4. TECHNICAL SPECIFICAITON

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 01010 – SUMMARY OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

The General Provisions and the Special Provisions apply to this Section. Special attention is directed to the Proposal Schedule.

1.02 SUMMARY

Section Includes:

1. Scope of Work
2. Vehicle Parking
3. Provisions for Field Office/Storage Space
4. Location of the Work
5. Hours of work
6. Safety
7. Disposal of excess soil materials
8. Construction stakes, lines and grades
9. Special project requirements
10. Unforeseen Conditions Allowances

1.03 SCOPE OF WORK

This project consists of furnishing supervision, labor, materials, equipment and all appurtenances to perform concrete relining, concrete spall repair, concrete crack repair, and chain link fence repair to portions of the Nanakuli Flood Control Channel. This project also includes the installation of security gates at channel entry points and maintenance easements. All work shall be completed as per the technical specifications and plans contained in this IFB.

1.04 VEHICLE PARKING

This project runs from Mokiawe Street down to Farrington Highway through various Nanakuli subdivisions. The only parking available will be street parking

1.05 PROVISIONS FOR FIELD OFFICE/STORAGE SPACE

No field office will be necessary.

1.06 LOCATION OF THE WORK

A. The work to be performed under this contract is located from the top of Mokiawe Street, Nanakuli to Mano Avenue, Nanakuli. Refer to the plans for project locations.

B. Conditions: Upon award of the contract, the Contractor, at their cost, shall obtain all permits required for this project.

1.07 HOURS OF WORK

A. Work can be performed at the construction site between 8:00 am and 4:30 pm, Monday through Friday. Submit a proposed construction schedule to Project Manager for review and approval within 14 calendar days prior to start of work. The Contractor shall coordinate their schedule with the Project Manager if rescheduling of work or intermittent work is required, such work shall be performed at no extra cost to the State. If the Contractor's obligation to pay.

B. Contractor shall clean work areas at the end of each working shift. Rubbish, loose materials, etc. shall be disposed of daily. Materials shall be safely secured and stored in an area designated by the DHHL West Hawaii District Supervisor.

1.08 SAFETY

A. The Contractor shall take the necessary precautions to protect his workers and other personnel from injuries. The rules and regulations promulgated by the Occupational Safety and Health Acts are applicable and made a part of these specifications.

B. Barricades and warning signs shall be erected by the Contractor in the work area to properly protect all personnel in the area.

C. During the progress of the work debris, empty crates, waste, material drippings, etc., shall be removed by the Contractor at the end of each work day, and the work area shall be left clean and orderly.

1.09 DISPOSAL OF EXCESS SOIL MATERIALS

A. At the Construction Manager and/or Engineers discretion, excess useable soil materials may be used as fill material for this project. Best Management Practices shall be employed at all times to control soil

erosion and water pollution that may result from stockpiling activities.

B. Off-Site Disposal of Excess Soil Material: Any excess soil material and rubbish disposed of outside the DHHL property shall be the responsibility of the Contractor. The Contractor shall make all arrangements and bear all costs involved therewith.

1.10 CONSTRUCTION STAKES, LINES AND GRADES

A. The Contractor shall perform all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, grading, paving, drainage, sewer, water, and all other appurtenances required for the completion of the work.

B. Existing horizontal and vertical survey control points for the project are shown on the plans. The Contractor shall verify the location of all control points prior to the start of construction.

C. The Department will not be responsible for delays in setting stakes and marks.

D. All control points and stakes or marks which the Project Manager may set shall be preserved by the Contractor. If such control points, stakes or marks are destroyed or disturbed by the Contractor, the cost of replacing such stakes or marks will be charged against the Contractor and deducted from payments due the Contractor.

E. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points whether established by the Contractor or by the Project Manager.

F. All original, additional or replacement stakes, marks, references and batter-boards which may be required for the construction operations, shall be furnished, set and properly referenced by the Contractor. The Contractor shall be solely and completely responsible for the accuracy of the line and grade of all features of the work. Any errors or apparent discrepancies found in previous surveys, the plans and specifications shall be called to the Project Manager’s attention by the Contractor for correction or interpretation prior to the proceeding with the work.

G. Before construction is started on any structure which is referenced to an existing structure or topographical feature, the Contractor shall check the pertinent locations and grades of the existing structures or topographical

features to determine whether the locations and grades shown on the plans are correct.

H. All construction staking shall be performed by qualified personnel under the direct supervision of a person with an engineering background who is experienced in the direction of such work and is acceptable to the Project Manager.

I. All stakes and markers used for control staking shall be of the same quality as used by the Department for this purpose. For slope limits, pavement edges, gutter lines, etc., where so called “working” stakes are commonly used, stakes of different quality may be acceptable.

J. The Department may check the Contractor’s control of the work at any times as the work progresses. The Contractor will be informed of the results of these checks, but the Department by doing so will in no way relieve the Contractor of his responsibility for the accuracy of the layout work. The Contractor shall at his expense correct or replace any deficient or inaccurate layout and construction work. If, as a result of these deficiencies or inaccuracies, the Department is required to make further studies, redesign, or both, all expenses incurred by the Department due to such deficiencies or inaccuracies, will be deduced from any payment due the Contractor.

K. The Contractor shall furnish all necessary personnel, engineering equipment and supplies, materials, and transportation incidental to the accurate and satisfactory completion of this work.

Unless otherwise provided, all requirements imposed by this section and performed by the Contractor shall be considered incidental to the various contract items and not separate or additional payment will be made thereof.

1.11 SPECIAL PROJECT REQUIREMENTS

A. Upon receipt of the Contract, the Contractor shall process and return the Contract to the DHHL office within five (5) calendar days.

B. The State intends to issue the Notice to Proceed for the Project to the Contractor within 30 calendar days after bid opening. The Contractor shall be able to commence work on this date.

1.12 UNFORSEEN CONDITIONS ALLOWANCE

A. Included in this project is an allowance for unforeseen conditions to be used by the engineer to pay for unknown conditions from either review of the contract documents or existing exposed conditions found at the site or anticipated from the type of work found.

B. All unforeseen conditions that the Contractor is anticipating being compensated for must be brought to the attention of the engineer and acknowledged as an unforeseen condition that will be paid for by the State before the Contactor proceeds with his work.

C. Work accomplished by the Contractor without prior approval by the Project Manager will be considered part of the work wand incidental to the work and no additional compensation will be allowed.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 - MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

A. Work under this section will not be measured not paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

B. Work under this section for unforeseen conditions shall be paid under an allowance item in the Proposal Schedule. The allowance is an estimate and the Additional charges by the Contractor for overhead, coordination, profit, included in the Contractor's lump sum bid price.

END OF SECTION

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Shop drawings and submittals shall be made in accordance with DHHL's General Conditions, Section 5.5.1 – "SHOP DRAWINGS" and Section 6.3 – "SUBSTITUTION OF MATERIALS AND EQUIPMENT"

1.02 OTHER SUBMITTALS REQUIRED BEFORE CONSTRCTION

The Contractor shall submit the following items prior to or at the pre-construction meeting or unless otherwise noted:

1.03 SHOP DRAWINGS, SAMPLES, CATALOG CUTS, AND CERTIFICATES

A. Submittal Schedule: Prior to the submission of any shop drawings or submittals, the Contractor shall submit to the Construction Manager and Design Consultant for review, a submittal schedule. The schedule shall identify the subject matter of each submittal, the corresponding specification section number and the proposed date of submission. During the progress of work, the Contractor shall revise and resubmit the submittal schedule as directed by the Project Manager.

B. The Contractor shall submit for review to the Construction Manager, or to a representative designated by the Project Manager, electronically or submit four (4) copies, if directed by the Project Manager of all shop drawings, samples, catalog cuts and certificates. Two (2) copies will be returned to the Contractor with information of review action. The Contractor shall submit additional quantities for their subcontractor's or supplier's use. Each shop drawing, certificate of compliance, sample, and equipment list shall be checked and certified correct by the Contractor, and shall be identified with the applicable information specified hereinafter under "Submittal Identification."

Items are to be reviewed prior to commencing fabrication or delivery of material to the job site.

C. Each copy of the drawings, certificates, catalog cuts, and lists reviewed by the Design Consultant will be stamped "REVIEW ACTION" with the appropriate action noted therein. The review of the Design Consultant shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Acceptance of such drawings will not relieve the Contractor the responsibility of conforming to the contract drawings and specifications or for any error or omission which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work. Each shop drawing submitted for review shall have, in the lower right-hand corner just above title, a white space 4" x 4" in which the Design Consultant can place the stamp and indicate

action taken. The Contractor shall also inform their subcontractors to provide this space in their preparation of shop drawings.

1.07 TEST REPORTS

Six copies of test reports for any material used in this Contract shall be submitted when specified or required by the Project Manager.

1.08 SUBMITTAL IDENTIFICATION

A. To avoid rejection and to clarify each submittal, the General Contractor shall have a rubber stamp made up in the following format:

B.

CONTRACTOR NAME: _____

PROJECT: _____

IFB NO: _____

THIS SUBMITTAL HAS BEEN CHECKED BY THIS GENERAL CONTRACTOR. IT IS CERTIFIED CORRECT, COMPLETE, AND IN COMPLIANCE WITH CONTRACT DRAWINGS AND SPECIFICATIONS. ALL AFFECTED CONTRACTORS AND SUPPLIERS ARE AWARE OF, AND WILL INTEGRATE THIS SUBMITTAL INTO THEIR OWN WORK.

DATE RECEIVED_____

SPECIFICATION SECTION _____

SPECIFICATION PARAGRAPH_____

DRAWING NUMBER_____

SUBCONTRACTOR NAME_____

SUPPLIER NAME_____

MANUFACTURER NAME_____

CERTIFIED BY:_____

C. This stamp “filled in” should appear on each reproducible shop drawing, on the cover sheet of copies of test and mill reports, certificates of compliance, catalog

cuts, brochures, etc. The stamp should be placed on a heavy stock paper merchandise (approximately 3” x 6”) and one tag tied to each sample submitted for approval. The tag on the samples should state what the sample is, so that if the tag is accidentally separated from the sample they can be matched up again.

The back of this tag will be used by the Project Manager for receipt, approval, and log stamp for any comments that relates to the sample.

D. Submission Number: Each submission is to be sequentially numbered in the space provided in the Contractor’s stamp. Correspondence and transmittal will refer to this number.

E. The Contractor shall ensure that all submittals, including shop drawings, are compete and in conformance to the requirements of the Contract specifications prior to submissions to the State for review and acceptance. Incomplete submittals will not be processed by the State and returned to the Contractor for correction. Any cost impacts and delays in the Project schedule as a result of incomplete submittals shall be the responsibility of the Contactor.

1.10 GUARANTEES

Guarantee periods shall start at the time of acceptance in writing by the State.

All guarantees and warranties shall be made out to the “State of Hawaii.” Supplier and subcontractor guarantees shall be co-signed by the Contractor.

The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor’s own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

PART 4 – MEASUREMENT AND PAYMENT

4.01 BASIS OF MEASUREMENT AND PAYMENT

Work under this section will not be measured nor paid for separately, but shall be considered incidental to and included in the bid prices for the various items of work in this project.

END OF SECTION

SECTION 01505 – MOBILIZATION AND DEMOBILIZATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

This section covers the requirements for mobilization and demobilization are hereby incorporated into and made a part of these specifications by reference unless otherwise modified hereinafter.

1.02 MOBILIZATION

The Contractor shall mobilize and transport his construction plant and equipment including materials and supplies for operation to the site of work, construct temporary buildings and facilities as necessary, and assemble the equipment at the site as soon as possible after receipt of Notice to Proceed, subject to the provisions of the General Provisions.

1.03 DEMOBILIZATION

The Contractor shall demobilize and transport his construction plant and equipment including materials, supplies and temporary buildings off the site as soon as possible after construction is completed. Demobilization shall include all cleanup required under this contract and as directed by the Engineer. Demobilization and final cleanup shall be completed prior to final acceptance.

1.04 PERFORMANCE BOND

The Contractor shall file and pay for the performance and payment bonds according to the Instruction for Bid Submittal, except that the value of the bonds shall equal one hundred percent (100%) of the amount of the contract basic bid amount plus one hundred percent (100%) of the amount of the extra work.

Payment for the Contractor's bond premium will be made in accordance to the terms stated in Part 4 below.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

PART 4 – MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Mobilization shall not be measured for payment. The maximum bid allowed for "Mobilization" is an amount not to exceed size (6) percent of the sum of all items (excluding this item and all Allowances). If the proposal submitted by the bidder indicates an amount in excess of the allowable maximum, the indicated amount

or amounts shall be reduced to the allowable maximum; the "Sum of All Items," in the proposal schedule shall be adjusted to reflect any such reduction. For the purpose of comparing bids and determining the contract price to be inserted in the contract awarded to the bidder, if any is so awarded, the "Sum of All Items" adjusted in accordance with the foregoing shall be used and the bidder's proposal shall be deemed to have been submitted for the amounts as reduced and adjusted in accordance herewith.

B. Demobilization will not be measured for payment. A separate line item called "Demobilization" will be added to the Contractor's Schedule of Values after the contract has been awarded. The total amount for this item shall be 2.5% of the Contractor's total bid amount and will be deducted from other line items in the schedule of values as negotiated between the Contractor and the State. **THE CONTRACTOR SHALL NOT MODIFY THE PROPOSAL SCHEDULE BY ADDING A "DEMOBILIZATION" BID ITEM TO THE PROPOSAL SCHEULE.**

4.02 BASIS OF PAYMENT

A. Mobilization will be paid for at the contract lump sum price under Mobilization. Partial payment will be made as follows:

1. When 2 ½ percent of the original contract amount is earned, 50 percent of the bid amount will be paid.

2. When 5 percent of the original contract amount is earned, 75 percent of the bid amount will be paid.

3. When 10 percent of the original contract amount is earned, 100 percent of the bid amount will be paid.

Nothing herein shall be construed or limit or preclude partial payments otherwise provided by the contract.

B. Partial payment will not be paid for Demobilization. Full payment will be made on the Contractor's final payment request. This will occur after the Contractor has fulfilled all of the requirements of the Contract bid documents to the satisfaction of the State and issuance of the Final Acceptance letter to the Contractor by the State.

END OF SECTION

SECTION 01750 - GUARANTEE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

Guarantee shall be made in accordance with Section 7.35 – “GUARANTEE OF WORK” of the DHHL’s General Conditions.

1.01 GUARANTEES

The Contractor guarantees all materials and equipment furnished to be in operable condition upon final acceptance of the work and that all such materials and equipment conform to the requirements of this contract and be fit for the use intended.

He further guarantees all such materials and equipment against defects and poor workmanship and, to the extent that he is responsible for design, the Contractor guarantees the design to meet the criteria and operating requirements specified against failure to perform in accordance with such criteria and operating requirements.

The period of this guarantee shall commence upon acceptance of the work by the DHHL, and shall extend through the project performance evaluation period not to exceed 1 year for all materials and equipment, provided that this period shall be extended from the time of correction of any defect or failures, corrected under the terms of this guarantee, for a like period for the corrected work.

The Contractor shall correct all defects or failures discovered within the guarantee period. The DHHL will give the Contractor prompt written notice of such defects or failures following their discovery. The Contractor shall commence corrective work within five (5) days following notification and shall diligently prosecute such work to completion. The Contractor shall bear all costs of corrective work, which shall include necessary disassembly, transportation, reassembly and retesting, as well as repair or replacement of the defective material or equipment, and any necessary disassembly and reassembly of adjacent work.

Any period that a particular equipment is not operable due to its failure shall not be considered as a part of the guarantee period. The guarantee period shall be extended for a like period. If due to failure of other equipment the equipment is unable to perform its intended function, the guarantee period shall be extended for a like period. Time that equipment is operating shall be counted as applying to the warranty. Such time shall be determined by use of plant operator's log or other suitable documentation.

If the Contractor falls to perform corrective work in the manner and within the time stated, the Department of Hawaiian Home Lands (DHHL) may proceed to have such work performed at the Contractor's expense and his sureties will be liable therefor. The DHHL shall be entitled to reasonable attorney's fees and court costs necessarily incurred by the Contractor's refusal to honor and pay such costs of corrective work. The Contractor's performance bond shall continue in full force and effect during the period of this guarantee.

The rights and remedies of the DHHL under this provision do not preclude the exercise of any other rights or remedies provided by this contract or by law with respect to unsatisfactory work performed by the Contractor.

This guarantee shall be deemed supplemental to guarantee provisions provided in other sections of the specifications for the individual units and systems of units so specified.

Guarantee periods shall start at the time of acceptance in writing by the State.
All guarantees and warranties shall be made out to the “State of Hawaii.”
Supplier and subcontractor guarantees shall be co-signed by the Contractor.
The Contractor is solely responsible for coincidence or non-coincidence of factory warranties or equipment guarantees, and the Contractor’s own warranties and guarantees as required by the contract. The Contractor is solely responsible for scheduling and coordinating the installation of equipment and materials so as to take maximum advantage of factory warranties.

END OF SECTION

SECTION 02 41 20

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes removal of designated construction; dismantling, cutting and alterations as indicated and necessary for the completion of the work; disposal of materials; identification of utilities; and protection of items to remain.

B. Related Requirements:
   1. Section 03 01 10 – Concrete Repair.
   2. Section 03 80 00 – Concrete Cutting and Boring.
   3. Section 07 90 00 – Sealants.

1.2 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Indicate demolition and removal sequence; location and construction of temporary work.

1.3 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures.

B. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions.

C. Operation and Maintenance Data: Procedures for submittals.

1.4 COORDINATION

A. Section 01 30 00 – Administrative Requirements.

B. Coordinate demolition with work specified in individual Sections.

1.5 PROJECT CONDITIONS

A. Conduct demolition to avoid interference with adjacent and occupied building areas.

1.6 ALTERATION PROCEDURES

A. Assign work of moving, removal, cutting and patching, to trades qualified to perform the work in manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.

B. Cutting and Removal:
   1. Perform cutting and removal as necessary to complete the Work specified in individual Sections.
   2. Remove minimum necessary and in a manner to avoid damage to adjacent work.

3. Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in straight line at natural point of division.

C. Protection:
1. Protect existing finishes, equipment, and adjacent work scheduled to remain from damage or disfigurement.
2. Protect existing and new work from weather and extremes of temperature.
3. Environmental Conditions:
a. Provide temporary enclosure, as necessary to separate work areas from existing building and from areas scheduled for continued operation during the Work.
b. Provide weather protection.

PART 2 PRODUCTS

2.1 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

A. General: Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.

B. Existing Construction: Generally, contract documents will not define products or standards of workmanship present in existing work; the contractor shall identify products by inspection and testing; and workmanship by use of selected existing work as a sample for comparison.

C. Presence of Product, Finish or Type of Construction: Perform patching, extending or matching as necessary to make Work complete and consistent to identical standards of quality.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify Engineer a minimum of 72 hours prior to start of Work.

B. Provide adequate protective materials, methods, and procedures, to prevent damage from weather, vehicles, or pedestrians.

C. Provide, erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, contractor's employees, and existing improvements to remain.

D. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued owner occupancy.

E. Protect existing materials and existing improvements that are not to be demolished.

F. Protect components during and after demolition from exposure to weather.

G. Where Work requires the disconnection or repair of utilities, notify affected utility companies before starting work and comply with their requirements.

H. Mark location and termination of utilities.

I. Prevent debris from entering floor drains, sewers, and storm drains.

J. Sprinkle work with water where applicable to prevent the spread of dust. Provide hoses and water connections for this purpose.

3.2 DEMOLITION

A. Demolish in an orderly and careful manner.

B. Demolish using means, methods, and procedures that prevent damage to adjacent construction not scheduled for work.

C. Remove demolished materials, waste, and debris from site, daily, except where specifically noted otherwise.

D. Upon completion of work, leave areas in clean condition.

E. Remove temporary work.

3.3 CLEANING

A. Section 01 73 00 – Execution.

B. Progress Cleaning: Perform cleaning during the progress of the work daily and as follows:

1. Maintain work areas in a clean and orderly condition at all times, to facilitate performance and to eliminate safety hazards.
2. Spillage, Overspray, or Heavy Collection of Dust: Clean immediately.
3. Work of Trades: At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

C. Final Cleaning: At completion of Alteration Work in each area, provide final cleaning and return space to condition suitable for use by Facility.

END OF SECTION

SECTION 03 01 10

CONCRETE REPAIR

PART 1 GENERAL

1.1 SUMMARY

A. Section includes preparation of concrete and application of repair materials to repair damaged concrete and masonry.

B. Related Sections:
   1. Section 02 41 20 – Selective Demolition.

1.2 ALLOWANCES

A. Provide quantities specified under Section 01 20 00 – Price and Payment Procedures: Quantity allowances.

1.3 REFERENCES

A. American Concrete Institute (ACI) – Cement and Concrete Terminology.

B. American Concrete Institute (ACI) – Manual of Concrete Practice.

C. Concrete Repair and Maintenance Illustrated, Peter H. Emmons, 1994, R.S. Means Company, Inc.

D. International Association of Concrete Repair Specialists (IACRS) – Surface Preparation Guideline, 1989.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

1.5 QUALIFICATIONS

A. Section 01 40 00 – Quality Requirements: Qualifications.

B. Materials Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

C. Applicator: Company specializing in concrete repair with minimum five years documented experience approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 33 00 – Submittal Procedures.

B. Comply with instructions for storage, shelf life limitations, and handling.

1.7 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Coordinate the work with demolition of floor coverings and the installation of associated metal flashings as the work of this Section proceeds.

1.8 WARRANTY

A. Section 01 77 00 – Closeout Requirements: Submittal of Project Warranties.

B. Materials: Provide manufacturer's standard material warranty.

C. Labor: Provide Contractor's two-year full labor and material warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:
   1. The Euclid Chemical Company.
   2. Substitutions: Section 01 60 00 – Product Requirements: or approved equal.

2.2 PATCHING MATERIALS

A. Concrete Repair: EucoRepair V100, one-component, polymer modified, cementitious, trowel-grade mortar, with integral corrosion inhibitor, as manufactured by The Euclid Chemical Company or approved equal.

2.3 BONDING AGENT/REINFORCEMENT PROTECTION

A. DURALPREP A.C., a three-component bonding agent and anti-corrosion coating for reinforcing steel, as manufactured by The Euclid Chemical Company or approved equal.

2.4 CONCRETE REINFORCEMENT

A. Structural: Steel bar, ASTM A615, Grade 40, deformed.

B. Non-structural: Glass Fiber Reinforced Polymer (GFRP) Bars, ACI 440.1R-01.

2.5 ACCESSORIES

A. Water: potable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution.

B. Verify that surfaces are suitable and ready to receive work.

C. Verify that surfaces are suitable and ready to receive work.

D. Beginning of installation means acceptance of existing conditions.

3.2 APPLICATION – PATCHING MATERIALS

A. Mix and apply products in accordance with manufacturer's instructions.

B. Treat exposed, structurally sound, reinforcing metals with bonding/anti-corrosion agent. Apply 2 coats at manufacturer recommended thickness by brush, allowing sufficient dry time between coats. Place patching materials within 24 hours.

C. Apply bonding agent to exposed concrete and CMU surfaces prior to patching. Work product into surface with a stiff bristle brush.

D. Work patching material into contact with substrate, forcing out trapped air and filling all pores and voids.

E. Strike off flush with adjacent surfaces and finish to match existing.

F. Repair minor surface irregularities using vinyl concrete patcher, in accordance with manufacturer's recommendations.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 73 00 – Execution: Protecting installed construction.

B. Protect adjacent surfaces not scheduled to receive coating.

C. Protect property and vehicles.

D. Protect installed materials from damage by pedestrian or vehicular traffic until fully cured.

E. If applied to unscheduled surfaces, remove immediately using methods recommended by product manufacturer.

F. Restrict foot traffic for a minimum of 12 hours at 68 deg. F (20 deg. C).

3.4 CLEANING

A. Section 01 73 00 – Execution: Progress Cleaning.

B. Clean cast off and excess material from adjacent surfaces in accordance with manufacturer's instructions.

C. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

D. As work proceeds, promptly remove spilled, splashed, or splattered finishes.

E. Cleaning of applicator tools, buckets etc. on site is prohibited without specific permission from Owner, and then only in designated areas. These designated areas shall in turn be cleaned daily at the completion of Work. Do not allow rinse water to enter floor drains, sewer pipes, or storm drains. Do not dispose of waste material on ground, in public street gutters, or on site. Return waste materials to Contractor's place of business and dispose of properly in accordance with environmental regulations.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Design, shop drawings, materials, labor, construction, placement, shoring, re-shoring and removal of formwork.

B. Related Requirements:
   1. Section 03 15 00 – Premolded Joint Filler
   2. Section 03 20 00 – Concrete Reinforcing.
   3. Section 03 30 00 – Cast-In-Place Concrete

1.2 REFERENCES

A. Conform to the latest edition of the following, unless otherwise noted or specified on the structural drawings or in these specifications.

B. American Concrete Institute (ACI):
   1. ACI 347R-14 – Guide to Formwork for Concrete.

C. International Code Council (ICC):
   1. International Building Code (IBC), 2006 Edition.

1.3 COORDINATION WITH OTHER TRADES

A. Section 01 30 00 – Contract Administration: Coordination and project conditions.

B. Coordinate formwork with trades impacted by the formwork.

C. Embedded items provided by others shall be set by the formwork contractor

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Provide shop drawings to include material types, form liners, locations and details of form joints, construction joints, expansion and contraction joints, and other control joints for the Engineer's review, prior to fabrication of forms.

1.5 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. The formwork contractor and an independent engineer employed by the formwork contractor shall be responsible for the quality, safety and structural integrity of formwork.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Deliver materials necessary to complete the formwork to site in a timely manner to facilitate the overall construction schedule.

1.7 SEQUENCING AND SCHEDULING

A. Formwork: Formwork, shoring, and bracing shall be complete per shop drawings which have been reviewed by the Engineer prior to placement of any concrete.

B. Embedded Items: Embedded items shall be securely fastened to the formwork by the formwork contractor prior to placement of concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber: Construction Grade.

B. Plywood: APA, Plyform, Class I or II, BB-Exterior, 5/8 inch thick minimum and graded according to Product Standard PS 1. Plywood forms for exposed Engineerural concrete shall be selected to reduce surface imperfections in the concrete. The Engineer shall review all proposed form materials prior to purchase.

C. Form Oil: Non-staining mineral oil, mineral oil emulsions, microcrystalline wax emulsions or resin emulsions.

D. Form Ties: Burke or equivalent, Penta-Tie System, with one inch plastic cone.
1. Place ties symmetrically in each panel. Wire ties will not be permitted.

PART 3 EXECUTION

3.1 FORMS

A. Forms shall be of the material best suited for obtaining desired finish of the concrete surfaces. Wood forms shall be free from warpage, cupping or loose knots.

B. Plywood forms shall be constructed with sheets as large as possible, free from worn edges, torn grain, or other defects.
1. Repetitive use of form materials is permitted provided they produce finish surfaces equal to those of the original forms.
2. Forms for exposed concrete shall be free from imperfections and blemishes which would affect the final appearance.
3. Where plywood is used for exposed surfaces, finish shall be as defined by ACI 301.

3.2 COATING

A. Prior to placement of reinforcing, forms shall be coated with acceptable form oil.

B. Coatings that may interfere with the application or adhesion of paint, plaster or any other material applied to the surface of the concrete shall not be used.

3.3 CONSTRUCTION

A. Erect to lines, grades, shapes, surfaces, and dimensions to give a uniform finish to all concrete surfaces. Make forms tight, without cracks or holes to prevent the leakage of mortar or loss of fine particles from the concrete.

B. The design and engineering of formwork and false-work supports shall be the responsibility of the Contractor. The design and construction shall consider strength, dimension and deflection tolerances, constructability and safety.

C. See Drawings for location and required amount of camber required in beam and slab forms.

D. Rods, bolts and other acceptable devices used for internal ties and spreaders shall be secured to avoid displacement during concrete placement. No metal shall be within 3/4-inch of an interior concrete surface nor within one inch of an exterior surface after the forms are removed.

E. All debris shall be completely removed from the forms with air pressure before any concrete placement. No wooden blocking or ties shall be left in concrete except where indicated for attachment of other work.

F. All exposed concrete corners shall be chamfered 3/4 inch unless otherwise shown on the drawings. Chamfer strips shall be placed at all form joints and construction joints.

3.4 REMOVAL

A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.

B. For post-tensioned slabs and beams, the forms may be removed immediately after post-tensioning is complete and tendon elongation records have been reviewed by the structural engineer.

C. The forms for mild slabs and beams without post-tensioning shall be left in place for 21 days minimum.

D. Provisions shall be made to draw forms into firm contact with existing concrete before placing additional concrete, if a concrete pour has been stopped for a sufficient length of time so that shrinkage or warp has separated the forms and the concrete.

3.5 CLEANING UP

A. During the progress of the work, the premises shall be kept free from waste material and debris resulting from the work of this section.

B. Upon completion, all surplus material and debris shall be removed from the site.

END OF SECTION

SECTION 03 15 00

PREMOLDED JOINT FILLER

PART 1 GENERAL

1.1 SSECTION INCLUDES

A. Premolded joint filler for control joints between cast-in-place concrete expansion joints.

B. Related Requirements:
   1. Section 01 74 19 – Construction Waste Management and Disposal.
   2. Section 03 10 00 – Concrete Forming and Accessories.
   3. Section 07 90 00 – Sealants.

1.2 REFERENCES

A. ASTM D1751-18 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Technical data, instructions and brochures illustrating size, physical appearance and other characteristics.

C. Manufacturer's Installation Instructions: Indicate special precautions required.

D. Material Safety Data sheets concerning impedances, hazards and safety precautions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Protect materials during handling and application to prevent damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. W. R. Meadows, Inc., PO Box 338, Hampshire, Illinois 60140-0338. Tel: (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com.

B. Substitutions: Section 01 60 00 – Product Requirements: Or approved equal.

2.2 MATERIALS

A. Joint Filler:

1. Premolded, resilient, flexible, non-extruding, expansion-contraction joint filler, meeting ASTM D1751.
2. Resilience: When compressed to half of original thickness, recover to a minimum of 70 percent of original thickness.
3. Thickness: 1 inch (25 mm).

B. Joint Sealant: Section 07 90 00.

C. Backer Rod: Section 07 90 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive joint filler.

B. Notify Contract Administrator if conditions are not acceptable. Do not begin application until unacceptable conditions have been corrected.

3.2 APPLICATION

A. Install expansion-contraction joint filler in accordance with manufacturer's instructions.

B. Position premolded joint filler 1-1/2 inch below concrete surface. Secure in position with concrete nails.

C. Fill top 1-1/2 inch with wood or plywood block-out material, to be removed after concreting.

D. After completion of concreting, remove block-out material and clean joint free of dust, dirt, debris, and loose material.

3.3 CLEANING

A. Section 01 50 00 – Temporary Facilities and Controls: Progress cleaning.

B. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site. Dispose of waste in accordance with Section 01 74 19.

3.4 PROTECTION OF FINISHED WORK

A. Section 01 73 00 – Execution: Protection of installed work.

B. Protect sealant from traffic until fully cured.

END OF SECTION

SECTION 03 15 10

ANCHORS AND DOWELS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes dowels installed in existing concrete by drilling and adhesive grouting.

B. Related Sections:
   1. Section 02 41 20 – Selective Demolition.
   2. Section 03 80 00 – Concrete Cutting and Boring

1.2 REFERENCES

A. ASTM C881/C881M-15 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

B. International Building Code (IBC) 2006 Edition – International Conference Council (ICC).

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal procedures.

B. Submit product data for adhesive anchors and installation.

PART 2 PRODUCTS

1.1 MATERIALS

A. Dowels: #4 by 18 inches long, ASTM A615, 60 ksi (420 MPa) yield grade; deformed billet steel bars, unfinished, new, free of loose rust.

B. Adhesive:
   1. Comply with ASTM C 881.
   2. Adhesive for Dowels in Concrete, or approved equal:
      a. Hilti HIT-HY 200-A, by Hilti Corporation.
      b. PE1000+, by Powers Fasteners.
      c. SET-XP High Strength Epoxy-Tie Anchoring Adhesive, Simpson Strong-Tie.
      d. Covert CIA-Gel 7000, USP Structural Connectors.
   3. Substitutions: Section 01 60 00 – Product Requirements: Product options.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install anchor in compliance with adhesive manufacturer’s instructions.

B. Detect location of existing reinforcement using pachometers and indicate on exposed concrete surface.

C. Explore hole locations with the smallest bit feasible.
   1. When existing reinforcing steel is encountered while drilling test holes, abandon hole and patch with non-shrink grout.
   2. Relocate new hole not less than 3 dowel diameters from rejected hole and repeat procedure.
   3. Do not cut existing steel or slant drill to miss.

D. Drill holes in accordance with Section 03 80 00.

E. Drill holes into existing concrete of diameters recommended by the adhesive manufacturer.

F. Position holes in a manner to avoid rebar locations, as identified above, while maintaining spacing indicated on Drawings.

G. If hole sizes are not stated by the manufacturer or specified in the Contract Documents, drill holes 1/8-inch larger than the diameter and 1/2-inch longer than the length of the anchor.

H. Drill holes to maximum embedment depth for details and lengths of anchors indicated on Contract Drawings.

I. Blow holes clean of all loose material and dust using compressed air.

J. Clean anchor free of oils, greases, dirt, old coatings, or chemical contaminants prior to installation.

K. Install adhesive in accordance with manufacturer's instructions.

L. Inject adhesive with enough material so that when the dowel is inserted excess material is extruded from the hole.

M. Insert dowel into hole, with twisting motion, to ensure full contact with the adhesive and to ensure there are no air voids.

N. Insert dowel to 6 inch embedment.

3.2 PROTECTION OF FINISHED WORK

A. Protect Work until adhesive has fully cured.

END OF SECTION

SECTION 03 15 13

WATERSTOPS

PART 1 GENERAL

1.1 SUMMARY

A. Non-bentonite hydrophilic rubber waterstops.

B. Sealing cold joints and construction joints between structural elements against penetration of water from wet-face of structure.

C. Sealing piping penetrations against water penetration from wet-face of structure

1.2 REFERENCES

A. ASTM International (ASTM):
   1. ASTM D412-16 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
   2. ASTM D2240-15e1 – Standard Test Method for Rubber Property – Durometer Hardness.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittals.

B. Product Data:
   1. Materials list of items proposed to be provided under this section.
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
   3. Show drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this section with the work of adjacent work.
   4. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.4 DELIVERY, STORAGE & HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Purchase products through an authorized distributor of the manufacturer.

C. Deliver products to site in sealed and labeled packages and containers as supplied by the manufacturer; inspect to verify acceptability.

D. On site storage shall be allowed at Owner's discretion and in a location designated by Owner. Only approved materials shall be stored at job site.

E. Delivery & storage:
   1. Deliver materials to job site in manufacturer's unpacked containers with all labels intact and legible at time of use.

2. Maintain products in a dry condition during delivery, storage, handling, installation and concealment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Adeka Corporation or approved equal.

B. Substitutions: Section 01 60 00 – Product Requirements.

2.2 WATERSTOP MATERIALS

A. Waterstop KBA-1510FP, 15mm X 10mm, flexible hydrophilic sponge rubber strip composed of vulcanized rubber and urethane polymer as the hydrophilic agent, as manufactured by Adeka Corporation or approved equal.

B. Waterstop Sealant: Adeka Ultraseal P-201, single-component, hydrophilic, elastic sealant, as manufactured by Adeka Corporation approved equal.

2.3 Physical properties of the swelling rubber waterstop material:

PHYSICAL PROPERTIES	**Adeka KBA-1510FP**
Hardness	HsC 22
Tensile Strength (MPa)	0.8
Elongation (%)	350
Specific Gravity	0.60
Vulcanization	Yes
Volume Expansion (%)	30
General Physical Properties	Vulcanized rubber, follows compression

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination.

B. Verify that surfaces are suitable and ready to receive work.

C. Verify that surfaces are suitable and ready to receive work.

D. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

A. Clean joints of dirt and debris.

B. Ensure rebar does not interfere with proper position of waterstop. Protect waterstops during progress of work.

3.3 INSTALLATION – SMOOTH CONCRETE

A. Surface of the concrete must be clean dry, clean and free of oil, dust and laitance.

B. Apply small bead of waterstop sealant approximately ¼" X ⅜". Press waterstop into bead of sealant. Smooth excess sealant against side of waterstop. Allow curing time (estimate 1 to 2 days) before placing concrete. Place a nail or screw every 12 to 14 inches if concrete must be placed immediately.

C. Paint concrete and hydrophilic waterstop strip with appropriate adhesive. Allow adhesive to become tacky. Firmly press hydrophilic strip waterstop onto adhesive.

D. Place concrete without displacing or disturbing the position of the waterstop.

E. Install waterstop and waterstop sealant in strict accordance with manufacturer's recommendations. Do not place expanding water stop closer than 1 inch from the edge of the concrete pour to ensure it will not spall the concrete edge. Place the ends of the expanding rubber waterstop ends with a parallel side by side bypass. Provide a good and uniform contact of the strip to the concrete surface.

3.4 INSTALLATION – ROUGH CONCRETE

A. Use where hydrophilic strip does not have intimate contact with the concrete surface along the entire length of the strip.

B. Surface of the concrete must be clean dry, clean and free of oil, dust and laitance.

C. Place a small bead of hydrophilic waterstop sealant paste on the concrete. Press the hydrophilic strip waterstop firmly onto the bead of sealant. Place nail or screw every 10 to 12 inches.

D. Check for any gaps between the product and the substrate. If gaps are present, fill-in using appropriate gun grade hydrophilic material applied to the side of the strip.

E. Place concrete without displacing or disturbing the position of the waterstop.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concrete reinforcement and accessories.

B. Related Requirements:
   1. Section 03 15 10 – Anchors and Dowels.
   2. Section 03 15 13 – Waterstops.
   3. Section 03 30 00 – Cast-In-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute (ACI)
   1. ACI 315R-18 – Guide to Presenting Reinforcing Steel Design Details.
   2. ACI 318-19 – Building Code Requirements for Structural Concrete and Commentary.

B. American National Standards Institute (ANSI)
   1. ANSI/AWS D1.4 – Structural Welding Code for Reinforcing Steel.

C. ASTM International (ASTM):
   1. ASTM A615/A615M-18e1 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   2. ASTM A1064/A1064M-18a – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

D. Concrete Reinforcing Steel Institute (CRSI)
   1. Placing Reinforcing Bars, 9th Edition – CRSI.

E. International Code Council (ICC):
   1. International Building Code (IBC), 2006 Edition.

1.3 COORDINATION WITH OTHER TRADES

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Coordinate the placement of reinforcing steel with other trades impacted by this work.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Provide complete shop drawings which include material types, quantities, spacing, dimensions and placing drawings for review by the structural engineer a minimum of 14 days prior to placement. Review of the shop drawings does not relieve the contractor from complying with the contract documents.

C. Provide mill certificates for all reinforcement listing chemical and physical properties, grades and conformance to ASTM specifications. Testing shall be provided at the expense of the contractor for all reinforcing which cannot be identified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. All materials necessary to complete the installation of reinforcing steel shall be delivered in a timely manner to facilitate the overall construction schedule.

1.6 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Perform Work in accordance with CRSI Placing Reinforcing Bars.

1.7 PRE-INSTALLATION CONFERENCE

A. Section 01 30 00 – Administrative Requirements: Preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.
   1. Attendance: Architect, Contractor, Project Superintendent, Job Foreman, and Paint Manufacturer's Technical Representative.
   2. Agenda:
      a. Review Specifications.
      b. Quality control.
      c. Painting details and procedures.
      d. Critical work sequencing.
   3. Examine and make notes of job conditions prior to installation.

1.8 SEQUENCING AND SCHEDULING

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Reinforcing: Installation of reinforcement shall be complete per shop drawings which have been reviewed by the structural engineer prior to placement of any concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Reinforcing Bars: Deformed bars conforming to ASTM A615 or A706. See structural drawings for bar sizes and quantities.

B. Welded Wire Fabric: ASTM A185. See structural drawings for designation and locations.

C. Tie Wire: 16 gage or heavier manufactured from annealed steel.

D. Accessories: Chairs, spacers and items required for accurately and securely supporting reinforcement prior to and during concrete placement.

PART 3 EXECUTION

3.1 FABRICATION

A. Fabricate steel bars to length and shape indicated, by methods that will not injure the materials. Heating of reinforcement for bending is not permitted. Bars with kinks and bends not shown in the drawings are unacceptable and will be rejected.

3.2 CLEANING

A. Clean reinforcement of loose mill scale, oil, or other coating that might destroy or reduce the bond, both before placing reinforcement and again before placing concrete.

3.3 PRODUCT HANDLING

A. Section 01 60 00 – Product Requirements: Delivery, Storage, and Handling.

B. Bundle, identify and tag reinforcement to facilitate sorting and placing.

C. Do not damage the material during transportation or storage.

D. Maintain an adequate supply of certified or tested reinforcement on the site to avoid project delays.

E. Welding of reinforcing bars shall conform to Structural Welding Code for reinforcing steel, AWS D1.4-79.

3.4 PLACEMENT

A. Place and secure reinforcement per shop drawings which have been reviewed by the structural engineer. Tie at points where bars cross to prevent displacement during the concrete placement. Beam stirrups shall be tied to bars at both top and bottom.

B. Place reinforcement to enable concrete cover conforming to IBC 2006, Section 1907.7 – Concrete Protection for Reinforcement.

C. Heating of rebar to facilitate field bending may be allowed only as specified in the structural drawings.

3.5 SPACING

A. Place and secure all reinforcement to maintain the specified clearances and distances between bars and the forms and between parallel bars. Provide spacers

and spreaders to secure horizontal bars in beams, girders and other areas as required.

3.6 SUPPORT

A. Support bars and fabric on sturdy chairs and hangers.

B. Assign a competent iron-worker to observe reinforcement and maintain the bars in their proper positions during concrete placement.

C. Bar supports, within one inch of exposed surfaces, shall be galvanized or acceptable plastic.

D. Pre-cast concrete cubes may be used to support reinforcing steel in slabs-on-grade, grade beams, pile caps and other foundation items.

3.7 SPLICING

A. Splice reinforcing only where indicated in the structural drawings.

B. Bars shall be in contact at splices and shall be tied firmly together before concrete placement.

C. Lap bars per the typical lap schedule if not otherwise indicated. Splices in horizontal wall reinforcement shall be staggered and separated a minimum of 30 bar diameters longitudinally in alternate bars of opposite tiers.

D. Dowels and stubs to lap with subsequent work shall extend as required to provide the full lap length.

3.8 WELDED WIRE FABRIC

A. Roll out, straighten, cut to size, and lay flat in place.

B. Provide a one foot minimum lap at sides and ends, and securely wire together.

C. At edges of slabs and at expansion and contraction joints, extend the fabric to within 2 inches of edge.

D. Provide chairs and support bars to maintain accurate clear distances.

3.9 CLEARANCES

A. Clear distance between reinforcing steel and face of concrete shall be as indicated on structural drawings.

3.10 CLEANING UP

A. Maintain the premises free from debris and waste material resulting from the work of this section during the progress of the work.

B. Upon completion, all surplus material and debris shall be removed from the site.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete.

B. Related Sections:
   1. Section 02 41 20 – Selective Demolition.
   2. Section 03 10 00 – Concrete Forming and Accessories.
   3. Section 03 15 13 – Waterstops.
   4. Section 03 20 00 – Concrete Reinforcing.

1.2 REFERENCES

A. American Concrete Institute (ACI)
   1. ACI 301-16 – Specification for Structural Concrete.
   2. ACI 305R-10 – Guide to Hot Weather Concreting.

B. ASTM International (ASTM):
   1. ASTM C33/C33M-18 – Standard Specification for Concrete Aggregates.
   2. ASTM C94/C94M-18 – Standard Specification for Ready-Mixed Concrete.
   3. ASTM C150/C150M-19a – Standard Specification for Portland Cement.
   4. ASTM C260/C260M-10a(2016) – Standard Specification for Air-Entraining Admixtures for Concrete.
   5. ASTM C494/C494M-17 – Standard Specification for Chemical Admixtures for Concrete.
   6. ASTM C618-19 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
   7. ASTM C1017/C1017M-13e1 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
   8. ASTM C1116/C1116M-10a(2015) – Standard Specification for Fiber-Reinforced Concrete.

C. International Code Council (ICC):
   1. International Building Code (IBC), 2006 Edition.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal procedures.

B. Mix Design: Submit proposed mix design for Engineer’s review and approval a minimum of 7 days prior to placement of concrete.

C. Product Data: Submit data on attachment accessories and admixtures.

D. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components that are concealed from view.

1.5 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Perform Work in accordance with ACI 305R.

C. Acquire cement and aggregate from same source for all Work.

1.6 PRE-INSTALLATION CONFERENCE

A. Section 01 30 00 – Administrative Requirements: Preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.
   1. Attendance: Architect, Contractor, Project Superintendent, Job Foreman, and Paint Manufacturer's Technical Representative.
   2. Agenda:
      a. Review Specifications.
      b. Quality control.
      c. Painting details and procedures.
      d. Critical work sequencing.
   3. Examine and make notes of job conditions prior to installation.

1.7 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Coordinate the installation of concrete with the placement of accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or Type II.

B. Fine and Coarse Aggregates: ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.2 ADMIXTURES

A. Air Entraining Admixtures: ASTM C260.

B. Chemical: ASTM C494, Type A or D, Water Reducing, Retarding and Accelerating.

C. Pozzolan: ASTM C618.

D. Plasticizing: ASTM C1017.

E. Vapor Emission Admixture:
   1. Product: Vapor Lock or approved equal.
   2. Description: A ready-to-use concrete admixture, for shrinkage control, to inhibit corrosion, and to reduce permeability, meeting ASTM 494 Type S.
   3. Corrosion inhibitor shall enhance the retardation set time.
   4. Provide 10 ounces per 100 weight of concrete with the head water or at the tail end of the load

F. Fiber Reinforcement:
   1. Product: Forta-Ferro Fibre, or approved equal, as manufactured by FORTA Corporation.
   2. Description: Fibrillated polypropylene synthetic copolymer fiber, 2.25 inches long, meeting ASTM C1116.
   3. Provide a minimum of 7.5 lbs. per cubic yard.

G. Crystalline Admixture:
   1. Product: Krystol Internal Membrane (KIM), as manufactured by Kryton International Inc., or approved equal.
   2. Hydrophilic crystalline admixture used to create permanently waterproof concrete.
   3. Provide 2% of total cementing materials by weight, to a maximum dosage of 8 kg/m3 (13.5 lb/yd3).

2.3 CONCRETE MIX

A. Mix concrete in accordance with ACI 301. Deliver concrete in accordance with ASTM C94.

B. Select proportions for normal weight concrete in accordance with ACI 301 field test data.

C. Provide concrete to the following criteria:

Unit	Measurement
Compressive Strength (28 day)	4,000 psi
Water/Cement Ratio (maximum)	0.45 by weight (mass)
Aggregate Size (maximum)	3/4-inch

D. Do not use calcium chloride unless approved.

E. Use set retarding admixtures only when approved.

2.4 FINISH MATERIALS

A. Evaporation Retardant:
   1. Product: EUCOBAR, as manufactured by Euclid Chemical, or approved equal.
   2. Description: Water-based polymer concentrate, mixed with water, and spray-applied to the surface of fresh concrete as an evaporation retardant.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

C. Verify requirements for concrete cover over reinforcement.

3.2 PREPARATION

A. Where new concrete abuts existing concrete, abrade surface of existing concrete to 1/4-inch amplitude.

B. Moisten base materials and adjoining concrete surfaces immediately prior to concrete placement.

C. Remove mud, water, wood scraps and debris from the areas in which concrete will be placed.

D. Thoroughly clean the areas to ensure proper placement and bonding of concrete.

E. Thoroughly clean all transporting and handling equipment prior to re-use.

3.3 PLACEMENT – CONCRETE

A. Notify Engineer a minimum of 48 hours prior to commencement of operations.

B. Place concrete in accordance with ACI 305R.

C. Provide cover around reinforcement conforming to IBC 2006, Section 1907.7 – Concrete Protection for Reinforcement.

D. Place concrete continuously. Do not interrupt successive placement; do not permit cold joints to occur.

3.4 VIBRATION AND COMPACTION

A. Thoroughly compact all concrete, except concrete overlay, by means of internal mechanical vibrators.

1. Vibrator shall be of flexible immersion type having a frequency of not less than 7,000 rpm.
2. Place vibrator directly in concrete at 18 to 30 inch intervals for a period of approximately 5 to 15 seconds and withdrawing slowly or as directed, depending on the consistency of concrete.
3. Provide one vibrator for each location where simultaneous pouring takes place, to ensure thorough vibrating of all sections at time of pour.
4. Provide sufficient spare vibrators on the job so as to have them readily available in case any vibrator in us should suddenly cease to function properly.
5. Under no condition shall vibrator be placed against reinforcing steel or attached to forms.

6. Do not use vibrators to transport material.

3.5 CONCRETE FINISHING

A. Finish concrete surfaces in accordance with ACI 301.

B. Steel trowel surfaces.

3.6 CURING AND PROTECTION

A. Immediately after placement, apply evaporation retardant, to protect concrete from premature drying and excessively hot temperatures. Mix concentrate at 9:1 ratio (water:vapor retardant). Apply at the rate of 200 to 300 square feet per gallon.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure in accordance with ACI 301.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Testing and Inspection Services.

B. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01 40 00.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.

E. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

F. Three concrete test cylinders will be taken for every 100 or less cu yds (76 or less cu m) of concrete placed.

G. One slump test will be taken for each set of test cylinders taken.

H. One air content test will be made for each set of test cylinders taken.

3.8 PATCHING

A. Allow Engineer to inspect concrete surfaces immediately after concrete placement.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

C. Patch imperfections in accordance with ACI 301.

3.9 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by the Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Engineer for each individual area.

END OF SECTION

SECTION 03 64 24

EPOXY INJECTION CRACK REPAIR

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Structural crack repair in existing concrete by injection of epoxy adhesive.

B. Related Requirements:
   1. Section 02 41 20 – Selective Demolition.
   2. Section 03 01 10 – Concrete Repair.
   3. Section 03 80 00 – Concrete Cutting and Boring.

1.2 ALLOWANCES

A. Provide quantities specified under Section 01 20 00 – Price and Payment Procedures: Quantity allowances.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO):
   1. T237 – Standard Method of Test for Testing Epoxy Resin Adhesive.

B. American Concrete Institute (ACI):
   1. ACI 503.7-07 – Specification for Crack Repair by Epoxy Injection.

C. ASTM International (ASTM):
   1. ASTM C882/C882M-13a – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
   2. ASTM D570-98(2010)e1 – Standard Test Method for Water Absorption of Plastics.
   3. ASTM D638-14 – Standard Test Method for Tensile Properties of Plastics.
   4. ASTM D648-07 – Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edgewise Position.
   5. ASTM D695-15 – Standard Test Method for Compressive Properties of Rigid Plastics.
   6. ASTM D790-10 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

D. International Concrete Repair Institute (ICRI):
   1. No. 210.1–1998 – Guide for Verifying Field Performance of Epoxy Injection of Concrete Cracks.

E. NSF International/American National Standards Institute (ANSI):
   1. NSF/ANSI Standard 61 – Drinking Water System Components – Health Effects.

1.4 DEFINITIONS

A. Crack: Complete or incomplete separation of concrete into two or more parts produced by breaking or fracturing.

B. Crack Injection: Method of sealing or repairing cracks by injecting a polymer.

C. Large Cracks: Wider than 0.015 inch.

D. Small Cracks: Width equal to 0.015 inch or less.

1.5 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Action Submittals:
   1. Physical and chemical properties for epoxy adhesives and polyurethane resins.
   2. Technical data for metering, mixing, and injection equipment.

C. Informational Submittals:
   1. Manufacturer's recommended surface preparation procedures and application instructions for epoxy adhesives and polyurethane resins.
   2. Installation instructions for repairing core holes with epoxy grout.
   3. Manufacturer's Certificate of Compliance: Certified test results for each batch of epoxy adhesive and polyurethane resin.
   4. Statements of Qualification for Epoxy Adhesive and Polyurethane Resin:
      a. Manufacturer's Site representative.
      b. Injection applicator.
      c. Injection pump operating technician.
   5. Epoxy adhesive two component ratio and injection pressure test records for concrete crack repair work.

1.6 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Qualifications for Epoxy and Polyurethane Injection Staff:
   1. Manufacturer's Site Representative:
      a. Capable of instructing successful methods for restoring concrete structures utilizing epoxy and polyurethane injection processes.
      b. Understands and is capable of explaining technical aspects of correct material selection and use.
      c. Experienced in the operation, maintenance, and troubleshooting of application equipment.
   2. Injection crew and job foreman shall provide written and verifiable evidence showing compliance with the following requirements:
      a. Licensed and certified by epoxy or polyurethane manufacturer.
      b. Minimum 3 years' experience in successful epoxy or polyurethane injection for at least 10,000 linear feet of successful crack injection including 2,000 linear feet of wet crack injection to stop water leakage.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact, containing the following information:
   1. Manufacturer's name.
   2. Product name and lot number.
   3. ANSI Hazard Classification.
   4. ANSI recommended precautions for handling.
   5. Mix ratio by volume.

C. Storage and Protection:
   1. Store adhesive containers at ambient temperatures below 110 degrees F and above 45 degrees F.
   2. Store polyurethane resin containers in a dry environment at ambient temperatures below 80 degrees F and above 40 degrees F.

D. Identify materials improperly stored or that become damaged. Conspicuously mark as rejected, and remove from the job site.

1.8 PRE-INSTALLATION CONFERENCE

A. Section 01 31 00 – Project Management and Coordination: Preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this section.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.
   1. Attendance: Engineer, Contractor, Project Superintendent, Job Foreman, and Manufacturer’s Technical Representative.
   2. Agenda:
      a. Review Specifications.
      b. Quality control.
      c. Installation details and procedures.
      d. Critical work sequencing.
   3. Examine and make notes of job conditions prior to installation.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements.

B. Do not apply products during inclement weather, or when inclement weather is expected within four hours.

C. Do not apply products when relative humidity is outside the humidity range required by the manufacturer.

D. Do not apply products to surfaces that are not dry.

E. Do not apply products when surface or ambient temperatures are outside the ranges required by the manufacturer.

F. Maintain on-site equipment, such as plastic sheeting and tarps, to provide emergency temporary protection in the event of sudden storms or inclement weather.

1.10 COORDINATION

A. Section 01 31 00 – Project Management and Coordination: Coordination and project conditions.

B. Coordinate the work with installation of sealants and traffic coating as the work of this Section proceeds.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Materials, equipment, and accessories specified in this section shall be products of:
   1. Epoxy Adhesive and Surface Seal:
      a. BASF Building Systems, Shakopee, MN; SCB Concresive Series.
      b. Sika Corp., Lyndhurst, NJ; Sikadur Series.
      c. Euclid Chemical Co., Cleveland, OH; Euco Series.

2.2 EPOXY ADHESIVE

A. ASTM C 881; Types I, II, and IV; Grades 1 and 2; two-component A and B structural epoxy adhesive for injection into interior or exterior cracks or other voids in concrete structures, for bonding or grouting, by pressure-injection or gravity-feed application.

B. VOC Content: 0 lbs per gal (g/L).

C. Adhesive Properties:

1.	7-day, Tensile Strength, psi, ASTM D638	5,000 mm
2.	Tensile Elongation @ Break, percent, ASTM D638	1.0% mm
3.	Compressive Yield Strength, 7 days @73°F, psi, ASTM D695a	8,000 mm
4.	Compressive Modulus, psi, ASTM D695a	1.5x10 mm
5.	Heat Deflection Temperature, °F, ASTM D648a	120 min. a
6.	Water absorption @ 24 hours, ASTM D570	Max %1.0
7.	Bond Strength @ 2 days psi, ASTM C882	1,000 mm
8.	Bond Strength @ 14 days psi, ASTM C882	1,500 mm
9.	Slant Shear Strength: (5,000 psi Compressive Strength Cone.) Where test results are available psi. AASHTO T237b:	
	a. Cured 3 days Co) 40 deg. F – Wet Concrete	3,500 mm
	b. Cured 1 day Co) 77 deg. F – Dry Concrete	5,000 mm
	c. Cured 3 days Co) 77 deg. ±3 deg. F	5,000 mm

2.3 SURFACE SEAL

A. Sufficient strength and adhesion for holding injection fittings firmly in place, and to resist pressures preventing leakage during injection.

B. Capable of removal after injection adhesive has cured.

2.4 POLYURETHANE RESIN

A. Single component, water-activated, hydrophilic or hydrophobic polyurethane resin for injection into wet cracks in concrete structures to seal active leaks.

B. Conformance to NSF 61: Polyurethane resin in contact with process water shall be NSF 61 approved for contact with potable water.

C. Manufacturers and Products:
   1. Prime Resins, Inc., Conyers, GA; Prime Flex 900 Series.
   2. Sika Corp., Lyndhurst, NJ; SikaFix HH Hydrophilic.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination.

B. Identify cracks scheduled for structural repair in structures.

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Free cracks from loose matter, dirt, laitance, oil, grease, salt, and other contaminants.

B. Mechanically abrade surfaces to be bonded to a rough profile.

C. Clean cracks in accordance with epoxy adhesive or polyurethane resin manufacturer's instructions.

D. Clean surfaces adjacent to cracks from dirt, dust, grease, oil, efflorescence, and other foreign matter detrimental to bond of surface seal system.

E. Do not use acids and corrosives for cleaning, unless neutralized prior to injecting epoxy.

3.3 INSTALLATION – GENERAL

A. Perform epoxy injection crack repair in accordance with ACI 503.7 and adhesive or resin manufacturer’s written instructions.

B. Structurally repair dry cracks where shown on Drawings and all wet cracks in existing concrete structures where directed.

C. Cracks:
   1. Repair cracks in new concrete and dry cracks in existing concrete by injection of epoxy adhesive.
   2. Repair wet cracks by injection of polyurethane resin.

3.4 EPOXY ADHESIVE APPLICATION

A. Sealing: Apply surface seal in accordance with manufacturer's instructions to designated crack face prior to injection. Seal surface of crack to prevent escape of injection epoxy.

B. Entry Ports:
   1. Establish openings for epoxy entry in surface seal along crack under Section 03 80 00.
   2. Determine space between entry ports equal to thickness of concrete member to allow epoxy to penetrate to the full thickness of the wall.
   3. Provide a means to prevent concrete dusts and fines from contaminating the crack or ports when drilling.
   4. Space entry ports closer together to allow adjustment of injection pressure to obtain minimum loss of epoxy to soil at locations where:
      a. Cracks extend entirely through wall.
      b. Backfill of walls on one side.
      c. Difficult to excavate behind wall to seal both crack surfaces.
   5. Core drill to verify epoxy depth where only one side of wall is exposed.

C. Epoxy Injection:
   1. Store epoxy at minimum of 70 degrees F.
   2. Start injection into each crack at lowest elevation entry port.
   3. Continue injection at first port until adhesive begins to flow out of port at next highest elevation.
   4. Plug first port and start injection at second port until adhesive flows from next port.
   5. Inject entire crack with same sequence.

D. Finishing:
   1. Cure epoxy adhesive after cracks have been completely filled to allow surface seal removal without draining or runback of epoxy material from cracks.
   2. Remove surface seal from cured injection adhesive.
   3. Finish crack face flush with adjacent concrete.
   4. Indentations or protrusions caused by placement of entry ports are not acceptable.
   5. Remove surface seal material and injection adhesive runs and spills from concrete surfaces.

3.5 POLYURETHANE RESIN APPLICATION

A. Inject polyurethane resin into cracks in accordance with manufacturer's written instructions.

3.6 EQUIPMENT

A. Portable, positive displacement type pumps with in-line metering to meter and mix two adhesive components, and inject mixture into crack.

B. Pumps:

1. Electric or air powered with interlocks providing positive ratio control of proportions for the two components at nozzle.
2. Primary injection pumps for each material of different mix ratio, including a standby backup pump of similar ratio.
3. Capable of immediate compensation for changes in resins.
4. Do not use batch mix pumps.

C. Discharge Pressure: Automatic pressure controls capable of discharging mixed adhesive at pressures up to 200 psi, plus or minus 5 percent, and able to maintain pressure.

D. Automatic Shutoff Control: Provide sensors on both Component A and B reservoirs for stopping machine automatically when only one component is being pumped to mixing head.

E. Proportioning Ratio Tolerance: Maintain epoxy adhesive manufacturer's prescribed mix ratio within a tolerance of plus or minus 5 percent by volume at discharge pressure up to 160 psi.

F. Ratio/Pressure Check Device:
1. Two independent valved nozzles capable of controlling flow rate and pressure by opening or closing valve to restrict material flow.
2. Pressure gauge capable of sensing pressure behind each valve.

3.7 FIELD QUALITY CONTROL

A. Epoxy Adhesive Two Component Ratio Tests:
1. Disconnect mixing head and pump two adhesive components simultaneously through ratio check device.
2. Adjust discharge pressure to 160 psi for both adhesive components.
3. Simultaneously discharge both adhesive components into separate calibrated containers.
4. Compare amounts simultaneously discharged into calibrated containers during same time period to determine mix ratio.
5. Complete test at 160 psi discharge pressure and repeat procedure for 0 psi discharge pressure.
6. Run ratio test for each injection unit at beginning and end of each injection work day, and when injection work has stopped for more than 1 hour.
7. Document and maintain complete accurate records of ratios and pressure checks.

B. Injection Pressure Test:
1. Disconnect mixing head of injection equipment and connect two adhesive component delivery lines to pressure check device.
2. Pressure Check Device:
   a. Two independent valved nozzles capable of controlling flow rate and pressure by opening or closing of valve.
   b. Pressure gauge capable of sensing pressure buildup behind each valve.
3. Close valves on pressure check device and operate equipment until gauge pressure on each line reads 160 psi.

4. Stop pumps and observe pressure; do not allow pressure gauge to drop below 150 psi within 3 minutes.
5. Run pressure test for each injection equipment unit:
   a. Beginning and end of each injection work day.
   b. When injection work is stopped for more than 45 minutes.
6. Check tolerance to verify equipment capable of meeting specified ratio tolerance.

3.8 MANUFACTURER'S FIELD SERVICES

A. Section 01 40 00 – Quality Requirements: Manufacturer's field services.

B. Provide field inspection and testing by the Manufacturer's Representative at no additional cost to the Owner.

C. Correct identified defects or irregularities.

3.9 CLEANING

A. Section 01 50 00 – Temporary Facilities and Controls: Progress cleaning.

B. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site. Dispose of waste in accordance with Section 01 74 19.

C. As work proceeds, promptly remove spilled, splashed, or splattered finishes.

D. Cleaning of applicator tools, buckets etc. on site is prohibited without specific permission from Owner, and then only in designated areas. These designated areas shall in turn be cleaned daily at the completion of Work. Coatings, sealants, solvents, and other waste material will not be disposed of on ground or in public street gutters or on site, but shall be returned to Contractor's place of business and disposed of properly in accordance with environmental regulations.

3.10 PROTECTION OF FINISHED WORK

A. Section 01 50 00 – Temporary Facilities and Controls: Protection of installed work.

END OF SECTION

SECTION 03 80 00

CONCRETE CUTTING AND BORING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coring and sawing of concrete slabs.

B. Related Sections:
   1. Section 02 41 20 – Demolition of Designated Construction.

1.2 MEASUREMENT AND PAYMENT

A. Separate measurement or payment will not be made for Work required under this Section. All costs in connection with the Work specified in this Section will be considered to be included with the related item of Work in the Price Schedule or incidental to the Work.

1.3 REFERENCES

A. Concrete Sawing & Drilling Association, Inc. (CSDA):
   1. CSDA-C-101-04 – Core Drilling.
   2. Blade Application Code for Diamond Saw Blades
   3. Chain Sawing CSDA-CS-109
   4. Core Drilling CSDA-C-101
   5. Flat Sawing CSDA-F-102
   6. Hand Sawing CSDA-HS-108
   7. IACDS Tolerances In Concrete Drilling R3
   8. Track-Mounted Wall Sawing CSDA-W-104
   9. Wire Sawing CSDA-WS-106

B. International Building Code (IBC) 2006 Edition – International Conference Council (ICC).

1.4 CODES AND STANDARDS

A. Reference Standards and Specifications: Comply with the provisions of the following specifications and standards, except as otherwise noted or specified.
   1. Safety and Health Standards Digest – Construction Industry (OSHA-2202) "Occupational Safety and Health Administration".

1.5 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Coring Procedures: Submit concrete coring procedure, which shall include the following:
   1. Proposed coring methods.
   2. Equipment to be used including coring equipment and rebar locating equipment.
   3. Methods to control drilling water and spoils.

C. Remedial Procedures When Reinforcement Is Cut: Coring operations shall terminate immediately when reinforcement is cut. The Contractor shall submit to the Engineer for approval, the procedure proposed to repair the cut reinforcement and to prevent further cutting of reinforcement.

D. Immediately after coring, the concrete cores shall be identified by the Contractor with a description of the core locations and submitted to the Engineer for inspection.

PART 2 PRODUCTS

2.1 MATERIALS

A. Water for core drilling operations: Clean, potable.

PART 3 EXECUTION

3.1 PREPARATION

A. Before coring, the contractor shall determine the following:
   1. Location of buried or embedded utilities.
   2. Location and size of steel rebar in the concrete slabs.
   3. Location of post-tensioning cable in the concrete slabs.
   4. Location of utility lines in the concrete.

3.2 PROTECTION

A. Existing Facilities: Protect adjacent walkways, building entries, and other building facilities during demolition operations.

B. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Section 01 50 00 - Temporary Facilities and Controls.

C. Protect adjacent buildings and facilities from damage due to demolition activities.

D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

E. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.

F. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.3 CORING REQUIREMENTS

A. Comply with CSDA guidelines.

B. Comply with OSHA standards for equipment and operation.

C. Position holes in a manner to avoid rebar locations, as identified above, while maintaining spacing indicated on Drawings.

D. Detect location of existing reinforcement using pachometers and indicate on exposed concrete surface. Verify hole location using pilot holes prior to coring.

E. Explore hole locations with the smallest bit feasible. When existing reinforcing steel is encountered while drilling test holes, abandon hole and patch with non-shrink grout. Relocate new hole not less than 3 dowel diameters from rejected hole and repeat procedure. Do not cut existing steel or slant drill to miss.

F. Drill holes utilizing methods that will not shatter or damage the concrete adjacent to the holes.

G. Drill holes perpendicular to the surface to the required depth.

H. Drill holes over 1" in diameter with non-impact rotary tool with diamond core drills of the proper size to minimize spalling at the hole exit.

I. Clearance:
   1. Anchors:
      a. Comply with adhesive manufacturer's guidelines.
      b. If hole sizes are not stated by the manufacturer or specified in the Contract Documents, drill holes 1/4-inch larger than the diameter and 1/2-inch longer than the length of the anchor.
   2. Conduit:
      a. Provide 1/2-inch clearance of the largest portion of the pipe or conduit passing through the hole to prevent dust or foreign matter from entering or leaving the area.
      b. If patching or packing is required around the pipe, provide a minimum of one-inch clearance be allowed to accommodate such patching or packing.

J. Vacuum or wash slurry or tailings generated from drilling operations. Do not permit water from drilling operations to contact interior finishes; to fall on public traffic; to flow across sidewalks, shoulders, or lanes occupied by public traffic; or to flow into gutters or other drainage facilities.

K. Provide equipment in drilling operations meeting all OSHA standards and specifications as to plugs, noise and fume pollution, wiring and maintenance.

L. If post-tension cables or stressing end caps are uncovered during the Work, cease work in the immediate vicinity and contact Engineer for further instructions. Concrete repairs involving or related to post tensioning cables shall be performed only under direction and supervision of the Structural Engineer.

3.4 SAWING REQUIREMENTS

A. Comply with CSDA guidelines.

B. Comply with OSHA standards for equipment and operation.

C. Provide sawing equipment adequate in units and power to complete the sawing operation.

D. Provide reference points to properly chalk line proposed saw cuts.

E. Sawing Method: Sawing method shall consist of cutting a groove in concrete with a power-driven concrete saw to the designated depth and width.

F. Saw groove lines straight and to consistent depth.

G. Spray water or provide water-assisted equipment to control dust.

3.5 PROTECTION OF EXISTING PROPERTY

A. Damages to utilities or other objects within the concrete slab are the responsibility of the contractor.

B. Prior to starting the sawing operation, protect against damage to the property caused by water traveling through the cracks in the concrete.

C. Provide adequate protection against water and/or other damage caused by the drilling or sawing above, adjacent to or below the critical or occupied areas.

3.6 TOLERANCES

A. Coring: Deviation in alignment of cored holes shall not be more than 1/2 inch per 10 feet of cored hole length with a maximum deviation of not more than 3 inches.

B. Sawing: Deviation of sawcut lines shall not vary from correct position more than 1/8 inch per 10 linear feet. Depth of groove shall not vary more than 1/8 in 10 linear feet.

3.7 CLEAN-UP

A. Do not allow debris to accumulate.

B. Clean up all concrete and cement materials, equipment, and debris upon completion of each portion of the concrete work.

C. Remove demolished materials from the site as work progresses.

D. Upon completion of work, leave areas in clean condition.

END OF SECTION

SECTION 07 90 00

SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants, joint backing, and accessories.

B. Related Requirements:
   1. Section 02 41 20 – Selective Demolition.
   2. Section 03 30 00 – Cast-In-Place Concrete.

1.2 REFERENCES

A. ASTM C920-11 – Standard Specification for Elastomeric Joint Sealants.

B. SWRI (Sealant, Waterproofing and Restoration Institute) – Sealant and Caulking Guide Specification.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal procedures.

A. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

B. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements.

B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

C. Do not place sealants during rain or when inclement weather is expected within four hours.

1.6 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Coordinate the work with all sections referencing this section.

1.7 WARRANTY

A. Section 01 77 00 –Closeout Procedures: Product warranties.

B. Material: Provide Manufacturer's standard one year material warranty.

C. Labor: Provide Contractor's one year labor and material warranty. Include coverage for installed sealants and accessories which fail to achieve air tight seal, water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

D. Upon written notification of failure due to defective materials or application, repair or replace failure to the approval of, and at no cost to, the Owner.

PART 2 PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Colors of Exposed Joint Sealants: Match concrete color.

2.2 MANUFACTURERS

A. BASF Corporation.

B. Dow Corning Corp.

C. GE Silicone.

D. Geocel Corporation.

E. Mameco International Inc.

F. Pecora Corp.

G. Sika Corporation.

H. Substitutions: Section 01 60 00 – Product Requirements: Product Options: Or approved equal.

2.3 SEALANTS

A. High Performance General Purpose (Nontraffic) Sealant: ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Vertical or horizontal applications where self-leveling sealant is not appropriate.
      b. Control, expansion, and soft joints in masonry.
      c. Joints between concrete and other materials.

d. Joints between metal frames and other materials.
e. Other exterior non-traffic joints for which no other sealant is indicated.

B. Horizontal Expansion Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
1. Approved by manufacturer for wide joints up to 1-1/2 inches.
2. Shore A Hardness: 45, plus or minus 5.
3. Color: As selected.
4. Applications:
a. Expansion joints, and other horizontal construction.

2.4 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round, closed cell polyethylene; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

2.5 MISCELLANEOUS MATERIALS

A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMNATION

A. Section 01 73 00 – Execution: Examination.

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Verify that joint backing and bond breaker tapes are compatible with sealant.

3.2 PREPARATION

A. Prepare joints in accordance with manufacturer's instructions, ASTM C1193, and SWRI (The Professionals' Guide).

B. Protect elements surrounding the Work of this section from damage or disfiguration.

C. Remove existing joint sealants. Mechanically abrade sides of concrete joints and cracks where necessary to provide a clean, porous surface, suitable for sealant application, free of laitance and residual sealants, sealers, grease, or other contaminants.

D. Remove loose materials and foreign matter that might impair adhesion of sealant.

3.3 CRACK ROUTING

A. Dormant Cracks: Rout the exposed face of cracks 1/16-inch and larger to form a V-shaped groove to a minimum 3/8-inch width and 3/8-inch depth.

B. Moving Cracks: Rout crack to form a rectangular shape, a minimum of 3/8-inch wide and 1/2-inch depth.

3.4 INSTALLATION

A. Install sealants in accordance with manufacturer's instructions and with ASTM C1193.

B. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

C. Measure joint dimensions and size materials to achieve required 2:1 width/depth ratios, and not less than 1/4-inch depth or width.

D. Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width. Install bond breaker where joint backing is not used. Joint backing or bond breaker is not required for V-shaped routed cracks.

E. Clean and prime joints in accordance with manufacturer's instructions.

F. Fill channel with sealant working from the bottom to the top, forcing sealant into full contact with the sides of the channel.

G. Tool the applied sealant with a putty knife dampened with xylol or water. Depress sealant firmly, forcing out bubbles and voids. Strike sealant level with surface unless detailed otherwise.

H. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

3.5 CLEANING

A. Section 01 50 00 – Temporary Facilities and Controls: Progress cleaning.

B. As work proceeds, promptly clean, repair, or replace spilled, splashed, or splattered finishes.

C. Collect waste material that may constitute a fire hazard, place in closed metal containers and remove daily from site.

D. Do not dispose of sealants, solvents, and other waste material on ground or in public street gutters or on site. Return waste to Contractor's place of business and dispose of properly in accordance with environmental regulations.

E. Dispose of waste in accordance with Section 01 74 19.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 73 00 – Execution: Protection of installed work.

B. Protect sealants until cured.

END OF SECTION

SECTION 31 00 00

EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavation; filling and backfilling; fill for over-excavation; rough contouring; base course, consolidation and compaction.

B. Related Requirements:
   1. Section 02 41 20 – Selective Demolition.
   2. Section 03 10 00 – Concrete Forming and Accessories.
   3. Section 32 31 13 – Chain Link Fences and Gates.
   4. Section 33 13 00 – Selective Tree and Shrub Removal and Trimming.

1.2 REFERENCES

A. ASTM C136/C136M-14 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D1557-12e1 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

C. ASTM D2487-17 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. ASTM D2922 - 01 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

E. ASTM D3017 - 01 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

F. Local utility standards when working within 24 inches of the respective utility lines.

G. Standard Specifications for Public Works Construction, City and County of Honolulu, 1986.

1.3 DEFINITIONS

A. Utility: Any buried pipe, conduit, or cable.

B. Top Soil: The top 4-inch layer in excavations across lawn or planting area.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal procedures.

B. Samples: Provide samples of materials as required by the Engineer that will be used from furnished material.

C. Materials Source: Submit name of imported materials suppliers.

D. Test Reports: Field density test reports. Submit gradation test for all furnished material.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 77 00 – Closeout Procedures.

B. Accurately record actual locations of new and existing utilities, by horizontal dimensions, elevations or inverts, and slope gradients.

C. Accurately record actual locations of capped utilities and subsurface obstructions.

1.6 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Perform Work in accordance with the Standard Specifications for Public Works Construction of the City and County of Honolulu.

1.7 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Convene minimum one week prior to commencing Work of this section.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. General Fill: Excavated native material or borrow material, free of subsoil, roots, grass, weeds, large stone, and foreign matter, consisting of coarse-grained soil with clay binders and fine-grained soils having expansion value less than 3 percent and with CBR value of 8 or greater; containing not more than 50 percent rock or hard lumps of earth larger than 3 inches in greatest dimension.

B. Structural Fill: Structural fill used below foundations should consist of a mineral soil free of organic material, loam, debris, frozen soil or other deleterious material which may be compressible or which cannot be properly compacted. Structural fill should conform to the following gradation requirements:

1. Gradation per ASTM C136:

SIEVE SIZE	% Passing
2”	100
No. 4	20 - 70
No. 40	5 - 35
No. 200	0 - 10

C. Structural fill should be placed in layers no thicker than 8 inches, as placed, and compacted with suitable compaction equipment to at least 95 percent of maximum dry density as determined by ASTM D1557. Lift thickness should be reduced to 4 inches in confined areas accessible only to hand guided compaction equipment.

D. Unsuitable Material: Highly organic soil ASTM D2487, Group PT or CH, topsoil, roots, vegetable matter, trash and debris.

E. Base: Crushed stone, free of vegetable matter and other deleterious substances, capable of meeting compaction requirements, conforming to the following:

1. Gradation per ASTM C136:

SIEVE SIZE	% Passing
2”	100
1 ½”	90
¾”	79
4	47
200	6

F. Pipe Zone Material: Granular material such as sand, crushed fine aggregate, or finely graded coral, free of vegetable matter and other deleterious substances, capable of meeting compaction requirements, conforming to the following:

1. Gradation per ASTM C136:

Sieve Size	% Passing (By Weight)
1"	100
3/4"	90-100
No. 4	35-65
No. 16	15-40
No. 200	2-10

G. Drainage Gravel: Natural gravel, free of clay, organic matter or other objectionable material. For grains retained on No. 4 sieve, the grain shape shall be rounded or sub-rounded, as defined by ASTM D-2488, and shall conform to the following:

1. Gradation per ASTM C136:

Sieve Size	% Passing (By Weight)
1/2”	100
No. 4	75-100
No. 50	0 - 70
No. 100	0 - 30
No. 200	0 - 15

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination.

B. Identify required lines, levels, contours, and datum.

C. Verify field measurements prior to fabrication or construction.

D. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.2 PREPARATION

A. Section 01 33 00 – Coordination and Project Conditions.

B. Notify Engineer a minimum of 72 hours prior to commencement.

C. Stake and flag locations of known utilities. Locate, identify, and protect utilities that remain from damage.

3.3 PROTECTION

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

B. Protect above and below grade utilities that remain.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, and curbs from damage by excavating equipment and vehicular traffic.

3.4 STOCKPILING

A. Stockpile excavated material in area designated on site to depth not exceeding 8 feet (2.5 m) and protect from erosion. Stockpile material on impervious material on 36 mil Hypalon material and covered over with the same material, until disposal.

B. Separate differing materials with dividers or stockpile apart to prevent mixing.

C. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

D. Remove excess topsoil, not intended for reuse, from site.

3.5 PUMPING, DRAINAGE, AND DEWATERING

A. Remove water, including rainwater, encountered during the course of the foundation and substructure work, by the use of pumps, drains, and other approved methods.

B. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary dams, curbs, and ditches as may be required.

3.6 SUBSOIL EXCAVATION

A. Excavate subsoil to accommodate slabs-on-grade, footings, and construction operations.

B. Remove groundwater by pumping to keep excavations dry.

C. When excavating through roots, perform work by hand and cut roots with sharp axe.

D. Slope banks with machine to angle of repose or less until shored.

E. Grade top perimeter to prevent surface water from draining into excavation.

F. Hand trim excavation. Remove loose matter.

G. Remove lumped subsoil, boulders, and rock from site.

H. Proofroll bearing surfaces. Correct soft spots and compact uniformly to required density.

I. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume Work.

J. Correct over-excavated by refilling to proper grade with approved materials at no additional cost to Owner.

K. Provide adequate protection of open excavations.

3.7 PREPARATION BEFORE BACKFILLING

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with General Fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Scarify subgrade surface to a depth of 6 inches to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.8 FILLING AND BACKFILLING

A. Fill areas to contours and elevations.

B. Do not backfill over porous, wet or spongy subgrade surfaces.

C. Employ a placement method that does not disturb or damage utility or other work.

D. Place fill materials in continuous layers and compact to required density. Do not exceed 8 inches depth per lift before compaction.

E. Pipe Trench:
   1. Place pipe cushion material in bottom of trench to a minimum depth of 2 inches.
   2. Backfill first lift with Pipe Zone Material from the bottom of pipe to 12 inches above the barrel of the pipe by hand shoveling and tamping. Make sure backfill material is in contact with entire periphery of the pipe.
   3. Backfill remainder of trench with General Fill.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Compact to 90 percent of ASTM D 1557 maximum dry density.

H. Remove surplus fill materials from site.

3.9 ROUGH GRADING

A. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Eliminate uneven areas and low spots.

C. Make grade changes gradual. Blend slope into level areas.

D. Slope grade away from buildings and other structures a minimum of 2 inches in 10 ft., unless noted otherwise.

3.10 BASE COURSE

A. Conform to Standard Specifications for Public Works Construction of the City and County of Honolulu for the placement and compaction of aggregate materials.

B. Place material in continuous layers not exceeding 6 inches compacted depth.

C. After spreading and blading, roll the aggregate lightly to obtain initial compaction to bring out any irregularities. Fill high and low spots until surface is smooth and true.

D. Roll aggregate material until it does not creep or weave under the weight of the roller.

E. Grade, level and contour surfaces to provide positive drainage to existing drain inlets without obstruction.

F. Add small quantities of fine aggregate to course aggregate as appropriate to assist compaction.

G. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

H. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

I. Compact to 95 percent of ASTM D 1557 maximum dry density.

3.11 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.12 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements.

B. Perform a minimum of 1 field density test per 100 square feet on compacted fill in accordance with ASTM D1557.

3.13 STOCKPILE CLEANUP

A. Remove stockpile; leave area in a clean and neat condition.

B. Remove surplus subsoil and topsoil from site.

C. Leave stockpile area and site clean and raked.

D. Grade site surface to prevent freestanding surface water.

3.14 PROTECTION OF FINISHED WORK

A. Protect finished Work under provisions of Section 01 73 00.

B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.15 SCHEDULE

A. Compaction:
   1. Structural Fill: Compact to 95% of maximum Standard Proctor Density.

END OF SECTION

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and disposal of grass, bushes, growth, roots, rubbish, debris and other objectionable materials from the area of the site.

1.1 RELATED REQUIREMENTS

A. Section 01 74 19 – Cleaning and Waste Management.

B. Section 03 10 00 – Concrete Forming and Accessories.

C. Section 31 00 00 – Earthwork.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PRESERVATION OF PROPERTY

A. Trees, planting and existing facilities which are to remain are indicated on the drawings and every precaution shall be taken to prevent injury to such growth as well as adjacent property line of the project site.

3.2 CLEARING

A. The natural ground within the limits of the property lines shall be cleared of vegetable growth, such as grass, stumps, logs, brush, and rubbish. It shall include removing buildings, fences, lumber, trash piles, and other obstructions interfering with the proposed work.

3.3 GRUBBING

A. The area below the natural ground, within the limits of the grading work indicated on the grading plans shall be grubbed of all stumps, roots, buried logs, decayed vegetable matter, and other objectionable materials.

B. No objectionable materials shall be permitted to remain under any of the fill areas.

3.4 REMOVAL AND DISPOSAL OF MATERIAL

A. The wood of removed trees and other debris shall become the property of the Contractor and shall be removed from the site. All other materials cleared or grubbed shall be hauled away from the site and disposed of by the Contractor.

B. No burning to dispose of this material will be permitted, except with written permission of the Owner and the Fire Department.

C. No materials shall be dumped on private or private property without proper authority.

D. Disposal: Remove cleared and grubbed materials as Contractor's property. Dispose of waste in accordance with Section 01 74 19.

END OF SECTION

SECTION 31 13 00

SELECTIVE TREE AND SHRUB REMOVAL AND TRIMMING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes tree and shrub removal and pruning.
   1. Pruning of existing trees.
   2. Removal of existing trees and stumps.
   3. Coordinating and scheduling of pruning inspections.
   4. Inspection of trees by Certified Biologist during bird nesting season.

1.2 RELATED REQUIREMENTS

A. Section 01 74 19 – Cleaning and Waste Management.

B. Section 31 00 00 – Earthwork.

1.3 REFERENCES

A. TCIA-ASCA300-14 - Tree Care Operations-Plant Management Standard Practices, Tree Care Industry Association (TCIA).

B. NIST Z133-17 – Arboricultural Operations, American National Standards Institute (NIST).

A. Standard Specifications for Public Works Construction, City and County of Honolulu, 1986.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated and proposed.

B. Pruning Method: The Contractor shall submit a written description for review and approval of proposed pruning method of trees.

1.5 QUALIFICATIONS

A. Section 01 40 00 – Quality Requirements: Qualifications.

B. Contractor: Company licensed in the State of Hawaii, specializing in plant management operations, with minimum five years documented experience.

1.6 PRE-INSTALLATION CONFERENCE

A. Section 01 30 00 – Administrative Requirements: Preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

C. Review preparation and installation procedures and coordinating and scheduling required with related work.
   1. Attendance: Engineer, Contractor, Project Superintendent, and Job Foreman.
   2. Agenda:

a. Review Specifications.
b. Quality control.
c. Details and procedures.
d. Critical work sequencing.

3. Examine and make notes of job conditions prior to installation.

1.7 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.

B. Coordinate with operations affected by the Work of this Section.

1.8 WARRANTY

A. Section 01 77 00 – Closeout Requirements: Submittal of Project Warranties.

B. Materials: Provide manufacturer's standard material warranty.

C. Labor: Provide Contractor's two-year full labor and material warranty.

PART 2 PRODUCTS

2.1 MATERIALS

A. Water: Clean, potable and free of deleterious matter..

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 73 00 – Execution: Examination.

3.2 PREPARATION

A. Inspection for bird/nests during bird nesting season: If tree work will be performed during bird nesting season (January 15 through August 15), a Certified Biologist must be obtained by the Contractor to provide a nesting inspection for the trees to be affected during construction work.

1. If active nests are identified by the Biologist, no work may occur at that tree or surrounding area: A 100-foot exclusion buffer of temporary fencing shall be erected around the tree with the active nest, and no work may occur within the 100-foot buffer until the Biologist has verified that young birds have left the nest and that active nesting has been completed.

3.3 TREE REMOVAL

A. Completely remove designated trees.

B. Before cutting down, completely "top" the tree in an accepted manner that will not jeopardize the public safety or damage structures including utility lines or services, or adjacent trees.

C. Remove branches, foliage, and other debris, from the construction site as soon as the tree has been cut.

D. Grind stumps to a depth of 24" (minimum) below finish grade.

E. Replace curbs, sidewalks, walls, streets, and other construction damaged during the removal of a tree, at Contractor's own expense.

3.4 BACKFILLING AND REGRADING

A. Perform backfilling and grading under Section 31 00 00.

B. Backfill holes, voids, and depressions with approved site soil or imported topsoil. Compact dampened soil to 85 percent. Water to settle. Add soil and grade to conform continuously to adjacent existing grades.

3.5 PRUNING OBSERVATIONS

A. Progress Observations: Contractor shall request the following observations during pruning operations:
   1. Observation after 30% of trees have been pruned.
   2. Inspection at completion of pruning.

3.6 TREE PRUNING

A. Prune existing trees that are indicated on drawings, and confirmed by pre-construction walk through. Remove trimmings and debris from under canopy. Apply 2-inch mulch layer under canopy, as directed.

B. Trees shall be pruned for safety considerations, such as crown cleaning, limb end weight reduction, and as determined by the pre-construction walk through.

C. Prune trees to compensate for limb or root loss caused by damage due to construction work. Provide subsequent maintenance during Contract period as directed City Representative.

D. Cut branches with sharp and clean pruning instruments; do not break or chop.

3.7 TREE REPAIR AND REPLACEMENT

A. Repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots as directed by Engineer. Aerate, water and mulch in accordance with TCIA-ASCA300.

B. Remove and replace dead and damaged trees that the Engineer determines to be incapable of restoring to a normal growth pattern.

C. Aerate surface soil compacted during construction, 10-feet beyond drip line and no closer than 36-inches to tree trunk. Drill 2-inch diameter holes a minimum of 12- inches deep at 24-inches on center. Backfill holes with an equal mix of augured soil and sand. Deep-root water in accordance with TCIA-ASCA300.

3.8 CHIPPING, SALVAGING AND DISPOSAL OF WASTE MATERIALS

A. Section 01 73 00 – Execution: Progress Cleaning.

B. Burning is not permitted.

C. Remove tree material indicated to be removed on the Drawings, or encountered during clearing or grubbing operations, from site and dispose of as Contractor's Property.

D. Disposal: Remove excess excavated material, trees, and tree parts as Contractor's property or as directed. Dispose of waste in accordance with Section 01 74 19.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fence framework, chain-link fabric, and accessories; excavation for post bases; concrete foundation for posts.

B. Related Sections:
   1. Section 03 30 00 – Cast-In-Place Concrete: Concrete anchorage for posts.
   2. Section 31 00 00 – Earthwork: Excavation for post bases.

1.2 REFERENCES

A. ASTM A392-11a(2017) – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.

B. ASTM F567-14a – Standard Practice for Installation of Chain-Link Fence.

C. ASTM F900-11(2017) – Standard Specification for Industrial and Commercial Steel Swing Gates.

D. ASTM F934-96(2017) – Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.

E. ASTM F1083-18 – Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

F. CLFMI-FIG-0111-14 – Field Inspection Guide, CLFMI (Chain Link Fence Manufacturers Institute).

G. CLF-PM0610-17 – Product Manual, CLFMI (Chain Link Fence Manufacturers Institute).

1.3 SYSTEM DESCRIPTION

A. Fence Height: 6 feet nominal.

B. Line Post Spacing: At intervals not exceeding 10 feet.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

C. Product Data: Submit data on fabric, posts, accessories, fittings and hardware.

1.5 QUALITY ASSURANCE

A. Section 01 40 00 – Quality Requirements.

B. Supply material in accordance with CLFMI – Product Manual.

C. Perform installation in accordance with ASTM F567.

D. Perform quality assurance in accordance with CLFMI-FIG-0111-14 – Field Inspection Guide.

1.6 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Fence fabric and accessories shall be delivered to the construction site in packed cartons or firmly tied rolls.

C. Each package shall be identified and shall bear the manufacturer's name.

D. Store fence fabric and accessories in a secure and dry place.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
   1. Anchor Fence Inc.
   2. Cyclone Inc.
   3. Substitutions: Section 01 60 00 – Product Requirements: or approved equal.

2.2 MATESRIALS

A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1043 Type A on pipe exterior and interior.

B. Fabric Wire (Steel): ASTM A392 zinc coated wire fabric.

C. Concrete: Section 03 30 00.

2.3 COMPONENTS

A. Terminal, Corner, and Gate Posts: 2.88-inch diameter.

B. Line Posts: 1.9-inch diameter.

C. Top and Brace Rail: 1.66-inch diameter, plain end, sleeve coupled.

D. Gate Frame:
   1. 1.9-inch diameter for welded fabrication.
   2. Hot-dip galvanize after fabrication.

E. Gusset Plates: 1/4-inch thick steel for truss rod attachment; fabricate to weld into gate frame corners. Hot-dip galvanize after fabrication.

F. Fabric: 2-inch diamond mesh interwoven wire, 9 gage thick, top salvage and bottom selvage knuckled.

G. Tension Wire: 6 gage thick steel, single strand.

H. Tension Band: Galvanized steel.

I. Tension Strap: Galvanized steel.

J. Tie Wire: Aluminum alloy steel wire.

2.4 ACCESSORIES

A. Caps: Dome type, cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings: galvanized steel.

C. Gate Hardware:
1. Fork latch with gravity drop rod and latch assembly.
2. Two 180 degree gate hinges per leaf.

D. Touch-Up Primer for Galvanized Surfaces: ZRC cold-galvanizing paint, with 94 percent zinc by weight in dried condition.

E. Privacy Slats: Vinyl strips, sized to fit fabric weave. Color: as selected.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install framework, fabric, and accessories, in accordance with ASTM F567.

B. Place fabric on outside of posts and rails.

C. Set posts plumb, in concrete footings with top of footing 1 inch above finish grade. Slope top of concrete for water runoff.

D. Do not stretch fabric until concrete foundation has cured.

E. Stretch fabric between terminal posts.

F. Position bottom of fabric 2 inches above finished grade.

G. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 18 inches on centers.

H. Attach fabric to posts with tension bars and tension bar clips.

I. Install bottom tension wire stretched taut between terminal posts.

J. Connect to existing fence at Picnic Area by installation of an end post.

K. The clear opening from end posts to buildings, fences and other structures shall not exceed 6 inches unless otherwise approved in advance by the Consultant.

L. Excavate holes for posts to the diameter and spacing required without disturbing the underlying materials.

M. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation.
1. Recheck vertical and top alignment of posts and make necessary corrections.
2. Extend concrete footings 1 inch above grade, and trowel to a crown to shed water.
3. Unless otherwise approved by the Consultant, no materials shall be installed on the posts, nor shall the posts be disturbed within 7 days after the individual post footing is completed.

3.2 ERECTION TOLERANCES

A. Section 01 40 00 – Quality Requirements: Tolerances.

B. Maximum Variation From Plumb: 1/4 inch.

C. Maximum Offset From True Position: 1 inch.

END OF SECTION