR's control.

H. When multiple lifts are specified in the contract, the final lift shall not be placed until all other lower lift pavement throughout that section, as defined by the Paving Plan, has been placed and accepted. Paving shall not begin until all adjacent curb has been poured and cured for 72 hours or until satisfactory strength is achieved.

I. Manholes, cleanouts and water valve boxes shall be raised to grade prior to paving. The structures shall have no less than 3/8” and no greater than 3/4” depression from adjacent asphalt to top of the lid.

   1. All structures located within AC pavement shall have a concrete collar installed prior to paving in accordance with CBJ Standard Detail 126 Concrete Collar. Concrete shall be a minimum of 4” thick and AC pavement shall be placed on top of the collar at a minimum depth equal to that of the surrounding pavement thickness.

2. Structures not meeting tolerances will be repaired as per CBJ Standard Detail 126 – CONCRETE COLLAR.

3. Damage to the manhole, frames, lids, risers, grout, concrete, pipes, or other appurtenant materials incurred due to the CONTRACTOR's operations shall be repaired or replaced per ENGINEER direction.

J. Paving shall be approximately 24 feet in width with the exception of cul-de-sac's and intersection radius returns. The ENGINEER shall determine the paving limits of the cul-de-sac's and intersection radius returns.

K. Unless waived by the ENGINEER both lanes shall be paved in a single day's operation.

3.9 COMPACTION

A. Immediately after the asphalt mixture has been spread, struck-off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling.

B. Minimum compaction shall be 94% of AASHTO T 209. The target value for density will be 94 to 97% of the maximum specific gravity (MSG) as determined in accordance with AASHTO T 209 for the first sample from each lot of asphalt concrete mixture, as defined in this Section. Acceptance testing for field density will be determined in accordance with WAQTC TM 8 as described in ATM 411, or ASTM D-2950, as directed in writing by the ENGINEER.

C. The asphalt concrete mixture, including the leveling course, shall have a minimum of three (3) complete passes with a pneumatic-tired roller prior to cooling to 175ºF. A pass is defined as once over each point on the pavement surface.

D. Areas not accessible to the rollers shall be graded with rakes and lutes and compacted with mechanical tampers. For depressed areas a trench roller may be used to achieve the required compaction.

E. Any asphalt concrete mixture that becomes loose and broken segregated, mixed with dirt, or is any other way defective shall be removed and replaced with fresh hot asphalt concrete mixture, which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of asphalt cement shall be removed and replaced.

F. Rollers or other vehicles shall not be parked or left standing on pavement that has not cooled sufficiently to prevent indentation by wheels.

3.10 JOINTS

A. Joints shall be made to ensure a continuous bond between old and new sections of the course. All joints shall present the same texture and smoothness as other sections of the course.

B. When joining old existing pavement and new pavement, the old pavement shall be cut in a neat line, with a power driven saw.

C. Improperly formed joints resulting in surface irregularities or rock segregation shall be removed, full road width, replaced with new material, and thoroughly compacted. Rolling of joints after the material has cooled below 160ºF shall not be allowed. All pavement removal shall be precut to a neat line using a power driven saw.

D. A thin tack coat of asphalt cement or asphalt emulsion shall be applied on all cold joints prior to placing any fresh asphalt concrete mixture against the joint. This WORK shall be completed by the CONTRACTOR just prior to paving.

E. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course or by using a removable bulkhead.

F. The longitudinal joints in one layer shall offset those in the layer immediately below by at least six (6) inches. The joints in the top layer shall be at centerline or lane lines except where pre-formed marking tape striping is required, in which case the longitudinal joint in the top layer shall be offset not more than one (1) foot.

G. The density at the joints shall not be more than 2% lower than the density specified in the lanes away from the joint.

H. Rolling at the longitudinal joint should be done from the hot side with a vibratory roller as soon as possible. The hot side should always overlap the cold side by 1 to 1.5 inches at the joint.

I. The finished asphalt surface along the edge of curb and gutter shall be ¼ inch above the top edge of the gutter pan.

J. All ACP to ACP cold joints and ACP to concrete joints shall be sealed with Crafco Roadsaver 220 or approved equal applied per manufacturer's recommendations.

3.11 SURFACE TOLERANCE

A. The surface will be tested after final rolling at selected locations using a ten (10) foot straightedge. The variation of the surface from the testing edge of the straightedge between any two (2) contacts with the surface shall not exceed 3/16 inch. The asphalt concrete mixture in all defective areas shall be removed and replaced. All costs associated with removal and replacement of asphalt concrete mixture in the defective areas shall be borne by the CONTRACTOR.

B. All asphalt surfaces segregated with single large stones void of intermediate aggregate on the surface shall be removed and replaced full lane width. The surface particles shall be consistent and conform to the contract gradation.

3.12 PATCHING DEFECTIVE AREAS

A. Any asphalt concrete mixture that becomes contaminated with wood or foreign material or is in any way defective shall be removed. Defective materials shall be removed for the full thickness of the course. The pavement shall be saw cut so that the sides are perpendicular and parallel to the direction of traffic and so that the edges are vertical. Edges shall be coated with a thin tack coat material in accordance with Section 02802 – Tack Coat. Fresh asphalt concrete mixture shall be placed in sufficient quantity so that the finished surface will conform to grade and smoothness requirements. Joints shall be sealed as specified in article 3.10J. The asphalt concrete mixture shall be compacted to the density specified. No payment shall be made for material replacing defective material. All costs associated with the patching of defective areas shall be borne by the CONTRACTOR.

3.13 ACCEPTANCE SAMPLING AND TESTING

A. Asphalt concrete pavement will be accepted for payment based on the ENGINEER's approval of: the Job Mix Design; the materials; the placement and compaction of the asphalt concrete pavement to the specified depth, finished surface requirements, tolerances, and densities. Any area of finished surfacing that is visibly segregated, fails to meet surface tolerance requirements or specified thickness or densities, or is in any way defective, shall be removed and replaced with new asphalt concrete pavement. Removal and replacement of defective pavement shall be at no additional cost to the OWNER. The full depth of the new asphalt concrete mixture will be replaced; surface patching will not be allowed.

B. Acceptance sampling and testing shall be performed by the ENGINEER. Acceptance testing will determine whether the materials, installation and compaction efforts used by the CONTRACTOR have met these specifications. The results of the acceptance testing performed by the ENGINEER may not be available to the CONTRACTOR until a period of at least seven working days has elapsed from the date of sampling.

C. A lot will be the total asphalt placed on the Project per season. A sublot will be one Day's production on the Project. Each sublot shall be randomly sampled and tested in accordance with this Subsection for asphalt cement content, maximum specific gravity using the Rice Method, density, and gradation.

D. Samples taken for the determination of asphalt cement content and gradation will be taken from behind the screed prior to initial compaction. Asphalt cement content shall be determined by ATM 405. The cost of this sampling (one per sublot) will be borne by the ENGINEER. The CONTRACTOR shall pay for additional testing if not in compliance.

E. ASTM D-2950 will be used to measure density. A minimum of six (6) random tests in locations determined by the ENGINEER will be taken from each sublot. When using ASTM D-2950, the MSG or laboratory pounds per cubic feet shall be determined by using the Rice Method, AASHTO T 209. The Rice Method, for the purposes of nuclear gauge compaction testing, replaces the Marshal Method. Acceptance testing for density will be completed by the ENGINEER in the following sequence:

1. The ENGINEER will randomly sample the in-place asphalt concrete mixture with a nuclear densometer gauge. Random is defined as having no specific pattern. Frequency of this testing will be determined by the ENGINEER. The CONTRACTOR may request a re-test of any nuclear densometer sample not within Specification limits. The ENGINEER will select the sample location for the re-test. Only one (1) re-test per sample will be allowed. This acceptance testing will be paid for by the OWNER.

2. If the random density acceptance testing indicates that the density specified has not been met, further sampling and testing will be required by the ENGINEER. At the direction of the ENGINEER, the CONTRACTOR shall cut at least one (1) full depth six (6) inch diameter core sample (per lot) from the finished mat. The samples shall be neatly cut by a core drill at the randomly selected locations. Core holes for sampling shall be backfilled and compacted with hot asphalt concrete mixture within two (2) hours of sampling. The core samples will be tested for compliance with these specifications at a certified laboratory specified by the ENGINEER. Any sampling and testing required beyond the nuclear densometer testing by the ENGINEER will be paid by the CONTRACTOR.

F. At the direction of the ENGINEER, samples taken for the determination of aggregate gradation may be obtained from one (1) of the following locations:

1. From the combined aggregate cold feed conveyor via a diversion chute, or from the stopped conveyor belt.

2. For dry batched aggregates, on batch plants, the pugmill shall be cleaned by dry batching at least two (2) dry batches or until no asphalt coating is found on the aggregate. One complete batch will be dropped in a loader bucket and hand mixed thoroughly with a shovel until a sample can be taken. The sample will be used for acceptance, gradation, control, and payment.

G. Additional materials testing will be required whenever a new Trial Job Mix Design is approved. The maximum specific gravity (MSG) for each lot will be determined from the first randomly selected sample from the first sublot. Materials testing includes, but is not limited to, gradations, extractions, density testing and core analysis.

H. If field density is determined in accordance with ASTM D-2950, additional core samples will be required whenever a new Trial Job Mix Design is approved or whenever there is a change in the typical section. The MSG for each lot will be determined from the first randomly selected sample from the first sublot. The CONTRACTOR shall reimburse the OWNER for all materials testing beyond the first $2,000.00. Materials testing includes but is not limited to gradations, extractions, density testing and core analysis.

I. All tests necessary to determine conformance with the requirements specified in this Section will be performed by the ENGINEER and paid for by the CONTRACTOR.

J. The frequency of materials testing for asphalt is determined by the CBJ Materials Frequency Guide. The CA/Inspector shall meet with the Project Manager prior to paving in order to determine the appropriate testing frequency. For testing frequency circumstances not covered by the CBJ Standard Specifications, the latest edition of the Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction shall be used and incorporated by reference herein.

3.14 PATCHING WITHIN AKDOT&PF RIGHTS OF WAY

A. Asphalt patching required for utilities, catch basins, curbs and driveway curb cuts within AKDOT&PF rights of way shall be performed in accordance with AKDOT&PF permit requirements.

B. If no such requirements are stipulated in the permits, then provide (two) each two inch layers of Asphalt Cement Pavement, Type II, Class B as outline herein for each patch over 6” thick layer of D-1 base course compacted to 98% relative standard density. Neatly sawcut and tack coat edges of patch prior to placing asphalt material and seal completed joints with Roadsaver hot asphalt sealant, per manufacturer’s recommendations.

END OF SECTION

SECTION 02802 -TACK COAT

PART 1- GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and applying bituminous material to an existing asphalt surface to provide bond for a new asphalt wearing surface.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt material used for tack coat shall be STE-1 or CCS-1 Cationic Emulsified Asphalt, conforming to the requirements of the following table:

CCS-1/STE-1 CATIONIC EMULSIFIED ASPHALT

TESTS ON EMULSION	
Viscosity @ 77ºF., SSF	30 max.
Storage Stability, One (1) day, %	One (1) max.
Demulsibility 35 ml. 0.8% SDS, %	25 min.
Particle Charge	Positive *
Sieve, % retained	0.10 max.
Distillation Oil by Vol. Of Emulsion, %	Five (5) max.
Distillation Residue by Wt. Of Emulsion, %	45 min.
TESTS ON RESIDUE	
Penetration @ 77º F.	100-200
Ductility @ 77ºF., 5cm/min., cm	40 min
Solubility in TCE, %	97.5 min.

* If particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

Storage/Application	Spray ºF	Mix ºF	Storage ºF
Limitations for STE-1	70-140	70-150	50-125
Limitations for CCS-1	70-140	70-160	50-125

PART 3 - EXEXUTION

3.1 EQUIPMENT

A. The CONTRACTOR shall provide equipment for heating and applying the Tack Coat.

3.2 CONSTRUCTION

A. The existing surface shall be patched, thoroughly cleaned, and free of irregularities to provide a reasonably smooth and uniform surface to receive the treatment. Unstable corrugated areas shall be removed and replaced with suitable patching materials. The

edges of existing pavements, which are to be adjacent to new pavement, shall be cleaned to permit the adhesion of asphalt materials.

B. Tack Coat shall not be applied to a wet surface. Tack Coat shall be applied only when the air temperature is above 40ºF.

C. CSS-1 emulsified asphalt for tack coat shall be diluted with an equal amount of potable water at a temperature of between 50ºF and 102ºF and mixed for a minimum of 15 minutes before using.

D. Diluted emulsion shall be used within 48 hours after the water is added.

E. The diluted emulsion shall be uniformly applied with a pressure distributor at a rate of 0.05 to 0.10 gallons per square yard, as directed.

F. The Tack Coat shall be applied in such a manner as to offer the least inconvenience to traffic and to permit one-way traffic without pick-up, or tracking of the asphalt material.

G. Existing improvements such as the rigid conduit, power supply cable, concrete encasement and centerline light shall be protected to prevent contact with bituminous material. The Tack Coat shall be allowed to dry until it is in a proper condition of tackiness to receive the next course. The Tack Coat shall be applied only as far in advance of the next course placement as is necessary to obtain this proper condition of tackiness. Until the next course is placed, the CONTRACTOR shall protect the Tack Coat from damage.

H. STE-1 cationic asphalt may not be diluted.

END OF SECTION

SECTION 02870 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 specification sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following site and street furnishings:

1. Bench

B. Related Sections include the following:

1. Section 03300 – Cast In Place Concrete, for installation of anchor bolts cast in concrete footings.

C. Products furnished, but not installed under this Section, include anchor bolts to be cast in concrete footings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details for approval.

B. Samples for Initial Selection: For units with factory-applied color finishes.

C. Product Schedule: For site and street furnishings. Use same designations indicated on Drawings.

D. Maintenance Data: For site and street furnishings to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of site and street furnishings through one source from a single manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the following or approved equal:

1. Bench:

a. Victor Stanley
2103 Brickhouse Road
Dunkirk, MD 20754
(800) 368-2573
www.victorstanley.com

2.2 MATERIALS

A. Steel: Free from surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.
3. Tubing: Cold-formed steel tubing complying with ASTM A 500.
4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513, or steel tubing fabricated from steel complying with ASTM A 569/A 569M and complying with dimensional tolerances in ASTM A 500; zinc coated internally and externally.
5. Sheet: Commercial steel sheet complying with ASTM A 569/A 569M.

B. Stainless Steel: Free from surface blemishes and complying with the following:

1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312 M.
3. Tubing: ASTM A 554.

C. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free from surface blemishes and complying with the following:

1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211.
2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221.
3. Structural Pipe and Tube: ASTM B 429.
4. Sheet and Plate: ASTM B 209.

D. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, noncorrodible materials; commercial quality; concealed, recessed, and capped or plugged. Provide as required for site and street furnishings' assembly, mounting, and secure attachment.

2.3 BENCH

A. Model: Steelsite Collection, straight backless bench with armrests, FRB-6, or approved equal

B. Length: 8-feet

C. Frame and Slats: Recycled solid-steel, zinc-rich primer with powder-coated

D. Installation Method: Wall Mount

E. Powder Coat Color: Teal, as approved by Landscape Architect

2.4 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Steel and Iron Components: Galvanized, galvanized and color coated, or color coated. Bare metal steel or iron components are not permitted.

E. Exposed Surfaces: Polished, sanded, or otherwise finished; smooth all surfaces, free from burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

F. Factory Assembly: Assemble components in the factory to the greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Landscape Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STEEL AND GALVANIZED STEEL FINISHES

A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester-TGIC, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site and street furnishings, where required.

B. Unless otherwise indicated, install site and street furnishings after landscaping and paving have been completed.

C. Landscape Architect to approve location of furnishings prior to installation. Install site and street furnishings level, plumb, true, and securely anchored at locations indicated on Drawings. Where indicated on drawings, orient furnishings with paving patterns.

3.3 CLEANING

A. After completing site and street furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION

SECTION 02892 – HANDRAIL

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section shall include all labor, materials, tools and equipment necessary for fabrication, handling, transport, construction and installation of the complete and in place new handrail including all steel assemblies, timber rails, all miscellaneous appurtenances, attachments, weldments and hardware, and all other related Work in accordance with requirements of the Contract Documents and as shown on the Plans.

1.2 REFERENCES

A. AWPA (American Wood Preservers Association), 2002 Standards

B. WWPA (Western Wood Products Association) Western Lumber Grading Rules, 1998

C. AISC (American Institute of Steel Construction) Code of Standard Practice - Manual of Steel Construction (ASD).

D. ASTM (American Society of Testing Materials) Specifications

E. AITC (American Institute of Timber Construction) Standard No. 117-87

1.3 SUBMITTALS

A. Structural Steel Submittals per Section 05120 – Metal Fabrication. Steel fabrication drawings must be approved by the ENGINEER prior to cutting, drilling and treatment of timbers. CONTRACTOR shall coordinate shop drawing submittals between timber fabricator and steel fabricator to submit both timber and steel fabrication shop drawings simultaneously.

B. Timber Fabrication Shop Drawings for all fabricated timber items.

C. Timber Grading and Pressure Treatment Certification for all timbers utilized for fabrication and construction of docks.

D. Timber treatment product for field treatment of timbers. Submit product specifications from manufacturer for filed treating of both ACZA treated timbers and creosote treated timbers.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials shall conform to the Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to ensure that materials purchased will comply with the fore mentioned documents. The CONTRACTOR shall inspect all materials, upon arrival, for conformance with the purchase orders, and the CONTRACTOR shall confirm that mill certificates and test reports are provided and that

they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to commencing any work involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified on the design documents if the proposal for a substitution is not approved by the ENGINEER.

B. All materials shall conform to good workmanship, acceptable industry standards and manufacturer's recommendations.

2.2 TIMBER

A. All sawn lumber shall be surfaced four sides (S4S), unless otherwise noted, and graded in accordance with the West Coast Lumber Inspection Bureau Standard No. 17, meeting Douglas Fir select structural grade. No individual timber shall fall outside the specified grade. Each piece of lumber shall be stamped with a grade mark, which identifies the grading and certification, and shall be so marked as to be legible after pressure treatment. All sawn lumber shall be pressure treated, after fabrication, with ACZA in accordance with AWPA C2 to a net retention of not less than 0.6 pounds per cubic foot, unless otherwise noted. Fabrication and drilling of timber shall be done as much as possible before pressure treatment. Field cuts and minor damage areas shall be field treated per AWPA M-4 using copper napthenate. Field drilled holes shall be field treated with copper napthenate then swabbed with asphaltic mastic, or approved equal. Bolts holes shall be 1/8 inch oversized.

2.4 FIELD TREATMENT COMPOUNDS

A. Treatment compounds for holes and cuts to treated timber shall be: copper napthenate solutions in concentrations as specified by AWPA M-4 and mastic shall be applied to bolt holes after treatment with copper napthenate per manufacturer's instructions.

2.5 STRUCTURAL STEEL AND HARDWARE

A. All structural steel shall comply with Section 05120 - Metal Fabrication.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Field confirm all existing conditions and all layout measurements required to complete WORK prior to installation. Notify ENGINEER of any discrepancies prior to installation.

B. The complete handrail shall be accurately assembled and installed as shown on the Plans, and/or to the highest industry standards if not fully shown on the Plans. Match marks shall be used and followed to ensure proper assembly and installation.

C. Handling and erection procedures shall be conducted in such a manner as to avoid inducing critical buckling stresses in the structure and to avoid damaging the coatings and/or paint system.

D. Construction methods and products not specified in these Contract Documents shall be utilized using reasonable care and the highest quality of construction practices. Final inspection and acceptance of all Work and products not specified in these Contract Documents shall be made by the Engineer. Approval shall be based upon conformance to the Contract Documents, quality of workmanship, applicable industry standards, and pertinent manufacturer's recommendations.

END OF SECTION

SECTION 02900 - PLANTING GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general information and conditions for the following sections:

1. Division 02 Section “Planting Soil”
2. Division 02 Section “Exterior Plants”
3. Division 02 Section “Landscape Maintenance”

1.3 DEFINITIONS

A. Acceptance Inspection: Inspection of landscape where upon approval, the maintenance and warranty period commences.

B. Arborist: Personnel certified as an Arborist in good standing and meeting the requirements as set forth by the International Society of Arboriculture (ISA).

C. Backfill: The earth used to replace or the act of replacing earth in an excavation. Backfill may be planting soil, if designated in specifications.

D. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

E. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

G. Finish Grade: Elevation of finished surface of planting soil.

H. Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

I. Growth Media: the media in which plants are grown and/or delivered to the site.

J. Herbicide or Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, and fungicides.

K. Invasive Species: Plant material as listed within the most recent US Department of Agriculture publication for Region 10 (Alaska) or most recent University of Alaska Fairbanks Cooperative Extension publication, specific for the region of Alaska in which the project is located.

L. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce planting soil. Manufactured soil may also be called manufactured/imported topsoil by some commercial retailers.

M. Native Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

N. Planting Soil: Standardized approved topsoil, existing/native approved surface topsoil, existing/in-place approved surface soil, approved imported topsoil, or manufactured soil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. Any of the above must meet the requirements of the specifications for planting soil.

O. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include but are limited to: insects, mites, grubs, mollusks (snails and slugs), rodents (voles and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

P. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

Q. Planting Area: Areas to be planted.

R. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

S. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soils.

T. Subsoil: All material, or engineered fill, beneath the subgrade elevation and typified by the lack of organic matter and soil organisms.

U. Warranty Inspection: Final inspection of landscape where upon approval, the maintenance and warranty period ends.

V. Weeds: Plant material that is not specified in the Drawings or Specifications.

1.4 REGULATORY REQUIREMENTS

A. Comply with all requirements of the State of Alaska, Department of Environmental Conservation concerning application of herbicides, pesticides, and insecticides.

B. ANSI Z60.1 (latest edition), American Standard for Nursery Stock, American Nursery and Landscape Association.

C. AASHTO, American Association of State Highway and Transportation Officials, Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Thirty-Second Edition, 2012.

1.5 SUBMITTALS

A. Schedule: Submit a schedule indicating dates for accomplishing work of this section including watering and maintenance. Provide for periodic up-dating and adequate notice for inspections, observations, and testing dates.

B. General:

1. Unless otherwise noted, the Contractor shall provide all submittals a minimum of thirty (30) days prior to commencement of installation.
2. Plant substitutions: submit all plant substitution requests with sufficient notice for two (2) week review period prior to ordering of materials.

C. Qualification Data:

1. Landscape Contractor: Provide project names, addresses, and year completed including names and addresses of owners' contact persons.
2. Landscape Construction Supervisor: Provide project names, addresses, and year completed as an experienced field supervisor.
3. Arborist: Provide documentation showing current certification of Arborist by the International Society of Arboriculture (ISA).
4. Planting Soil Manufacturer: Provide documentation on soil production experience.
5. Proof of Alaska certification of personnel handling herbicides or pesticides.

D. Product Data: For each type of product indicated.

1. Fertilizer: Include product label and manufacturer's application instructions specific to the Project.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
3. Soil amendments: Include product label and manufacturer's application instructions specific to the Project.
4. For custom fabrications or assemblies (shop drawings): Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and installation details for approval.
5. Product Data Sheets

E. Product Certifications:

1. Manufacturer’s certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

F. Product Sources:

1. The Contractor shall notify the Landscape Architect of the source of the planting soil – as per Section 02910 – Planting Soil.
2. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.

G. Product Testing: For each unamended soil type and the specified planting soil, furnish soil analysis and a written report by a qualified soil-testing laboratory. At a minimum, soil analysis shall include:

1. Percentages of organic matter.
2. Gradation of sand, silt, and clay content.
3. Cation exchange capacity.
4. Deleterious material (greater than #4 screen).
5. pH.
6. Mineral and plant-nutrient content of soil (nitrogen, phosphorous and potassium at a minimum).

H. Samples: Provide samples of the following in the quantities indicated:

1. Organic Mulch: 1-pint volume of each required organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Planting Soil: 1-quart volume of each required planting soil; in sealed plastic bags labeled with composition of materials by percentage of weight and source of planting soil. Each sample shall be typical of the lot of material to be furnished.
3. Tree tie and wire: One tie and 6 inch segment of wire.
4. Edging and stakes: Manufacturer's standard size, to verify material and color selected

I. Maintenance Plan: This plan shall outline all of the tasks that will be performed during the warranty and maintenance period, and shall include a schedule for performance of these tasks.

1.6 QUALITY ASSURANCE

A. Landscape Contractor: Shall demonstrate their capabilities in landscape installation and have 10 years of experience, 5 years in Alaska.

B. Landscape Construction Supervisor: Shall demonstrate their capabilities in horticultural operations and have 10 years of experience, 5 years in Alaska.

C. Arborist: Shall be certified by the International Society of Arboriculture (ISA). This certification shall remain current for the length of the project including warranty and maintenance periods.

D. Planting Soil Manufacturer: Shall have 5 years of experience in the production of planting soil that supports the healthy growth of plant material.

E. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during the following period. Coordinate planting periods with initial maintenance periods to provide required maintenance from date Substantial Completion.

1. Tree, Shrub, Perennial and Turf Planting: May 1 to September 1, or as approved by the Landscape Architect.

B. Weather Limitations:

1. Plantings: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Do not plant during excessive periods of rain or when soils are saturated and can become compacted due to normal planting operations. Apply products during favorable weather conditions according to manufacturer's written instructions.
2. Planting Soil Production: Proceed with producing planting soil only when existing and forecasted weather conditions permit. Do not screen or produce planting soils during periods of prolonged rain, heavy rain, freezing conditions or other conditions that do not allow optimum results to be obtained.

1.8 MAINTENANCE SERVICE

A. Begin maintenance immediately after each area is planted and continue until work is accepted. See Section 02970 – Landscape Maintenance.

1.9 ACCEPTANCE INSPECTION

A. Acceptance Inspections shall be conducted as per Section 02970 – Landscape Maintenance.

1.10 WARRANTY INSPECTION

A. Warranty Inspections shall be conducted as per Section 02970 – Landscape Maintenance.

END OF SECTION

SECTION 02910 - PLANTING SOILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Manufacturing of planting soil

B. Related Sections include the following:

1. Division 02 Section “Planting General”
2. Division 02 Section “Exterior Plants”
3. Division 02 Section “Landscape Maintenance”

1.3 DEFINITIONS

A. Reference Section 02900 – Planting General for definitions.

1.4 SUBMITTALS

A. Reference Section 02900 – Planting General for submittals.

1.5 QUALITY ASSURANCE

A. Reference Section 02900 – Planting General for quality assurance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
4. Planting Soil: Protect planting soils and materials to produce planting soil from excessive moisture that will lead to erosion or saturation levels that will negatively affect the texture and structure of soil or its placement on site.

1.7 ACCEPTANCE INSPECTION

A. An Acceptance Inspection for the planting soil shall be conducted as per Section 029700 – Landscape Maintenance.

PART 2 - PRODUCTS

2.1 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
2. Provide lime in form of ground dolomitic limestone.

B. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

2.2 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, sterile, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

2.3 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

C. Organic fertilizer: Granular or pelleted, all natural, organic fertilizer approved by the United States Department of Agriculture, Organic Foods Production Act.

2.4 PLANTING SOILS

A. General Planting Soil: Manufacture planting soil from a variety of sources. Obtain native organic surface soil displaced from naturally well-drained construction or mining sites where soil occurs at least 4 inches deep; do not obtain from public land or protected bogs, or marshes. Soil shall not have a deleterious material mass percentage of greater than 5% not passing a #4 screen.

1. Additional Properties of Planting Soil: Screened and free of stones ¾ inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration.

B. Planting soil shall conform to the following requirements:

1. Sand by Volume: 45-60%.
2. Silt/Clay by Volume: 25-35%
3. Loose Organics by Volume: 20-30%.
4. Total Organic Content (% loss due to ignition): 10-15%.
5. Weight of Slow Release Fertilizers: As recommended by testing agency.
6. Weight of Lime: As recommended by testing agency for pH of 5.5 – 6.5.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not mix or place soils and soil amendments when frozen, wet, or muddy conditions.

B. Suspend soil mixing operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

C. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

D. Proceed with mixing only after unsatisfactory conditions have been corrected.

E. Suitability of planting soil for plant growth: Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

F. Problem materials: Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and

vanadium. If such problem materials are present, provide additional recommendations for corrective action.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting soil operations.

END OF SECTION

SECTION 02930 - EXTERIOR PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Fertilizers.
3. Mulches.
4. Tree Stabilization.
5. Edging.

B. Related Sections include the following:

1. Division 02 Section “Planting General”
2. Division 02 Section “Planting Soil”
3. Division 02 Section “Landscape Maintenance”

1.3 DEFINITIONS

A. Reference Section 02900 – Planting General for definitions.

1.4 REGULATORY REQUIREMENTS

A. Reference Section 02900 – Planting General for regulatory requirements.

1.5 SUBMITTALS

A. Reference Section 02900 – Planting General for submittals.

B. Boulder Samples: Identify and submit the sources for all landscape boulders for field approval.

1. Boulder Photographs: Furnish high resolution digital images of landscape boulders to be submitted for approval. Photographs shall be taken from different viewpoints and of sufficient detail to determine the color, shape and texture.

1.6 QUALITY ASSURANCE

A. Reference Section 02900 – Planting General for additional quality assurance.

B. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

C. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6 inches above ground for trees up to 4-inch caliper size, and 12 inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.

D. Observation: Landscape Architect may observe all plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. Landscape Architect retains right to observe all plant material further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Landscape Architect may remove a portion of or all growth media from the root system for inspection of the roots and to ensure proper nursery practices. This shall be a maximum of two plants per species, up to 2% of the species if greater. The Landscape Architect reserves the right to observe and remove growing media from additional plants should previous observations indicate defects in the root system or nursery practices. It will be the responsibility of the Contractor to immediately plant or repot in original container, if approval of material is granted.

1. Notify Landscape Architect of arrival of planting materials for inspection 7 days prior to installation.

E. Approval: Plant material shall not be planted by the Contractor until observed and approved by the Landscape Architect. All rejected material shall be immediately removed from the Project site. All rejected material shall be replaced with observed and approved material of the required species and size at no additional cost. The Landscape Architect reserves the right to reject individual plants, or the entire shipment of any species or multiple species not meeting the specifications.

F. Trees shall meet the following specifications for quality:

1. As typical for the species/cultivar, trees shall be healthy and vigorous, as indicated by an inspection for the following:

    a. foliar crown density
    b. length of shoot growth (throughout crown)
    c. size, color and appearance of leaves
    d. uniform distribution of roots in the container media
    e. appearance of roots
    f. absence of twig and/or branch dieback
    g. relative freedom from insects and diseases

2. There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around in the top half of the root ball. Roots larger than this may be cut provided they are smaller than one-third the trunk diameter. There shall be no kinked roots (90 degrees or more) greater than 1/5 the trunk diameter. Roots larger than this can be cut provided they are less than one-third the trunk diameter.
3. Trunk flare on trees must be visible above the surface of the root ball. Major roots must be found at 2 inches or less below surface of root ball.

4. Trees should be rooted into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted. The trunk should bend when gently pushed, not pivot at or below soil line.
5. The point where the top-most root in the root ball emerges from the trunk shall be visible at the soil surface.
6. The relationship between caliper, height and root ball size shall meet the ANSI Z60.1 standard.
7. There should be one dominant leader more-or-less straight to the top of the tree with the largest branches spaced at least 6 inches apart. There can be a double leader in the top 10% of the tree when typical of the species or cultivar. All coniferous plant material shall have only one leader.
8. The tree canopy should be symmetrical, free of large voids greater than twelve inches, and typical of the species or cultivar. Live crown ratio (distance from bottom of canopy to tree top/tree height) should be at least 65%.
9. One-half or more of the foliage shall be on branches originating on the lower two-thirds structure of the canopy, and one-half or less shall occur on the upper one-third of the canopy structure.
10. Branches should be less than 2/3 the trunk diameter when measured one inch above the branch, free of bark inclusions, and more-or-less radially distributed around the trunk and vertically along trunk, without crossed branching.
11. Trees shall stand erect without a supporting stake.
12. The trunk shall decrease in taper with increasing height.
13. The trunk and main branches shall be free of wounds (except for properly-made pruning wounds), damaged areas, conks, bleeding, and signs of insects or disease. Open wounds or visible damage on the trunk shall not exceed 2 inches in length or be more than 5% of the total circumference of the trunk. Pruning wounds do not have to be closed over but shall have been made properly and just outside the collar.
14. There shall be live buds or foliage along the length and to the ends of all twigs.
15. At time of inspection and delivery, the rootball shall be moist throughout, and the tree crown shall show no signs of moisture stress, as indicated by wilt, shriveled, dead leaves, or branch dieback. Roots shall show no signs of being subjected to excess soil moisture conditions, as indicated by root discoloration, distortion, death, or foul odor.
16. Trees shall not have nursery tape, labels, wire, twine, or other materials within live tissue of the trunk, branches, major roots, or other portions of the tree that may compromise the health or structural integrity of the tree.
17. If any of the above conditions are not met, trees may be rejected.

G. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Shrubs shall meet the same requirements for quality as for trees with the exception of trunk and branching requirements. The Landscape Architect may reject shrubs not meeting these requirements.

H. Shrubs, perennials, and annuals shall meet the same requirements for quality as for trees with the exception of trunk and branching requirements. The Landscape Architect may reject shrubs, perennials, and annuals not meeting these requirements.

I. Pre-installation Conference: Conduct conference on site prior to beginning work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Bulk Materials: Do not deliver or place backfill, soils and soil amendments in frozen, wet, or muddy conditions.

1. Do not dump or store bulk materials near structures, utilities, sidewalks, pavements, and other facilities, or on existing trees, turf areas or plants.
2. Provide protection including tarps, plastic and or matting between all bulk materials and any finished surfaces sufficient to protect the finish material.

B. Provide erosion-control measures to prevent erosion or displacement of bulk materials and discharge of soil-bearing water runoff or airborne dust to adjacent properties, water conveyance systems, and walkways. Provide additional sediment control to retain excavated material, backfill, soil amendments and planting mix within the project limits as needed.

C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

D. Plants transported to the site on open vehicles shall be completely covered with tarpaulins or other suitable covers securely fastened to the vehicle to prevent damage to the plants or wind desiccation. Closed vehicles or shipping containers shall be adequately ventilated to prevent overheating of plants and allow natural respiration. Do not ship plants in the same container with fresh produce (fruit and vegetables) or other products harmful to plant material. Ensure plants are well watered prior to shipping. Immediately open shipping containers upon arrival in port and water plants if necessary. Do not let plants remain in shipping containers more than 48 hours after arrival in port. Plants damaged in transit or due to improper handling shall be cause of rejection.

E. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery and handling.

F. Handle planting stock by root ball or container. Do not drop plant material.

G. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees F until planting.

H. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Do not remove container-grown stock from containers before time of planting.
2. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

I. Keep plant tags and labels on all plants until approved.

1.8 MAINTENANCE SERVICE

A. Begin maintenance immediately after each area is planted and continue until work is accepted. See Section 02970 – Landscape Maintenance.

1.9 WARRANTY PERIOD

A. For Warranty Period see Section 02970 – Landscape Maintenance.

1.10 WARRANTY INSPECTION

A. A Warranty Inspection shall be conducted as per Section 02970 – Landscape Maintenance.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls. Tree and shrub sizes indicated on Drawings are sizes after pruning.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Spring/Autumn Bulbs: Furnish nursery-grown landscape #1 quality bulbs, harvested for year of planting. Do not use bruised, soft, damaged or diseased bulbs.

2.2 FERTILIZER

A. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 21-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 PLANTING SOIL

A. As indicated on Drawings and specified in Section 029100 – Planting Soil.

2.4 MULCHES

A. Organic Mulch: Free from deleterious materials, growth-inhibiting or germination-inhibiting ingredients, and suitable as a top dressing of trees and shrubs, consisting of the following:

1. Type: Ground or shredded bark.

a. Wood chips are not acceptable.
b. Naturally biodegradable.
c. May contain up to 50% shredded wood material aged for a minimum of one year prior to installation.

2. Size Range: Maximum length of any individual component 2 inches and a minimum of 75% of the mulch shall pass through a one inch screen. Shall be of size and structure to remain in place during rain and wind events.
3. Color: Natural.

B. Rock Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Type: Rounded riverbed gravel, washed.
2. Size Range: 3 inches maximum, 2 inch minimum
3. Color: Uniform color range locally available, as approved.

C. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Type: Crushed stone or gravel.
2. Size Range: 1-1/2 inches maximum, 3/4 inch minimum
3. Color: Color other than gray, uniform color range locally available, as approved.

2.5 TREE STABILIZATION MATERIALS

A. Tree Stakes:

B. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, redwood, or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, size and length as indicated, pointed at one end.

1. Guys and Tie Wires: ASTM A 641A/M, Class 1 galvanized-steel wire, 2 strand, twisted, 0.05 inch in diameter.
2. Tree Webbing: 1 inch wide, UV-resistant polypropylene webbing, 18 inches long with a brass grummet on each end. Do not use hose and wire.

2.6 LANDSCAPE EDGING

A. Aluminum Edging: Commercial Grade-Heavy Duty, standard-profile extruded-aluminum edging, ASTM B 221 Alloy 6063-T6, fabricated in standard lengths with interlocking sections with loops stamped from face of sections to receive stakes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Curv-Rite, Inc.
b. Permaloc Corporation.
c. Russell, J. D. Company (The).
d. Sure-Loc Edging Corporation.

B. Edging Size: 3/16 inch wide by 6 inches deep

C. Color: Black

D. Stakes: Aluminum, Commercial Grade-Heavy Duty, ASTM B 221 Alloy 6061-T6, approximately 1-1/2 inches wide by 12 inches long.

2.7 PATH EDGING

A. Steel Landscape Edging
1. Landscape edging shall be 1/8”x4”x16’ unpainted steel edging as manufactured by Sure-loc edging corporation, 494 E. 64th Street, Holland, MI. 49423, telephone (800) 787-3562 or approved equal.
2. Install per manufacturer’s specifications.
3. Thickness: 1/8” thickness where flowing curves are desired.
4. Stake: Stakes are to be minimum of 12” long for 14 ga. and 1/8” edging. All stakes manufactured of steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

D. Examine planting areas and surrounding areas for defects that will adversely affect the work and for deviations beyond allowable tolerances.

E. Verification of Existing Conditions and Protection of New or Existing Improvements: Before proceeding with work in this section, the Installer shall carefully check and verify all dimensions, quantities, and grade elevations, and inform the Landscape Architect immediately of any discrepancies.

1. Carefully examine the civil, record, and survey drawings to become familiar with the existing underground conditions before digging. Verify the location of all aboveground and underground utility lines, infrastructure, other improvements, and existing trees, shrubs, and plants to remain including their root system, and take proper precautions as necessary to avoid damage to such improvements and plants.
2. In the event of conflict between existing and new improvements notify the Landscape Architect in writing and obtain written confirmation of any changes to the work prior to proceeding.

    a. When new or previously existing utility lines are encountered during the course of excavation, notify the Landscape Architect in writing and make recommendations as to remedial action. Proceed with work in that area only upon approval of appropriate remedial action. Coordinate all work with the appropriate utility contractors, utility company or responsible public works agency.

F. Protect partially completed installation against damage from other construction traffic when work is in progress, and following completion with highly visible construction tape, fencing, or other means until construction is complete.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.

B. Obtain utility locates for all underground utilities and structures in planting areas. Notify the Landscape Architect of any conflicts prior to beginning excavation.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out planting beds and trenches for exterior plantings. Stake locations, outline areas, adjust locations when requested and obtain Landscape Architect acceptance of layout before starting planting bed excavation work and planting. Make minor adjustments as required.

3.3 PLANTING SOIL PLACEMENT

A. Homogeneously blend planting soil mix off-site before spreading or mix planting soil in beds and homogeneously blend planting soil mix to the full depth to a uniform texture. Do not add planting soil until all water has percolated out of excavation. Do not use planting soil that is subgrade is frozen, muddy, or excessively wet.

B. Spread planting soil to the depth indicated on Drawings. Install in lifts that do not exceed 8 inches. Compact using irrigation or a water filled roller. Do not use mechanical compaction. Compact soil to 80-85% of maximum dry density. Check the soil compaction with a penetrometer or densiometer. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

1. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

C. Install organic top dressing to depth indicated in specifications over installed planting soil and incorporate into underlying planting soil at the depth indicated. Compact as indicated above.

D. If the planting soil becomes overly compacted, remove the soil and reinstall.

E. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Protect areas from vehicle and pedestrian traffic and other forms of compaction.

F. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

G. Plant trees and shrubs after finish grades are established and before planting lawns. Do not plant in soils immediately after performing irrigation compaction of planting soils. Allow soils to dry before planting.

3.4 TREES, SHRUB AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped, and container grown stock plumb and in center of pit or trench with uppermost lateral root no more than 2 inches below finish grades.

1. Remove burlap and wire baskets from root balls without breaking root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
2. Make adjustments to ensure proper planting depth is obtained.
3. Plumb before backfilling, and maintain plumb while working backfill around roots.
4. Place planting soil in lifts that do not exceed 6 inches. Compact using irrigation or a water filled roller. Do not use mechanical compaction. Compact soil to 80-85% of maximum dry density. Check the soil compaction with a penetrometer or densiometer. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

5. Backfill around root ball with planting soil in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
6. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
7. Continue backfilling process in layers to maintain soil layers established prior to excavating plant pits. Water again after placing and tamping final layer of soil.

D. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.5 TREE STABILIZATION

A. Upright Staking and Tying: Stake all trees indicated.

1. Use stakes of length required as indicated on drawings and to extend to height indicated above grade.
2. Set vertical stakes and space to avoid penetrating root balls or root masses.
3. Support trees with two strands of tie wire and webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

3.6 GROUND COVERS AND PERENNIALS

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in Drawings - even rows with triangular spacing.

B. Use approved planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.7 BULB/TUBER PLANTING

A. Set out and space bulbs/tubers as indicated in Drawings even rows with triangular spacing.

B. Plant bulbs/tubers with nose pointing upward at the spacing and depth indicated on the Drawings. Do not plant in frozen or waterlogged soils.

1. Spring Flowering Bulbs: Plant between September 15 and October 15, or as approved by Landscape Architect.
2. Summer/Autumn Flowering Bulbs: Plant between May 1 and June 1, or as approved by Landscape Architect.

C. Work soil around bulbs/tubers to eliminate air pockets.

D. Water thoroughly after planting.

E. Minimize disturbance to existing plant material within planting area and prevent planting soil from becoming overly compacted due to planting operations.

3.8 EDGING INSTALLATION

A. Layout edging as shown on Drawings. Layout of curves shall be smooth and curvilinear without deformations or kinks or bends. Straight runs shall be linear with a deviation of less than ¼ inch in any 8 foot length. Connections shall be visually seamless with no overlap. Top elevation of edging shall be uniform.

B. Aluminum Edging: Install aluminum edging where indicated according to manufacturer's written instructions. Anchor with aluminum stakes spaced approximately 36 inches apart, driven below top elevation of edging.

C. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 36 inches apart, driven below top elevation of edging.

3.9 MULCHING

A. Mulch all planting beds and other areas indicated on Drawings. Ensure even coverage.

1. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.
2. Mineral/Rock Mulch: Apply average thickness of mulch over whole surface shown on Drawings at depth indicated, and finish level with adjacent finish grades.

3.10 MAINTENANCE

A. Refer to Section 02970 – Landscape Maintenance.

3.11 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants and planting areas from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. Remove all nursery ties, tape, nursery stakes, ribbons, twine, and wire from branches and trunk. Remove all nursery plant identification labels and tags when approved and directed by Landscape Architect.

D. Remove all debris from plant material, planting areas, and Project site.

3.12 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

SECTION 02970 - LANDSCAPE MAINTENANCE

PART 1 - GENERAL

1.1 RELATED WORK

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Maintenance period and warranty
2. Maintenance of Exterior Plants
3. Clean-up
4. Inspection

B. Related Sections include the following:

1. Division 02 Section “Planting General”
2. Division 02 Section “Planting Soil”
3. Division 02 Section “Exterior Plants”

1.3 DEFINITIONS

A. Reference Section 02900 – Planting General for definitions.

1.4 REGULATORY REQUIREMENTS

A. Reference Section 02900 – Planting General for regulatory requirements.

1.5 MAINTENANCE PERIOD AND WARRANTY

A. Warranty Periods: Commencement of the maintenance and warranty period shall begin upon completion of the Acceptance Inspection.

1. The maintenance and warranty period for Exterior Plants shall be one year.

B. Acceptance Inspection:

1. The Contractor shall notify the Landscape Architect in writing seven (7) days in advance of the requested Acceptance Inspection date.
2. Upon acceptance of the landscape installation by the Landscape Architect as meeting project requirements, the Warranty Period will begin.

C. Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period at no cost to the Owner.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization, edgings, and tree grates.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion:

a. Trees, Shrubs, Vines and Ornamental Grasses: One year.
b. Groundcover, Biennials, Perennials and Other Plants: One year.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements including maintenance.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

D. Landscape Architect will provide the Contractor with written notice of any deficiencies with performance during the maintenance period. If the Contractor fails to address those concerns within thirty (30) days, the Landscape Architect shall terminate the Contractor's maintenance period and hire an alternative contractor to complete the remainder of the warranty period. The cost of the alternative contractor shall be at the original contractor's expense.

1.6 WARRANTY INSPECTION

A. At the end of the Warranty Period, all trees, shrubs, plants, and turf areas shall be inspected and shall meet all required specified conditions.

B. Condition of Plant Material: Prior to Acceptance Inspection, the Contractor shall be responsible for repairing third-party damage, watering and protecting planted areas, resetting any plants to an upright position, to proper grade or to proper position, and for removal and replacement of any dead plant material. The Contractor shall also re-stake trees and prune plants if necessary.

C. Acceptance shall be contingent upon the following:

1. All plantings shall be in healthy condition, free of damage, and of the specified quantities and size, as outlined within Drawings and Specifications.
2. All planting areas shall be weed free.
3. Lawns and grasses shall consist of an established healthy, uniform, close stand of grass that is free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

1.7 SUBMITTALS

A. Reference Section 02900 – Planting General for submittals.

1.8 QUALITY ASSURANCE AND SAFETY

A. Reference Section 02900 – Planting General for additional quality assurance.

B. The Contractor shall furnish all labor, materials, equipment, supervision, traffic control, and transportation and shall secure all necessary permits and licenses required to maintain and keep the landscape in an attractive, healthy and vigorous growing condition for one year.

PART 2 - EXECUTION

2.1 GENERAL

A. Diseases and Pests: An approved pesticide shall be applied as necessary to maintain plant materials in a healthy and vigorous growing condition. The Contractor shall apply for and receive a "permit to apply pesticide" from the State of Alaska, Department of Environmental Conservation, or shall engage the services of a qualified, licensed pest control service familiar with plants, pests and appropriate pesticides.

B. Weed Control: All planting and seeding areas shall be kept free of weeds by chemical control, hand weeding, or other approved methods.

2.2 EXTERIOR PLANTS

A. Watering: The Contractor shall deepwater all trees and shrubs providing water penetration to the depth of planting pits and extent of the root zone. Deep watering shall be done in accordance with the following schedule:

1. Summer of Installation: Deepwater all trees and shrubs each week (during periods of extended dry weather, watering shall occur twice weekly) continuing through the first hard frost, or October 15, whichever occurs first.

B. Staking and Guying: Tree collars, stakes, and guys are to be inspected and adjusted as necessary a minimum of twice per year. Tree collars, staking and guys shall be removed at the end of the warranty period. Tree girdling, rubbing, or other deficiencies caused by improper staking conditions or materials will be immediately repaired, and adjustments made as necessary to avoid additional issues.

C. Fertilization: Fertilization of all trees and shrubs shall be as follows:

1. Summer of Installation: One week after the installation of plant material, an initial application of fertilizer will be applied. Only this initial application of fertilizer during planting is necessary.
2. Following summer(s) of warranty period: Fertilization shall occur twice per year. The first shall be applied no later than June 1 with 8-32-16 fertilizer, and the

second shall be applied on or about July 15 with 14-14-14 fertilizer. Application rate shall be per manufacturer's specifications.

D. Plant Damage: In the event of damages to trees or shrubs from a third party, including vandalism, the Owner may direct the Contractor to replace them at unit cost amounts. Such replacements to be made only upon written notice from the Owner's Representative.

2.3 TREE, SHRUB AND VINE PRUNING

A. Prune only when directed by Landscape Architect. Pruning to be executed by or under direct supervision of a certified Arborist, or experienced nurseryman with pruning experience.

B. All pruning cuts shall comply with ANSI A-300 standards. Do not cut tree leaders; remove only injured or dead branches from trees. Do not prune branches unless damaged or to retain natural character. Prune trees and shrubs according to standard horticultural practice with sharp, clean tools.

C. Tree sizes indicated are sizes after pruning. Prune shrubs to retain natural character. Shrub sizes indicated are sizes after pruning.

D. Do not apply pruning paint to wounds.

2.4 PERENNIALS

A. Watering: All areas shall be watered at least once a week during the one-year maintenance period, excluding the period from the first hard frost or October 15, whichever comes first to May 15, to maintain soil moisture throughout the root zone and shall be conducted regardless of natural rain fall unless approved in writing by the Landscape Architect.

1. Three-fourths of an inch (3/4") of water is required weekly and shall be applied at rates to promote maximum penetration to root zone with minimal run-off.

2.5 MULCH

A. Mulch shall be maintained to the depth and extents as indicated in the documents.

2.6 WEEDING

A. All areas shall be maintained as weed-free.

2.7 CLEAN-UP

A. The Contractor shall keep the project site clean and free of excess materials, and rubbish incidental to his work at all times. Clean-up will be one of the conditions to be met prior to all phases of planting acceptance.

2.8 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

SECTION 03301 - STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing Portland cement concrete for structures in conformance with the Drawings and Specifications.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT

A. Portland cement shall conform to the requirements of AASHTO M 85.

B. Unless otherwise permitted by the ENGINEER, the product of only one mill of any one brand and type of Portland cement shall be used on the Project.

2.2 FINE AGGREGATE. Fine aggregate for Portland cement concrete shall conform to the requirements of AASHTO M 6 with the following exceptions:

A. Delete section on deleterious substances and substitute the following:

The amount of deleterious substances shall not exceed the following limits:
Friable particles, percent by weight .....5% max.
Coal and Lignite, percent by weight using a liquid of 1.95 specific gravity (only material that is brownish- black shall be considered as coal or lignite) .....0.5% max.
Material passing the No. 200 sieve, percent by weight .....3.0% max.

B. Delete paragraph 4.2 of AASHTO M 6.

2.3 COARSE AGGREGATE. Coarse aggregate for Portland cement concrete shall conform to the requirements of AASHTO M 80, Class A, with the following exceptions:

A. Delete section on deleterious substances and substitute the following:

The amount of deleterious substances shall not exceed the following limits:
Coal and Lignite, percent by weight (only material that is brownish-black or black shall be considered coal or lignite.)..... 1.0% max.
Material passing the No. 200 sieve, percent by weight ..... 1.0% max.
Thin-elongated pieces, percent by weight.
(Length greater than 5 times average thickness)..... 15%max.
Sticks and roots, percent by weight ..... 0.10% max.
Friable Particles, percent by weight..... 0.25% max.
Maximum loss from AASHTO T 96 shall be 50 percent.
Maximum loss from AASHTO T 104 shall be 12 percent.

B. Add the following: AASHTO T-104 shall be performed using sodium sulfate solution.

2.4 JOINT FILLERS. Joint filler, of the type designated in the contract, shall conform to the following:

A. Poured filler shall conform to AASHTO M 173 or AASHTO M 282 as specified.

B. Preformed fillers shall conform to AASHTO M 33 for bituminous type; AASHTO M 153 for sponge rubber (type I), cork (type II), and self-expanding cork (type III; AASHTO M 213 for non-extruding and resilient bituminous types and ASHTO M 220 for preformed elastomeric types as specified. The filler shall be punched to admit the dowels where called for on the plans. Joint filler shall be furnished in a single piece for the depth and width required for the joint unless otherwise authorized by the ENGINEER. When more than one piece is authorized for a joint, the abutting ends shall be fastened securely, and held accurately to shape, by stapling or other positive fastening satisfactory to the ENGINEER.

C. Foam filler shall be expanded polystyrene filler having a compressive strength of not less than 10 p.s.i..

D. Hot-poured sealants for concrete and asphaltic pavements shall conform to ASTM D 3405.

E. Hot-poured elastomeric type sealant for concrete pavements shall conform to ASTM D 3406.

F. Cold-poured silicone type sealant for concrete pavements shall conform to Federal Specification TT-S-1543, Class A. The sealant shall be a one part, low-modulus silicone rubber with an ultimate elongation of 1,200 percent.

2.5 CURING MATERIAL

A. Curing material shall conform to the following requirements as specified:

1. Burlap Cloth made from Jute Kenaf AASHTO M 182
2. Sheet Material for Curing Concrete AASHTO M 171
3. Liquid Membrane-Forming Compounds AASHTO M 148 for Curing Concrete, Type I

B. The requirements specified in AASHTO M 148 covering "Liquid Membrane-Forming Compounds for Curing Concrete" shall be modified by adding the following:

1. Liquid membrane-forming compounds utilizing linseed oil shall not be used.

2.6 SEALING COMPOUND

A. Non-colored concrete shall be sealed with the “Concrete International Corporation” Ashford Formula sealing compound, or approved equal.

B. Colored concrete shall be sealed with Euclid Chemical Company Lusterseal 300, or approved equal.

2.7 AIR ENTRAINING AGENTS. Air-entraining admixtures shall conform to the requirements of AASHTO M 154.

2.8 MIXING WATER. Unless otherwise permitted in writing by the ENGINEER, all water shall be obtained from the City/Borough potable water system.

2.9 REINFORCING STEEL. Unless specified otherwise, reinforcing shall be galvanized and conform to ASTM A767, Grade 60, excluding the requirement for chromating. Welded wire fabric shall conform to AASHTO M 55. Submit material certifications for all reinforcing steel.

2.9 SHIPPING AND STORAGE OF CEMENT

A. Cement may be shipped from pretested approved bins. The cement shall be well protected from rain and moisture, and any cement damaged by moisture or which fails to meet any of the specified requirements shall be rejected and removed from the WORK.

B. Cement stored by the CONTRACTOR for a period longer than 60 days in other than sealed bins or silos shall be retested before being used. Cement of different brands, types, or from different mills shall be stored separately.

2.10 COMPOSITION OF CONCRETE

A. All Portland cement concrete shall be ready-mix, provided by an approved plant regularly engaged in the production of concrete, unless otherwise authorized in writing by the ENGINEER. Ready-mix concrete shall conform to the requirements of AASHTO M 157.

B. The CONTRACTOR shall furnish the mix design to the ENGINEER for approval. The mix design shall be suitable for its intended use. Concrete shall be designed using an absolute volume analysis. The CONTRACTOR shall be responsible for having each mix laboratory tested. Prior to the start of production of any mix design, the CONTRACTOR shall submit test results and certifications for all materials, detailed mix design data and results of laboratory tests to the ENGINEER for approval. Approval by the ENGINEER will be based on apparent conformity to these specifications. It shall remain the CONTRACTOR's responsibility during production to produce concrete conforming to the mix design and the minimum acceptance criteria in the contract. When requested by the ENGINEER, the CONTRACTOR shall submit samples of all materials for verification testing. Production shall not commence until the mix design is approved by the ENGINEER.

C. Unless otherwise specified, the design mix shall meet the following:

Minimum cement content 7 sacks (658 lb.) per C.Y.
Maximum water/cement ratio = 0.40
28 day compressive strength (f'c) 4000 psi unless otherwise noted.
Slump 3" $\pm$ 1"
Entrained Air 4% to 7%
Coarse Aggregate AASHTO M 43, Gradation No. 67
Cement factors are based on 94-pound sacks

D. The CONTRACTOR shall be responsible for producing and placing specification concrete with a cement content within a tolerance of 2%.

E. The use of superplasticizers in the concrete mix to improve the workability of mixes with low water cement ratios will require prior written approval by the ENGINEER.

G. The CONTRACTOR may, subject to prior approval in writing, use alternative sizes of coarse aggregate as shown in Table 1 of AASHTO M 43. If the use of an alternative size of coarse aggregate produces concrete which exceeds the permissible water-cement ratio above, thereby requiring additional cement above that specified, no compensation will be made to the CONTRACTOR for the additional cement.

H. Concrete Color Admixture: Color concrete admixture shall be dry iron oxide pigment manufactured by Davis Color Products, www.daviscolors.com, or ENGINEER approved equal. Pigment shall comply with ASTM C979 and color shall be Silver Smoke #860. The pigments shall be designed for ready mix concrete to produce a uniform color. The color shall be permanent, inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime-proof, and non-bleeding.

2.11 SAMPLING AND TESTING

A. The CONTRACTOR shall retain an independent agency, acceptable to the OWNER and ENGINEER, to sample and test concrete in accordance with the applicable Specifications. When the results of the field tests indicate the material does not conform to the requirements of the Specifications, the re-tests required by the ENGINEER shall be at the expense of the CONTRACTOR.

B. Materials that fail to meet contract requirements, as indicated by laboratory tests, shall not be used in the WORK. The CONTRACTOR shall remove all defective materials from the site.

C. Types and sizes of concrete specimens shall be in accordance with ASTM C 31. Additional slump tests and/or test cylinders may be required at the discretion of the ENGINEER. Should the analysis of any test cylinder not meet the preceding requirements of Article 2.10, Composition of Concrete, its representative concrete shall be removed and replaced at the CONTRACTOR's expense.

D. Three copies of all test reports shall be furnished to the ENGINEER.

E. Color Concrete Mock Up: One minimum two-foot by five-foot full depth color concrete section shall be installed as shown in the Drawings. The mock up is to be used to determine the quality of the finish, color(s), profile, and layout. Subsequent Work that does not match the approved mock up shall be replaced. The mock up can be incorporated into the Work provided it can be incorporated into the remaining Work without seams, breaks or other visual deviations. Remove mock up if not approved and install new segment for mock up approval.

2.12 COLD WEATHER CONCRETE

A. Concrete shall not be placed when the descending air temperature in the shade, away

from artificial heat, falls below 40° F nor resumed before the ascending air temperature reaches 35°F, without specific written authorization. When the air temperature falls below 40° F, or is, in the opinion of the ENGINEER, likely to do so within a 24 hour period after placing concrete, the CONTRACTOR shall have ready on the job materials and equipment required to heat mixing water and aggregate and to protect freshly placed concrete from freezing.

B. Concrete placed at air temperatures below 40°F shall have a temperature not less than 50°F nor greater than 70°F when placed in the forms. These temperatures shall be obtained by heating the mixing water and/or aggregate. Mixing water shall not be heated to more than 160°F.

C. Binned aggregates containing ice or in a frozen condition will not be permitted, nor will aggregates which have been heated directly by gas or oil flame, or heated on sheet metal over an open fire. When aggregates are heated in bins, only steam-coil or water-coil heating will be permitted, except that other methods, when approved, may be used. If live steam is used to thaw frozen aggregate piles, drainage times comparable to those applicable for washed aggregates shall apply.

D. When the temperature of either the water or aggregate exceeds 100° F, they shall be mixed together so that the temperature of the mix does not exceed 80° F at the time the cement is added.

E. Any additives must have prior approval of the ENGINEER before being used.

F. The use of calcium chloride is prohibited.

G. When placing concrete in cold weather, the following precautions shall be taken in addition to the above requirements:

1. Heat shall be applied to forms and reinforcing steel before placing concrete as required to remove all frost, ice, and snow from all surfaces which will be in contact with fresh concrete.

2. When fresh concrete is to be placed in contact with hardened concrete, the surface of the previous pour shall be warmed to at least 35°F, thoroughly wet, and free water removed before fresh concrete is placed.

3. Freshly placed concrete shall be maintained at a temperature of not less than 70°F for 3 days or not less than 50°F for 5 days, when Type I or II cement is used, and not less than 70°F for 2 days or not less than 50°F for 3 days, when Type III cement is used. The above requirements are not intended to apply during the normal summer construction season when air temperatures of 40°F or higher can reasonably be anticipated during the two-week period immediately following concrete placement, or until the concrete is no longer in danger from freezing.

H. When temperatures below 20°F are not expected during the curing period and, in the opinion of the ENGINEER, no other adverse conditions, such as high winds, are expected, concrete temperatures may be maintained in thick concrete sections by retention of heat of hydration by means of adequately insulated forms.

I. When, in the opinion of the ENGINEER, greater protection is required to maintain the specified temperature, the fresh concrete shall be completely enclosed and an adequate heat source provided. Such enclosure and heat source shall be so designed that evaporation of moisture from the concrete during curing is prevented. Precautions shall be taken to protect the structure from overheating and fire.

J. At the end of the required curing period protection may be removed, but in such a manner that the drop in temperature of any portion of the concrete will be gradual and not exceed 30°F in the first 24 hours.

K. For concrete placed within cofferdams and cured by flooding with water, the above conditions may be waived provided that the water in contact with the concrete is not permitted to freeze. Dewatering shall not be carried out until the ENGINEER determines that the concrete has cured sufficiently to withstand freezing temperatures and hydrostatic pressure.

L. The CONTRACTOR shall be wholly responsible for the protection of the concrete during cold weather operations. Any concrete injured by frost action or overheating shall be removed and replaced at the CONTRACTOR's expense.

2.13 FORMS

A. Forms shall be so designed and constructed that they may be removed without injuring the concrete.

B. Unless otherwise specified, forms for exposed surfaces shall be made of plywood, hard-pressed fiberboard, sized and dressed tongue-and-groove lumber, or metal in which all bolt and rivet holes are countersunk, so that a plane, smooth surface of the desired contour is obtained. Rough lumber may be used for surfaces that will not be exposed in the finished structure. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects affecting the strength or appearance of the finished structure. All forms shall be mortar tight, free of bulge and warp, and shall be cleaned thoroughly before reuse.

C. Forms shall be so designed that placement and finishing of the concrete will not impose loads on the structure resulting in adverse deflections or distortions.

D. The forms shall be so designed that portions covering concrete that is required to be finished may be removed without disturbing other portions that are to be removed later. As far as practicable, form marks shall conform to the general lines of the structure.

E. When possible, forms shall be daylighted at intervals not greater than 10 feet vertically, the openings being sufficient to permit free access to the forms for the purpose of inspecting, and working.

F. Metal ties or anchorages within the forms shall be so constructed as to permit their removal to a depth of at least 1 inch from the face without injury to the concrete. All

fittings for metal ties shall be of such design that, upon their removal, the cavities which are left will be of the smallest possible size.

G. All exposed edges 90° or sharper shall be chamfered 3/4 inch unless otherwise noted. Chamfering of forms for re-entrant angles shall be required only when specifically indicated on the Plans.

H. Forms shall be inspected immediately prior to the placing of concrete. Dimensions shall be checked carefully and any bulging or warping shall be remedied. All debris and standing water within the forms shall be removed. Special attention shall be paid to ties and bracing and where forms appear to be braced insufficiently or built unsatisfactorily, either before or during placing of the concrete. The ENGINEER shall order the WORK stopped until the defects have been corrected.

I. Forms shall be constructed true to line and grade. Clean-out ports shall be provided at construction joints.

J. All forms shall be installed in accordance with approved fabrication and erection plans.

K. All porous forms shall be treated with non-staining form oil or saturated with water immediately before placing concrete.

L. Falsework shall be built to carry the loads without appreciable settlement. Falsework that cannot be founded on solid footings must be supported by ample falsework piling. Falsework shall be designed to sustain all imposed loads.

M. Detail drawings of the falsework shall be submitted for review, but such review shall not relieve the CONTRACTOR of any responsibility under the contract for the successful completion of the structure.

N. Forms and falsework shall not be removed without the consent of the ENGINEER. The ENGINEER's consent shall not relieve the CONTRACTOR of responsibility for the safety of the WORK. Blocks and bracing shall be removed at the time the forms are removed and in no case shall any portion of the wood forms be left in the concrete.

O. To facilitate finishing, forms used on exposed vertical surfaces shall be removed in not less than 12 nor more than 48 hours, depending upon weather conditions.

P. In warm weather, falsework and forms shall remain in place under slabs, beams, girders and arches for 14 days after the day of last pour when Type I or Type II cement is used, or for 7 days when Type III cement is used. Forms for slabs having clear spans or cantilever spans of less than 10 feet may be removed after 7 days when Type I or Type II cement is used, or after 4 days when Type III cement is used. In cold weather, the length of time that forms and falsework are to remain in place shall be as approved.

Q. No superstructure load shall be placed upon finished concrete until the ENGINEER so directs, but the minimum time allowed for the curing of structural concrete in the substructure before any load of the superstructure is placed thereon shall be 7 days when Type I or Type II cement is used and 2 days when Type III cement is used.

PART 3 - EXECUTION

3.1 GENERAL

A. All concrete shall be placed before it has taken its initial set and, in any case, within 30 minutes after mixing. Concrete shall be placed in such manner as to avoid segregation of coarse or fine portions of the mixture, and shall be spread in horizontal layers when practicable. Special care shall be exercised in the bottom of slabs and girders to assure the working of the concrete around nests of reinforcing steel, so as to eliminate rock pockets or air bubbles. Enough rods, spades, tampers and vibrators shall be provided to compact each batch before the succeeding one is dumped and to prevent the formation of joints between batches.

Extra vibrating shall be done along all faces to obtain smooth surfaces. Care shall be taken to prevent mortar from splattering on forms and reinforcing steel and from drying ahead of the final covering with concrete.

B. Concrete shall not be placed in slabs or other sections requiring finishing on the top surface when precipitation is occurring or when in the opinion of the ENGINEER precipitation is likely before completion of the finishing, unless the CONTRACTOR shall have ready on the job all materials and equipment necessary to protect the concrete and allow finishing operations to be completed.

C. Troughs, pipes, or short chutes used as aids in placing concrete shall be arranged and used in such a manner that the ingredients of the concrete do not become separated. Where steep slopes are required, troughs and chutes shall be equipped with baffle boards or shall be in short lengths that reverse the direction of movement. All chutes, troughs, and pipe shall be kept clean and free of hardened concrete by flushing thoroughly with water after each run. Water used for flushing shall be discharged clear of the concrete in place. Troughs and chutes shall be of steel or plastic or shall be lined with steel or plastic and shall extend as nearly as possible to the point of deposit. The use of aluminum for pipes, chutes or tremies is prohibited. When discharge must be intermittent, a hopper or other device for regulating the discharge shall be provided.

D. Dropping the concrete a distance of more than 5-feet or depositing a large quantity at any point and running or working it along the forms will not be permitted. The placing of concrete shall be so regulated that the pressures caused by wet concrete shall not exceed those used in the design of the forms.

E. High frequency internal vibrators of either the pneumatic, electrical, or hydraulic type shall be used for compacting concrete in all structures. The number of vibrators used shall be ample to consolidate the fresh concrete within 15 minutes of placing in the forms. In all cases, the CONTRACTOR shall provide at least two concrete vibrators for each individual placement operation (one may be a standby), which shall conform to the requirements of these specifications. Prior to the placement of any concrete, the CONTRACTOR shall demonstrate that the 2 vibrators are in good working order and repair and ready for use.

F. The vibrators shall be an approved type, with a minimum frequency of 5,000 cycles per minute and shall be capable of visibly affecting a properly designed mixture with a 1-inch

slump for a distance of at least 18-inches from the vibrator.

G. Vibrators shall not be held against forms or reinforcing steel nor shall they be used for flowing the concrete or spreading it into place. Vibrators shall be so manipulated as to produce concrete that is free of voids, is of proper texture on exposed faces, and of maximum consolidation. Vibrators shall not be held so long in one place as to result in segregation of concrete or formation of laitance on the surface.

H. Concrete shall be placed continuously throughout each section of the structure or between indicated joints. If, in an emergency, it is necessary to stop placing concrete before a section is completed, bulkheads shall be placed as the ENGINEER may direct and the resulting joint shall be treated as a construction joint.

I. The presence of areas of excessive honeycomb may be considered sufficient cause for rejection of a structure. Upon written notice that a given structure has been rejected, the rejected WORK shall be removed and rebuilt, in part or wholly as specified, at the CONTRACTOR'S expense.

3.2 PUMPING CONCRETE

A. Concrete may be placed by pumping if the CONTRACTOR demonstrates that the pumping equipment to be used will effectively handle the particular class of concrete with the slump and air content specified and that it is so arranged that no vibrations result that might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced.

B. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned. Slump tests shall be taken at the discharge end of the pipe.

3.3 COLUMNS

A. Concrete in columns shall be placed in one continuous operation unless otherwise permitted. The concrete shall be allowed to set a least 12 hours before caps are placed.

3.4 SLAB AND GIRDER SPANS

A. Slabs and girders having spans of 30 feet or less shall be cast in one continuous operation.

B. Girders spanning more than 30 feet may be cast in 2 operations, the first operation being the casting of the girder stems to the bottom of the slab haunches. Shear keys shall be provided for by inserting oiled timber blocks to a depth of at least 1-1/2 inches in the fresh concrete at the top of each girder stem. A sufficient number of blocks shall be used to cover uniformly about 1/2 the top surface of the girder stem and the blocks shall be removed as soon as the concrete has set sufficiently to retain their shape. The period between the first or girder casting and the second or slab casting shall be at least 24 hours. Immediately before the second casting, the CONTRACTOR shall check all falsework for shrinkage and settlement and shall tighten all wedges to insure minimum

deflection of the stems due to the added weight of the slab.

3.5 SLABS ON STEEL BEAMS

A. A concrete slab on simple steel girder spans may be placed in not more than three sections with the first section centered on the span.

B. On truss spans or continuous girders, the concrete slab shall be placed as shown on the Plans or as directed by the ENGINEER.

3.6 CONCRETE DEPOSITED UNDER WATER

A. If conditions render it impossible or inadvisable in the opinion of the ENGINEER to dewater excavations before placing concrete, the CONTRACTOR shall deposit under water, by means of a tremie or pump, a seal course of concrete of sufficient thickness to thoroughly seal the cofferdam. The concrete shall be carefully placed in a compact mass and shall not be disturbed after being deposited. Still water shall be maintained at the point of deposit.

B. A tremie shall consist of a watertight tube having a diameter of not less than 10-inches with a hopper at the top. When a batch is dumped into the hopper, the flow of concrete shall be induced by slightly raising the discharge end, always keeping it in the deposited concrete.

C. Tremie tubes or pump discharge tubes used to deposit concrete under water shall be equipped with a device that will prevent water from entering the tube while charging the tube with concrete. Such tubes shall be supported so as to permit free movements of the discharge end over the entire top surface of the work and to permit rapid lowering, when necessary to retard or stop the flow of concrete. The tubes shall be filled by a method that will prevent washing of the concrete. The discharge end shall be completely submerged in concrete at all times and the tube shall contain sufficient concrete to prevent any water entry. The flow shall be continuous until the WORK is completed and the resulting concrete seal shall be monolithic and homogeneous.

D. The exact thickness of the seal will depend upon the hydrostatic head, bond and spacing of piles, size of cofferdam, and other related factors, but in no case shall the seal be less than 2 feet in thickness, unless otherwise shown on the plans. Before dewatering, the concrete in the seal shall be allowed to cure for not less than five days after placing, or until the seal concrete has achieved a minimum compressive strength of 2,500 p.s.i. based on test cylinders cured under the same conditions as the in situ concrete, whichever occurs first.

E. If a seal which is to withstand hydrostatic pressure is placed in water having a temperature below 45°F, the curing time before dewatering shall be increased as directed.

F. Periods of time during which the temperature of the water has been continuously below 38°F shall not be considered as curing time.

G. After sufficient time has elapsed to insure adequate strength in the concrete seal, the cofferdam shall be dewatered and the top of the concrete cleaned of all scum, laitance and

sediment. Before fresh concrete is deposited, local high spots shall be removed as necessary to provide proper clearance for reinforcing steel.

3.7 CONSTRUCTION JOINTS

A. Construction joints shall be located where shown on the plans or as permitted by the ENGINEER. Construction joints shall be perpendicular to the principal lines of stress and in general shall be located at points of minimum shear.

B. At horizontal construction joints, gage strips 1-1/2 inches thick shall be placed inside the forms along all exposed faces to give the joints straight lines. Before placing fresh concrete, the surfaces of construction joints shall be washed and scrubbed with a wire broom, drenched with water until saturated, and kept saturated until the new concrete is placed.

C. Immediately prior to placing new concrete the forms shall be drawn tight against the concrete already in place. Concrete in substructures shall be placed in such manner that all horizontal construction joints will be truly horizontal and, if possible, in locations such that they will not be exposed to view in the finished structure. Where vertical construction joints are necessary, reinforcing bars shall extend across the joint in such a manner as to make the structure monolithic. Special care shall be taken to avoid construction joints through large surfaces which are to be treated architecturally.

D. All construction joints shall be provided with concrete shear keys at least 1-1/2 inches deep and 1/3 of the concrete thickness in width, unless otherwise shown on the Plans.

3.8 EXPANSION JOINTS

A. Expansion joints shall be located and formed as required on the plans.

B. Open Joints. Open joints shall be placed in the location shown on the plans and shall be formed. The form shall be removed without chipping or breaking the corners of the concrete. Reinforcement shall not extend across an open joint, unless so specified on the plans.

C. Filled Joints. Unless otherwise shown on the plans, expansion joints shall be constructed with pre-molded expansion joint filler with a thickness equal to the width of the joint.

D. The joint filler shall be cut to the same shape and size as the adjoining surfaces. It shall be fixed firmly against the surface of the concrete already in place in such manner that it will not be displaced when concrete is deposited against it.

E. Immediately after the forms are removed, the expansion joints shall be inspected carefully. Any concrete or mortar that has sealed across the joint shall be removed.

F. Joint sealer for use in deck joints shall be of the type shown on the plans conforming to the requirements of Article 2.4 – Joint Fillers, of this Section. The faces of all joints to be sealed shall be free of foreign matter, paint, curing compound, oils, greases, dirt, free water, and laitance.

G. Elastomeric Compression Seals. The joint seal shall be shaped as shown on the plans. It shall be installed by suitable hand or machine tools and thoroughly secured in place with a lubricant-adhesive recommended by the seal manufacturer. The lubricant-adhesive shall cover both sides of the seal over the full area in contact with the sides of the joint.

H. The seal shall be in one piece for the full width of the joint. Any joints at curbs shall be sealed adequately with additional adhesive.

I. The seal may be installed immediately after the curing period of the concrete. Temperature limitations of the lubricant-adhesive as guaranteed by the manufacturer shall be observed.

J. Strip Seals. Expansion joint strip seals shall be as shown on the plans, and composed of a steel extrusion and an extruded strip seal. The steel shall conform to ASTM A242 or A588. The seal shall be manufactured of material conforming to the requirements of PART 2 of this Section. Strip seals shall be one-piece for the length of the joint.

K. Installation of the expansion joints shall be in accordance with the manufacturer's recommendations, except that the joint opening shall be adjusted for the dimensions indicated on the Plans.

L. Steel Joints. The plates, angles, or other structural shapes shall be accurately shaped at the shop to conform to the section of the concrete slab. The fabrication and painting shall conform to the requirements of the specifications covering those items. Care shall be taken to insure that the surface in the finished plane is true and free of warping. Positive methods shall be employed in placing the joints to keep them in correct position during the placing of the concrete. The opening at expansion joints shall be that designated on the plans at normal temperature.

3.9 ANCHOR BOLTS

A. Anchor bolt assemblies conforming to the details shown shall be accurately secured in the forms in the positions shown on the plans, before any concrete is placed in the forms. The positions shall be checked and any adjustments made as soon as the concrete has been placed.

B. When pipe sleeves or pre-cast holes are provided, no water shall be allowed to freeze in the cavity. If frost causes cracks in the concrete, the entire placement shall be removed and replaced at the CONTRACTOR's expense. When anchor bolts are installed in pipe sleeves or pre-cast holes, the cavity shall be completely filled with grout at the time the grout pads are constructed or at the time the bearing assemblies or masonry plates are placed.

3.10 PIPES, CONDUITS, AND DUCTS. Pipes, conduits, and ducts that are to be encased in concrete shall be installed in the forms by the CONTRACTOR before the concrete is placed. Unless otherwise indicated, they shall be standard, lightweight cast-iron water pipe or wrought iron. They shall be held rigidly so they will not be displaced during concrete placement.

3.11 FINISHING CONCRETE SURFACES. All concrete surfaces exposed in the completed WORK

shall receive an Ordinary Finish, as described below, unless otherwise noted on the Plans or in other Specification sections.

3.12 ORDINARY FINISH

A. An Ordinary Finish is defined as the finish left on a surface after the removal of the forms, the filling of all holes left by form ties, and the repairing of all defects. The surface shall be true and even, free from stone pockets and depressions or projections. All surfaces that cannot be satisfactorily repaired shall be given a Rubbed Finish.

B. The concrete in caps and tops of walls shall be struck off with a straightedge and floated to true grade. The use of mortar topping for concrete surfaces shall in no case be permitted.

C. As soon as the forms are removed, metal devices that have been used for holding the forms in place, and which pass through the body of the concrete, shall be removed or cut back at least 1 inch beneath the surface of the concrete. Fins of mortar and all irregularities caused by form joints shall be removed.

D. All small holes, depressions, and voids that show upon the removal of forms, shall be filled with cement mortar mixed in the same proportions as that used in the body of the WORK. In patching larger holes and honeycombs, all coarse or broken material shall be chipped away until a dense uniform surface of concrete exposing solid coarse aggregate is obtained. Feathered edges shall be cut away to form faces perpendicular to the surface. All surfaces of the cavity shall be saturated thoroughly with water, after which a thin layer of neat cement mortar shall be applied. The cavity shall then be filled with stiff mortar composed of 1 part of Portland cement to two parts of sand, which shall be thoroughly tamped into place. The mortar shall be pre-shrunk by mixing it approximately 20 minutes before using. The length of time may be varied in accordance with brand of cement used, temperature, humidity, and other local conditions. The surface of this mortar shall be floated with a wooden float before initial set takes place and shall be neat in appearance. The patch shall be kept wet for a period of five days.

E. For patching large or deep areas, coarse aggregate shall be added to the patching material. All mortar for patching on surfaces which will be exposed to view in the completed structure shall be color matched to the concrete. Test patches for color matching shall be conducted on concrete that will be hidden from view in the completed WORK and shall be subject to approval.

3.13 RUBBED FINISH

A. When forms can be removed while the concrete is still green, the surface shall be pointed and wetted and then rubbed with a wooden float until all irregularities and form marks are removed and the surface is covered with a lather composed of cement and water. If permitted, a thin grout composed of one part cement and one part fine sand may be used in the rubbing. This lather shall be allowed to set for at least five days. The surface shall then be smoothed by being rubbed lightly with a fine Carborundum stone.

B. If the concrete has hardened before being rubbed, a medium coarse Carborundum stone shall be used to finish the surface. Such WORK shall not be done until at least 4 days

after placing and it shall be done in the following manner. A thin grout composed of 1 part cement and 1 part fine sand shall be spread over a small area of the surface and rubbed immediately with the stone until all form marks and irregularities are removed and the surface is covered with a lather, after which the surface shall be finished as described above for green concrete.

C. The surface shall be smooth in texture and uniform in appearance. The building up of depressions will not be permitted.

C. If, through the use of first-class form materials and the exercise of special care, concrete surfaces are obtained that are satisfactory, the CONTRACTOR may be relieved entirely or in part from the requirement for rubbing.

3.14 COLORED CONCRETE

A. Measure, batch, mix, and deliver concrete with pigments in accordance with manufacturer's instructions and in accordance with specifications.

A. Place, finish, and cure concrete with pigments in accordance with manufacturer's instructions and in accordance with specifications.

B. Finish concrete as indicated in Finishing Concrete Surfaces.

3.15 CONCRETE DECKS

A. A smooth riding surface of uniform texture, true to the required grade and cross section, shall be obtained on all decks. The CONTRACTOR may use hand tools or finishing machines, or a combination of both, conforming to the requirements specified herein for finishing deck concrete.

C. The rate of placing concrete shall be limited to that which can be finished before the beginning of initial set.

D. After the concrete has been placed and consolidated, the surface of the concrete shall be carefully struck off by means of a hand operated strike board, operating on headers. A uniform deck surface true to the required grade and cross section shall be obtained.

E. Following strike off, the surface of the concrete shall be floated longitudinally. In the event strike off is performed by means of a hand operated strike board, two separate hand operated float boards for longitudinal floating shall be provided. The first float shall be placed in operation as soon as the condition of the concrete will permit and the second float shall be operated as far back of the first float as the workability of the concrete will permit.

F. Longitudinal floats, either hand operated or machine-operated, shall be used with the long axis of the float parallel to the centerline of the deck. The float shall be operated with a combined longitudinal and transverse motion planing off the high areas and floating the material removed into the low areas. Each pass of the float shall lap the previous pass by 1/2 the length of the float. Floating shall be continued until a smooth riding surface is obtained. The driving surface of the concrete shall have a heavy broom finish. Decks to

have waterproof membranes shall be float finished.

G. Hand operated float boards shall be from 12 feet to 16 feet long, ribbed and trussed as necessary to provide a rigid float, and shall be equipped with adjustable handles at each end. The float shall be wood, not less than 1 inch thick and from 4-inches to 8-inches wide. Adjusting screws spaced at not to exceed 24-inches on centers shall be provided between the float and the rib. The float board shall be true and free of twist.

H. Immediately following completion of the deck finishing operations, the concrete in the deck shall be cured as specified in Article 3.15, Curing Concrete, of this Section.

I. The finished surface of the concrete shall be tested by means of a straightedge 10 feet long. The surface shall not vary more than 0.01 foot from the lower edge of the straightedge. All high areas in the hardened surface in excess of 0.01 foot as indicated by testing shall be removed by abrasive means. After grinding by abrasive means has been performed, the surface of the concrete shall not be smooth or polished. Ground areas shall be of uniform texture and shall present neat and approximately rectangular patterns.

3.16 CURING CONCRETE

A. Water Curing

1. All concrete surfaces shall be kept wet for at least seven days after placing if Type I or II cement has been used or for three days if Type III cement has been used. Concrete shall be covered with wet burlap, cotton mats, or other materials meeting the requirements of AASHTO M 171 immediately after final finishing of the surface. These materials shall remain in place for the full curing period or they may be removed when the concrete has hardened sufficiently to prevent marring and the surface immediately covered with sand, earth, straw, or similar materials.

2. In either case the materials shall be kept thoroughly wet for the entire curing period. All other surfaces, if not protected by forms, shall be kept thoroughly wet, either by sprinkling or by the use of wet burlap, cotton mats, or other suitable fabric, until the end of the curing period. If wood forms are allowed to remain in place during the curing period, they shall be kept moist at all times to prevent opening at joints.

B. Membrane Curing. Liquid membrane curing compound meeting the requirements of AASHTO M 148, Type I, may be permitted, subject to approval by the ENGINEER, except compounds utilizing linseed oil shall not be used. All finishing of concrete surfaces shall be performed to the satisfaction of the ENGINEER prior to applying the impervious membrane curing compound. The concrete surfaces must be kept wet with water continuously until the membrane has been applied. The manufacturer's instructions shall be carefully followed in applying the membrane, and in all cases the membrane curing compound must always be thoroughly mixed immediately before application. In case the membrane becomes marred, worn, or in any way damaged, it must immediately be repaired by wetting the damaged area thoroughly and applying a new coat of the impervious membrane curing compound.

3.17 BACKFILLING AND OPENING TO TRAFFIC

A. Unbalanced backfilling against concrete structures will not be permitted until the concrete has attained a compressive strength of not less than 75% of the ultimate strength (f ’c) shown on the Plans.

3.18 CONCRETE SAMPLING AND TESTING

A. The CONTRACTOR shall retain a qualified inspection and testing agency to sample and test concrete. Inspection shall be by an ACI Concrete Field Technician I or under the direction of a professional Civil Engineer registered in the State of Alaska. Testing shall be performed by an established lab under the direction of a professional Civil Engineer registered in the State of Alaska. The CONTRACTOR shall submit daily reports to Engineer on a weekly basis.

B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M.

   a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

   a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, CONTRACTOR shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified

compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

9. Test results shall be reported in writing to ENGINEER, concrete manufacturer, and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by ENGINEER, but will not be used as sole basis for approval or rejection of concrete.

11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by ENGINEER. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by ENGINEER.

12. Additional testing and inspecting, at CONTRACTOR's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

D. Measure slab flatness and levelness within 24 hours of finishing.

3.19 CLEANING UP. Upon completion of the structure and before final acceptance, the CONTRACTOR shall remove all falsework. Falsework piling shall be removed or cut off at least 2 feet below the finished ground line.

END OF SECTION

SECTION 03302 - MINOR CONCRETE STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools and equipment necessary for furnishing and installing minor concrete structures, and all backfill and grading, in accordance with these specifications and in reasonably close conformity with the lines, grades, details, and locations shown on the plans or established by the ENGINEER.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement shall conform to the requirements of AASHTO M 85.

B. Aggregate shall be clean, durable, uniformly graded sand and gravel, or crushed stone, 100 percent passing a 1 1/2-inch sieve and containing not more than 5 percent passing a U.S. No. 200 sieve.

C. Air-entraining admixtures shall conform to the requirement of AASHTO M 154.

D. Water shall be obtained from the CBJ potable water system, unless otherwise permitted in writing by the ENGINEER.

E. Curing materials shall conform to the requirements of AASHTO M 182, AASHTO M 171, or AASHTO M 148, as appropriate; except that AASHTO M 148 is modified to prohibit use of compounds utilizing linseed oil. Curing Compound shall also meet requirements of Section 033001- Structural Concrete

F. Reinforcing Steel shall conform to the requirements of Section 03301-Structural Concrete.

G. Welded wire fabric shall conform to the requirements of AASHTO M 55.

H. Joint Fillers shall be of the type specified in the contract, and shall conform to the appropriate following requirements:

1. Poured filler - AASHTO M 173 or AASHTO M 282 as specified.
2. Preformed filler - AASHTO M 213

I. “Concrete International Corporation” Ashford formula or approved equal shall be used instead of the specified curing materials.

2.2 COMPOSITION OF CONCRETE

A. Portland cement concrete will ordinarily be accepted on the basis of certification.

B. The concrete shall contain 5 to 8 percent of entrained air, as determined by ASTM C231. Concrete shall have a slump of not more than 4 inches as determined by ASTM C143.

C. Concrete shall contain not less than 611 pounds of cement and not more than 300 pounds of water per cubic yard.

D. The concrete shall develop a minimum compressive strength of 4,000 psi in 28 days.

E. The concrete shall be subject to acceptance or rejection by visual inspection at the job site. Retempering concrete will not be permitted.

F. The CONTRACTOR shall submit a concrete mix design to include the following:

1. The type and sources of aggregates and cement.
2. Scale weights of each aggregate proposed as pounds per cubic yard of concrete.
3. Quantity of water proposed as pounds per cubic yard of concrete.
4. Quantity of cement proposed as pounds per cubic yard of concrete.
5. Air content.
6. Slump.

G. When a commercial supplier is used the CONTRACTOR shall furnish a certification with each truck load of concrete certifying that the material and mix proportions used are in conformance with the approved mixture.

H. Concrete complying with Section 03301 – Structural Concrete will be acceptable as an approved mixture with appropriate certification.

I. The ENGINEER may make and test cylinders for strength determinations.

2.3 FORMS

A. Forms shall be designed and constructed to be removed without injuring the concrete. They shall be free of bulge and warp, and constructed so the finished concrete will be of the form and dimensions shown on the plans, and true to line and grade. Forms for concrete containing a retarding admixture shall be designed for a lateral pressure equal to that exerted by a fluid weighing 150 pounds per cubic foot.

PART 3 - EXECUTION

3.1 PLACING CONCRETE

A. Concrete shall be placed to avoid segregation of materials and consolidated with mechanical vibrators in accordance with Section 03301 – Structural Concrete.

B. When concrete is placed by the pumping method or by tremie operations, the use of aluminum pipe or conduit for transporting the concrete will not be permitted.

C. The intervals between deliveries of batches for a single pour shall not exceed 30 minutes.

D. When placing concrete at or below an atmospheric temperature of 35°F the CONTRACTOR shall comply with the applicable requirements of Section 03301 – Structural Concrete.

3.2 FINISHING CONCRETE SURFACES

A. All concrete surfaces shall be finished in accordance with the requirements of Section 03301 – Structural Concrete, except "Concrete International Corporation" Ashford formula shall be used as a curing compound.

3.3 CURING CONCRETE

A. All concrete will be cured a minimum of 7 days, or, if high early strength cement is used, a minimum of 3 days. The concrete shall be cured in accordance with Section 03301 – Structural Concrete.

3.4 REMOVAL AND DISPOSAL OF EXISTING STRUCTURES

A. Existing concrete and any other debris necessary to be removed to allow construction of the new structure, shall be removed and replaced or disposed of as shown on the plans, or approved by the ENGINEER.

B. All WORK necessary to provide support for, and/or stabilization of existing structures, embankments, landscaping, and other existing features that will be affected by the new concrete structure construction, shall be accomplished by the CONTRACTOR.

C. The CONTRACTOR shall coordinate his work with the affected property owners, with adequate time (48 hours minimum) made available for their access to their property through the excavated area for other work they may wish to accomplish.

END OF SECTION

SECTION 03303 – SIDEWALK, CURB AND GUTTER

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK under this Section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing sidewalk, curb and gutter of all types, concrete slabs, wheel stops, and other areas as noted and shown in the Plans and as shown on Standard Details.

1.2 SUBMITTALS

A. All concrete submittals as described in Section 03301-Structural Concrete

B. Micro Synthetic Fiber Reinforcement- Product data sheets

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials shall conform to the requirements of Section 03301 – Structural Concrete, except "CureCrete" Ashford Formula, or approved equal, shall be used instead of the specified curing materials on curbs and gutters.

B. Micro-synthetic Fiber Reinforcement

1. Micro-synthetic fiber shall be used in curb and gutter as noted in the Plans.

2. Micro Synthetic Fiber shall be 100 percent virgin homo-polymer polypropylene fibrillated fibers, containing no reprocessed olefin materials conforming to ASTM C 1116, Type III

3. Micro-synthetic fiber shall be *Fibermesh 300* as manufactured by Propex *Operating Company* provided in ½-inch to 1 ½"-inch lengths or approved equal.

C. Colored Concrete: Color pigmented concrete with sparkle grains topping additive.

1. Colored concrete paving shall be concrete conforming to Section 03301 and .

2. Colored concrete shall be Dark Grey integral colored concrete topped with Sparkle Grains, Silicon Carbide Topping, manufactured by Pacific Palette Concrete Products, www.pacificpalette.com, or ENGINEER approved equal. The Silicon Carbide Topping shall consisting of 16 grit black color silicon carbide.

3. Concrete Color Admixture: Color concrete admixture shall be dry iron oxide pigment manufactured by Davis Color Products, www.daviscolors.com, or ENGINEER approved equal. Pigment shall comply with ASTM C979 and color shall be Dark Grey #860, black iron oxide-based pigment. The pigments shall be designed for ready mix concrete to produce an integral and uniform color. The color shall be permanent, inert, stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime-proof, and non-bleeding.

PART 3 - EXECUTION

3.1 METHODS OF CONSTRUCTION

A. Sidewalk, concrete slabs, curb and gutter, wheel stops shall conform to the applicable requirements of Section 03301 –Structural Concrete, and as shown on the Drawings, except "CureCrete" Ashford Formula, or approved equal, may be used as a curing compound for curbs and gutters. Ashford Formula shall be applied per the following manufacturer's instructions.

1. The curing compound shall be sprayed on the surface with a low-pressure sprayer as soon as the surface is firm enough to walk on immediately following the finishing operation.

2. The entire surface shall be kept wet for 30 minutes by brooming excess material onto the dry spots or by re-spraying them immediately. No areas on the concrete surface shall be allowed to dry during the initial 30-minute period.

3. As the curing compound begins to dry into the surface and becomes slippery, lightly sprinkle the surface with water to aid the penetration of the curing compound and to bring any alkali to the surface.

4. After 30 to 40 minutes, squeegee or broom the surface to remove any excess curing compound and alkali or other impurities brought to the surface. All WORK required for the application of the curing compound shall conform to the manufacturer's recommendations.

B. Colored Concrete Finish:

1. Apply sparkle grain toppings to surface of colored concrete at rate and as directed by manufacturer for exterior application.

2. Immediately after substrate surface has been leveled and floated, before bleed water has appeared, apply sparkle grains with two coat application process (in two directions), as directed by manufacturer, leaving sparkle grains at and just below the surface covered with a thin concrete film.

3. Trowel and broom finish when surface has sufficiently set to avoid burying sparkle grains below concrete surface, but before concrete has hardened and cannot accept grains or creates surface voids.

4. Immediately after completing the finish, apply a membrane curing compound appropriate for colored concrete and meeting all requirements of this section and manufacturer instructions.

C. All exposed or unprotected edges of sidewalks shall be tooled to a radius of not more than one-half inch. After floating, trowel finish the entire surface using steel trowels. Final finish shall be obtained by brooming the surface, including the tooled edge, to a gritty finish after all free moisture has disappeared from the surface. Sprinkling of cement or sand for blotting will not be permitted.

D. Concrete curb and gutter, curb, and valley gutter shall be integral, one course construction, and molded in place on a gravel subgrade. The face forms of the integral curb and gutter shall be removed as soon as practicable. The top and inclined surface shall then be worked with float or steel trowels to a gritty finish. Glazing, sprinkling of sand or cement, or blotting will not be permitted. Both front and back edges shall be tooled to a radius of one-half inch.

E. Concrete curb and gutter shown in the Plans without reinforcing steel bar shall have Micro-synthetic fiber reinforcement as specified herein. Fiber reinforcement will not be accepted as a suitable substitution for curbs with reinforcing steel bar as shown in the Plans.

F. Use of monolithic curb and gutter machines will be permitted only on the written approval of the ENGINEER. Mortar may be added to the curb machine in a quantity approved by the ENGINEER.

G. Isolation joints shall be constructed as shown in the Plans and shall be placed at locations shown on the Plans. Isolation joints shall not be placed between the seawalk and the curb.

H. Isolation joint material shall conform to the requirements of AASHTO M 213. This material shall extend the full width of the structure and shall be cut to such dimensions that the base of the expansion joint shall extend to the subgrade and the top shall be depressed not less than one-quarter inch nor more than one-half inch below the finished surface of the concrete. The material shall be one piece in the vertical dimension and shall be securely fastened to the existing concrete face against which fresh concrete is to be poured.

I. Control joints, shall be constructed as shown in the Plans, shall be tooled in the sidewalk at intervals equal to the width of the sidewalk and at ten-foot intervals in the curb and gutter. Where the sidewalk adjoins the curb (parallel to it), control joints in the curb shall be made to match the sidewalk joints per ENGINEER direction.

J. The top and face of the finished curb shall be true and straight and the top surface of curbs shall be of uniform width, free from lumps, sags, or other irregularities. When a straightedge 10 feet long is laid on the top or face of the curb, or on the surface of gutters, the surface shall not vary more than 0.02 foot from the edge of the straightedge except at grade changes or curves. All discolored concrete shall be cleaned at the CONTRACTOR's expense. The concrete may be cleaned by abrasive blast cleaning or other methods approved by the ENGINEER. Repairs shall be made by removing and replacing the entire unit between scoring lines or joints.

END OF SECTION

SECTION 03304 – SPECIAL CONCRETE STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION

2. The WORK under this Section shall include all labor, materials, tools and equipment necessary for construction of the cast-in-place concrete seawalk and cantilevered concrete seawalk, concrete landscape planter seatwall and all other hardware and related Work, in accordance with the requirements of the Contract Documents and as shown on the Plans.

1.2 REFERENCES

A. ASTM (American Society of Testing Materials) Specifications

B. ACI (American Concrete Institute) Code

C. AWS (American Welding Society) D1.4 – Reinforcing Steel

D. ASTM A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

E. ASTM A706 – Low Alloy Steel Deformed Bars for Concrete Reinforcement

F. ASTM C150 – Portland Cement

G. ASTM C33 – Concrete Aggregates

H. ACI 301 – Structural Concrete for Buildings

I. ACI 304 – Recommended Practice for Measuring, Mixing Transporting and Placing Concrete

J. ACI 306R – Cold-Weather Concreting

K. ACI 308 – Standard Practice for Curing Concrete

L. ACI 309 – Standard Practice for Consolidation of Concrete

M. ACI 318 – Building Code Requirements for Reinforced Concrete

N. ACI 347 – Recommended Practice for Concrete Formwork

1.3 SUBMITTALS

A. Concrete Mix Design

B. Reinforcement Fabrication Drawings

C. Concrete Sealer

D. Construction Joint Layout: Indicate proposed construction joints required to construct the pavement. Location of construction joints is subject to Engineer approval.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with applicable ACI requirements.

B. Acquire cement and aggregate from the same source for all Work.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Concrete shall conform to the following requirements:

- Minimum 28 day compressive strength f'c = 6,000 psi
- Minimum cement content = 7.5 sacks per cubic yard
- Maximum water cement ratio = 0.40
- Air Entrainment = 4% to 7%
- Cement conform to ASTM C595 Type IL with tri-calcium aluminate content below 8%.
- Aggregate conform to ASTM C33 with maximum size of 3/4 inch.
- Water shall be potable, and free from amounts of oil, acid, alkali, and organic materials detrimental to the concrete.

B. Reinforcing steel shall be new billet stock ASTM A615, Grade 60. Bent or welded bars shall be ASTM A706, Grade 60. All reinforcing steel shall be galvanized in accordance with ASTM A767. Galvanizing shall be performed after fabrication.

B. All other miscellaneous materials shall conform to Section 03301 – Structural Concrete.

2.2 CONCRETE SEALER

A. CureCrete Ashford Formula or approved equal shall be used as a concrete waterproofing sealer system. The concrete sealer shall be applied to the cantilever concrete slab and counterweight prior to opening the surface to use.

2.3 FORMWORK

A. Forms shall be designed and constructed to be removed without injuring the concrete. They shall be free of bulge and warp, and constructed so the finished concrete will be of the form and dimensions shown on the Plans, and true to line and grade. Forms for concrete containing a retarding admixture shall be designed for a lateral pressure equal to that exerted by a fluid weighing 150 pounds per cubic foot.

2.4 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752.

2.5 CONCRETE CRACK REPAIR

A. Euco Qwikstich Fast Setting Urethane Crack and Spall Repair by The Euclid Chemical Company or approved equal.

2.6 HANDRAIL

A. The seawalk handrail shall be provided in accordance with Section 02892 - Handrail.

2.7 BENCHES

A. The landscape planter seatwall benches shall be provided in accordance with Section 02870 – Site Furnishings.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Mixing: Mix in accordance with proportions specified in the Concrete Mix Design submitted by the CONTRACTOR, and approved by the ENGINEER. Concrete shall be mixed in a batch mixer of acceptable size and type which will ensure a uniform distribution of materials throughout the mix so as to produce a homogeneous mix, uniform in color. All concrete shall be placed within (1) hour after water is first added to the batch. The mixer shall be cleaned at frequent intervals while in use.

B. Placing Concrete:

1. Notify ENGINEER a minimum of 24 hours prior to commencement of operations.
2. Place concrete in accordance with ACI 304 and as herein specified. Place concrete continuously or in layers of such thickness that no concrete has hardened or set sufficiently to cause the formation of cold joints, seams or planes of weakness.
3. Remove water and debris from concrete form work prior to placing concrete.
4. Place concrete as nearly as practicable to its final position so as to avoid segregation due to excessive drop and re-handling.
5. Do not use concrete which becomes non-plastic and unworkable and does not meet the required quality control limits, or has been contaminated by foreign materials.
6. Remove rejected concrete from the site.

C. Consolidation:

1. Consolidate concrete in accordance with ACI 309 and as herein specified.
2. Consolidate the full depth of concrete slab and thickened slab edge. Consolidate slabs per section 03301-Structural Concrete immediately after placing concrete. Use a high frequency mechanical concrete vibrator to consolidate concrete, supplemented by hand-spreading, rodding or tamping.
3. Do not use vibrators to transport concrete inside the forms.
4. Consolidate concrete placed along forms that will be exposed when forms are removed to prevent exposed honeycombing.

D. Equipment:

1. Provide adequate number of mechanically maintained equipment, including spare units, to ensure completion of concrete placement, as required, without delay or stopping.

E. Finishing:

1. All finished or formed surfaces shall accurately conform to the shape, alignment, grades and sections as shown of the Plans.
2. Provide medium broom finish, transverse to primary traffic, on all horizontal surfaces. Provide Ordinary Finish on all vertical surfaces per Section 03301 – Structural Concrete.

F. Curing and Protection:

1. Cure and protect concrete in accordance with ACI 308, ACI 306R and as herein specified.
2. Immediately after placement, protect concrete from premature drying and physical damage according to section 03301-Structural Concrete. No concrete shall be placed during a rain event unless acceptable protective shelter is provided.
3. Maintain concrete with minimal moisture loss and at relatively constant temperature for period of time necessary for sufficient hydration of cement and hardening of concrete.
4. Concrete shall be kept continually wet while curing by applying water over the curing concrete slab a minimum of twice a day. The curing concrete slab shall be covered with water saturated burlap or other approved material for at least 7 days if Type I or Type II cement is used or for at least 3 days if Type III cement is used.
5. Wood forms allowed to remain in place during the curing period shall be keep moist at all times.
6. Liquid membrane curing compound may be permitted, subject to approval of manufacturer's product data. Apply in strict accordance with manufacturer's instructions. Maintain moisture cure procedures prior to application of approved curing compound. Repair marred or damaged membrane immediately.
7. Protect all fresh concrete from vibrations due to compaction of adjacent earthwork until the fresh concrete has reached a min 80% of its compressive capacity.
8. Protect fresh and curing concrete from ambient temperatures less than 40^{o}F per section 03301-Structural Concrete.

G. Defective concrete consists of concrete not conforming to mix design, required lines, grades, details, dimensions, tolerances or other specified requirements. Repair or replacement of defective concrete shall be determined by the ENGINEER. Defective concrete shall be repaired and/or replaced at no additional cost to the OWNER. Repair all concrete cracks greater than 0.007" wide with Euco Qwikstich crack repair product or approved equal.

H. CONTRACTOR shall protect adjacent fill materials from erosion at all times during construction of the concrete slab. Any eroded materials shall be replaced at no additional cost to the OWNER.

I. All other construction requirements shall conform to Section 03301 – Structural Concrete.

J. Apply sealer to finished concrete surface per Section 03301- Structural Concrete and per manufactures recommendations. Submit product information to ENGINEER for approval prior to ordering.

END OF SECTION

SECTION 05120 – METAL FABRICATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK in this Section shall include all labor, materials, tools and equipment necessary for fabrication, handling, transport and installation of all structural steel and aluminum items in accordance with the requirements of the Contract Documents and as shown on the Plans.

1.2 REFERENCES

A. AISC (American Institute of Steel Construction) Code of Standard Practice - Manual of Steel Construction - Allowable Stress Design (ASD).

B. ASTM (American Society of Testing Materials) Specifications

C. ASTM A36/A36M - Structural Steel.

D. ASTM A6 – General Requirements for Rolled Steel Plates, Shapes, Sheet piling, and Bars for Structural Use.

E. ASTM A108 – Steel Bars, Carbon Cold-Finished, Standard Quality.

F. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

G. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

H. ASTM A325 - High Strength Bolts for Structural Steel Joints.

I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

J. ASTM A53 – Steel Pipe.

K. ASTM F593 – Stainless Steel Bolts, Hex Cap Screws, and Studs.

L. ASTM F594 – Stainless Steel Nuts.

M. AWS D1.1 - Structural Welding Code - Steel.

N. The Aluminum Association – Aluminum Design Manual: Specifications and Guidelines for Aluminum Structures.

O. ASTM B209 – Standard Specifications for Aluminum and Aluminum-Alloy Sheet and Plate.

P. ASTM B210 – Standard Specifications for Aluminum and Aluminum-Alloy Drawn Seamless Tube.

Q. ASTM B221 – Standard Specifications for Aluminum and Aluminum-Alloy Bar, Rod, Wire, Profiles and Tubes.

R. ASTM B241 – Standard Specifications for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Tube.

S. ASTM B308 – Standard Specifications for Aluminum and Aluminum-Alloy 6061-T6 Standard Structural Profiles.

T. AWS D1.2 - Structural Welding Code - Aluminum.

1.3 SUBMITTALS

A. Fabrication Shop Drawings of all fabricated steel and aluminum items prior to fabrication.

1. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld.
2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
3. Indicate type, size and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct-tension, or tensioned shear/bearing connections.

B. Manufacturer's Mill Certificate: Steel certification for all steel used shall include chemistry, yield strength, and mill numbers.

C. Galvanizing Certifications

D. Galvanizing Repair Method and Materials

E. Welding Procedures

F. Welders Certificates: Certify welders employed in the work, verifying AWS qualification.

G. Product data, samples, preparation, application, QA/QC Plan, and field repair of metal coatings per Section 09000 – Coatings.

H. Provide fabrication shop QA/QC Plan for review by ENGINEER. Provide qualification data for firms and/or persons to demonstrate their capabilities and experience. Include lists of projects with project names and addresses, and names and addresses of engineers, architects and owners.

1.4 QUALITY ASSURANCE

A. Fabricate and install structural steel in accordance with AISC Code of Standard Practice.

B. Fabricate and install aluminum in accordance with Aluminum Association Aluminum Design Manual.

C. Quality Assurance. The metal fabricator must have an ongoing quality assurance program approved by a qualified, independent source. At the option of the ENGINEER, the fabricator shall submit a copy of their operational quality assurance program, and

shall not begin fabrication until the ENGINEER has approved this quality assurance program. The objectives of the quality assurance program are as follows:

1. Completed products shall conform completely to all governing codes and specifications stipulated in the Design Contract Documents, and Plans.

2. Quality Assurance Program is an integral part of the ongoing manufacturing activities of the Fabricator.

Although periodic inspections will be carried out by the ENGINEER, the purpose of these inspections is to note general conformance to the design documents. It is still the responsibility of the fabricator to produce a quality product, in complete conformance with the design documents, and to document and correct any non-conformance. All documentation, including that submitted, shall be kept on file by the fabricator, for review, if requested by the OWNER or ENGINEER.

D. Fabrication Facility. The fabrication facility shall provide the proper environment and physical conditions necessary for welding, cutting, and general metal fabrication. The facility shall provide adequate work space, equipment, level surfaces, and protection from wind, moisture and freezing. The fabricator shall have the capability to carry out the following work in-house or on a contract basis:

- Design of lifting and erection devices not shown on the drawings.
- Preparation of shop fabrication drawings.
- Receiving, checking and storing of materials for metal fabrication.
- Dimensional checking and verification.
- Resolution of non-conformities.
- Documentation of all stages of work with capability of tracing all major components.
- Finishing, repairing, storing and shipping.

E. Fabricator Qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the WORK. Shop welding procedures and qualifications shall be submitted for review by the ENGINEER.

F. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code - Steel, current edition, and AWS D1.2 Structural Welding Code – Aluminum, current edition.

1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

2. Submit welding procedures in accordance with AWS Structural Welding Codes.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Fabricator’s shop in such quantities and at such times to ensure continuity of installation.

B. Store materials to permit easy access for inspection and identification. Materials shall be protected during shipping and handling. Materials shall be stored above ground on

pallets, platforms or other supports. Materials shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members shall be adequately supported on skids to prevent damage from deflection.

C. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

D. Do not store materials or assembled structures in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS - All materials for metal fabrication shall conform to the Contract Documents and as shown on the Plans. Purchase orders shall contain all necessary information to verify that materials purchased comply with the fore mentioned documents. The Fabricator shall inspect all materials, upon arrival, for conformance with the purchase orders. The Fabricator shall confirm that mill certificates and test reports are provided and that they correctly identify the materials delivered. If a supplier proposes a substitute for any material, the proposed substitution shall be submitted to the ENGINEER for approval prior to commencing any WORK involving use of the proposed substitute material. Supplier must be prepared to supply materials as identified on the design documents if the proposal for a substitution is not approved by the ENGINEER.

A. All miscellaneous steel shapes and plate steel shall be ASTM A36, hot-dip galvanized, unless otherwise noted.

B. Square and rectangular HSS shall be ASTM A500, Grade B, hot-dip galvanized, unless otherwise noted.

C. Pipe less than 12-inch diameter shall be ASTM A53, Grade B, Type E or S, hot-dip galvanized, unless otherwise noted. Pipe greater than 12-inch diameter shall conform to Section 02896 - Steel Pipe Piles.

D. Bolts and Miscellaneous Hardware: Unless otherwise noted, all bolts shall be ASTM A307, hot-dip galvanized. Washers are required under both the head and nut of all bolts, unless otherwise noted. All nuts and washers shall be hot-dip galvanized. Plate washers, with a diameter equivalent to a malleable iron washer, shall be used in all areas where the bolt head or nut bear against wood, except under economy head bolts. All bolts called out as ASTM A325 shall be hot-dip galvanized. A325 bolts shall be installed per AISC turn-of-nut method, or other ENGINEER approved method, unless otherwise indicated on the Plans.

All bolts, nuts, washers, screws, and miscellaneous hardware called out as Stainless Steel shall be Type 316 Stainless Steel conforming to ASTM F593 and F594 as applicable.

All nails shall be hot-dip galvanized.

E. Aluminum shall conform to 6061-T6, unless otherwise noted. Aluminum pipe and round bar shall be 6063-T6.

2.2 METAL COATINGS

A. Unless otherwise noted, all steel shall be hot-dip galvanized in accordance with ASTM A123 or A153 as appropriate.

B. All other metal coatings shall be per Section 09900 – Coatings.

PART 3 - EXECUTION

3.1 METAL FABRICATION

A. Shop Inspection: The CONTRACTOR shall furnish the ENGINEER with 30 days notice of the beginning of WORK at the mill or in the shop so that special fabrication inspections may be scheduled by the ENGINEER.

B. Fabricate and assemble components in a shop, to greatest extent possible. Workmanship and finish shall be equal to the best industry standards and in accordance with the requirements of AWS, AISC, and The Aluminum Association, as applicable.

1. Mark and match-mark materials for field assembly.
2. Materials shall be sourced with matching heat numbers and/or from the same mill runs as necessary for fabricated project elements that require consistent, critical dimensions and fit-up in order to function as intended by design.
3. Fabricate for delivery in a sequence that will expedite erection and minimize field handling.
4. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
5. Holes: Drill holes perpendicular to metal surfaces; do not flame-cut holes or enlarge holes by burning.
6. Aluminum Fabrication: Edges shall be cut true, smooth and free of burrs. Flame cutting is not permitted. Corner edges shall be ground smooth. Holes shall be drilled or punched. Weld spatter and flash marks shall be removed and ground smooth. Mill stamps and markings shall be removed from all exposed surfaces.

C. Structural material, either plain or fabricated, shall be stored at the fabricating shop above ground, on platforms, skids or other supports. It shall be kept free from dirt, grease or other foreign matter, and shall be protected, as far as practical, from corrosion.

D. All holes required for steel hot-dip galvanizing shall be clearly identified on the Shop Fabrication Drawings for ENGINEER review and approval. Fabricator shall coordinate with Galvanizer to determine size and quantity of holes required. Some, or all of the holes, may be required to be fully repaired per AWS D 1.1, at the discretion of the ENGINEER.

3.2 METAL ERECTION

A. General: The CONTRACTOR shall provide and later remove all falsework, temporary shoring, and bracing necessary for erection and to complete assembly. All such devices

shall be properly designed and constructed by the CONTRACTOR to meet anticipated construction and handling loads.

B. Handling and Storing of Materials: Material to be stored shall be placed on skids above the ground. It shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Handling and erection procedures shall be conducted in a manner to avoid over stressing any structural element. Stress and deflection calculations shall be provided by the CONTRACTOR, as deemed necessary by the ENGINEER, for any erection procedure.

C. Method and Equipment: Before starting the WORK of erection, the CONTRACTOR shall inform the ENGINEER fully as to the method of erection proposed, and the amount and character of equipment proposed to be used. Approval by the ENGINEER shall not be considered as relieving the CONTRACTOR of the responsibility for the safety of his method and equipment, or from carrying out the WORK in full accordance with the Plans and Specifications.

D. Assembling: Metal parts shall be accurately assembled as shown on the Plans, following applicable Industry Standards, Codes, erection drawings and fabricators' match-marks. Excessive force or manipulation of parts shall not be allowed as determined by the ENGINEER. The material shall be carefully handled so that no parts will be bent, broken, or otherwise damaged. Hammering, which will injure or distort the members will not be permitted. Bearing surfaces shall be cleaned before the members are assembled.

E. Bolt Holes and Bolting: Bolt holes and bolting shall follow the requirements as stated on the Plans and as indicated by applicable Industry Standards and Codes. Any steel to steel connections noted to be considered "slip-critical" shall be installed by the "turn-of-nut" tightening method per AISC. In addition to the requirements of AISC, bolting of slip-critical joints shall proceed in the following manner:

1. The joint shall be fitted up and aligned with drift pins.
2. Sufficient force shall be applied so as to bring the faying surfaces of steel into close contact. If high strength bolts are used for this purpose (i.e. used to pull steel into position), they shall be clearly marked for identification, and not used in the final connection.
3. High strength bolts shall be installed and brought up to snug-tight condition, such as can be produced by a few blows of an impact wrench, or by an ordinary spud wrench.
4. High strength bolts shall then be tightened by turn-of-nut method, progressing from the most rigid part of the joint toward the free edges.
5. Bolts used to pull steel into position (mentioned above) shall then be removed, replaced with high strength bolts, and tightened as described above.
6. The impact wrench used for bolt tightening shall be of adequate capacity so as to provide the required tightening in approximately 10 seconds.
7. Bolt lengths shall be such that 0" to ¼" of the bolt shall extend past the end of the nut after tightening.

F. Welding: All welding shall be in accordance with AWS D1.1 or AWS D1.2, current edition, as applicable. All welders shall be qualified per AWS for the type of welding anticipated. Welds will be spot tested by the ENGINEER by VT, MT, or UT and any welds which fail shall be repaired at the CONTRACTOR's expense, which will also include all costs for retesting. No welding through galvanized coatings will be permitted. The galvanizing within one inch of the weld shall be removed and repaired, after welding, according to these Specifications. All weld filler metal shall have chemistry similar to the base metal and shall have a minimum Charpy Impact Test Value of 20 ft-lbs. at –20 degrees F and have chemistry similar to the base metal. Filler metals shall only be used in welding positions recommended by the manufacturer. Welding materials shall be stored, and the condition maintained, according to AWS.

G. Galvanize Repair: Galvanized coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per Section 09900 – Coatings, Sub-Section 3.2.

H. Thermal Spray Metalizing (TSM) Repair: TSM coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired per Section 09900 – Coatings, Sub-Section 3.2.

END OF SECTION

SECTION 09900 - COATINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The WORK in this section shall include all labor, materials, tools and equipment necessary for handling, transport, surface preparation and application of all metal coatings, and all other miscellaneous associated work, in accordance with the requirements of the Contract Documents and as shown on the Plans.

1.2 REFERENCES

A. ASTM (American Society of Testing Materials) Specifications

B. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

C. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

D. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

E. SSPC Guide No. 23 for Thermal Spray Metallic Coating.

1.3 SUBMITTALS

A. Product Data: Provide product data and/or technical specifications including manufacturer's instructions for surface preparation, required environmental conditions, etc., for all metal coating products.

B. Samples: Submit (2) samples demonstrating color and texture for each proposed metal coating product.

C. Coating Repair Methods and Materials: CONTRACTOR'S proposed repair methods, procedures and materials for all metal coatings damaged as a result of shipping, handling, welding or by other means.

D. CONTRACTOR shall submit a Quality Plan for preparation and application of all metal coatings. Quality Plan shall address solvent cleaning, blasting, surface profile standards, stripe coat and primer coat application, finish coat applications, coating thickness measurement and documentation, adhesion pull test procedures, independent inspection and documentation, as well as handling and transport methods.

1.4 QUALIFICATIONS

A. Thermal sprayed and painted coatings shall be applied by an experienced firm that has knowledge, procedures and equipment necessary to provide surface preparation and application of complex protective coating systems. Thermal sprayed and painted coatings shall be applied by a firm possessing AISC certification for Shop Application of Complex Protective Coating Systems (SPE) P1 and/or SSPC-QP 3.

PART 2 - PRODUCTS

2.1 GALVANIZING

A. Hot-dipped galvanizing shall be per ASTM A123 or A153, as appropriate.

2.2 THERMAL SPRAY METALLIC COATING

A. Shall conform to SSPC Guide No. 23.

B. Thermal Spray Metallic Coating shall be 85%zinc/15% aluminum applied to a minimum dry coating thickness of 15 mils, and shall be top coated with clear sealer PRO-LINE 4800/4801 PROTHANE H.S. as manufactured by *Sherwin-Williams*, or approved equal, to a dry film thickness (DFT) of 2-3 mils.

2.3 NON-SKID COATING

A. Metal surfaces designated to have Non-Skid coating shall be initially thermal arc-sprayed with zinc only to a minimum dry coating thickness of 6 mils, followed by a thermal arc-sprayed top coat of TH 605, as manufactured by *Thermion*, or an approved equivalent product, to achieve an aggressive surface profile. Approved Non-skid coating shall be applied to a minimum dry coating thickness of 12 mils, and shall be top coated with clear sealer PRO-LINE 4800/4801 PROTHANE H.S. as manufactured by *Sherwin-Williams*, or approved equal, to a dry film thickness (DFT) of 2-3 mils. Surface prep and Non-Skid coating application shall be conducted as recommended by *Thermion,* or other approved manufacturer. Fabricator shall coordinate with manufacturer prior to Non-Skid coating application, and submit surface prep and application procedures for ENGINEER approval. Samples of Non-Skid coating must be submitted to ENGINEER and approved by the ENGINEER prior to commencing with Non-Skid coating application.

PART 3 - EXECUTION

3.1 PREPARATION AND APPLICATION

A. Galvanizing shall be performed after fabrication, and all holes required for galvanizing shall be repaired per AWS D1.1, and in accordance with Sub-Section 3.2, unless otherwise approved by the ENGINEER.

B. Preparation and application of Thermal Spray Metallic Coatings shall conform to SSPC Guide No. 23, to the minimum dry film coating thickness specified in these specifications. Thermal Spray Metallic Coating damaged from shipping, handling, welding or by other means shall be repaired in accordance with SSPC Guide No. 23, Section 8.7.

C. Metal surfaces specified to be Non-Skid shall be prepared per coating manufacturer's recommendations and submitted Quality Plan.

D. Surface preparation will be monitored and dry film thickness testing will be performed by OWNER representative to ensure adequate coating application. If coating thickness is insufficient, the Fabricator is responsible for and shall be prepared to apply more layers as

necessary to obtain the required minimum thickness specified in the Contract Documents.

3.2 COATING REPAIRS

A. CONTRACTOR shall submit metal coating repair methods and procedures for review and approval by the ENGINEER, prior to fabrication or mobilization of any equipment and materials.

B. Galvanize Repair: Galvanized coatings damaged due to fabrication, welding, material handling or occurring during installation shall be repaired by using the following hot-applied repair stick method:

1. Repair sticks shall be zinc-cadmium alloys (melting point 518° - 527°F) such as "Rev-Galv", or zinc-tin-lead alloys (melting point 446° - 600°F) such as "Galv-Weld", "Zilt", and "Galv-over". The zinc-tin -lead alloys shall comply with U.S. Federal Specification O-G-93 and contain fluxing agents.
2. Remove welding slag by chipping hammer and clean weld or damaged area by vigorous wire brushing.
3. Preheat the region to be repaired by means of an oxyacetylene torch or other convenient method to between 600°F and 750°F. The alloys do not spread well at temperatures lower than 600°F. Also, as temperatures rise above 600°F increasing amounts of dross form.
4. Wire brush surface again.
5. Apply coating by rubbing bar of the alloy over the heated surface while it is hot enough to melt the alloy.
6. Spread the molten alloy by briskly wire brushing or rubbing with a flat edge strip of steel or palette knife. Minimum thickness of applied zinc stick material shall be 12 mils.
7. Remove flux residues by wiping with a damp cloth or rinsing with water.
8. Brush apply two top coats of zinc rich paint, ZRC or equal (cold galvanize repair).

C. Thermal Spray Metalizing (TSM) Repair: Thermal Spray Metallic Coating damaged due to fabrication, welding, material handling or occurring during installation shall be repaired in accordance with SSPC Guide No. 23, Section 8.7.

END OF SECTION

SECTION 16060 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Connectors and splices.

B. Related Requirements:

1. Section 16211 "Communications Copper Horizontal Cabling" for twisted pair cabling used for data circuits.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Copper building wire.
2. Connectors and splices.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B8 for stranded conductors.

D. Conductor Insulation:

1. Type XHHW-2. Comply with UL 44.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Branch Circuits:

1. Copper: Stranded

3.2 CONDUCTOR INSULATION AND WIRING METHODS

A. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION, GENERAL

A. Complete raceway installation between conductor and cable termination points in accordance with Section 16075, “Underground Ducts and Raceways for Electrical Systems” prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

1. Use oxide inhibitor in each splice, termination, and tap.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 16120 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

END OF SECTION 16060

SECTION 16070 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding bushings.
3. Grounding and bonding connectors.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment Grounding Conductor:

1. General Characteristics: 600 V, XHHW-2 copper wire or cable, green color, in accordance with Section 16060 "Low-Voltage Electrical Power Conductors and Cables."

B. ASTM - Bare Copper Grounding and Bonding Conductor:

1. Referenced Standards: Complying with one or more of the following:

a. Soft or Annealed Copper Wire: ASTM B3.
b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.
d. 19-Wire Combination Unilay-Stranded Copper Conductor: ASTM B787/B787M.

2.2 GROUNDING AND BONDING BUSHINGS

A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures and have one or more bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.

B. Source Limitations: Obtain products from a single manufacturer.

C. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

D. UL KDER - Bonding Bushing:

1. General Characteristics: Threaded bushing with insulated throat.

E. UL KDER - Grounding Bushing:

1. General Characteristics: Threaded bushing with insulated throat and mechanical-type wire terminal.

2.3 GROUNDING AND BONDING CONNECTORS

A. Source Limitations: Obtain products from a single manufacturer.

B. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

2. Listing Criteria:

a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

C. UL KDER - Pressure-Type Grounding and Bonding Busbar Cable Connector:

1. General Characteristics: Copper or copper alloy, for compression bonding of one or more conductors directly to copper busbar. Listed for direct burial.

D. UL KDER - Crimped Pressure-Type Grounding and Bonding Cable Connector:

1. General Characteristics: Crimp-and-compress connectors that bond to conductor when connector is compressed around conductor.

a. Copper alloy or Tinned copper, C and H shaped.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the facility's grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of electrical system.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

3.2 SELECTION OF GROUNDING AND BONDING PRODUCTS

A. Grounding and Bonding Conductors:

1. Provide solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
2. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch (6 mm) in diameter.
3. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.
4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
5. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.

3.3 INSTALLATION OF GROUNDING AND BONDING

A. Special Techniques:

1. Grounding and Bonding Connectors: Make connections so the possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
b. Make connections with clean, bare metal at points of contact.
c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.

d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
f. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1) Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate adjacent parts.
2) Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.

2. Equipment Grounding and Bonding:

a. Install insulated equipment grounding conductors with branch circuits.
b. Heat-Tracing, and Antifrost Heating Cables: Install separate insulated equipment grounding conductor to each heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
c. Poles Supporting Outdoor Lighting Fixtures: Bond insulated equipment grounding conductor to equipment grounding terminal inside pole base.

3.4 FIELD QUALITY CONTROL FOR GROUNDING AND BONDING

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, inspect for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections.

B. Nonconforming Work:

1. The grounding system will be considered defective if it does not pass inspections.
2. Remove and replace defective components and retest.

3.5 PROTECTION

A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 16075 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type ERMC-S raceways, elbows, couplings, and nipples.
2. Type PVC raceways and fittings.
3. Type RTRC-BG raceways and fittings.
4. Fittings for conduit, tubing, and cable.
5. Electrically conductive corrosion-resistant compounds for threaded conduit.
6. Solvent cements.
7. Handholes and boxes for exterior underground wiring.

B. Related Requirements:

1. Section 16120 "Identification for Electrical Systems" specifies underground-line warning tape.

1.2 DEFINITIONS

A. Duct: A single raceway or multiple raceways installed singly or as components of a duct bank.

B. Duct Bank: Two or more ducts installed in parallel, direct buried or with additional casing materials such as concrete.

C. Handhole: An underground chamber containing electrical cables, sized such that personnel are not required to enter in order to access the cables.

D. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 TYPE ERMC-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL CCN DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Hot-dipped galvanized.
2. Options:

a. Interior Coating: Zinc with organic top coating.
b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.2 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL CCN DZYR.

B. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Dimensional Specifications: Schedule 80.
2. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.3 TYPE RTRC-BG RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2420 and UL CCN DZKT, for Type BG.

B. Low-Halogen, Belowground Reinforced Thermosetting Resin Conduit (RTRC-BG) and Fittings:

1. Options:

a. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.4 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Metallic Fittings for Type ERMC, Type PVC, and Type RTRC Raceways:

1. General Characteristics: UL 514B and UL CCN DWTT.
2. Options:

a. Material: Steel.

2.5 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL Subject 2419 and UL CCN FOIZ.

2.6 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL CCN DWTT.
3. Sustainability Characteristics:

B. Solvent Cements for Type PVC Raceways and Fittings:

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING.

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:

a. ASTM C858 for design and manufacturing processes.
b. SCTE 77.

B. Precast Concrete Handholes and Boxes:

1. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover must form top of enclosure and must have load rating consistent with that of handhole or box.
2. Configuration: Units must be designed for flush burial and have open bottom unless otherwise indicated.
3. Frame and Cover:

a. Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
b. Cover Finish: Nonskid finish must have minimum coefficient of friction of 0.50.
c. Cover Legend: Molded lettering, as indicated for each service.

4. Extensions: Designed to mate with bottom of enclosure. Same material as enclosure.

a. Extension must provide an increased depth of 12 inch (300 mm).

5. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at installation location with ground-water level at grade.

2.8 SOURCE QUALITY CONTROL

A. Factory Tests for Handholes and Boxes:

1. Factory Tests and Inspections: Perform the following tests and inspections on handholes and boxes, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, before delivering to site. Affix label with name and date of manufacturer's certification of system compliance.

a. Precast Concrete Utility Structures: Test and inspect in accordance with ASTM C1037.

2. Nonconforming Work:

   a. Equipment that does not pass tests and inspections will be considered defective.

3. Factory Test Reports: Prepare and submit factory test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in field. Notify Engineer if there is conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of duct and duct-bank entrances into handholes and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.

3.2 SELECTION OF UNDERGROUND DUCTS

A. Duct for Electrical Branch Circuits: PVC-80 or RTRC-BG, direct buried unless otherwise indicated.

B. Underground Ducts Crossing Paved Paths Walks and Driveways: PVC-80 or RTRC-BG, direct buried.

C. Underground Ducts Crossing Roadways: PVC-80 or RTRC-BG, direct buried.

D. Stub-ups: ERMC-S.

3.3 SELECTION OF UNDERGROUND ENCLOSURES

A. Handholes and Boxes:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete, AASHTO HB 17, H-20 structural load rating.
2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
3. Units in Sidewalk and Similar Applications with Safety Factor for Nondeliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.

4. Units Subject to Light-Duty Pedestrian Traffic Only Precast concrete.
5. Cover design load must not exceed load rating of handhole or box.

3.4 EARTHWORK

A. Excavation and Backfill: Comply with Section 02203 "Trenching," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated.

3.5 INSTALLATION OF DUCTS AND DUCT BANKS

A. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA TCB 2 for installation of underground ducts and duct banks.

B. Special Techniques:

1. Curves and Bends:
   a. Field bending must be in accordance with NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved. Use PVC heating bender for bending PVC conduit.
   b. Duct must have a maximum of 270 degrees of bends between pull points.

2. Joints: Use solvent-cemented joints in nonmetallic duct and fittings and make watertight in accordance with manufacturer's published instructions. Stagger couplings so those of adjacent duct do not lie in same plane. Couple steel conduits to ducts with adapters designed for this purpose,.
3. Building Wall Penetrations: Make transition from underground duct to steel raceway at least 10 ft (3 m) outside building wall, without reducing duct line slope away from building and without forming trap in line. Use fittings manufactured for transition to steel raceway type installed.
4. Pulling Cord: Install 200 lbf (1000 N) test nylon cord in empty ducts.
5. Direct-Buried Duct and Duct Bank:

   a. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 02203 "Trenching" for preparation of trench bottoms for pipes less than 6 inch (150 mm) in nominal diameter.
   b. Width: Excavate trench 3 inch (75 mm), or more, wider than duct on each side..
   c. Depth: Install top of duct at least 24 inch (600 mm) below finished grade unless otherwise indicated.
   d. Place minimum 3 inch (75 mm) of sand as bed for duct. Place sand to minimum of 6 inch (150 mm) above top level of duct.

e. Install duct with minimum of 3 inch (75 mm) between ducts for like services and 6 inch (150 mm) between power and communications duct..
f. Install steel elbows for stub-ups, at building entrances, and at changes of direction in duct.

1) Couple RNC duct to steel raceway with adapters designed for this purpose.
2) Stub-ups to Outdoor Equipment: Extend steel raceway horizontally minimum of 60 inch (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.

a) Stub-ups must be minimum 4 inch (100 mm) above finished base and minimum 3 inch (75 mm) from conduit side to edge of base.

g. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inch (100 mm) over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 02203 "Trenching" for installation of backfill materials.

6. Underground-Line Warning Tape: Bury conducting underground line specified in Section 16120 "Identification for Electrical Systems" no less than 12 inch (300 mm) above duct and duct banks and approximately 12 inch (300 mm) below grade. Align tape parallel to and within 3 inch (75 mm) of centerline of duct bank. Provide additional warning tape for each 12 inch (300 mm) increment of duct-bank width over nominal 18 inch (450 mm). Space additional tapes 12 inch (300 mm) apart, horizontally across width of ducts.

3.6 INSTALLATION OF CONCRETE HANDHOLES AND BOXES

A. Reference Standards:

1. Precast Concrete Handholes: Comply with ASTM C891 unless otherwise indicated.
2. Consult Engineer for resolution of conflicting requirements.

B. Special Techniques:

1. Precast Concrete Handholes and Manholes:

a. Install the units level and plumb and with orientation and depth coordinated with connecting duct to minimize bends and deflections required for proper entrances.
b. Unless otherwise indicated, support units on level bed of crushed stone or gravel graded from 1 inch (25 mm) sieve to No. 4 (4.75 mm) sieve and compacted to same density as adjacent undisturbed earth.

c. Field-cut openings for conduits in accordance with enclosure manufacturer's published instructions. Cut wall of enclosure with tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

2. Elevations:

a. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
b. Where indicated, cast handhole cover frame integrally with handhole structure.

3. Ground manholes, handholes, and boxes in accordance with Section 16070 "Grounding and Bonding for Electrical Systems."

3.7 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION 260543

SECTION 16110 - CONDUITS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Type EMT-S duct raceways and elbows.
2. Type ERMC-S duct raceways, elbows, couplings, and nipples.
3. Type FMC-S duct raceways.
4. Fittings for conduit, tubing, and cable.
5. Electrically conductive corrosion-resistant compounds for threaded conduit.
6. Solvent cements.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 16120 "Identification for Electrical Systems" for electrical equipment labels.
2. Section 16075 "Underground Ducts and Raceways for Electrical Systems" for exterior duct banks and underground utility construction.

1.2 DEFINITIONS

A. Conduit: A structure containing one or more duct raceways.

B. Duct Raceway: A single enclosed raceway for conductors or cable.

C. Duct Bank: An arrangement of conduit providing one or more continuous duct raceways between two points.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Type EMT-S duct raceways and elbows.
2. Type ERMC-S duct raceways, elbows, couplings, and nipples.
3. Type FMC-S duct raceways.
4. Fittings for conduit, tubing, and cable.
5. Electrically conductive corrosion-resistant compounds for threaded conduit.
6. Solvent cements.

PART 2 - PRODUCTS

2.1 TYPE EMT-S DUCT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN FJMX; including UL 797.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL FJMX - Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Material: Steel.
2. Options:

a. Exterior Coating: Zinc.
b. Interior Coating: Zinc.
c. Minimum Trade Size: Metric designator 16 (trade size 1/2).

2.2 TYPE ERMC-S DUCT RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN DYIX; including UL 6.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL DYIX - Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Hot-dipped galvanized
2. Options:

a. Interior Coating: Zinc.
b. Minimum Trade Size: Metric designator 16 (trade size 1/2).

2.3 TYPE FMC-S DUCT RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

2. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

B. UL DXUZ - Steel Flexible Metal Conduit (FMC-S):

1. Material: Steel.
2. Options:

a. Minimum Trade Size: Metric designator 16 (trade size 1/2).

2.4 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL FKAV - Fittings for Type EMT Duct Raceways:

1. Listing Criteria: UL CCN FKAV; including UL 514B.
2. Options:

a. Material: Steel.
b. Coupling Method: Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.

PART 3 - EXECUTION

3.1 SELECTION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of duct raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Physical Damage: ERMC.

C. Indoors:

1. Exposed and Not Subject to Physical Damage: EMT.

D. Duct Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC: Provide threaded-type fittings unless otherwise indicated.

3.2 INSTALLATION OF CONDUITS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Type EMT-S: Article 358 of NFPA 70 and NECA NEIS 101.
2. Type ERMC-S: Article 344 of NFPA 70 and NECA NEIS 101.
3. Type FMC-S: Article 348 of NFPA 70 and NECA NEIS 101.
4. Consult Engineer for resolution of conflicting requirements.

C. Special Installation Techniques:

1. General Requirements for Installation of Duct Raceways:

a. Complete duct raceway installation before starting conductor installation.
b. Install no more than equivalent of three 90-degree bends in conduit run. Support within 12 inch (300 mm) of changes in direction.
c. Support conduit within 12 inch (300 mm) of enclosures to which attached.
d. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
e. Install pull wires in empty duct raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground duct raceways designated as spare above grade alongside duct raceways in use.
f. Install duct raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.

1) Termination fittings with shoulders do not require two locknuts.

g. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric

designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts.

2. Types ERMC:

   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of duct raceway and fittings before making up joints. Follow compound manufacturer's published instructions.

3. Types FMC:

   a. Provide a maximum of 36 inch (915 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

4. Duct Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

   a. EMT: Provide setscrew fittings. Comply with NEMA FB 2.10.
   b. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

3.3 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION 16110

SECTION 16115 - BOXES AND COVERS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.

B. Products Installed, but Not Furnished, under This Section:

1. See Section 16120 "Identification for Electrical Systems" for electrical equipment labels.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Metallic outlet boxes, device boxes, rings, and covers.
2. Junction boxes and pull boxes.

PART 2 - PRODUCTS

2.1 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN QCIT; including UL 514A.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL QCIT - Metallic Outlet Boxes and Covers:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:

a. Material: Sheet steel.
b. Sheet Metal Depth: Minimum 2 inch (50 mm).

D. UL QCIT - Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

2.2 JUNCTION BOXES AND PULL BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. Listing Criteria: UL CCN BGUZ; including UL 50 and UL 50E.

B. Source Quality Control:

1. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

C. UL BGUZ - Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Options:

a. Degree of Protection: Type 1 or Type 12.

D. UL BGUZ - Outdoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Options:

a. Degree of Protection: Type 4X, stainless steel.

E. UL BGUZ - Outdoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Options:

a. Degree of Protection: Type 4X.

PART 3 - EXECUTION

3.1 SELECTION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:

a. Type 4X, stainless steel unless otherwise indicated.

2. Indoors:

a. Type 1 unless otherwise indicated.

3.2 INSTALLATION OF BOXES AND COVERS FOR ELECTRICAL SYSTEMS

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Pull, and Junction Boxes: Article 314 of NFPA 70.
2. Consult Engineer for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
2. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

3.3 CLEANING

A. Remove construction dust and debris from boxes before installing covers.

3.4 PROTECTION

A. After installation, protect boxes from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 16115

SECTION 16120 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Tapes.
2. Cable ties.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 TAPES

A. Underground-Line Warning Tape:

1. Tape:

a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical and communications utility lines.
b. Printing on tape must be permanent and may not be damaged by burial operations.
c. Tape material and ink must be chemically inert and not be subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

2. Color and Printing:

a. Comply with APWA Uniform Color Code using NEMA Z535.1 safety colors.
b. Inscriptions for Red Tapes: "CAUTION BURIED ELECTRIC LINE BELOW".

3. Detectable Line-Warning Tape:

a. Detectable three-layer laminate, consisting of printed pigmented polyolefin film, solid aluminum-foil core, and clear protective film that allows inspection of continuity of conductive core; bright colored, compounded for direct-burial service.
b. Width: 3 inch (75 mm).
c. Overall Thickness: 5 mil (0.125 mm).
d. Foil Core Thickness: 0.35 mil (8.9 m).
e. Weight: 28 lb/1000 sq. ft (13.7 kg/100 sq. m).

f. Tensile in accordance with ASTM D882: 70 lbf (311.3 N) and 4600 psi (31.7 MPa).

2.2 CABLE TIES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria: UL CCN ZODZ; including UL 1565 or UL 62275.

B. UL ZODZ - UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black.

PART 3 - EXECUTION

3.1 SELECTION OF COLORS

A. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded branch-circuit conductors.

1. Color must be factory applied.
2. Colors for 208Y/120 V Circuits:

a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.

3. Color for Neutral (Grounded Conductor): White.
4. Color for Equipment Ground: Green.

B. Locations of Underground Lines: Underground-line warning tape for power and lighting.

C. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.

3.2 INSTALLATION

A. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape not less than 12 inch (300 mm) directly above cables or raceways buried 18 inch (450 mm) or more below grade. Use multiple tapes where width of multiple lines installed in common trench exceeds 16 inch (400 mm) overall.
2. Install underground-line warning tape for direct-buried cables and cables in raceways.

END OF SECTION 260553

SECTION 16140 - LIGHTING POLES AND STANDARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel poles.
2. Pole accessories.
3. Mounting hardware.

1.2 DEFINITIONS

A. EPA: Equivalent projected area.

B. Pole: Luminaire-supporting structure, including tower used for large-area illumination.

C. Standard: See "Pole."

1.3 ACTION SUBMITTALS

A. Product Data:

1. Steel poles.
2. Pole accessories.
3. Mounting hardware.

B. Shop Drawings:

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Detail fabrication and assembly of poles and pole accessories.
4. Foundation construction details, including material descriptions, dimensions, anchor bolts, support devices, and calculations, signed and sealed by a professional engineer licensed in the state of installation.
5. Anchor bolt templates keyed to specific poles and certified by manufacturer.
6. Method and procedure of pole installation. Include manufacturer's written installations.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' published instructions.

1.5 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store poles on decay-resistant skids at least 12 inch (300 mm) above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

B. Retain factory-applied pole wrappings on metal poles until right before pole installation. Handle poles with web fabric straps.

1.7 WARRANTY

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed pole(s) perform in accordance with specified requirements and agrees to repair or replace products that fail to perform as specified within extended-warranty period.

1. Extended Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that pole(s) perform in accordance with specified requirements and agrees to provide repair or replacement of products that fail to perform as specified within extended-warranty period, including materials that corrode, fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.

1. Extended Warranty Period: Five years from date of Substantial Completion; prorated coverage for labor, materials, and equipment.
2. Warranty Period for Corrosion Resistance: Five years from date of Substantial Completion; full coverage for labor, materials, and equipment.
3. Warranty Period for Color Retention: Five years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Characteristics: Comply with AASHTO LTS-6-M.

B. Dead Load: Weight of luminaire and its horizontal and vertical supports and supporting structure, applied in accordance with AASHTO LTS-6-M.

C. Ice Load: Load of 3 lb/ft^2 (145 Pa), applied in accordance with AASHTO LTS-6-M for applicable areas on the Ice Load Map.

D. Wind Load for Poles Not Exceeding 50 ft (15 m) Height:

1. Basic Wind Speed: 100 mile/h (45 m/s).
2. Wind Importance Factor: 1.0.
3. Minimum Design Life: 25 years.
4. Velocity Conversion Factor: 1.0.

E. Strength Analysis: For each pole, multiply the actual EPA of luminaires and brackets by a factor of 1.1 to obtain the EPA used in pole selection strength analysis.

F. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless steel fasteners and mounting bolts unless otherwise indicated.

G. General Finish Requirements:

1. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.2 STEEL POLES

A. Source Limitations: Obtain poles from single manufacturer or producer.

B. Carbon-Steel Poles: Comply with ASTM A500/A500M, Grade B carbon steel with a minimum yield of 46,000 psig (317 MPa); one-piece construction up to 40 ft (12 m) in height with access handhole in pole wall.

1. Shape: Round, straight and Square, straight in accordance with the Drawings.
2. Mounting Provisions: Butt flange for bolted mounting on foundation.

C. Brackets for Luminaires: Detachable, cantilever, without underbrace.

1. Adaptor fitting welded to pole, allowing the bracket to be bolted to the pole-mounted adapter, then bolted together with stainless-steel bolts.

D. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

E. Fasteners: Stainless steel, size and type as determined by manufacturer. Corrosion-resistant items compatible with support components.

1. Materials: Compatible with poles and standards as well as the substrates to which poles and standards are fastened and may not cause galvanic action at contact points.
2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.

F. Grounding and Bonding Lugs: Welded 1/2 inch (13 mm) threaded lug, complying with requirements in Section 16070 "Grounding and Bonding for Electrical Systems," listed for

attaching grounding and bonding conductors of type and size indicated, and accessible through handhole.

G. Handhole: Oval shaped, with minimum clear opening of 2-1/2-by-5 inch (65-by-130 mm), with cover secured by stainless steel captive screws.

H. Powder-Coat Finish: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces in accordance with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair powder coat bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, in accordance with SSPC-SP 5/NACE No. 1 or SSPC-SP 8.
2. Powder Coat: Comply with AAMA 2604.

a. Electrostatic-applied powder coating; single application and cured to a minimum 2.5 to 3.5 mil (64 to 89 µm) dry film thickness. Coat interior and exterior of pole for equal corrosion protection.
b. Color: As indicated in the Drawings.

2.3 POLE ACCESSORIES

A. Base Covers: Manufacturers' standard metal units finished same as pole, and arranged to cover pole's mounting bolts and nuts.

2.4 MOUNTING HARDWARE

A. Anchor Bolts: Manufactured to ASTM F1554, Grade 55, with a minimum yield strength of 55,000 psi (380 000 kPa).

1. Galvanizing: Hot dip galvanized in accordance with ASTM A153, Class C.
2. Threading: Uniform National Coarse, Class 2A.

B. Nuts: ASTM A563, Grade A, Heavy-Hex.

1. Galvanizing: Hot dip galvanized in accordance with ASTM A153, Class C.
2. Four nuts provided per anchor bolt.

C. Washers: ASTM F436, Type 1.

1. Galvanizing: Hot dip galvanized in accordance with ASTM A153, Class C.
2. Two washer(s) provided per anchor bolt.

2.5 SOURCE QUALITY CONTROL

A. Product Data: Prepare and submit catalog cuts, brochures, and performance data illustrating size, physical appearance, and other characteristics of product.

1. Include data on construction details, profiles, EPA, cable entrances, materials, dimensions, weight, rated design load, and ultimate strength of individual components.
2. Include finishes for lighting poles and luminaire-supporting devices.
3. Anchor bolts.

B. Manufacturer's Published Instructions: Prepare and submit installation, testing, and operating instructions for product.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine poles, luminaire-mounting devicesand pole accessories before installation. Components that are scratched, dented, marred, wet, moisture damaged, or visibly damaged are considered defective.

C. Examine roughing-in for foundation and conduit to verify actual locations of installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 POLE FOUNDATION

A. Pre-Cast Foundations: Factory fabricated, with structural steel complying with ASTM A36/A36M and hot-dip galvanized in accordance with ASTM A123/A123M; and with top-plate and mounting bolts to match pole-base flange and strength required to support pole, luminaire, and accessories. Concrete, reinforcement, and formwork are specified in Section 03304 "Special Concrete Structures."

3.3 POLE INSTALLATION

A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on pole.

B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on drawing.

1. Fire Hydrants and Water Piping: 60 inch (1520 mm).

C. Concrete Pole Foundations: Set anchor bolts in accordance with anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 03304 "Special Concrete Structures."

D. Foundation-Mounted Poles: Mount pole with leveling nuts and tighten top nuts to torque level in accordance with pole manufacturer's written instructions.
   1. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space
   2. Install base covers unless otherwise indicated.
   3. Use a short piece of 1/2 inch (13 mm) diameter pipe to make a drain hole through grout. Arrange to drain condensation from the interior of pole.

E. Raise and set pole using web fabric slings (not chain or cable) at locations indicated by manufacturer.

3.4 CORROSION PREVENTION

A. Steel Conduits: Comply with requirements in Section 16075 "Underground Ducts and Raceways for Electrical Systems." In concrete foundations, wrap conduit with 0.010 inch (0.254 mm) thick, pipe-wrapping plastic tape applied with a 50-percent overlap.

3.5 GROUNDING

A. Ground Metal Poles and Support Structures: Comply with requirements in Section 16070 "Grounding and Bonding for Electrical Systems."

   1. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

3.6 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 16120 "Identification for Electrical Systems."

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

   1. Inspect poles for nicks, mars, dents, scratches, and other damage.

B. Nonconforming Work:

   1. Units will be considered defective if it does not pass tests and inspections.
   2. Remove and replace defective units and retest.

C. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

END OF SECTION 16140

SECTION 16145 – LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Luminaires.
2. Luminaire fittings.

B. Related Requirements:

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1. Section 16060 "Low-Voltage Electrical Power Conductors and Cables" specifies wiring connections installed by this Section.
2. Section 16120 "Identification for Electrical Systems" specifies electrical equipment labels and warning signs installed by this Section.

1.2 DEFINITIONS

A. BUG Rating: Backlight, uplight, and glare rating for light pollution from exterior luminaires.

B. Correlated Color Temperature (CCT): The absolute temperature (in kelvins) of a blackbody whose chromaticity (color quality) most nearly resembles that of the light source.

C. Color Rendering Index (CRI): The measure of the degree of color shift objects undergo when illuminated by the light source as compared with the color of those same objects when illuminated by a reference light source. The lower the CRI of a light source, the more difficult it is to identify colors and stripes on electronic components and wiring.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For luminaires.

a. Product brochure and specifications.
b. Product Certificates: Include product certificates stating compliance with standards listed below, signed by manufacturer or fabricator.

1) Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with current accreditation under National Voluntary Laboratory Accreditation Program (NVLAP) for Energy Efficient Lighting Products.

c. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
d. Include operating characteristics, electrical characteristics, and furnished accessories.

e. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
f. Include photometric data and adjustment factors obtained from qualified laboratory tests.
g. Include manufacturer's sample warranty language.

2. For luminaire fittings.

a. Product brochure and specifications.
b. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop drawings.

C. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' published instructions.

1.5 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect exposed surface finishes on lighting equipment by applying strippable, temporary protective covering before shipping.

1.7 WARRANTY FOR LUMINAIRES

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed luminaires perform in accordance with specified requirements and agrees to repair or replace products that fail to perform as specified within extended-warranty period. Warranty must convey to Owner upon acceptance of the Work.

1. Extended Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that luminaires perform in accordance with specified requirements and agrees to provide repair or replacement of products that fail to perform as specified within extended-warranty period.

1. Extended Warranty Period: Five years from date of Substantial Completion; prorated coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
b. See individual product types below for listing criteria.
c. Marked in accordance with UL CCN HYXT, including UL 1598, for compatible power supply, installation location, and environmental conditions.

B. Source Quality Control:

1. Compile and submit product data.

2.2 LUMINAIRE FITTINGS

A. Performance Criteria:

1. Regulatory Requirements:

a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
b. See individual product types below for listing criteria.

B. Source Quality Control:

1. Compile and submit product data.

C. Luminaire Support Accessories:

1. Product Characteristics:

a. Sized and rated for luminaire weight.
b. Capable of maintaining luminaire position after cleaning and maintenance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF LIGHTING

A. Comply with manufacturer's published instructions.

B. Reference Standards for Installation: Unless more stringent installation requirements are specified in Contract Documents or manufacturers' published instructions, comply with the following:

1. Installation of Exterior Lighting Systems: NECA NEIS 501.
2. Consult Engineer for resolution of conflicting requirements.

C. Special Installation Techniques:

1. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
2. Install luminaires at height and aiming angle as indicated on Drawings.
3. Coordinate layout and installation of luminaires with other construction.
4. Adjust luminaires that require field adjustment or aiming.
5. Exterior Corrosion Prevention:

    a. Do not use aluminum in contact with earth or concrete. When in direct contact with dissimilar metals, protect aluminum with insulating fittings or treatment.
    b. When embedding steel conduits in concrete, wrap conduit with 10 mil (0.254 mm) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

6. Install wiring connections for luminaires.

D. Systems Integration: Integrate lighting control devices and equipment with electrical power connections for operation of luminaires as specified.

3.3 FIELD QUALITY CONTROL OF LIGHTING

A. Field tests and inspections must be witnessed by Engineer.

B. Tests and Inspections:

1. Perform manufacturer's recommended tests and inspections.
2. Operational Test: After installing luminaires, controls, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
3. Exterior Illumination Tests:

    a. Measure light intensities at night. Use photometers with calibration referenced to NIST standards.

C. Nonconforming Work:

1. Luminaire will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

D. Field Quality-Control Reports: Collect, assemble, and submit test and inspection reports.

3.4 ADJUSTING

A. Luminaire Aiming Adjustments: When requested within **12** months of the date of Substantial Completion, provide on-site assistance in adjusting aiming direction of luminaires to suit occupied conditions. Make up to one visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace luminaires that are defective.
2. Parts and supplies must be the manufacturer's authorized replacement parts and supplies.
3. Adjust aim of luminaires in presence of Engineer.

3.5 PROTECTION

A. After installation, protect lighting equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 16145

16175 – HEAT TRACE CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes piping heat tracing for freeze prevention with the following electric heating cables:

1. Self-regulating, parallel resistance.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, and furnished specialties and accessories.
2. Schedule heating capacity, length of cable, spacing, and electrical power requirement for each electric heating cable required.

B. Shop Drawings: For electric heating cable.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

C. Operation and Maintenance Data: For electric heating cables to include in operation and maintenance manuals.

1.5 WARRANTY

A Warranty: Manufacturer agrees to repair or replace electric heating cable that fails in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

A. Comply with IEEE 515.1.

B. Heating Element: Pair of parallel No. 16 or 18 AWG, nickel-coated, stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response

to temperature along its length. Terminate with waterproof, factory-assembled, non-heating leads with connectors at one end and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.

C. Electrical Insulating Jacket: Flame-retardant polyolefin.

D. Cable Cover: Tinned-copper braid and polyolefin outer jacket with ultraviolet inhibitor.

E. Maximum Operating Temperature (Power On): 150 deg F.

F. Maximum Exposure Temperature (Power Off): 80 deg F.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

H. Capacities and Characteristics:

1. Maximum Heat Output: 8 W/ft.
2. Electrical Characteristics for Single-Circuit Connection:

a. Volts: 120.
b. Phase: Single-phase.
c. Hertz: 60.

2.2 ACCESSORIES

A. Cable Installation Accessories: Power connection, end seal and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and substrates to receive electric heating cables for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Ensure surfaces and pipes in contact with electric heating cables are free of burrs and sharp protrusions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A Install the following types of electric heating cable for the applications described:

1. Pipe Freeze Protection: Self-regulating, parallel-resistance heating cable.

3.3 INSTALLATION

A Install electric heating cable according to manufacturer's written instructions; use cable-protection conduit and slack cable to allow movement without damage to cable.

B. Install electric heating cable as indicated on Drawings.

C. Electric Heating-Cable Installation for Freeze Protection for Piping:

1. Install electric heating cables according to IEEE 515.1.

D. Set field-adjustable switches and circuit-breaker trip ranges.

3.4 CONNECTIONS

A. Ground equipment according to Section 16070 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 16060 "Low-Voltage Electrical Power and Control Conductors and Cables."

3.5 FIELD QUALITY CONTROL

A Perform the following tests and inspections:

1. Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
2. Test cables for electrical continuity and insulation integrity before energizing.
3. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.

B. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounted cables.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.5 PROTECTION

A Protect installed heating cables, including non-heating leads, from damage during construction.

B. Remove and replace damaged heat-tracing cables.

END OF SECTION 16175

SECTION 16211 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Category 6 twisted pair cable.
2. Twisted pair cable hardware.

1.2 DEFINITIONS

A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

B. EMI: Electromagnetic interference.

C. FTP: Shielded twisted pair.

D. F/FTP: Overall foil screened cable with foil screened twisted pair.

E. F/UTP: Overall foil screened cable with unscreened twisted pair.

F. IDC: Insulation displacement connector.

G. Jack: Also commonly called an "outlet," it is the fixed, female connector.

H. LAN: Local area network.

I. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.

J. RCDD: Registered Communications Distribution Designer.

K. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

L. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

M. S/FTP: Overall braid screened cable with foil screened twisted pair.

N. S/UTP: Overall braid screened cable with unscreened twisted pairs.

O. UTP: Unscreened (unshielded) twisted pair.

1.3 COPPER HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

B. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Category 6 twisted pair cable.
2. Twisted pair cable hardware.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings and field-testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

1.7 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index:25 or less.
2. Smoke-Developed Index: 50 or less.

2.3 CATEGORY 6 TWISTED PAIR CABLE

A. Category 6 Twisted Pair Cable: Four-pair, balanced -twisted pair cable, with internal spline, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.

C. Conductors: 100-ohm, 23 AWG solid copper.

D. Shielding/Screening: Shielded twisted pairs (FTP).

E. Jacket: Gray thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

A. Twisted Pair Cable Hardware: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.

B. General Requirements for Twisted Pair Cable Hardware:

1. Comply with the performance requirements of Category 6.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables shall be terminated with connecting hardware of same category or higher.

C. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.

D. Connecting Blocks:

1. 110-style IDC for Category 6.

2. Number of Terminals per Field: One for each conductor in assigned cables.

E. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.

1. Features:

a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. Replaceable connectors.

2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
3. Number of Jacks per Field: One for each four-pair cable.

F. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Standard: Comply with TIA-568-C.2.

G. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Designed to snap-in to a patch panel or cover plate.
3. Standard: Comply with TIA-568-C.2.
4. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.

a. Flush mounting jacks, positioning the cord at a 45-degree angle.

2.5 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.6 SOURCE QUALITY CONTROL

A. Factory test cables on reels according to TIA-568-C.1.

B. Factory test twisted pair cables according to TIA-568-C.2.

C. Cable will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

A. Routing:

1. Install cables in raceways, except within cabinets.

B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

3.2 INSTALLATION OF TWISTED PAIR HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568.

B. General Requirements for Cabling:

1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, and terminals.
7. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by the manufacturer.
8. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
9. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
10. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.

11. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

C. Separation from EMI Sources:

1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).

3. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).

3.3 GROUNDING

A. Comply with requirements in Section 16070 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."

C. Comply with TIA-607-B and NECA/BICSI-607.

3.4 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by Engineer.

B. Tests and Inspections:

1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

D. Nonconforming Work:

1. End-to-end cabling will be considered defective if it does not pass tests and inspections.
2. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. Collect, assemble, and submit test and inspection reports.

END OF SECTION 16211

SECTION 16442 - VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes a video surveillance system consisting of cameras, and data transmission wiring with its associated equipment.

1.3 DEFINITIONS

A. AGC: Automatic gain control.

B. BNC: Bayonet Neill-Concelman - type of connector.

C. B/W: Black and white.

D. CCD: Charge-coupled device.

E. FTP: File transfer protocol.

F. IP: Internet protocol.

G. LAN: Local area network.

H. MPEG: Moving picture experts group.

I. NTSC: National Television System Committee.

J. PTZ: Pan-tilt-zoom.

K. RAID: Redundant array of independent disks.

L. TCP: Transmission control protocol - connects hosts on the Internet.

M. UPS: Uninterruptible power supply.

N. WAN: Wide area network.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
3. Dimensioned plan and elevations of control panels. Show access and workspace requirements.
4. Wiring Diagrams: For power, signal, and control wiring.

C. Design Data: Include an equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustment, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Product Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, and control-station components to include in operation, and maintenance manuals.

1.7 PROJECT CONDITIONS

A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:

1. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h) and snow cover up to 24 inches (610 mm) thick. Use NEMA 250, Type 4X enclosures.
2. Corrosive Environment: System components subject to wind-driven salt spray in coastal zones. Use NEMA 250, Type 4X enclosures.

3. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. Video-signal format shall comply with NTSC standard, composite interlaced video. Composite video-signal termination shall be 75 ohms.

B. Tamper Protection: Tamper switches on enclosures, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NECA 1.

C. Comply with NFPA 70.

2.3 STANDARD CAMERAS

A. Single Sensor, Outdoor Dome Type Network cameras for video surveillance.

1. Video Standards: minimum H.264 / H.265 / MJPEG
2. Network Standards:

a. IEEE 802.3at (Power of Ethernet)
b. IEEE 802.1X (Authentication).
c. IPv4 (RFC 791).
d. IPv6.

3. Video Requirements

    a. Provide cameras with a primary stream capable of supporting the video resolution and aspect ratio and capable of generating the image framerates noted in this section.

4. Encoding Requirements

    a. Support compression and image quality settings from 1 to 20 to configure bandwidth utilized by the camera and desired image response. Provide user configuration of compression quality and image rate per camera.
    b. Provide independently configured simultaneous H.264, H.265 and Motion JPEG streams (multi-stream).
    c. Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval, and image rate per camera.

5. Image Control Requirements

    a. User Configurations Supported:

        1) Automatic and manual white balance control.
        2) Flicker control (50 Hz, 60 Hz).
        3) Color saturation and sharpening.
        4) Motion detection sensitivity and threshold.
        5) Digital rotation of the image.
        6) Minimum Dynamic Range:

            a) 100db.
            b) Dynamic Range shall not change based on configured encoding.

    b. Include detection of the following behaviors:

        1) Motion detection.
        2) Camera tampering.

6. Network Requirements: Provide video cameras that have the following network capabilities:

    a. Supports both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.
    b. Supports user configuration of network parameters including:

        1) Fixed (static) IP address.
        2) Subnet mask.
        3) Gateway.
        4) Control port.
    c. Provides support for both IPv4 and IPv6 Networks.

7. Streaming Support Requirements: Provide video cameras that incorporate support for at least the following:

    a. RTP/UDP.
    b. RTP/UDP multicast.
    c. RTP/RTSP/TCP.
    d. RTP/RTSP/HTTP/TCP.
    e. RTP/RTSP/HTTPS/TCP.
    f. HTTP.

8. Video Overlay Requirements: Provide video cameras with the following overlay requirements:

    a. Individually configurable privacy zones to conceal defined areas in image as non-viewable. Masks required to be dynamically adjusted based on current zoom-factor, without capability of operator bypass.
    b. Video masked by privacy zones must be obscured prior to streaming.

9. Security Requirements: Provide video cameras with the following security requirements:

    a. Support the use of the following:

        1) Password protection.
        2) HTTPS Encryption.
        3) Digest authentication.
        4) WS authentication.
        5) User access Log.
        6) SSL encryption.

10. Diagnostics:

    a. Equipped with LEDs, indicating the camera's functional status, which may be user enabled or disabled.

11. Connectivity:

    a. Gigabit Ethernet-port with RJ-45 socket, auto negotiation of network speed and transfer mode.

12. Installation and Maintenance Requirements: Provide video cameras with the following installation and maintenance requirements:

    a. Allow firmware updates via network.
    b. Provide Microsoft Windows based management software, allowing camera configuration, upgrade of firmware, and backup of individual camera configurations.

13. Outdoor Mount.

    a. Operational Range:

b. Temperature: -40 degrees C to +60 degrees C [-40 F to +140 F].
c. Relative Humidity: 0–95 percent (non-condensing).

B. Multiple Sensor, Dome Type Network cameras for video surveillance.

1. Video Standards: minimum H.264 / H.265 / MJPEG
2. Network Standards:

a. IEEE 802.3at (Power of Ethernet)
b. IEEE 802.1X (Authentication).
c. IPv4 (RFC 791).
d. IPv6.

3. Video Requirements

a. Provide cameras capable of simultaneously delivering individual video streams for each sensor, for use when connecting to the Video Management Software for recording and live viewing.

4. Encoding Requirements

a. Support compression and image quality settings from 1 to 20 to configure bandwidth utilized by the camera and desired image response. Provide user configuration of compression quality and image rate per camera.
b. Provide independently configured simultaneous H.264, H.265 and Motion JPEG streams (multi-stream).
c. Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval, and image rate per camera.

5. Image Control Requirements

a. User Configurations Supported:

1) Automatic and manual white balance control.
2) Flicker control (50 Hz, 60 Hz).
3) Color saturation and sharpening.
4) Motion detection sensitivity and threshold.
5) Digital rotation of the image.
6) Minimum Dynamic Range:

a) 100db.
b) Dynamic Range shall not change based on configured encoding.

7) Include detection of the following behaviors:

a) Motion detection.
b) Camera tampering.

6. Network Requirements: Provide video cameras that have the following network capabilities:

    a. Supports both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.
    b. Supports user configuration of network parameters including:

        1) Fixed (static) IP address.
        2) Subnet mask.
        3) Gateway.
        4) Control port.

    c. Provides support for both IPv4 and IPv6 Networks.

7. Streaming Support Requirements: Provide video cameras that incorporate support for at least the following:

    a. RTP/UDP.
    b. RTP/UDP multicast.
    c. RTP/RTSP/TCP.
    d. RTP/RTSP/HTTP/TCP.
    e. RTP/RTSP/HTTPS/TCP.
    f. HTTP.

8. Video Overlay Requirements: Provide video cameras with the following overlay requirements:

    a. individually configurable privacy zones to conceal defined areas in image as non-viewable. Masks required to be dynamically adjusted based on current zoom-factor, without capability of operator bypass.
    b. Video masked by privacy zones must be obscured prior to streaming.

9. Security Requirements: Provide video cameras with the following security requirements:

    a. Support the use of the following:
        1) Password protection.
        2) HTTPS Encryption.
        3) Digest authentication.
        4) WS authentication.
        5) User access Log.
        6) SSL encryption.

10. Diagnostics:

    a. Equipped with LEDs, indicating the camera's functional status, which may be user enabled or disabled.

11. Connectivity:

    a. Gigabit Ethernet-port with RJ-45 socket, auto negotiation of network speed and transfer mode.

12. Installation and Maintenance Requirements: Provide video cameras with the following installation and maintenance requirements:

    a. Allow firmware updates via network.
    b. Provide Microsoft Windows based management software, allowing camera configuration, upgrade of firmware, and backup of individual camera configurations.

13. Indoor/Outdoor Pendant Mount.

    a. Operational Range:

        1) Temperature: -40 degrees C to +60 degrees C [-40 F to +140 F].
        2) Relative Humidity: 0–95 percent (non-condensing).

2.4 CAMERA-SUPPORTING EQUIPMENT

A. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.

2.5 NETWORK SWITCHES:

A. Managed Gigabit Power over Ethernet (PoE) switch shall provide Ethernet and PoE (PoE+ or PoE++) capable of powering all proposed PoE devices.

2.6 LENSES

A. Description: Optical-quality coated lens, designed specifically for video-surveillance applications and matched to specified camera. Provide color-corrected lenses with color cameras.

1. Auto-Iris Lens: Electrically controlled iris with circuit set to maintain a constant video level in varying lighting conditions.
2. Fixed Lens: With calibrated focus ring.
3. Zoom Lens: Motorized, remote-controlled unit, rated as "quiet operating." Features include the following:

    a. Electrical Leads: Filtered to minimize video signal interference.
    b. Motor Speed: Variable.
    c. Lens shall be available with preset positioning capability to recall the position of specific scenes.

2.7 SIGNAL TRANSMISSION COMPONENTS

A. Video Surveillance Cable: CAT6 shielded and unshielded as required by equipment manufacturer.

B. Video Surveillance Cable Connectors: 8P8C Modular Connector, T568B

2.8 INFRARED ILLUMINATORS

A. Description: Lighting fixtures that emit light only in the infrared spectrum, suitable for use with cameras indicated, for nighttime surveillance, without emitting visible light.

1. Field-Selectable Beam Patterns: Narrow, medium, and wide.
2. Rated Lamp Life: More than 8000 hours.

B. Area Coverage: Illumination to 150 feet (50 m) in a narrow beam pattern.

C. Exterior housings shall be suitable for same environmental conditions as the associated camera.

2.9 CAMERA-SUPPORTING EQUIPMENT

A. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.

B. Pan Units: Motorized automatic-scanning units arranged to provide remote-controlled manual and automatic camera panning action and equipped with matching mounting brackets.

1. Scanning Operation: Silent, smooth, and positive.
2. Stops: Adjustable without disassembly, to limit the scanning arc.

C. Pan-and-Tilt Units: Motorized units arranged to provide remote-controlled aiming of cameras with smooth and silent operation and equipped with matching mounting brackets.

1. Panning Rotation: 0 to 355 degrees, with adjustable stops.
2. Tilt Movement: 90 degrees, plus or minus 5 degrees, with adjustable stops.
3. Speed: 12 degrees per second in both horizontal and vertical planes.
4. Wiring: Factory prewired for camera and zoom lens functions and pan-and-tilt power and control.
5. Built-in encoders or potentiometers for position feedback, and thermostat-controlled heater.
6. Pan-and-tilt unit shall be available with preset positioning capability to recall the position of a specific scene.

D. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.

E. Protective Housings for Fixed and Movable Cameras: Steel or 6061 T6 aluminum enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed.

1. Tamper switch on access cover sounds an alarm signal when unit is opened or partially disassembled. Central-control unit shall identify tamper alarms and indicate location in alarm display. Tamper switches and central-control unit are specified in Section 283100 "Intrusion Detection."
2. Camera Viewing Window: Lexan window, aligned with camera lens.
3. Alignment Provisions: Camera mounting shall provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
4. Built-in, thermostat-activated heater units. Units shall be automatically controlled so the environmental limits of the camera equipment are not exceeded.
5. Sun shield shall not interfere with normal airflow around the housing.
6. Mounting bracket and hardware for wall or ceiling mounting of the housing. Bracket shall be of same material as the housing; mounting hardware shall be stainless steel.
7. Finish: Housing and mounting bracket shall be factory finished using manufacturer's standard finishing process suitable for the environment.
8. Enclosure Rating: NEMA 4X.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.

B. Examine roughing-in for LAN, WAN, and IP network before device installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING

A. Wiring Method: Install cables in raceways unless otherwise indicated.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

C. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

D. For communication wiring, comply with the following:

1. Section 16211 "Communications Copper Horizontal Cabling."

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E. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

A. Install cameras and infrared illuminators level and plumb.

B. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms and adjust.

C. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:

    a. Prepare equipment list described in "Informational Submittals" Article.
    b. Verify operation of auto-iris lenses.
    c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
    d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet (17 to 23 m) away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
    e. Set and name all preset positions; consult Owner's personnel.
    f. Set sensitivity of motion detection.
    g. Connect and verify responses to alarms.
    h. Verify operation of control-station equipment.

3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

D. Video surveillance system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:

1. Check cable connections.
2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
3. Adjust all preset positions; consult Owner's personnel.
4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
5. Provide a written report of adjustments and recommendations.

3.6 CLEANING

A. Clean installed items using methods and materials recommended in writing by manufacturer.

B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION 16442