

REQUEST FOR PROPOSALS

FOR THE PAVEMENT MAINTENANCE
AND DRAINAGE IMPROVEMENTS AT
THE MID VALLEY FIRE STATION

FOR THE MONTEREY COUNTY REGIONAL
FIRE PROTECTION DISTRICT

SEALED PROPOSALS MUST BE RECEIVED AT THE
OFFICE OF THE FIRE CHIEF,
MONTEREY COUNTY REGIONAL FIRE DISTRICT,
19900 PORTOLA DRIVE, SALINAS, CALIFORNIA 93908

BY 5:00 P.M. On August 9, 2023

REQUEST FOR PROPOSALS
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IMPROVEMENTS AT THE MID VALLEY FIRE STATION

FOR THE MONTEREY COUNTY REGIONAL
FIRE PROTECTION DISTRICT

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INTENT

The Monterey County Regional Fire District (hereinafter “DISTRICT”) is seeking an experienced California-licensed Contractor (hereinafter “CONTRACTOR”) to complete the Pavement Maintenance and Drainage Improvements at the Mid-Valley Fire Station. The Mid-Valley Fire Station is located at 8455 Carmel Valley Road, Carmel Valley, California. It is the intent of this Request for Proposal to:

1. Establish the specifications, terms and conditions governing the selection of a California-licensed Contractor, which must be experienced in general engineering construction specific to site improvements, including but not limited to earthwork, asphalt paving, concrete curb, gutter and pavements and underground utilities.
2. Solicit sufficient and verifiable information from prospective California-licensed Contractors to establish a list of contractors from which the successful contractor will be selected.

SCOPE

Scope of Work:

It is the intent of these specifications to cover the major components as part of the Pavement Maintenance and Drainage Improvements at the DISTRICT Mid-Valley Fire Station. The scope of work is intended to include descriptions of work to be performed from demolition to final inspection.

The Mid-Valley Fire Station is a critical facility, and the schedule shall be managed to keep closures to a minimum. During Phase I, the front entry driveway and Fire Station doors shall remain open and available for district use. During Phase II, emergency vehicles will be moved to the visitor parking area east of the fire station.

Each phase of the Mid-Valley Station Pavement Maintenance and Drainage Improvements shall be fully operational no more than 30 working days after the project demolition has begun. This date will be agreed upon by the CONTRACTOR and DISTRICT. Additive alternatives will allow an additional 10 working days in the construction schedule for each phase. It is anticipated that temporary emergency access will need to be utilized during this construction. The bid prices should **reflect** these accommodations. CONTRACTOR shall be required to schedule work so that emergency vehicles and staff have access to/from the facility or visitor parking area east of the fire station.

Bid prices shall include all associated services required to furnish and deliver to the DISTRICT complete and operational pavement and drainage facilities as shown on the

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plans and within this scope of work. It is the contractor's responsibility to ensure that all necessary codes have been met. Scheduling of inspections shall be the responsibility of the contractor with coordination of DISTRICT.

Suggested materials and equipment listed in this scope of work shall be used unless an alternate material is called for. All alternate materials shall be identified by the CONTRACTOR in a bid addendum memo. All alternative materials shall be approved by DISTRICT.

This is a prevailing wage project and is subject to all local, state and federal labor laws.

CONTRACTOR shall be responsible for the following activities:

1. Develop an understanding of the Mid-Valley Fire Station. Conduct a detailed review of available plans. Perform additional investigations including pot-holing and field investigations as may be required to determine existing conditions.
2. Attend a **mandatory** pre-bid meeting on July 10, 2023, 8:00 am at the Mid-Valley Fire Station located at 8455 Carmel Valley Road, Carmel Valley, CA 93923.
3. Sawcut and removal of existing AC pavement and base as indicated on approved plans.
4. Sawcut and removal of existing concrete curb and gutter and asphalt dike as indicated on approved plans.
5. Remove existing rock swale as indicated on approved plans.
6. Demolish existing septic tank per County standards, as indicated on approved plans.
7. Install 4" sewer laterals and connect or stub to a proposed sewer lateral stub as indicated on approved plans.
8. Install new pavement and aggregate base (HMA and/or Concrete Pavement as indicated on approved plans and in accordance with the Additive Alternatives awarded).
9. Install concrete curb and gutter, HMA dike, and concrete V-gutter as indicated on approved plans.
10. Install graded swale as indicated on approved plans.
11. Install storm drain pipes, area drains, rounded rock cobble pads, and connections to existing downspouts as indicated on approved plans.
12. Install appropriate ADA parking space as indicated on approved plans.
13. Install appropriate ADA path of travel as indicated on approved plans.

Disposal of all demolition debris will be the responsibility of the contractor.

CONTACT PERSON

All questions and correspondence shall be directed to the following person:

David Sargenti, Fire Chief
Monterey County Regional Fire District - Administrative Office
19900 Portola Drive
Salinas, CA 93908
Phone: (831) 455-1828
Fax: (831) 455-0646

If the above person is not available to provide an immediate answer to a question, they will research the question, determine the appropriate response, and communicate the answer to all interested proposers, as appropriate.

Interested proposers shall not contact any other DISTRICT officer or employee with questions or suggestions regarding this Request for Proposals without first contacting the person listed above. Any undue pressure or badgering of DISTRICT personnel may result in disqualification of the proposer from further consideration.

CALENDAR OF EVENTS

The preliminary phase of the project is expected to follow this schedule of events:

| <u>Date</u> | <u>Event</u> |
|-----------------------------|--|
| June 26 and July 2, 2023 | Public Notice inviting proposals to be published in local newspaper(s). |
| July 10, 2023 at 8:00 a.m. | Mandatory site visit and question/answer session for all interested proposers. Question/answer session will be in an open forum setting at the job site so that all proposers may hear the questions and answers. |
| July 17, 2023 by 5:00 p.m. | Bidders written inquiries are due to the District |
| July 26, 2023 by 5:00 p.m. | Response to Bidder Inquires will be posted and addenda issued via email. |
| August 9, 2023 by 5:00 p.m. | Proposals due and must be received, <u>no later than</u> 5:00 p.m. Pacific Time. |
| August 23, 2023 | Announcement of selected proposer |

The DISTRICT reserves the right to reject any and all proposals, to postpone or revise the abovementioned dates for its own convenience, to make an award in its own best interests, and to waive any informalities or technicalities. Should the DISTRICT choose to extend the proposal period and modify the due date, potential proposers will be notified via First Class U.S. Mail.

BASIS OF AWARD / PROPOSAL EVALUATION

The evaluation of proposals and selection of the CONTRACTOR will be conducted by District employees.

Proposals will be evaluated based on the following criteria:

1. Understanding of the Scope of Work and proposer's Proposed Methodology.
2. Delivery Schedule.
3. Past experience and performance of the proposer's team on similar work including: individuals in the firm assigned to do the work; cost control; quality of work, and meeting scheduled milestones.
4. Cost. Will services be performed at fair and reasonable prices?

The DISTRICT reserves the right to conduct independent reviews and interview proposers submitting proposals prior to making any selection. The DISTRICT will not be liable for any costs associated with your firm preparing its response to the Request for Proposals.

No proposer will be allowed to modify the content of proposal at any time after the submission deadline, except in direct response to a request from the DISTRICT for clarification or for an oral interview, provided that no such modification will result in a substantive amendment to the proposal. The DISTRICT reserves the right to reject any or all proposals received as a result of this request and at its discretion waive any informality, technical defect or clerical error in any proposal.

PROPOSAL FORMAT AND CONTENT

Proposals shall consist of responses to the questions listed below. Please clearly label answers to all questions. The questions must be completely addressed in the body of the proposal and be presented in the order indicated. The submissions are subject to a page limitation of four (4) pages in twelve-point font, not including documents demonstrating proof of qualification, including but not limited to contractor's licensing and registration with California Department of Industrial Relations. You may attach additional information as exhibits which will not count against the page limit; however, responses to questions must be answered within the specified page limit. The DISTRICT makes no assurances that any non-requested additional information in exhibits will be reviewed.

Proposers must have a minimum of two (2) years of professional experience in general engineering site work and utilities. They shall have completed a minimum of three (3) projects of similar complexity and scale; and shall have demonstrated experience of

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similar scope projects. Firm must employ qualified individuals who are licensed and/or otherwise qualified in the following disciplines:

1. California State Licensed General Engineering Contractor (Class A)

Questions:

1. Name of proposer and principal contact person, including office location, address, telephone number, fax number and email address.
2. Brief description and history of the firm and experience of the principal contact with the firm.
3. Description of the services, materials, and systems as they relate to the proposed scope of work that your firm proposes to provide to the DISTRICT for this project.
4. Description of three (3) projects of similar scope for a public agency within the last five (5) years. Please provide project name, location, brief description of work, contract amount, and date of completion. List any liquidated damages or claims that were paid, citations by OSHA, if any, or failure to pay prevailing wage or other federal/state required taxes or contributions. Please provide a reference for each project.
5. Provide the proposed fee for services.

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|---------------------------|
| PROPOSAL SUBMITTAL |
|---------------------------|

One original of each proposal must be received no later than **5:00 p.m., Wednesday, August 9, 2023** in the office of Fire Chief, David Sargenti, Monterey County Regional Fire District, at 19900 Portola Dr., Salinas, California 93908. **Proposals which are received after 5:00 p.m. on August 9, 2023, will be returned to the proposer, unopened, and will not be considered. Postmarks, facsimile transmissions or email transmissions will not be accepted.**

All proposals must be submitted in sealed envelopes bearing on the outside the proposer's name, address and the title **Request for Proposal – Mid-Valley Pavement Maintenance and Drainage Improvements**. It is the sole responsibility of the proposer to see that the proposal is received by the proper time.

All materials submitted in response to this Request for Proposals become the property of the DISTRICT.

CONTRACTUAL REQUIREMENTS

The successful proposer (CONTRACTOR) will be required to enter into a contract with the DISTRICT, which will include, but not be limited to, the following provisions:

A. INDEMNIFICATION

CONTRACTOR shall indemnify, defend, and hold harmless the DISTRICT, its officers, agents, and employees, from and against any and all claims, liabilities, and losses whatsoever (including, but not limited to, damages to property and injuries to or death of persons, court costs and attorney's fees) occurring or resulting to any and all persons, firms, or corporations furnishing or supplying work, services, materials or supplies in connection with the performance of this Agreement, and from any and all claims, liabilities, and loss occurring or resulting to any person, firm or corporation for damage, injury or death arising out of or connected with the CONTRACTOR'S performance of this Agreement, unless such claims, liabilities or losses arise out of the sole negligence or willful misconduct of the DISTRICT, excluding, however, any claim for negligent hire, design and construction by reason of the imputation of any agency relationship with the DISTRICT or arising out of the ownership of the project by the DISTRICT. CONTRACTOR'S performance includes the CONTRACTOR'S action or inaction and the action or inaction of CONTRACTOR'S officers, employees, agents, and subcontractors.

B. INSURANCE

Insurance Coverage Requirements. Without limiting CONTRACTOR'S duty to indemnify, CONTRACTOR shall maintain in effect throughout the term of this agreement, a policy or policies of insurance with the following minimum limits of liability:

Commercial general liability, including, but not limited to, premises, personal injuries, products, and completed operations, with a combined single limited of not less than One Million Dollars (\$1,000,000) per occurrence; and

Comprehensive automobile liability covering all motor vehicles, including owned, leased, non-owned and hired vehicles, used in providing services under this Agreement, with a combined single limit of not less than One Million Dollars (\$1,000,000) per occurrence; and

Worker's compensation insurance, if CONTRACTOR is an employer, in accordance with California Labor Code §3700 and with a minimum of One Million Dollars (\$1,000,000) per occurrence for employer's liability; and

Other Insurance Requirements. All insurance required by this Agreement shall be with a company acceptable to the DISTRICT and authorized by law to transact insurance business in the State of California. Unless otherwise specified by this Agreement, all such insurance shall be written on an occurrence basis, or, if the policy is not written on an occurrence basis, such policy with the coverage required herein shall continue in effect for a period of three years following the date CONTRACTOR completes performance of services under this Agreement.

Each liability policy shall provide that the DISTRICT shall be given notice in writing at least thirty days in advance of any change, cancellation, or non-renewal thereof. Each policy shall provide identical coverage for each subcontractor, if any, performing work under this Agreement, or be accompanied by a certificate of insurance showing each subcontractor has identical insurance coverage.

Commercial general liability and automobile liability policies shall provide an endorsement naming MONTEREY COUNTY REGIONAL FIRE PROTECTION DISTRICT OF MONTEREY COUNTY, its officers, agents and employees as Additional Insureds and shall further provide that such insurance is primary insurance to any insurance or self-insurance maintained by the DISTRICT and that the insurance of the Additional Insureds shall not be called upon to contribute to a loss covered by the CONTRACTOR'S insurance.

Prior to the execution of this Agreement by the DISTRICT, CONTRACTOR shall file certificates of insurance with the Fire Chief, showing that the CONTRACTOR has in effect the insurance required by this Agreement. The CONTRACTOR shall file a new or amended certificate of insurance promptly after any change is made in any insurance policy, which would alter the information of the certificate then on file. Acceptance or approval of insurance shall in no way modify or change the indemnification clause in this Agreement, which shall continue in full force and effect.

The DISTRICT reserves the right to waive or impose any additional insurance or bond requirements, during the contract negotiation and execution phase.

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| <i>C. ADDITIONAL REQUIREMENTS</i> |
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The DISTRICT may, at its sole option, terminate the contract for lack of performance, lack of confidence on behalf of the DISTRICT, change in ownership of the provider firm or changes in personnel assigned to this project without the permission of the DISTRICT, or other reasons the DISTRICT may have, by giving ten (10) days written notice that the DISTRICT is terminating the Agreement.

Proposer shall furnish DISTRICT with any contractual provisions that it requires in the final Agreement for approval prior to selection. Failure to submit any proposed clauses will be deemed a waiver of Proposer's choice of contract language.

ATTACHMENTS

1. Bid Form
2. Electronic copies of the Building Permit plan set submittal can be found at www.mcrfd.org

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**MID VALLEY FIRE STATION
 DRAINAGE AND PAVEMENT IMPROVEMENTS**

MONTEREY COUNTY REGIONAL FIRE DISTRICT

BID FORM

To the Monterey County Regional Fire Protection District
 Office of the Fire Chief
 19900 Portola Drive
 Salinas, California

The undersigned declares to have carefully examined the location of the proposed work, that the Plans and Specifications as set forth herein have been examined, and hereby proposes to furnish all materials and equipment and do all the work required to complete the said work in accordance with said Plans and Specifications for the lump sums and unit prices set forth in the following schedule:

BASE BID SCHEDULE PHASE I

| Item No. | Description | Approx. Quantity | Unit | Unit Price | Amount |
|-----------------|---|-------------------------|-------------|-------------------|---------------|
| 1 | Mobilization and Demobilization | 1 | LS | | |
| 2 | Stormwater Compliance | 1 | LS | | |
| 3 | Sawcut AC Pavement | 50 | LF | | |
| 4 | Remove AC Pavement and Base | 8035 | CF | | |
| 5 | Remove Concrete Curb and Gutter | 160 | LF | | |
| 6 | 4" Storm Drain | 172 | LF | | |
| 7 | 6" Storm Drain | 40 | LF | | |
| 8 | 8" Storm Drain | 165 | LF | | |
| 9 | 12" Storm Drain | 150 | LF | | |
| 10 | Connect Existing Downspout to Storm Drain | 9 | EA | | |
| 11 | 18" Area Drain | 4 | EA | | |
| 12 | Rounded Rock Cobble Pad | 1 | EA | | |
| 13 | 6" Class 2 Aggregate Base | 9640 | SF | | |
| 14 | 4" HMA (Type A) | 9640 | SF | | |
| 15 | Concrete Curb and Gutter | 160 | LF | | |
| 16 | 4" Sanitary Sewer Pipe | 310 | LF | | |
| 17 | Concrete Pedestrian Pavement | 90 | SF | | |

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| | | | | | |
|---|---------------------------------------|----|----|--|---------------------|
| 18 | 6" Class 2 Aggregate Base | 90 | SF | | |
| 19 | Water Pipe | 50 | LF | | |
| 20 | Water connection | 1 | LS | | |
| 21 | 3" Conduit with Trace and Pull String | 90 | LF | | |
| TOTAL BASE BID PHASE I (ITEMS 1 THROUGH 21) (In Words) | | | | | (In Figures) |
| <hr/> | | | | | \$ |
| <hr/> | | | | | |

BASE BID SCHEDULE PHASE II

| Item No. | Description | Approx. Quantity | Unit | Unit Price | Amount |
|-----------------|---|-------------------------|-------------|-------------------|---------------|
| 22 | Sawcut AC Pavement | 50 | LF | | |
| 23 | Remove AC Pavement and Base | 6750 | CF | | |
| 24 | Remove Concrete Curb and Gutter | 120 | LF | | |
| 25 | Remove AC Dike | 180 | LF | | |
| 26 | 4" Storm Drain | 65 | LF | | |
| 27 | 8" Storm Drain | 75 | LF | | |
| 28 | 12" Storm Drain | 155 | LF | | |
| 29 | Connect Existing Downspout to Storm Drain | 2 | EA | | |
| 30 | 24" Area Drain | 1 | | | |
| 31 | 18" Area Drain | 1 | EA | | |
| 32 | Rounded Rock Cobble Pad | 1 | EA | | |
| 33 | 6" Class 2 Aggregate Base | 9780 | SF | | |
| 34 | 4" HMA (Type A) | 9780 | SF | | |
| 35 | 4" Class 2 Aggregate Base | 1780 | SF | | |
| 36 | 3" HMA (Type A) | 1780 | SF | | |
| 37 | HMA Dike | 115 | LF | | |

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| | | | | | |
|---|---------------------------------------|-----|----|--|---------------------|
| 38 | Concrete Curb and Gutter | 110 | LF | | |
| 39 | Demolish Existing Septic Tank | 1 | LS | | |
| 40 | 4" Sanitary Sewer Pipe | 100 | LF | | |
| 41 | Concrete Vehicular Pavement | 350 | SF | | |
| 42 | 4" Class 2 Aggregate Base | 350 | SF | | |
| 43 | Concrete Pedestrian Pavement | 65 | SF | | |
| 44 | 6" Class 2 Aggregate Base | 65 | SF | | |
| 45 | Pavement Markings (2-Coat Paint) | 1 | LS | | |
| 46 | Detectable Warning Surface | 2 | EA | | |
| 47 | ADA Parking Signage | 1 | LS | | |
| 48 | 3" Conduit with Trace and Pull String | 145 | LF | | |
| 49 | Housekeeping Pad around Fire Hydrant | 1 | LS | | |
| TOTAL BASE BID PHASE II (ITEMS 22 THROUGH 49) (In Words) | | | | | (In Figures) |
| _____ | | | | | \$ |
| _____ | | | | | |

BASE BID SCHEDULE PHASE III

| Item No. | Description | Approx. Quantity | Unit | Unit Price | Amount |
|-----------------|-----------------------------|-------------------------|-------------|-------------------|---------------|
| 50 | Sawcut AC Pavement | 25 | LF | | |
| 51 | Remove AC Pavement and Base | 410 | CF | | |
| 52 | Remove Rock Swale | 40 | LF | | |
| 53 | Remove AC Dike | 75 | LF | | |
| 54 | 4" Class 2 Aggregate Base | 720 | SF | | |
| 55 | 3" HMA (Type A) | 720 | SF | | |
| 56 | 2" HMA Grind & Overlay | 900 | SF | | |
| 57 | HMA Dike | 65 | LF | | |

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| | | | | | |
|--|---------------------------------------|-----|----|--|---------------------|
| 58 | Concrete V-Gutter | 440 | SF | | |
| 59 | Graded Swale | 130 | LF | | |
| 60 | 3" Conduit with Trace and Pull String | 30 | LF | | |
| TOTAL BASE BID PHASE III (ITEMS 50 THROUGH 60) (In Words) | | | | | (In Figures) |
| _____ | | | | | \$ |
| _____ | | | | | |

ADDITIVE ALTERNATIVE 1 BID SCHEDULE

| Item No. | Description | Approx. Quantity | Unit | Unit Price | Amount |
|--|-----------------------------|------------------|------|------------|---------------------|
| 61 | 6" Class 2 Aggregate Base | (9640) | SF | | |
| 62 | 4" Class 2 Aggregate Base | 9640 | SF | | |
| 63 | 4" HMA (Type A) | (9640) | SF | | |
| 64 | Concrete Vehicular Pavement | 9640 | SF | | |
| TOTAL ADDITIVE ALTERNATIVE 1 BID (ITEMS 61 THROUGH 64) (In Words) | | | | | (In Figures) |
| _____ | | | | | \$ |
| _____ | | | | | |

ADDITIVE ALTERNATIVE 2 BID SCHEDULE

| Item No. | Description | Approx. Quantity | Unit | Unit Price | Amount |
|----------|-----------------------------|------------------|------|------------|--------|
| 65 | 6" Class 2 Aggregate Base | (9780) | SF | | |
| 66 | 4" Class 2 Aggregate Base | 9780 | SF | | |
| 67 | 4" HMA (Type A) | (9780) | SF | | |
| 68 | Concrete Vehicular Pavement | 9780 | SF | | |
| 69 | HMA Dike | (115) | LF | | |
| 70 | Concrete Curb | 115 | LF | | |

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| | |
|--|---------------------|
| TOTAL ADDITIVE ALTERNATIVE 2 BID (ITEMS 65 THROUGH 70) (In Words) | (In Figures) |
| _____ | \$ |
| _____ | |

GRAND TOTAL BID (BASIS OF AWARD)

| | |
|---|---------------------|
| GRAND TOTAL BID [BASE BID PHASE I, BASE BID PHASE II, AND BASE BID PHASE III; (ITEMS 1 THROUGH 60)] (In Words) | (In Figures) |
| _____ | \$ |
| _____ | |

BASIS OF AWARD

Award of contract, if any be made, shall be made to the Contractor with the lowest responsive responsible bid based on the based on the **Total Base Bid Phase I plus Base Bid Phase II plus Base Bid Phase III (Items 1 through 60)**

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TECHNICAL SPECIFICATIONS

01 57 23 - Temporary Storm Water Pollution Control

01 71 23 - Field Engineering

31 00 00 – Earthwork

31 23 33 – Trenching

32 11 23 - Aggregate Base Course

32 12 16 - Asphalt Concrete Paving

32 13 00 - Concrete Paving

33 10 00 - Water Utilities

33 30 00 - Sanitary Sewerage Utilities

33 40 00 - Storm Drainage Utilities

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Work in this section includes furnishing all labor, equipment and materials necessary for the implementation of temporary Water Pollution Controls, including implementation, monitoring, and maintenance of Best Management Practices (BMPs).
- B. The anticipated area of disturbance for this project is less than one acre. If the area of disturbance will exceed one acre, the OWNER must obtain coverage under the State's Construction General Permit. The CONTRACTOR shall notify the ENGINEER in the event he anticipates the area of disturbance will exceed one acre. The CONTRACTOR shall not disturb more than one acre on the site, including staging, material lay-down, and equipment storage areas, if the OWNER has not gained coverage under the Permit
- C. Principal items of work include:
 - 1. Training employees and subcontractors in stormwater Best Management Practices (BMPs)
 - 2. Stormwater site inspections
 - 3. Reporting and recordkeeping
 - 4. Implementing and maintaining BMPs, and removing BMPs when no longer needed.
 - 5. Non-stormwater management and good housekeeping practices
 - 6. Final site cleanup

1.2 REFERENCES

- A. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 edition
- B. Standard Plans, State of California, Department of Transportation (Caltrans), 2022 edition
- C. Construction Site Best Management Practices Manual (BMP Manual), State of California, Department of Transportation (Caltrans), 2017 edition

1.3 QUALITY ASSURANCE

- A. CONTRACTOR's Water Pollution Control Manager (WPCM) is responsible for overseeing the implementation of Temporary Water Pollution Control (WPC) work on a day-to-day basis. The WPCM shall be an employee of the Contractor and shall be on site regularly.
- B. The WPCM shall educate, direct and enforce compliance with WPC requirements by all employees and subcontractors.
- C. All contractor employees, subcontractors, and heavy equipment operators shall attend a pre-construction WPC training session conducted by the Contractor's WPCM.

1.4 GENERAL PERFORMANCE REQUIREMENTS

- A. All storm water and non-storm water discharges shall be in compliance with all applicable federal, state, and local requirements.

TEMPORARY WATER POLLUTION CONTROL

- B. This Section outlines the contract minimum requirements, and does not relieve the Contractor of his responsibilities for protection of water quality in accordance with all federal, state, and local requirements.
- C. Additional BMPs shall be required if the BMPs which are utilized are not adequately protecting water quality.
- D. The Contractor shall update the Water Pollution Control Drawings to indicate current operations, equipment used, sequence of work, and other aspects of the project.
- E. Contractor is responsible for the performance of subcontractors. Contractor's WPCM shall inspect and monitor all subcontractors' work and storage areas for compliance with this Section.

1.5 FINES AND PENALTIES

- A. Contractor shall pay any fines and be liable for any other penalties that may be imposed by any federal, state, or local regulatory agency for non-compliance with any water quality requirement during the course of work.
- B. Contractor is responsible for implementing any and all BMP corrective measures, at his own expense, as may be directed by the owner or regulatory agencies.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Provide all temporary and permanent water pollution control measures, equipment and materials as required by this Section and the Construction Drawings.
- B. Materials shall conform to the Caltrans Standard Specifications and Caltrans Standard Plans including Standard Specifications sections:
 - 1. 13-4 Job Site Management
 - 2. 13-5 Temporary Soil Stabilization
 - 3. 13-6 Temporary Sediment Control
 - 4. 13-7 Temporary Tracking Control
 - 5. 13-9 Temporary Concrete Washouts
 - 6. 13-10 Temporary Linear Sediment Barriers
 - 7. 14-9 Air Quality
 - 8. 14-10 Solid Waste Disposal and Recycling
 - 9. 14-11 Hazardous Waste and Contamination

2.2 SUBMITTALS

- A. Provide documentation for WPCM, employee and subcontractor training, including pre-construction WPC training.

PART 3 – EXECUTION

3.1 MONITORING, INSPECTIONS AND REPORTING

- A. Monitor the National Weather Service (NWS) forecast on a daily basis during the rainy season.
- B. Conduct inspections:

TEMPORARY WATER POLLUTION CONTROL

1. Within 72 hours prior to predicted rain events to ensure that the site is prepared for the rain event
 2. Within 48 hours after a rain event to evaluate BMP performance and identify corrective actions
 3. Conduct daily inspections of adjoining public roadways, material storage areas, and vehicle and equipment areas.
- C. Implement identified corrective actions within 72 hours, unless a later date is authorized.
- D. Notify the OWNER of any site visits by or correspondence received from any federal, state, or local agency, which are related to activities under this Section.

3.2 BEST MANAGEMENT PRACTICES

- A. Implement Best Management Practices as required by Sections 13 and 14 of the Caltrans Standard Specifications.
- B. Work shall comply with the following Caltrans Standard Specifications Sections, as applicable:
1. 13-4 Job Site Management
 2. 13-5 Temporary Soil Stabilization
 3. 13-6 Temporary Sediment Control
 4. 13-7 Temporary Tracking Control
 5. 13-9 Temporary Concrete Washouts
 6. 13-10 Temporary Linear Sediment Barriers
 7. 14-9 Air Quality
 8. 14-10 Solid Waste Disposal and Recycling
 9. 14-11 Hazardous Waste and Contamination
- C. Best Management Practices shall be implemented concurrent with the commencement of construction, shall be maintained throughout construction, and shall be removed when no longer required, when approved by the ENGINEER.

3.3 COMPLETION OF WORK

- A. Final site cleanup and stabilization shall be considered complete when all of the following have been achieved:
1. The site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity;
 2. There is no potential for construction-related storm water pollutants to be discharged into site runoff;
 3. Final stabilization has been reached;
 4. Construction materials and wastes have been disposed of properly;
 5. Post-construction storm water management measures have been installed;
 6. All construction-related equipment, materials and any temporary BMPs no longer needed are removed from the site.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Work in this section includes surveying and engineering services required for the execution of work.
- B. CONTRACTOR shall:
 - 1. Provide SURVEYOR to perform construction staking as outlined herein
 - 2. Locate utilities by an appropriate combination of potholing and electronic detection
 - 3. Verify horizontal and vertical locations of all utility crossings and points of connection
 - 4. Verify horizontal and vertical elevations of existing improvements at match points
 - 5. Provide any engineering calculations and/or plans required for execution of CONTRACTOR's construction methods.
- C. Principal items of work include:
 - 1. Field location of existing on-site utility lines and improvements required for the execution of the work under this contract.
 - 2. Surveying and construction staking work required for the execution of the work under this contract.
 - 3. Civil, structural or other professional engineering services required to execute Contractor's construction methods.

1.2 EXISTING DATA

- A. Review and verify the existing horizontal and vertical controls within two (2) weeks of Notice to Proceed, and prior to the start of work.
- B. Review all record documents provided by the OWNER within two (2) weeks of Notice to Proceed, and prior to the start of work,.
- C. Site data given herein and on the Drawings are as exact as could be secured, but their absolute accuracy cannot be guaranteed. Exact locations, distances, elevations, etc., shall finally be governed by field conditions and the OWNER'S instructions.
- D. In the event there is any conflict between actual conditions and the Drawings, notify the OWNER immediately and do not proceed with the work until directed by the OWNER.

1.3 QUALIFICATIONS OF SURVEYOR

- A. California registered civil engineer or California licensed land surveyor, acceptable to OWNER

1.4 QUALIFICATIONS OF ENGINEER

- A. California registered engineer of the appropriate discipline, acceptable to OWNER.

1.5 SUBMITTALS

- A. Submit the name, address, and license number of the SURVERYOR AND ENGINEER to the OWNER, if CONTRACTOR-provided.

PART 2 – PRODUCTS

2.1 NOT USED.

PART 3 – EXECUTION

3.1 PROTECTION OF SURVEY REFERENCE POINTS

- A. Locate and protect existing survey reference points prior to starting site work, and preserve all permanent reference points during construction.
- B. All stakes, boundary lines, corner markers, benchmarks survey markers, etc., which have been or may be established in any part of the site, must be carefully preserved and respected by the CONTRACTOR and must be restored at the CONTRACTOR's expense if lost or destroyed as a result of the CONTRACTOR's operations.

3.2 CONSTRUCTION STAKING

- A. Prior to the start of work, SURVEYOR shall review and verify the existing horizontal and vertical controls. Report any discrepancies to the OWNER.
- B. Establish and safeguard a minimum of two permanent benchmarks on the project site.
- C. SURVEYOR shall establish all necessary horizontal and vertical survey control lines and points on site prior to commencement of CONTRACTOR's work, as outlined below. These controls shall be maintained by the CONTRACTOR throughout the course of construction.
- D. The following survey stakes shall be provided by the CONTRACTOR-PROVIDED SURVEYOR for use in constructing the improvements as shown on the contract documents.
 - 1. Rough Grade Stakes for building pad and areas to be paved
 - 2. Building Stakes – Provide a minimum of 4 stakes
 - 3. Finish Grade Stakes for curbs, gutters, valley gutters, slabs and sidewalk areas – Provide stakes at grade breaks and angle points, at beginning and end of horizontal and vertical curves, at maximum 25' spacing on curved alignments, at 50' spacing on tangent alignments, and as generally necessary for construction of the work.
 - 4. Underground Utilities
 - a. Storm Drain – Provide one set of 2 stakes per storm drainage structure greater than 8" in diameter and 1 stake every 100' for line and grade.
 - b. Sanitary Sewer System – Provide one set of 2 stakes per structure and 1 stake every 100' for line and grade.
 - c. Water Service – Provide one stake at all water main angle points and tees, for horizontal location.

3.3 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Upon completion of final site improvements, prepare record (as-built) drawings including locations and elevations of all underground utilities, site drainage piping and structures, points of connection, manholes and drain inlets, and locations of utility stub outs.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Clearing
 - 2. Stripping
 - 3. Excavation
 - 4. Moisture conditioning and compaction
 - 5. Embankment

1.3 RELATED REQUIREMENTS

- A. Section 31 23 33 – Trenching

1.4 REFERENCES

- A. California Building Standards Code (CBSC), 2022 Edition
- B. Project Geotechnical Report
- C. California Code 4216 – Protection of Underground Infrastructure
- D. California Occupational Safety and Health Administrative Code
- E. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 Edition
- F. ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Course Aggregates
- G. ASTM D1556 – Standard Test Method for Density of Soil in Place by the Sand - Cone Method.
- H. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- I. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
- J. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- K. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- L. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.5 SUBMITTALS

- A. Submit samples of proposed imported engineered fill materials to the GEOTECHNICAL ENGINEER. Number and size of samples shall be as directed by the GEOTECHNICAL ENGINEER.
- B. Submit gradation and quality testing results for proposed imported engineered fill materials to the ARCHITECT and GEOTECHNICAL ENGINEER.
- C. Submit samples and test results at least two weeks prior to planned purchase/delivery.

- D. Existing on-site soils will be sampled and tested by the GEOTECHNICAL ENGINEER during construction.

1.6 DEFINITIONS

- A. Relative Compaction, or Percent Relative Compaction: Dry density expressed as a percentage of the maximum dry density at optimum moisture content obtained in accordance with ASTM D1557.
- B. Remove: Remove and dispose of off-site, in a legal manner.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General Engineered Fill – Proposed fill material shall be of approved on-site soil supplemented by imported material, if necessary.
 - 1. On-site soil shall meet the following requirements:
 - a. Soil shall be free of organics, debris, and other deleterious materials, and recycled materials such as asphaltic concrete, concrete, brick, etc.
 - b. Soil shall not contain any rocks and clods over 4 inches in maximum dimension
 - 2. Imported soil shall meet the following requirements:
 - a. Soil shall be free of organic and deleterious materials, and recycled materials such as asphaltic concrete, concrete, brick, etc.
 - a. Soil shall not contain any rocks or clods over 4 inches in maximum dimension, and shall not contain over 15 percent by weight rocks larger than 2 inches.
 - b. Soil shall be granular, having a plasticity index of less than 15, and not more than 20 percent by weight passing the #200 sieve.
 - c. Soil shall have sufficient binder to allow excavations to stand without caving.
 - d. The portion finer than the no. 200 sieve shall not contain any expansive clays.
- B. Controlled Density Fill – Slurry cement backfill conforming to the Standard Specifications.
- C. Trench bedding and backfill: See Section 312333 – Trenching.

PART 3 – EXECUTION

3.1 GENERAL

- A. All improvements shall be constructed in accordance with the California Building Code, the Geotechnical Report, the Drawings, and these Specifications.
- B. Onsite grading and earthwork, site preparation, excavation, trenching and compaction shall be observed and tested by the GEOTECHNICAL ENGINEER. All grading and earthwork shall be done to the satisfaction of the GEOTECHNICAL ENGINEER.
- C. In the event that any unusual conditions are encountered during grading operations which are not covered by the Geotechnical Report or these Specifications, the GEOTECHNICAL ENGINEER shall be immediately notified such that additional recommendations may be made
- D. Provide dust control in accordance with all federal, state, and local requirements

3.2 PREPARATION

- A. Layout all work, establish grades, locate existing underground utilities, set markers and stakes, set up and maintain barricades and protection for utilities, benchmarks, paving, site features, and the public.
- B. Excavation for any purpose shall not remove lateral support from any foundation without first underpinning or protecting the foundation against settlement or lateral translation. The excavation outside the foundation shall be backfilled with soil that is free of organic material, construction debris, cobbles and boulders or with a controlled low-strength material (CLSM). The backfill shall be placed in lifts and compacted in a manner that does not damage the foundation or the waterproofing or dampproofing material.

3.3 CLEARING AND STRIPPING

- A. Remove structures, pavements, and utilities as shown on the Drawings.
- B. Areas to be graded shall be cleared of all grass, brush, trees, rubbish, and debris. The cleared materials shall be removed from areas to be graded and shall be disposed of off-site in a legal manner.
- C. Completely remove tree stumps and root balls in areas to receive pavements, structures, or engineered fill.
- D. Upper natural soils containing roots, deleterious materials, and excessive organics shall be stripped from all areas to be graded. This material shall not be reused as compacted fill and shall either be removed from the site or stockpiled for later use in landscape areas.
- E. Unanticipated buried subsurface objects encountered, or voids created during site preparation, shall be called to the attention of the geotechnical engineer.

3.4 EXCAVATION, MOISTURE CONDITIONING, AND RECOMPACTION

- A. Following clearing and stripping, subgrade shall be cut and finished true to line and grade, to present a smooth surface free from ruts, hummocks or other uneven features which would tend to prevent uniform compaction.
- B. The exposed subgrade shall then be scarified to a depth of 8 inches, moisture conditioned, and recompacted to at least 90% relative compaction.
 - 1. In building and vehicular traffic areas, recompact to 95% relative compaction.
- C. When the moisture content of the subgrade is below the desired moisture, water shall be added until the proper moisture content is achieved.
- D. When the moisture content of the subgrade is too high to permit the specified compaction to be achieved, the subgrade shall be aerated by blading, ripping, diking or other methods until the moisture content is satisfactory for compaction.

3.5 PLACING, SPREADING, AND COMPACTING FILL MATERIAL

- A. The geotechnical engineer shall inspect all surfaces to receive fill prior to the placement of fill.
- B. Fill shall be placed in horizontal layers not exceeding eight inches (8") in loose thickness (before compaction). Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to promote uniformity of material in each layer.
- C. All re-compacted and engineered fill soils shall be compacted within 3 percent of the laboratory optimum moisture content for the soil.

1. When the moisture content of the fill material is below the proper moisture, water shall be added until the proper moisture content is achieved.
 2. When the moisture content of the fill material is too high to permit the specified degree of compaction to be achieved, the fill material shall be aerated by blading, ripping or disking or other methods until the moisture content is satisfactory.
- D. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to at least 90% relative compaction.
1. Compact structural fill placed beneath building foundations and interior floor slabs to at least 95% relative compaction.
 2. Compact the upper 12 inches of finished subgrade in vehicular traffic areas to at least 95% relative compaction.
- E. Compaction shall be undertaken with equipment capable of achieving the specified density and shall be accomplished while the fill material is at the required moisture content. Each layer shall be compacted over its entire area until the required density has been obtained.
- F. Fill slopes shall be compacted by slope rolling and trimming, or shall be overfilled and trimmed back to planned grade.
- G. The filling operations shall be continued until the fills have been brought to the finished slopes and grades as shown on the Drawings.
- H. Fill slopes shall be no steeper than 2:1 (horizontal to vertical), unless shown otherwise in the Construction Documents.
- I. The completed fill shall be finished true to line and grade. Any depressions shall be filled and compacted and all loose material shall be removed.

3.6 KEYING AND BENCHING

- A. Where existing grade is at a slope of 5H:1V (20%) or steeper, a toe key and benching shall be provided.
- B. The toe key shall be cut a minimum depth of 2 feet into undisturbed soils. The keyway shall be 12 feet in width and shall slope at no less than 2% into the slope.
- C. As the fill advances up-slope, benches at least 3 feet wide, or twice the width of the compaction equipment, whichever is wider, shall be scarified into the fill/undisturbed soil interface.

3.7 SUBGRADE PREPARATION IN PAVEMENT AREAS:

- A. Pavement Areas are exterior areas which are not in the building subgrade preparation area and which will receive asphalt or concrete pavement or other flatwork, including parking lots, driveways, access roads, patios, equipment slabs, curbs, gutters, or sidewalks.
- B. Subgrade preparation in pavement areas shall be in accordance with the Geotechnical Report and as directed by the GEOTECHNICAL ENGINEER.
 1. Over-excavate to at least 12 inches below pavement subgrade or existing grade, whichever is lower.
- C. Subgrade preparation shall extend at least 1 foot horizontally beyond the edge of pavement areas.

3.8 SUBGRADE PREPARATION IN BUILDING AREAS:

- A. Subgrade preparation in the building and other structure areas shall be in accordance with the Geotechnical Report and as directed by the GEOTECHNICAL ENGINEER.

1. Over-excavate to at least 3 feet below the bottom of footings and at least 5 feet horizontally beyond the outside edge of perimeter footings.

3.9 SURPLUS MATERIAL

- A. Surplus material shall become the property of the CONTRACTOR and shall be disposed of off the site in a legal manner.

3.10 TESTING AND OBSERVATION

- A. The GEOTECHNICAL ENGINEER will inspect all surfaces to receive fill prior to the placement of any fill.
- B. The GEOTECHNICAL ENGINEER will make field density tests after compaction of each layer of fill or as determined necessary. Additional layers of fill shall not be spread until the field density tests indicate that the minimum specified density has been obtained.
- C. Should the result of any compaction test fail to meet the minimum required density as specified in these Specifications or in the Geotechnical Report, the deficiency shall be corrected to the satisfaction of the GEOTECHNICAL ENGINEER, at the contractor's expense. The expense of retesting such areas shall also be borne by the contractor.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Trench excavation, shoring, and dewatering
 - 2. Pipe bedding, installation, and alignment
 - 3. Concrete encasement
 - 4. Warning tape and tracer wire
 - 5. Trench backfilling and compaction
 - 6. Surface restoration
 - 7. Record drawing requirement

1.2 RELATED SECTIONS

- A. Section 31 00 00 – Earthwork
- B. Division 33 – Utilities

1.3 REFERENCES

- A. California Building Standards Code (CBSC), 2022 Edition
- B. Project Geotechnical Report
- C. California Code 4216 – Protection of Underground Infrastructure
- D. California Occupational Safety and Health Administrative Code
- E. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 Edition
- F. ASTM C 136 – Standard Test Method for Sieve Analysis of Fine and Course Aggregates
- G. ASTM D1556 – Standard Test Method for Density of Soil in Place by the Sand - Cone Method
- H. ASTM D 1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
- I. ASTM D 2321 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- J. ASTM D 2419 – Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate
- K. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- L. ASTM D 2922 – Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- M. ASTM D 3017 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- N. ASTM F 1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe

1.4 SUBMITTALS

- A. Submit proposed foundation, bedding, and backfill materials to the GEOTECHNICAL ENGINEER at least 2 weeks prior to planned delivery or use.
- B. Submit manufacturer's cut sheets for all other materials to the ENGINEER.

- C. Submit samples and test results at least two weeks prior to planned purchase/delivery.

1.5 DEFINITIONS

- A. Relative Compaction, R.C., or Percent Compaction: Dry density expressed as a percentage of the maximum dry density at optimum moisture content obtained in accordance with ASTM D1557.
- B. Remove: Demolish, remove and dispose of off-site in a legal manner.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Pipe: as specified for the utility being installed.
- B. Foundation, bedding and backfill materials shall be as noted on the Plans and as specified for the type of facility being installed.
- C. Concrete: Minor concrete conforming to Section 90 of the Caltrans Standard Specifications.
- D. Controlled density fill (CDF): 2-sack slurry cement backfill conforming to Section 19 of the Standard Specifications.
- E. Aggregate base: Class 2 aggregate base conforming to Section 26 of the Standard Specifications.
- F. Clean Sand: As defined in ASTM 2487-10, with sand equivalent of 30 or greater.
- G. Select native material may be used for bedding and/or backfill only if approved by the GEOTECHNICAL ENGINEER.

2.2 ACCESSORIES

- A. Detection tape: Polyethylene plastic warning tape, minimum 3.5 mils thick, 3" wide, appropriately labeled and color coded.
- B. Tracer wire: Insulated 12 AWG copper wire.
- C. Geotextile fabric: in accordance with Section 88 of the Standard Specifications and as approved by the GEOTECHNICAL ENGINEER.

PART 3 – EXECUTION

3.1 GENERAL

- A. All improvements shall be constructed in accordance with the California Building Standards Code, the Geotechnical Report, the Drawings, and these Specifications.
- B. Onsite grading and earthwork, site preparation, excavation, trenching and compaction shall be observed and tested by the GEOTECHNICAL ENGINEER. All grading and earthwork shall be done to the satisfaction of the GEOTECHNICAL ENGINEER.
- C. In the event that any unusual conditions are encountered during grading operations which are not covered by the Geotechnical Report or these Specifications, the GEOTECHNICAL ENGINEER shall be immediately notified such that additional recommendations may be made.
- D. Where work is performed in public streets or rights of way, or on public utilities, perform the work in accordance with the requirements of the authority having jurisdiction and/or utility owner, if such requirements are more stringent than the requirements of this section.

3.2 SAFETY

- A. Work shall comply with all federal, state, and local safety requirements
- B. Except by permission of the OWNER, no trench shall remain open overnight.

3.3 PROTECTION

- A. Protect trees, shrubs, lawns, rock outcropping, and other landscape features to remaining as portion of final landscaping.
- B. Protect benchmarks, existing structures, fences, roads, sidewalks, paving, curbs and other improvements to remain.
- C. Locate and protect above and below grade utilities which are to remain.
- D. Document all pre-existing surface defects by photographic means prior to conducting trenching operations. Upon completion of construction, all surfaces showing non-documented settlement, spalls, gouges, cracks or other defects shall be repaired or replaced to the satisfaction of the ENGINEER.
- E. Return all surface improvements designated to remain, which are removed for excavation, to their original condition, except as required to comply with other portions of the contract.
- F. Utility trenches which are parallel to the side of a footing shall be placed so that the trench bottom does not extend below a plane sloping downward and away from the building/footing at an inclination of 2:1 (H:V) from the bottom outside edge of the footing.

3.4 POTHOLING

- A. Pothole utility lines in advance of construction to determine if adjustment in horizontal or vertical location of pipe line is required. Submit drawing to ENGINEER showing located utility locations and elevations.
- B. If potholing indicates a conflict between existing and proposed facilities, notify the ENGINEER immediately. Do not perform work on systems which may be affected by the conflict until a resolution has been reached and you have been notified by the ENGINEER.
- C. The Contractor shall locate existing utilities, including water, sewer, storm drain, gas, electric, and telecommunications prior to performing trenching work or any excavation.
- D. The Contractor shall notify the OWNER and ENGINEER a minimum of two weeks prior to planned utility location work. The Owner may identify areas for underground utility location, other than those shown on the Plans.
- E. The precise locations and elevations of all utility crossings and points of connection must be verified by the Contractor prior to construction of systems which may be affected by the existing utility's location. Utilities shall be located by potholing where location and/or grade is critical

3.5 EXCAVATION, BEDDING, PIPE PLACEMENT, AND BACKFILLING

- A. Trenching
 - 1. Excavate to the lines and grades indicated on the Drawings. The OWNER reserves the right to make changes to lines, grades, and depths when required due to field conditions.
 - 2. The excavation and the preparation of the trench shall be completed a sufficient distance in advance of pipe laying to prevent dislodged material from entering the pipe.

3. If the foundation soil is soft, wet, spongy or unstable, the trench shall be excavated to stable soil as determined by the Geotechnical Engineer, and the excavation backfilled with pipe bedding material.
- B. Shoring
1. The sides of all excavations shall be laid back or supported in the manner set forth by CAL/OSHA.
 2. Sheet piling and other shoring shall be withdrawn in such a manner as to prevent caving of the walls of excavations or damage to piping or other structures.
 3. Whenever timber or other sheeting is driven to a depth below the elevations of the top of the pipe, that portion of the sheeting below the elevation of the top of the pipe shall not be disturbed or removed.
- C. Dewatering
1. Remove all water which may accumulate in the excavation during progress of the work so that all work can be done under dry conditions. Trenches shall be kept free from water while the pipe or other structures are installed, while concrete is setting, and until backfill has progressed to a sufficient height to anchor the work against possible flotation or leakage.
 2. Dewatering shall conform to the best management practices as outlined in the California Stormwater Quality Association's *Stormwater Best Management Practice Handbook: Construction*, latest edition.
- D. Pipe bedding
1. Bedding shall be placed in such a manner that the pipe may be laid true to line and grade. When the pipe is bedded, it shall be brought into true alignment and secured.
 2. Place and compact the initial backfill material to the pipe spring line in maximum 8 inch lifts. Carefully compact this material around and under the pipe.
 3. Place and compact the initial backfill material to 12 inches above the top of the pipe in maximum 8 inch lifts. Carefully compact this material around and under the pipe.
 4. Place and compact final trench backfill material in maximum 8" lifts to the final grade or subgrade elevation.
 5. Bedding and backfill shall be compacted to at least 95 percent relative compaction in improved areas, and 90 percent in landscaped or unimproved areas.
 6. Where slurry cement is utilized for pipe bedding, the pipe shall be set on precast mortar blocks or similar devices to allow for placement of required thickness of material under and around the pipe. The Contractor must take the necessary steps to avoid pipe flotation or mis-alignment.
- E. Pipe Installation:
1. Pipe installation shall be in accordance with the manufacturer's instructions.
 2. All pipe handling shall be done in a manner that will not damage the materials. Pipe shall be carried into position, not dragged, and shall be carefully lowered into the trench. Under no circumstances shall the pipe or accessories be dropped into the trench.
 3. Before lowering into the trench, and while suspended, the pipe shall be inspected for defects. Any defective, damaged or unsound pipe shall be rejected and replaced with sound material. The interior of the pipe shall be clean and free of debris.
 4. Joints shall be centered and tight. Cutting of pipe for inserting fittings or for pipe connections shall be done in a neat and skillful manner without damage to the pipe. Each joint shall be inspected to ensure it is properly made before backfilling is done.

5. The pipe shall be laid true to line and grade. When completed, the pipe shall have a smooth and uniform invert. Care shall be taken to prevent any dirt or foreign matter from entering the open end of the pipe.
 6. Where piping is installed on curves, the maximum deflection of each joint shall be no more than 80 percent of the maximum deflection recommended by the pipe manufacturer.
- F. Trench Backfill and Compaction:
1. All backfill shall be placed in a manner to avoid rock pockets, voids, or other conditions that could lead to future settlement of the backfill.
- 3.6 TEMPORARY PIPE COVER
- A. Provide temporary backfill or other means as necessary to protect underground utilities from heavy construction loads.
- 3.7 CONTROLLED DENSITY FILL (CDF)
- A. Backfill trenches with CDF where trenches cross below footings, including perimeter footings. CDF plug shall be a minimum of 3 feet long, and shall extend a minimum of 1 foot beyond the edge of footing.
 - B. Backfill trenches with CDF where pipes are "nested" in clusters where adequate compaction cannot be achieved between and around the pipes, and at all pipe connections, valves, utility vaults, etc. where adequate compaction cannot be achieved by mechanical means.
 - C. Backfill other areas with CDF where indicated on the Drawings and as directed by GEOTECHNICAL ENGINEER.
 - D. If pipe will be partly or entirely embedded in CDF, support and brace the pipe in a manner that will prevent movement or displacement of the pipe during testing and during placement and consolidation of the slurry backfill. Consolidate CDF under and around the pipe without displacing the pipe.
- 3.8 CONCRETE BACKFILL
- A. Place concrete backfill where indicated on the Drawings.
 - B. If pipe will be partly or entirely embedded in concrete, support and brace the pipe in a manner that will prevent movement or displacement of the pipe during testing and during placement and consolidation of the concrete. Consolidate concrete under and around the pipe without displacing the pipe.
- 3.9 WARNING TAPE
- A. Provide warning tape for
 1. All exterior gas pipes
 2. All other pipes which are 2"-diameter and larger
 - B. Install 12" above the pipe.
- 3.10 TRACER WIRE
- A. Tape continuous tracer wire on top of and along entire length of pipes and extend to the grade at each end of the utility pipe so locator equipment can be connected.
 - B. Install tracer wire on:
 1. All exterior gas pipes

1. All exterior nonmetallic pressure pipes 2.5"-diameter and larger (water, recycled water, sewer force mains, and gas)

3.11 SURFACE RESTORATION

- A. Any pavement, curb, walk or any other surface or subsurface improvement removed or damaged during progress of the work, shall, before termination of the contract, be restored to its original condition whether or not such restoration is shown on the Drawings.
- B. The trench patch structural section shall be equivalent to the existing structural section, or 2.5" Hot Mix Asphalt (Type A) on 8" Class 2 Aggregate Base, whichever is greater. Trench patch shall extend min 6" beyond trench wall ("tee cut").
- C. All street cuts shall be neatly sawcut on true line to 1-1/2" minimum depth at a minimum of 6" beyond edge of trench wall.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Class 2 aggregate subbase
 - 2. Class 2 aggregate base

1.3 REFERENCES

- A. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 edition.
- B. ASTM D1557 - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
- C. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand - Cone Method
- D. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 SUBMITTALS

- A. Results of laboratory testing for gradation, R-value, Sand Equivalent, and Durability Index in accordance with Sections 25 and 26 of the Standard Specifications.
- B. Materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, the specified requirements.

1.5 PRODUCTS

1.6 MATERIALS

- A. Class 2 Aggregate Subbase shall conform to Section 25 of the Standard Specifications.
- B. Class 2 Aggregate Base shall conform to Section 26 of the Standard Specifications.

PART 2 – EXECUTION

2.1 GENERAL

- A. Perform work in conformance with Sections 25 and 26 of the Caltrans Standard Specifications.

2.2 PREPARATION

- A. Prepare subgrade as specified in Section 310000.
- B. Sprinkle the subgrade regularly to moisten the surface and to prevent it from drying out and/or cracking prior to the placement of aggregate base.

2.3 INSTALLATION

- A. Deliver, handle, place and compact aggregate base per Sections 25 and 26 of the Standard Specifications.
- B. Compact aggregate subbase and aggregate base to at least 95 percent relative compaction as determined by ASTM D1557.

2.4 FIELD QUALITY CONTROL

- A. The GEOTECHNICAL ENGINEER will field test subgrade and aggregate base course compaction.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Asphalt concrete paving (Hot Mix Asphalt).

1.2 RELATED REQUIREMENTS

- A. Section 321123 – Aggregate Base Course.

1.3 REFERENCES

- A. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 edition.

1.4 SUBMITTALS

- A. Hot mix asphalt mix design prepared by a certified laboratory
- B. Materials certificates signed by material producer and Contractor

PRODUCTS

2.1 ASPHALT CONCRETE PAVEMENT (HOT MIX ASPHALT)

- A. HMA Type A in accordance with Section 39 of the Standard Specifications.
 - 1. Construction Process: Standard.
 - 2. Tack Coat: as required by the Standard Specifications
 - 3. Asphalt Binder: PG 64-10
 - 4. Initial Lift: 3/4" Aggregate
 - 5. Final Lift: 1/2" Aggregate

EXECUTION

3.1 GENERAL

- A. Perform work in accordance with Section 39 of the Standard Specifications.
- B. Equipment, methods and tolerances used for spreading and compacting HMA shall comply with the requirements of Standard Specifications.
- C. Finish paving shall conform to slopes, lines and finish grades shown and noted on the Drawings and shall drain properly.
 - 1. Maintain line and profile shown on the Construction Drawings to tolerance of 1/4 inch plus/minus, in any 10 feet, non-cumulative.
 - 2. HMA surface shall be free from depressions exceeding 1/8 inch when measured with a 10 foot straight-edge.
- D. Surface shall be free of gouges, ridges and ruts, with a uniform and consistent finish.
- E. Where adjacent surfaces are intended to be flush, they shall conform smoothly at all points with no greater than 1/4 inch grade differential, and shall drain properly across the seam.

3.2 FIELD QUALITY CONTROL

- A. Field density and thickness testing of asphalt pavement will be performed by the GEOTECHNICAL ENGINEER.

- B. For accessible paths of travel and accessible parking areas, comply with California Building Code accessibility requirements regarding:
 - 1. Surface: slip resistant
 - 2. Changes in Level: 1/4 inch or less (vertical)
 - 3. Path of travel:
 - a. Clear Width: 4 feet minimum, unless otherwise noted
 - b. Running Slope: less than 1:20 (5%)
 - c. Cross-Slope: not greater than 1:48 (2%)
 - 2. Slope in Landings and Accessible Parking and Loading Areas: not greater than 1:48 (2%) in any direction
- C. Flood Test:
 - 1. Perform a flood test in areas which are sloped less than 3%. Where a seal coat is to be applied, perform flood test prior to application of seal coat.
 - 2. Where water ponds in excess of 1/8 inch deep or in an area greater than 2 feet in any direction, or where the drainage pattern does not conform to the intent of the Drawings, repair or replace HMA in a manner acceptable to the ENGINEER to provide proper drainage, at no cost to the OWNER.

3.3 PROTECTION

- A. Do not permit vehicular traffic on pavement until it has cooled to atmospheric temperature and hardened, but in no case less than 8 hours.
- B. Do not use completed paving surface for storage of construction vehicles or construction materials.
- C. Gouges, cracks, stains, or other surface defects or marks shall be corrected by the CONTRACTOR in a manner acceptable to the ENGINEER, at no cost to the OWNER.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes exterior concrete paving including driveways, walkways, patios, curbs, and gutters.

1.2 RELATED REQUIREMENTS

- A. Section 321123 – Aggregate Base Course

1.3 REFERENCES

- A. California Building Standards Code (CBSC), 2022 Edition
- B. Standard Specifications, State of California, Department of Transportation (Caltrans), 2022 edition.
- C. ACI 301, "Specification for Structural Concrete"

1.4 SUBMITTALS

- A. Concrete mix design and materials certificates:
 - 1. Aggregate (gradation and quality)
 - 2. Cementitious materials
 - 3. 28-day compressive strength
 - 4. Slump
 - 5. w/c Ratio
 - 6. Entrained Air
 - 7. Admixtures
 - 8. Curing compound
 - 9. Steel reinforcement and reinforcement accessories.
 - 10. Bonding agent or epoxy adhesive
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the Contract Documents
- C. Manufacturers' current printed specifications and catalogue cut sheets for each type of manufactured product, including:
 - 1. Expansion joint filler, backer rod and bond breaker and/or zip strip.
 - 2. Integral color
 - 3. Applied finish materials
 - 4. Joint Sealant Color Sample
- D. Proposed joint pattern, if not indicated on or if different from the Drawings

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. Installer Qualifications: Regularly engaged and specializing in concrete paving, with a minimum 5 years' experience
- C. Mock-Up:
 - 1. Provide one full-scale mock-up. Construct at least two months before start of concrete work. Allow concrete to cure 28 days before observation.

2. At location on Project selected by Owner's Representative, demonstrate each forming and finishing condition required on Project using materials, workmanship, joint treatment, form ties, curing method, and patching techniques to be used throughout Project. Paving mock-ups shall be a minimum 4-foot x 4-foot for each type of finish.
 3. Accepted mock-up provides visual standard for work of Section.
 4. Mock-up may remain as part of Work
- D. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program

1.6 PRODUCTS

A. FORMS

1. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
2. Use flexible or curved forms for curves with a radius 100 feet or less.
3. Use commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces

1.7 CONCRETE:

1. Concrete mix design shall conform to Section 90, "Concrete," of the Caltrans Standard Specifications.
1. Cementitious material: Portland cement, Type II, low alkali, with supplementary cementitious materials as defined in Section 90 of the Standard Specifications.
 - a. Vehicular Pavements and Heavy-Duty Curbs and Gutters: Provide cementitious materials content and maximum water to cementitious materials ratio as required to achieve a compressive strength of 3,600 psi at 28 days age. Cementitious materials content must be between 505 and 675 pounds per cubic yard.
2. Pedestrian Paving: provide at least 505 pounds per cubic yard cementitious materials.

- B. Admixtures: complying with Section 90, "Concrete" of the Caltrans Standard Specifications

1.8 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet
- C. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A, plain steel
- D. Reinforcing Bars: ASTM A615, grade 40 for #3 and smaller bars and grade 60 for #4 and larger bars
- E. Galvanized Reinforcing Bars: ASTM A 767, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615, Grade 60 deformed bars.

- F. Epoxy-Coated Reinforcing Bars: ASTM A 775 or ASTM A 934; with ASTM A 615, Grade 60 deformed bars.
- G. Smooth Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs, with half of the dowel length lubricated to prevent bonding with the concrete, and with polyethylene cap installed on lubricated end to prevent end bearing.
- H. Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports

1.9 CURING MATERIALS

- A. Curing materials conforming to "Section 90, "Concrete" of the Caltrans Standard Specifications.

1.10 EXPANSION JOINT MATERIAL

- A. Premolded Joint Filler: ASTM D1751, non-extruding and bituminous type resilient filler, compatible with sealant and backer rod.
- B. Sealant Backer Rod:
 - 1. Type: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.
- C. Expansion Joint Cap: Snap Cap by W.R. Meadows or similar.
- D. Joint Sealer
 - 1. Type: Multi-component modified polyurethane sealant conforming to Federal Specification TT-S-00227E, designed for exterior locations subject to foot traffic.
 - 2. Color: Submit Samples
- E. Bond Breaker: Polyethene tape as recommended by joint sealant manufacturer where bond to joint filler must be avoided for proper performance of joint sealer.

PART 2 – EXECUTION

2.1 GENERAL

- A. Construct in accordance with the Standard Specifications and ACI 301, "Specification for Structural Concrete".

2.2 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 1. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/4 inch shall be brought to the attention of the Geotechnical Engineer, who will provide recommendations for corrective action.

- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

2.3 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.
- B. Precautions to protect fresh concrete from developing plastic shrinkage cracks must be taken in advance of concrete placement when evaporation rate due to any combination of temperature, humidity, and wind velocity is expected to approach 0.2 lb./sq. ft./hr. as determined by Figure 2.1.5 of ACI 305.

2.4 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

2.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963.

2.6 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.

- C. Isolation (Expansion) Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints as shown on the Drawings, and at a minimum:
 - a. At the beginning and end of curves and at changes in direction
 - b. At re-entrant corners
 - c. At abutting walls, column penetrations, footings, or other structures
 - d. At approximately 20 feet on center each way in plaza areas, as necessary to limit area to a maximum of 400 square feet
 - e. At maximum intervals of 60 feet.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least 1-1/4 inches, or one-fourth of the concrete thickness, whichever is greater.
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface, and before the pavement develops shrinkage cracks.
 3. Locate contraction joints as shown on the Drawings, and at a minimum:
 - a. At 10 feet on center maximum for curbs and cross gutters. Where concrete sidewalk occurs adjacent to curb, align curb and sidewalk joints.
 - a. At pavement plazas, approximately 4 feet on center each way, and as necessary to limit area to a maximum of 20 square feet.
 - b. At all re-entrant corners and at changes in direction.
 - c. To provide rectangles of not less than 12 nor more than 20 square feet in linear walkways
- E. Dowels: Install dowel bars and support assemblies at joints where indicated and at construction joints.
1. Expansion joint dowels: Lubricate one-half of dowel length to prevent concrete bonding to one side of joint, and install polyethylene end sleeve on the lubricated end to prevent end bearing of the dowel against the concrete.
- F. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch radius, unless otherwise shown on the Drawings. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

2.7 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
- D. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- E. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- I. Screed pavement surfaces with a straightedge and strike off.
- J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- K. Slip-Form Pavers: When automatic machine placement is used, submit specific mix design and laboratory test results.
 - 1. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 - 2. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- L. Hot and Cold Weather Placement: Comply with ACI 306.1.

2.8 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.

2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
 3. All exterior walkway surfaces shall receive a slip-resistant finish at least equivalent to a medium broom finish.
 4. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.
- C. All exposed faces shall be finished. Faces of curbing at planter areas shall be finished to 6" below finish planter grade.

2.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by the moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - a. Continuous water-fog spray.
 - b. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

2.10 TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
1. Elevation: 1/4 inch
 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch.
 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
 5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.

7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
 8. Joint Spacing: 3 inches.
 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 10. Joint Width: Plus 1/8 inch, no minus.
- B. Comply with California Title 24 accessibility requirements regarding:
1. Surface: slip resistant
 2. Changes in Level: 1/4 inch or less (vertical)
 3. Clear Width: complying with the minimum clear width required for the various types of facilities being constructed.
 4. Running Slope, General: less than 1:20 (5%)
 5. Running Slope, Ramps and Curb Ramps: not greater than 1:12 (8.33%)
 6. Cross-Slope: not greater than 1:48 (2%)
 7. Slope in Landings: not greater than 1:48 (2%) in any direction
- C. Provide flood test of all gutters and paving. Where water ponds in excess of 1/8 inch deep or in an area greater than 2 feet in any direction, or where the drainage pattern does not conform to the intent of the Drawings, replace the gutter or pavement to the nearest joint to provide proper drainage, at no cost to the OWNER.

2.11 FIELD QUALITY CONTROL

- A. Testing Agency: a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

2.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes:
 - 1. Site domestic wastewater (sanitary sewage) pipe and fittings
 - 2. Manholes, cleanouts, flushing inlets, and other appurtenances

1.2 RELATED REQUIREMENTS

- A. Section 31 23 33 – Trenching
- B. California Building Standards Code (CBSC), 2022 Edition.
- C. California Plumbing Code (CPC), 2022 Edition.

1.3 REFERENCES

- A. ASTM C 1244 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- B. ASTM D 2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- C. ASTM D 3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- D. ASTM F 1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air

1.4 SUBMITTALS

- A. Submit testing results for the proposed bedding and backfill to the ENGINEER and GEOTECHNICAL ENGINEER at least 2 weeks prior to proposed use
- B. Submit samples of proposed bedding and backfill to the GEOTECHNICAL ENGINEER at least 2 weeks prior to proposed use.
- C. Submit manufacturer cut sheets for piping and appurtenances to the ENGINEER.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Sewer system shall be constructed in accordance with ASTM D 2321, manufacturer recommendations, the Drawings, and these Specifications.

2.2 BEDDING AND BACKFILL

- A. Pipe bedding and initial backfill: Clean Sand in accordance with Section 31 2333, or native material if approved by the GEOTECHNICAL ENGINEER.
- B. Final backfill: Clean Sand in accordance with Section 31 2333, or native material if approved by the GEOTECHNICAL ENGINEER.

2.3 PIPE

- A. Gravity sewer pipe, 4" through 8": PVC SDR 26 with rubber gasketed joints conforming to ASTM D 3034

2.4 MANHOLES

- A. Concrete manholes shall be precast units conforming to ASTM C 478 and the details shown on the plans.
- B. Precast unit joints shall be sealed with preformed butyl rubber joint sealant conforming to ASTM C-990.
- C. Pipe connections to concrete structures shall be fitted with a flexible, watertight elastomeric gasket conforming to ASTM C-923 (for PVC pipe).
- D. The flow line, whether precast or cast in place, shall be formed in the field to provide a smooth flow line with bench at the pipe spring line. The invert paving thickness in precast structures shall be at least 3" below the bottom of the lowest pipe.

2.5 CLEANOUTS

- A. Cleanout boxes: Christy G5 with cast iron cover, traffic rated. Cover to be marked "Sewer".
- B. Materials for cleanouts and flushing inlets shall be in accordance with the California Plumbing Code and the details on the Construction Drawings. Cleanout risers shall be of the same material and diameter as the sewer line.

2.6 ACCESSORIES

- A. Provide warning tape as specified in Section 31 2333 – Trenching

PART 3 – EXECUTION

3.1 GENERAL

- A. All work shall be in accordance with:
 - 1. The California Plumbing Code
 - 2. Product manufacturer's recommendations
 - 3. ASTM D 2421

3.2 MAINTAINING SANITARY SEWER SERVICE

- A. Maintain sanitary sewer service and conduct operations at times selected to minimize the duration and inconvenience of service interruption.
- B. At least 48 hours prior to the required cutting or abandoning of an existing sewer line, notify the water utility owner, and obtain approval of the schedule.

3.3 TRENCHING

- A. Perform trenching in accordance with Section 31 23 33.
- B. Provide warning tape in accordance with Section 31 23 33.

3.4 PIPE COVER

- A. Top of pipe to finished grade shall be 36 inches minimum for 4 inch and larger pipe, unless otherwise indicated on the Drawings or approved by the Engineer.
 - 1. Pipes 4" in diameter and larger which are located within paved areas and with less than 24" of cover measured from the top of pipe to the finished pavement grade shall be backfilled with minimum 2,500 psi concrete to at least 6" above the top of pipe.

3.5 TESTING

- A. Following placement and compaction of backfill, and prior to the placement of permanent pavement, sewer mains and laterals shall be cleaned, videoed, and tested with low pressure air to verify that the pipeline is free from obstructions (deflections, joint offsets, lateral pipe intrusions, etc.) and water-tight.
- B. Low pressure air testing shall be performed in accordance with ASTM F 1417.

END OF SECTION

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Storm drain pipe and fittings
 - 2. Manholes, cleanouts, inlets, and other appurtenances

1.2 RELATED REQUIREMENTS

- A. Section 017123 – Field Engineering
- B. Section 310000 – Earthwork
- C. Section 312333 – Trenching
- D. California Building Standards Code (CBSC), 2022 Edition.

1.3 REFERENCES

- A. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections
- B. ASTM C 1244 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- C. ASTM D2241 – Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
- D. ASTM D 2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- E. ASTM D 3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- F. ASTM D3212 – Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- G. ASTM D2751 – Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
- H. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe

1.4 SUBMITTALS

- A. Submit testing results for proposed bedding, backfill and drain rock to the ENGINEER and GEOTECHNICAL ENGINEER at least 2 weeks prior to proposed use.
- B. Submit samples of proposed bedding, backfill and drain rock to the GEOTECHNICAL ENGINEER at least 2 weeks prior to proposed use.
- C. Submit manufacturer cut sheets for piping and appurtenances to the ENGINEER.
- D. Submit concrete mix design and shop drawings for any cast-in-place concrete structures proposed.

PART 2 – PRODUCTS

2.1 BEDDING AND BACKFILL

- A. Pipe bedding and initial backfill: Clean Sand in accordance with Section 312333, or native material if approved by the GEOTECHNICAL ENGINEER.
- B. Final backfill: Clean Sand in accordance with Section 312333, or native material if approved by the GEOTECHNICAL ENGINEER.

2.2 STORM DRAIN PIPE

- A. 4" and 6" pipe: Rubber gasketed PVC gravity sewer pipe conforming to ASTM D-3034, SDR 26.
 - 1. Alternate: Rubber gasketed PVC water pipe conforming to AWWA C900, DR 25.
 - 2. Alternate, rain water leaders: solvent weld ABS sewer pipe conforming to ASTM D-2661, SCH 40.
- B. 8" and larger pipe: HDPE type "S" (smooth interior, corrugated exterior) pipe with watertight joints conforming to AASHTO designation M 294.
 - 1. Alternate: Rubber gasketed PVC gravity sewer pipe conforming to ASTM D-3034, SDR 26.
 - 2. Alternate: Rubber gasketed PVC water pipe conforming to AWWA C900, DR 25

2.3 PERFORATED PIPE

- A. Solvent weld perforated PVC pipe conforming to one of the following: ASTM D-1785, SCH 40; ASTM D-3034, SDR 35 or SDR 25; or ASTM D-2729; or solvent weld perforated ABS pipe conforming to ASTM D-2661, SCH 40.
 - 1. Perforation pattern shall conform to AASHTO M-27 or ASTM D-2729.

2.4 CONCRETE DRAINAGE STRUCTURES

- A. Cast in place concrete and precast concrete drain inlets shall conform to Section 51, "Concrete Structures", Section 52 "Reinforcement", Section 70 "Miscellaneous Facilities", Section 75 "Miscellaneous Metal" of the Standard Specifications, and these Specifications.
- B. Precast members shall conform to section 70-1.02h, "Precast Concrete Structures", of the standard specifications, and standard plans.
- C. Concrete drainage inlets shall be precast units conforming to the details shown on the plans.
- D. Concrete manholes shall be precast units conforming to ASTM C 478 and the details shown on the plans
- E. Precast unit joints shall be sealed with preformed butyl rubber joint sealant conforming to ASTM C-990.
- F. Pipe connections to concrete structures shall be fitted with a flexible, watertight elastomeric gasket conforming to ASTM C-923 (for PVC pipe), or ASTM F-2510 (for HDPE Type 'S' pipe).
- G. The flow line of concrete inlets, whether precast or cast in place, shall be formed in the field to provide a smooth flow line with bench at the pipe spring line. The invert paving thickness in precast structures shall be at least 3" below the bottom of the lowest pipe.
- H. Structures, grates, and covers shall be H-20 load rated if located in vehicular areas, and pedestrian load rated otherwise.
- I. Cast-in-place concrete may be utilized in lieu of specified precast units only if approved by the ENGINEER. Cast in place concrete structures shall conform to Section 51-7, "Minor Structures" of the Standard Specifications and to the dimensions on the Drawings. Contractor shop drawings shall be required for approval for any cast-in-place concrete.
- J. ADA-compliant grates shall have less than 1/2" clear between bars, and the openings shall be aligned perpendicular to the path of travel. All grates within pedestrian areas shall be ADA-compliant.

2.5 CLEANOUTS

- A. Cleanout boxes: Christy G05T with cast iron traffic rated cover. Cover marked "Storm".
- B. Materials for cleanouts shall be in accordance with the California Plumbing Code and the details on the Construction Drawings. Cleanout risers shall be of the same material as the storm drain line.

2.6 GEOTEXTILE FABRICS

- A. Filter fabric: as indicated on the Drawings or in the Geotechnical Report.
 - 1. If not indicated, submit Mirafi 140N or equivalent for approval by the GEOTECHNICAL ENGINEER.
- B. Other geotextile fabrics: as indicated on the Drawings or in the Geotechnical Report.
 - 1. If not indicated, submit type appropriate for the intended use for approval by the GEOTECHNICAL ENGINEER
- C. Filter fabric is not used on subsurface drains constructed of Class 2 Permeable Material.

2.7 DRAIN ROCK

- A. Caltrans Permeable Material Class 1A, 1B or 2, as indicated on the Drawings. If not indicated, use Class 2.

2.8 ACCESSORIES

- A. Provide warning tape as specified in Section 312333 – Trenching

PART 3 – EXECUTION

3.1 GENERAL

- A. All work shall be in accordance with:
 - 1. The California Plumbing Code
 - 1. Product manufacturer's recommendations
 - 2. ASTM D 2421

3.2 TRENCHING

- A. Perform trenching in accordance with Section 312333.

3.3 PIPE COVER

- A. Top of pipe to finished grade shall be 36 inches minimum for pipe located within vehicular areas, unless otherwise indicated on the Drawings or approved by the Engineer.
 - 1. Pipes which are located within paved areas and with less than 24" of cover measured from the top of pipe to the finished pavement grade shall be backfilled with minimum 2,500 psi concrete to 6" above the top of pipe. Pipe shall be adequately restrained to prevent floatation or movement during backfilling.

3.4 TESTING

- A. Following placement and compaction of backfill, and prior to the placement of permanent pavement, storm drains shall be cleaned and videoed to verify that the pipeline is free from obstructions (deflections, joint offsets, lateral pipe intrusions, etc.).

END OF SECTION