

RECLAMATION DISTRICT 341

BIDDING REQUIREMENTS, CONTRACT
DOCUMENTS AND TECHNICAL SPECIFICATIONS
FOR

SHERMAN ISLAND

“LITTLE BAJA” AND “MANZO RANCH”
FISH RELEASE SITES

AUGUST 2014

Wagner & Bonsignore
Consulting Civil Engineers
A Corporation
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Sacramento, California 95833
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TECHNICAL SPECIFICATIONS

DRAFT

DIVISION 1 - GENERAL REQUIREMENTS

SECTION 01010 – SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section includes a Summary of Project Work.

1.02 WORK COVERED BY CONTRACT DOCUMENTS:

- A. The Contractor shall furnish, in accordance with the Specifications and Drawings, all labor, equipment and materials required for construction of all elements of the Sherman Island Levee Repair Project.
- B. The work generally consists of construction of a temporary public roadway around the work area. A stability toe berm will be constructed and the levee raised to meet PL 84-99 standards. Two 64-foot by 50-foot pads will be constructed on the levee crown to accommodate future Department of Water Resources facilities. The county road will be re-aligned on the newly constructed stability toe berm. Work will include removal of existing road surfacing and sub-base, placement of compacted embankment, installation of electrical conduits, modification of existing siphon pipes and replacement of road surfacing. The Contract for the work will be awarded upon the basis of the total base bid price of the Bid Schedule.
- C. The Project includes, but is not limited to, the following elements:
 - 1. Mobilization and Demobilization
 - a. Supply and transport of construction equipment, materials, supplies, appurtenances, etc., to perform the work.
 - b. Remove all equipment, construction waste, storage facilities and incidentals from the Project site and cleanup of the Project site to the satisfaction of the Engineer.
 - 2. Clearing, Grubbing and Stripping
 - a. The clearing, grubbing, filling of all grubbing holes and stripping and removal of unsuitable earth, vegetation and organic materials.
 - 3. Off-Haul Strippings
 - a. The removal of all strippings from job site to an approved off-island disposal area or landfill.

4. Grind and Stockpile Existing Asphalt-Concrete Roadway
 - a. The pulverization and stockpile of existing asphalt-concrete roadway.
5. Aggregate Base Excavation
 - a. The excavation and removal to stockpile of existing aggregate base road surfacing and road subbase.
6. Earthwork
 - a. The preparation, placement and compaction of new levee embankment and drains, including clearing, grubbing, stripping, delivery of earthfill materials and finish grading.
7. Aggregate Base
 - a. The preparation, placement and compaction of imported and stockpiled aggregate base materials including delivery and finish grading.
8. Asphalt Concrete
 - a. The preparation, placement and compaction of new asphalt concrete materials including delivery and finish grading.
9. Hydroseed and Erosion Control
 - a. The preparation and placement of hydroseed and erosion control materials.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 01020 – COORDINATION OF WORK AND WORK RESTRICTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes:

1. Meetings and conferences between the Contractor and Engineer
2. Contractors responsibilities for establishing temporary facilities, utilities and/or equipment necessary to complete the Project.
3. Contractors restrictions in work areas, access restriction and interferences for Contractor and public.

1.02 PRECONSTRUCTION CONFERENCE:

A. The Engineer will schedule a conference within five (5) days after the Notice of Contract Award letter has been issued to the Contractor. The Contractor's Representative and subcontractor representatives shall attend.

B. At the preconstruction conference the Contractor shall submit to the Engineer:

1. Construction plan and schedule for the project. Construction schedule shall be a Critical Path Method (CPM) schedule with a maximum ten (10) day event length.
2. Proposed plan and layout for all temporary offices, sanitary facilities, storage buildings, and storage yards.
3. Proposed construction access roads and routes.
4. Proposed State of California, Department of Water Resources (DWR), Fish Release Facility access limitation schedule.
5. Access plan for local traffic.
6. Schedule for construction in the giant garter snake monitoring areas.
7. Schedule of Values for lump sum items of Bid Schedule (as required).
8. Compacted embankment placement schedule for depth/time constraints.

1.03 PROGRESS MEETINGS:

A. Meetings will be held as often as is deemed necessary by the Engineer. Meetings will normally be held weekly. Representatives of the Contractor shall attend. The purpose of the meetings will be to discuss compliance with the schedule, progress, coordination, submittals, and job-related problems and changes.

1.04 TEMPORARY FACILITIES AND UTILITIES:

A. Prior to starting work, the Contractor shall submit to the Engineer proposed plan and layout for all temporary offices, sanitary facilities, storage buildings, storage yards, access roads and routes, temporary water service and distribution, and temporary power service and distribution. Should the Contractor require space in addition to that available on-site, the Contractor shall make his own arrangements for storage of materials and

equipment in locations within the construction area, and shall provide the District a copy of the letter of authorization for storage from the property owner(s).

- B. The Contractor shall provide and pay for all temporary utilities, including but not limited to electricity, water, gas, and telephone, used on the project. The Contractor shall furnish and install necessary temporary distribution systems, including meters, if necessary, from distribution points to points on the work site where utility is necessary to perform the work. Upon completion of the Contract, the Contractor shall remove all temporary distribution systems.
- C. The Contractor shall provide toilet and wash up facilities for his work force at the site of the work. Such facilities shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of temporary facilities and construction sites.
- D. The Contractor shall provide for the protection of equipment and materials which deteriorate when exposed to moisture or ultraviolet light.
- E. The Contractor shall provide all-weather parking for his workmen and the workmen employed by all subcontractors and suppliers providing work at the site.
- F. Barricades and Protection: Provide barricades, temporary fencing, handrails, shoring and other devices required by law and as necessary to protect new construction and materials, and to protect all persons on the job site.
- G. All facilities installed shall meet the requirements of all applicable codes.

1.05 WORK AREAS

- A. The Contractor's work area shall be confined to the levee crown and landside of the levee. The limits of the work area are shown on the Drawings.
- B. Staging and stockpile areas shall be delineated and provided to Engineer at the pre-construction conference.

1.06 LOCAL CONSTRUCTION TRAFFIC:

- A. Local construction traffic and haul routes shall be clearly identified and provided to Engineer at the pre-construction conference.
- B. The Contractor shall preserve and protect all existing private or project access or right-of-way roads. At the completion of work and prior to the Contractor leaving the project, he shall restore all such roads to pre-project conditions.

- C. All access roads, including the “Temporary Public Road” shall be graded at least weekly during project construction periods.

1.07 ACCESS TO THE WORK AREA:

- A. The Contractor shall conduct his construction activities so as not to interfere with the local business or agricultural operations on private lands in the vicinity of the work.
- B. The Contractor shall conduct work to allow full access to Sherman Lake Marina and Sherman Island County Park at the end of each work day and weekends.
- C. The Contractor shall provide continuous access, at all times, to all residences, buildings, crop fields, businesses, and local traffic affected by the construction of the project. Convenient and suitable crossings for access to side roads shall be provided and maintained by the Contractor. The Contractor shall provide a plan for providing reasonable access to the Engineer at the preconstruction meeting. At any and all points along the work where the nature of construction operations in progress, and the equipment and machinery in use, are of such character as to endanger passing traffic, the Contractor shall provide such lights and signs, erect such fences or barriers, and station such guards as may be necessary to give adequate warning and to avoid damage or injury to passing traffic. Signs, flags, lights, and other warning and safety devices shall conform to applicable City, County, and State requirements.

1.08 CONSTRUCTION WATER SUPPLY:

- A. The Contractor shall provide his own construction water supply and shall obtain whatever approvals and permits may be required by local, State or Federal regulations to access, divert and transport such supply. Construction water for on-island use may be obtained from irrigation canals and from other locations as directed by Engineer.

1.09. STAGING AREAS:

- A. It is the intent of this Contract to utilize the work areas shown on the Drawings for staging, project administration buildings, and maintenance areas. By making the sites available to the Contractor, the District, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, subcontractors, or any individual or organization connected with the project.
- B. The Contractor shall be responsible for furnishing all labor, equipment, supplies, and materials necessary to perform all operations required for establishing, maintaining, and providing security of the staging areas for the duration of the project.
- C. The Contractor may provide alternate sites for staging areas. If alternative sites are to be used, they must be near the project and the Contractor must make all arrangements for their use at his own expense and in accordance with all local, State and Federal

regulations. Contractor shall provide written approval for use of alternate staging areas upon request of Engineer.

1.10 RESTORATION OF CONSTRUCTION AREA:

- A. Temporary construction areas shall be restored to the same condition they were in prior to the beginning of any work. The Contractor shall not remove any soil or material from such areas, shall not bury any foreign materials thereon, and shall rip and regrade, if so directed by the Engineer, such areas after associated construction is completed to remedy any compaction which may have resulted from such construction activities.
- B. All staging areas shall be restored to pre-project conditions, in accordance with the applicable provisions of this Contract or pursuant to appropriate agreements between the Contractor and the property owners for use of said staging areas.

1.11 HOUSEKEEPING AND CLEANUP:

- A. The Contractor shall keep the total construction area, structures and access ways free of debris and obstructions at all times. Work will not be allowed in those areas that have unsatisfactory cleanup and housekeeping as determined by the District representative in charge. At least once each day, all areas shall be checked by the Contractor and, if necessary, corrected to comply with the above requirement. Housekeeping and cleanup shall be assigned by the Contractor to specific personnel. The name(s) of the cleanup personnel shall be available at the project site; each will be supplied with a distinctively marked hard hat, to be worn from the beginning to the end of the project.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 01040 – INSURANCE REQUIREMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section includes the supplemental insurance requirements:

1.02 INSURANCE:

- A. Landowners to be named as additional insured pursuant to Article 5.3 and 6.22-6.24 & 6.27 of the General Conditions and Section SC-3 of the Supplemental Conditions are as follows:

<u>Landowner</u>	<u>APN</u>
State Of California	158-0080-005
State Of California	158-0080-008

As described in Article 5.3 and 6.22-6.24 & 6.27 of the General Conditions, and Section SC-3 of the Supplemental Conditions the Contractor shall procure and thereafter maintain during the entire period of his performance under this Contract the minimum insurance as stated in Section SC-3 of the Supplemental Conditions.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 01060 – REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section includes: Compliance with all terms, conditions, and requirements attached to all permits, bonds, licenses required by any local, state, or federal agency to perform work, construct, erect, test, or startup any equipment or facility for this Contract. Obtain all environmental permits for all work, including but not limited to, excavations, tunneling, trenches, construction, demolition, and disposal, give all notices necessary and incidental to the lawful prosecution of, and comply with all relevant requirements applicable to, the Work required under this Contract.

1.02 SCOPE

- A. The work covered by this Section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental pollution during and as the result of construction operations under this Contract except for those measures set forth in other Technical Specifications of these Specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of air, water, and land, and involves noise, solid waste management, and management of radiant energy and radioactive materials, as well as other pollutants.

1.03 APPLICABLE REGULATIONS:

- A. In order to prevent, and to provide for abatement and control of, any environmental pollution arising from the construction activities of the Contractor and his subcontractors in the performance of this Contract, they shall comply with all applicable Federal, State, and local laws, and regulations concerning environmental pollution control and abatement as well as the specific requirements stated elsewhere in the Contract Documents.
- B. Compliance with the provisions of this Section by subcontractors will be the responsibility of the Contractor.

1.04 PROTECTION OF LAND RESOURCES:

- A. It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this Contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural. The Contractor shall confine his construction activities to areas defined by the

Drawings and Specifications, and to areas to be cleared for any other operations, as indicated on the Drawings.

- B. Except in areas marked on the Drawings to be cleared, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without special authority. Staging areas, access, and construction roads should be located in areas and in such a manner to preserve the existing species. Clearing shall be kept to the minimum to accomplish construction, and no clearing shall be done on the waterside of the levee. No ropes, cables, or guy wires shall be fastened to or attached to any existing nearby trees unless specifically authorized by the Engineer.
- C. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense.

1.05 HISTORICAL LANDMARKS AND ARCHAEOLOGICAL FINDS:

- A. If Contractor uncovers any archaeological artifacts or remains during the course of the work, all earthmoving activities shall cease until the county coroner or a qualified archeologist is retained by the District and the findings are evaluated. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity. The costs of professional services shall be borne by the District.

1.06 PROTECTION OF WATER RESOURCES:

- A. The Contractor shall not pollute streams with soil, fuels, oils, bitumens, calcium chloride, acid or harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable Federal, State, County, and Municipal laws concerning pollution of rivers and streams. All work under this Contract shall be performed in such a manner that objectionable conditions will not be created in streams through or adjacent to the project areas. At all times of the year, special measures shall be taken to prevent chemicals, fuels, oil greases, bituminous materials, waste washing, herbicides and insecticides, and cement and surface drainage from entering public waters.
- B. Disposal of any materials, wastes, effluent, trash, garbage, soil, grease, chemicals, etc., in areas adjacent to streams shall not be permitted. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed of and replaced with suitable fill material, compacted and finished with topsoil, all at the expense of the Contractor.

1.07 PROTECTION OF FISH AND WILDLIFE:

- A. This project is subject to the California Endangered Species Act (Fish and Game Code Section 2050) and the Contractor shall comply with all provisions contained therein. The Contractor shall comply with Sections 3500, 3503, 3503.5 and 3513 of the Fish and Game Code, which address protection of migratory game birds, birds of prey, and migratory birds on the Federal List (50 CFR 10.13).
- B. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area. Fouling or polluting of water or dry stream beds will not be permitted.

1.08 GIANT GARTER SNAKE MONITORING

- A. A qualified biologist will be monitoring construction occurring within 200 feet of the work areas between station 694+50 and 744+50. If a giant garter snake is encountered during construction activities, the monitoring biologist will have the authority to stop construction activities until appropriate corrective measures have been completed or it is determined that the snake would not be harmed. Giant garter snakes will be allowed to move away from the area of their own accord. Any incidental take will be immediately reported to the USFWS by telephone (916-414-6600) and by written letter addressed to the Chief, Endangered Species Division, within one working day.
- B. The giant garter snake monitoring biologist shall be provided by the Engineer and shall work at the Engineer's expense. Contractor shall perform work within the monitoring area between May 1 and September 30. No work shall be performed in these areas on or after October 1. A schedule for construction in the giant garter snake monitoring areas shall be presented by the Contractor during the preconstruction conference for the Engineer's approval.
- C. Construction delays through fault of the Contractor which cause the snake monitoring biologist to remain onsite beyond the time provided in the construction schedule or which cause supplemental surveys be completed may result in Engineer assessing damages in the amount of the cost of the biologist daily rate.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 1080 – SPECIAL PROJECT PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section includes special project procedures for the prosecution of the Work under the Contract.

1.02 PROTECTION OF AIR QUALITY:

- A. Air pollution restrictions applicable to this project are as follows:

1. Material may not be burned within the Contract area, at any time within the Contract period.
2. The Contractor will be required to maintain all excavations, compacted embankments, stockpiles, haul roads, access roads, plant sites, waste areas, borrow sources, and all other work areas within or without the project boundaries free from dust which would cause the local standard for air pollution to be exceeded or which would cause a hazard or nuisance to others. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, or similar methods will be permitted to control dust. Sprinkling, to be approved, must be repeated at least twice daily or at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. The Contractor's attention is particularly drawn to the proximity of public roadways, residential areas and vineyard and the special importance of effective dust control. The Contractor shall be solely responsible for any crop damage or crop loss due to inadequate dust control.
3. Cover or maintain at least two feet of free board space on haul trucks transporting soil, sand, or other loose material on the site. Any haul trucks that would be traveling along freeways or major roadways should be covered.
4. Limit vehicle speeds on unpaved roads to 15 miles per hour (mph).
5. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes [required by California Code of Regulations, Title 13, sections 2449(d)(3) and 2485]. Provide clear signage that posts this requirement for workers at the entrances to the site.

1.03 TRANSPORTATION

- A. Regional traffic management requirements to the project are as follows:

1. The contractor shall prepare and implement a traffic control plan following CalTrans standards as required.

1.04 ENCROACHMENT PERMIT:

- A. The Contractor shall not do any work that would affect any oil, gas, sewer, or water pipeline, any telephone, telegraph, or electric transmission line, fence, or any other structure, nor enter upon the rights-of-way involved until notified by the Engineer that the District has secured authority therefore from the proper party. After authority has been obtained, the Contractor shall give said party due notice of his intention to begin work, and shall give said party convenient access and every facility for removing, shoring, supporting, or otherwise protecting such pipeline, transmission line, ditch, fence, or structure, and for replacing same.

1.05 ENVIRONMENTAL LITIGATION:

- A. If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Engineer, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or a subcontractor at any tier not required by the terms of this Contract. If it is determined that the order is not due in any part to acts or omissions of the Contractor or a subcontractor at any tier other than as required by the terms of this Contract, such suspension, delay, or interruption shall be considered as if ordered by the Engineer in the administration of this Contract under the terms of the "Suspension of Work," Section 6.7 of the General Conditions. The period of such suspension, delay or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) as provided in that Section, subject to all the provisions thereof.
- B. The term "environmental litigation," as used herein, means a lawsuit alleging that the work will have an adverse effect on the environment or that the District has not duly considered, either substantively or procedurally, the effect of the work on the environment.

1.06 SALVAGE MATERIALS AND EQUIPMENT:

- A. The Contractor shall maintain adequate property control records for all materials or equipment specified to be salvaged. The Contractor shall be responsible for the adequate storage and protection of all salvaged materials and equipment and shall replace, at no cost to the District, all salvage materials and equipment which are broken or damaged during salvage operations as the result of his negligence, or while in his care.

1.07 SUBCONTRACTORS:

- A. At the Engineer's discretion, subcontractors may be permitted to such extent as shall be shown to be necessary or advantageous to the Contractor in the prosecution of the work and without injury to the District's interests. The re-subletting of work by a subcontractor shall be subject to the same limitations as an original subletting. Each subcontractor shall be properly licensed for the type of work which he is to perform and shall meet any other experience requirements of the Specifications.
- B. A copy of each subcontract, if in writing (or if not in writing, then a written statement signed by the Contractor giving the name of the subcontractor and the terms and conditions of each subcontract), shall be filed promptly with the Engineer upon the Engineer's request. Each subcontract shall contain a reference to the Agreement between the District and the Contractor, and the terms of that Agreement shall be made a part of each subcontract insofar as applicable to the work covered thereby. Each subcontract shall provide for annulment of same by the Contractor upon written order of the Engineer, if, in the Engineer's opinion, the subcontractor fails to comply with the requirements of the prime Contract insofar as the same may be applicable to this work.
- C. The Contractor shall be responsible to the District and the Engineer for the acts and omissions of his subcontractor and their employees to the same extent as he is responsible for the acts and omissions of his own employees. Nothing contained in this Section shall create any contractual relationship between any subcontractor and the District or the Engineer, or relieve the Contractor of any liability or obligation under the prime Contract.

1.08 NON-CONTRACT WORK:

- A. The Contractor and/or his subcontractors shall not perform any work or erect any structure for third parties, landowners or otherwise, within the limits of the rights-of-way without prior approval of the Engineer.

1.09 CONTROL OF WATER:

- A. The Contractor shall be responsible for dewatering and control of water as may be required to achieve acceptable embankment and structure foundation and to safely and satisfactorily construct the improvements.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 1100 – SPECIFICATIONS AND DRAWINGS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section describes the project specifications, drawings and site conditions.

1.02 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION:

- A. The work shall conform to the following Contract Drawings and maps, all of which form a part of these Specifications and are available in the Office of Wagner & Bonsignore, Consulting Civil Engineers, A Corporation, located at 2151 River Plaza Drive, Suite 100, Sacramento, California.
- B. Omissions from the Drawings or Specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the Drawings and Specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the Drawings and Specifications.
- C. The Contractor shall check all Drawings furnished him immediately upon their receipt and shall promptly notify the Engineer of any discrepancies. Figures marked on Drawings shall in general be followed in preference to scale measurements. Large scale Drawings shall in general govern over small scale Drawings. The Contractor shall compare all Drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.
- D. The Contractor shall keep on the work site a copy of the Drawings and Specifications and shall at all times give the Engineer access thereto. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. In case of difference between Drawings and Specifications, the Specifications shall govern. In case of discrepancy in the figures, in the Drawings, or in the Specifications, the matter shall be promptly submitted to the Engineer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense.
- E. Wherever in the Specifications or upon the Drawings the words "directed," "required," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the "direction," "requirement," "order," "designation," or "prescription," of the Engineer is intended and similarly the words "approved," "acceptable," "satisfactory," or words of like import shall mean "approved by," or "acceptable to," or "satisfactory to" the Engineer, unless otherwise expressly stated.

- F. Where "as shown," "as indicated," "as detailed," or words of similar import are used, it shall be understood that the reference is made to the Drawings accompanying this Contract unless stated otherwise. The word "provided" as used herein shall be understood to mean "provide complete in place," that is "furnished and installed."

1.03 PHYSICAL DATA:

- A. Data and information furnished or referred to herein is for the Contractor's information.
- B. The District shall not be responsible for any interpretation of, or conclusion drawn from, the data or information by the Contractor.
- C. The indications of physical conditions on the Drawings and in the Specifications are the result of site investigations.
- D. Weather conditions: The Contractor shall satisfy himself as to the hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from any U.S. Weather Bureau Office.
- E. Transportation Facilities: The Contractor shall make his own investigation of the conditions of existing public and private roads and of clearances, restrictions, bridge load limits and other limitations affecting transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims against the District or extension of time for completion of the work.

1.04 SURFACE AND SUBSURFACE CONDITIONS:

- A. It is the Contractor's responsibility to become acquainted and satisfied as to the character, quality, and quantity of surface and subsurface materials to be encountered, by inspecting the site and by evaluating information derived from exploratory work that may have been accomplished by others or included in these Contract Documents. Any failure by the Contractor to become acquainted with all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.
- B. The submission of a Bid shall be conclusive evidence that the Bidder has reviewed the site conditions, and is satisfied as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract Documents.
- C. Prior to Bid submittal, the Contractor may make his own subsurface investigations to satisfy himself regarding site and subsurface conditions but only after he has received necessary clearance from the following agencies and individuals:

RECLAMATION DISTRICT NO. 341
c/o WAGNER & BONSIGNORE,
2151 RIVER PLAZA DRIVE, SUITE 100,
SACRAMENTO, CALIFORNIA

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

DRAFT

SECTION 1120 – SUBMITTALS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for submission of product data, mix designs, samples, certificates of compliance, and other items as specified.

1.02 SUBMITTALS:

- A. General: The Contractor shall submit to the Engineer, for approval, five (5) copies of submittals required for performance of the Work, including:

1. Contractor's Construction Schedule
2. Submittal Schedule
3. Shop Drawings
4. Product Data
5. Samples
6. Testing and Performance Reports
7. Manufactures Certifications and Warranties
8. Installer Qualifications

1.03 SHOP DRAWINGS:

- A. Wherever called for in these Specifications or on the Drawings, or where required by the Engineer, the Contractor shall furnish to the Engineer for review, the required number of prints of each shop drawing stated in Technical Specifications Section 1.4.1. The term "shop drawing" as used herein shall be as defined in Article 1 of the General Conditions. Unless otherwise required, said drawings shall be submitted at a time sufficiently early to allow review of same by the Engineer, and to accommodate the rate of construction progress required under the Contract.
- B. The Contractor may authorize a material or equipment supplier to deal directly with the Engineer with regard to shop drawings, however, ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor.
- C. If three (3) prints of the drawing are returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision of said drawing will not be required.
- D. If three (3) prints of the drawing are returned to the Contractor marked "MAKE CORRECTIONS NOTED," the Contractor shall implement the corrections indicated, however, formal revision and resubmittal of said drawing will not be required.

- E. If one (1) print of the drawing is returned to the Contractor marked "AMEND-RESUBMIT," the Contractor shall revise said drawing and shall resubmit seven (7) copies of said revised drawing to the Engineer.
- F. If one (1) print of the drawing is returned to the Contractor marked "REJECTED-RESUBMIT," the Contractor shall revise said drawing and shall resubmit seven (7) copies of said revised drawing to the Engineer.
- G. Fabrication of an item shall not be commenced before the Engineer has reviewed the pertinent shop drawings and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN," or "MAKE CORRECTIONS NOTED." Revisions indicated on shop drawings shall be considered as changes necessary to meet the requirements of the Contract Drawings and Specifications and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from the Contractor's having to make the required revisions to shop drawings (unless review by the Engineer of said drawings is delayed beyond a reasonable period of time and unless the Contractor can establish that the Engineer's delay in review actually resulted in a delay in the Contractor's construction schedule). The review of said drawings by the Engineer will be limited to checking for general agreement with the Specifications and Drawings, and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein nor shall such review operate to waive or modify any provision contained in the Specifications or Contract Drawings. Fabricating dimensions, quantities of material, applicable code requirements, and other Contract requirements shall be the Contractor's responsibility.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 1140 – SPECIAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes special requirements for the progress of the Work:

1.02 BORROW SOURCE:

- A. The Contractor shall obtain earth materials for construction of compacted levee embankments from approved borrow sources.
- B. The Contractor shall obtain borrow source. Prior to award of Contract, Engineer shall inspect borrow site and adjacent areas for conditions which might indicate potential contamination with hazardous materials. Conditions include but are not limited to presence of aboveground or underground tanks, unexplained and unexpected areas of dead vegetation, nearby industrial sites or hazardous substance release sites, or active discharge of wastewater onto or across site. If the Engineer encounters or suspects any of the above mentioned conditions or any other conditions that could reasonably be expected to cause or result in contamination, the Contractor shall supply additional information regarding the prior use of the site (e.g. orchard, agricultural land, industrial, residential, etc.). Based on a review of the borrow site information supplied by the Contractor, the Engineer will determine a list of the analytical test requirements for the soil to be provided by Contractor. All chemical analysis shall be conducted by an environmental testing laboratory accredited by the State of California for the analyses performed. A report shall be compiled under the direction of an experienced hazardous material professional (PE, PG or CEG) which documents sampling and laboratory protocol, chain of custody documentation, sampling locations, and results. The results shall include the professional interpretation of results and an environmental opinion of the suitability of the material for thin intended source. Said report will be reviewed by Engineer prior to acceptance or refusal of the borrow source. Engineer reserves the right to refuse and reject borrow material with or without justification.
- C. Contractor shall submit written evidence to the District prior to the award of project that property rights and access to the material therein has been obtained.
- D. Borrow material may include dredged spoils/sediment provided: 1) The Contractor shall be responsible for full compliance with all local, State, and Federal regulatory requirements for use of borrow materials for the Project without limitation for reuse of dredged sediments imposed by California Regional Water Quality Control Board(s); 2) The Contractor shall be responsible for all costs of meeting such requirements and shall indemnify District against any such costs including reasonable costs of consultants and attorneys; 3) said requirements for reuse shall not require testing of water or soil at or

near the project work areas. Contractor shall be responsible for ascertaining all such requirements in advance of submitting its bid.

- E. The Engineer shall obtain a sample of the material from the borrow source proposed to be used prior to the award of the Contract. The Contractor shall provide sampling equipment (backhoe, excavator, etc.) as necessary to evaluate to full depth, the borrow source material character, quantity, and availability.
- F. Approval of borrow source shall not relieve the Contractor from the obligation to furnish satisfactory material nor in any way commit the District to acceptance of unsatisfactory material or to responsibility for the character, quantity, or availability of material in such borrow sources.
- G. The cost for initial soil sampling and material tests for purposes of awarding the Project will be at the expense of the District. If additional material testing is required, those costs shall be at the expense of the Contractor.

1.03 MONITORING EQUIPMENT

- A. The contractor is hereby notified that the inclinometers, pressure piezometers, and settlement plates are located within the work area as shown on the Drawings. The monitoring equipment is for the Engineer's use in evaluating earth movement and must be protected in place. Avoidance and protection of the monitoring equipment during construction is the sole responsibility of the Contractor. Equipment damaged by the Contractor during construction will be replaced by the Engineer at the Contractor's expense.

PART 2 –MEASUREMENT AND PAYMENT

2.01 PAYMENT:

- A. Full compensation for the work described in this section will be considered to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

PART 3 (NOT USED)

END OF SECTION

SECTION 01200 – PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This Section describes the price and payment procedures for the payment of work completed.

1.02 MEASUREMENTS:

- A. Measurement of the completed work shall be in accordance with, and by instruments and devices calibrated to the United States Standard Measures and the units of measurement for payment, and the limits thereof, shall be made as shown on the Plans, Specifications, General Requirements, and Supplementary Conditions.
- B. Measurements shall be in accordance with U.S. Standard Measures. A pound is an avoirdupois pound. A ton is 2,000 pounds avoirdupois. The unit of liquid measure is the U.S. gallon.
- C. Weighmaster Certificates: Copies of weigh bills or delivery tickets shall be dated and signed by the authorized weighmaster during that day and shift and shall be submitted to the Engineer or designated representative, during the progress of the work. The Contractor shall furnish the Engineer or designated representative scale tickets for each load of material weighed; these tickets shall include tare weight, identification mark of each vehicle or vessel weighed, date, time, and location of loading. Tickets shall be furnished at the point and time individual loads arrive at the work site. Delivery tickets or weigh bills not conforming to these requirements will not be accepted for measurement and payment and will be deducted from any invoice submitted for payment.
- D. Certified Weights:
 - 1. Scale Weight Measurement:

For materials delivered by land hauling unit, measurements will be based on certified scale weight and measuring devices sealed and approved by the California Department of Food and Agriculture, Division of Measurement Standards, or its designated representative.

 - a. Scales used for measurement shall conform to the requirements for such devices as provided in Caltrans Standard Specifications Section 9-1.01, and shall, at the option of the Contractor, be either public scales or approved scales provided by the Contractor. Vehicles used for hauling materials shall be weighed empty daily, and each shall bear a plainly legible identification mark. Duplicate identification marks from different haulers is not acceptable and may be cause for rejection and non-payment

of the delivery. Scales shall be sealed by a representative of the State agency referred to above at the expense of the Contractor as often as the Engineer may deem necessary to insure their accuracy.

- b. Scales owned or operated by the Contractor shall conform to the following requirements.
 - i. The Contractor shall be certified and bonded as a licensed weighmaster in the State in which the work under this Contract is performed;
 - ii. Any employee of the Contractor engaged in weighing materials under this Contract shall be deputized to perform such weighing, in accordance with the requirements of the aforementioned State agency; and
 - iii. The Contractor shall verify the scale accuracy prior to weighing material for payment and then once a week thereafter. The scale accuracy verification requires weighing an empty truck on the nearest certified scale to determine the tare, loading the truck using the Contractor's scale, and re-weighing the truck on the same certified scale. The weight obtained from the Contractor's scale must be within one percent of the net weight obtained on the certified scale.

2. Displacement Measurement:

For materials delivered to the job by barge, the measurement of materials delivered and placed will be based on the displacement of the transporting vessel. One (1) cubic foot of barge displacement will be assumed to be equivalent to 62.5 pounds of weight.

- a. All barge displacement charts used for measurement and payment shall be prepared, certified, signed and dated by an independent licensed Marine Surveyor, for all barge/vessels used to transport materials to the project site. A copy of the certified charts shall be provided to the Engineer by the Contractor prior to the commencement of any material delivery and placement on site.
- b. All displacement measurements shall be made at the site where the material is to be unloaded, unless otherwise directed. Transporting vessel will be free of bilge water prior to and during displacement measurements.
- c. The Engineer shall be present to observe barge sticking and tabulations.

- d. The barge delivering materials, when measured at the designated delivery point, shall be free from bilge water. Pumping of excess bilge water shall nullify the displacement measurements.
 - e. The off-loading vessel at the project site shall maintain a current, hard copy log containing the following information:
 - i. Actual Displacement measurements, loaded and unloaded, for each barge of material placed. The log shall include the quarry source, the date and time of the measurements, and a signature by the skipper of the off-loading vessel certifying the measurements.
 - ii. The stationing of the levee sites completed by each shift and displacement measurements at the beginning and end of each site. The hard copy log shall be provided to the Engineer during the progress of the work.
- E. Volume: For materials measured by unit of volume of material placed or removed, measurements shall be made by cross-sectional surveys by a licensed surveyor provided by the Contractor and working at the Contractor's expense. The Contractor shall make a cross-sectional survey of the site of the specified work at appropriate intervals to determine quantity of work completed. Cross-sections shall be surveyed, perpendicular to the final centerline of the work area, at not greater than one hundred (100) foot intervals and shall extend the full width of the work area limits. The Contractor's surveyors and/or graders shall establish the limits of work in accordance with the lines and grades shown on the Drawings.

1.03 METHODS OF MEASUREMENT

- A. Materials and items of work which are to be paid for on the basis of measurement shall be measured in accordance with the method stipulated in the particular sections involved or the descriptions of the Bid Items found in 1.02 of this Section.
- B. When material is to be measured and paid for on a volume basis and it would be impractical to determine the volume, or when requested by the Contractor in writing and approved by the Engineer in writing, the material will be weighed and converted to volume measurement for payment purposes. Factors for conversion from the weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities will be adopted.
- C. Full compensation for all expenses involved in conforming to the above requirements for measuring and weighing materials shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional allowances will be made therefore.

- D. Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the Contractor to perform to the provisions of the Contract; or material not unloaded from the transporting vehicle; or placed outside the lines indicated on the plans or given by the Engineer; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will be deducted from the final total quantities. No compensations will be allowed for hauling rejected materials.

1.04 MEASUREMENT AND PAYMENT OF BID ITEMS

A. MOBILIZATION AND DEMOBILIZATION:

The lump sum bid for mobilization and demobilization will be computed as follows for progress payment purposes:

When five (5) percent of the original Contract amount is earned, fifty (50) percent of the amount bid for mobilization, or five (5) percent of the original Contract amount, whichever is less, may be paid.

When ten (10) percent of the original Contract amount is earned, seventy-five (75) percent of the amount bid for mobilization, or 7.5 percent of the original Contract amount, whichever is less, may be paid.

When twenty (20) percent of the original Contract amount is earned, ninety-five (95) percent of the amount bid for mobilization, or 9.5 percent of the original Contract amount, whichever is less, may be paid.

When fifty (50) percent of the original Contract amount is earned, one hundred (100) percent of the amount bid for mobilization, or ten (10) percent of the original Contract amount, whichever is less, may be paid.

Upon completion of all work on the project, payment of any amount bid for mobilization in excess of ten (10) percent of the original Contract amount will be paid.

In the event the Engineer considers the actual cost for Mobilization does not bear a reasonable relation to the costs of the work in the Contract, the Engineer may require the Contractor to produce cost data to justify this portion of the bid. Failure to justify such price to the Engineer's satisfaction will result in payment of actual mobilization costs, as determined by the Engineer, at the completion of mobilization, and payment of the remainder of this item in the final payment under this Contract. The determination of the Engineer is final and not subject to appeal.

B. CLEARING, GRUBBING, STRIPPING AND OFF-HAUL MATERIAL:

The unit quantity of clearing, grubbing, stripping and off-haul of material will be measured for payment by the acre of clearing, grubbing and stripping completed.

Following approval of clearing, grubbing and stripping, the ground surface shall be surveyed in accordance with Section 1.02 of this Section. Survey shall establish the basis of measurement of all required excavations and fills required by the project.

C. ASPHALT-CONCRETE ROAD SURFACE REMOVAL:

The unit quantity of asphalt-concrete road surface removal shall be measured for payment by the cubic yard of road surface excavated according to cross-sectional surveys performed in accordance with Section 1.02 of this Section. Measurements for payment will be calculated as the difference between the ground surface after clearing, grubbing and stripping is complete, and the ground surface as measured after asphalt-concrete road surface removal is completed, or otherwise established by the Engineer, using the average end area method along the actual centerline of the reconstructed levee, with appropriate adjustments made for curvature. Excavation beyond the limits shown on the Drawings or established by the Engineer will not be included in computing the amounts of the excavation for payment purposes. Any such over excavation shall be replaced to the satisfaction of the Engineer at no cost to the District. The lines, slopes and depths of the required excavation as established by the Engineer may vary from those indicated on the Drawings.

D. ASPHALT-CONCRETE ROAD AGGREGATE SUBBASE REMOVAL:

The unit quantity of excavation shall be measured for payment by the cubic yard of road subbase excavated according to cross-sectional surveys performed in accordance with Section 1.02 of this Section. Measurements for payment for required excavation, except as noted below, will be calculated as the difference between the ground surface after asphalt-concrete road surface removal is complete, and the ground surface as measured after excavation is completed, or otherwise established by the Engineer, using the average end area method along the actual centerline of the reconstructed levee, with appropriate adjustments made for curvature. Excavation beyond the limits shown on the Drawings or established by the Engineer will not be included in computing the amounts of the excavation for payment purposes. Any such over excavation shall be replaced to the satisfaction of the Engineer at no cost to the District. The lines, slopes and depths of the required excavation as established by the Engineer may vary from those indicated on the Drawings.

E. COMPACTED EMBANKMENT LEVEE FOUNDATION:

The unit quantity of levee foundation preparation will not be measured for payment and shall be considered to be included in Road Surface Excavations and Subgrade Preparation. Full compensation for the work described in this section will be considered

to be included in the applicable related items of work in the Bid Schedule or incidental to the Contract.

F. COMPACTED EMBANKMENT:

All compacted embankment fill material will be measured for payment by the number of tons (2000 pounds) of material placed and accepted in the completed work in accordance with Section 1.02 of this Section. Tonnage will be determined by either displacement measurement or scale weight measurement.

Following final finish grading of the compacted embankment, the finished ground surface shall be surveyed in accordance with Section 1.02 of this Section. Survey shall establish the basis of measurement of aggregate base fill quantities placed by the project.

Finish grade surfaces of the compacted embankment beyond the construction tolerances stated in Section 02100 or otherwise established by the Engineer will be deducted from the amounts of the compacted embankment computed for payment purposes.

There shall be no adjustment to contract prices for increases or decreases in quantities differing from amounts estimated on the bidding schedule.

Quantities of material wasted or disposed of in a manner not called for under the contract, rejected loads of material, including material rejected after it has been placed by reason of the contractor's failure to conform to the provisions of the contract, material not unloaded from the transporting vehicles, material placed outside the limits indicated on the plans or established by the Engineer, or material remaining on hand after completion of the work will not be paid for and such quantities will be deducted from the final total quantities. No compensation will be allowed for hauling and disposing of rejected material.

G. AGGREGATE BASE:

The number of tons of imported aggregate base measured for payment will be the actual tonnage placed as determined by waybills and delivery tickets.

The volume of reclaimed aggregate base will be measured for payment in cubic yards and will be computed as the difference between the completed embankment grade, and the finish grade of the completed roadway, as determined from cross-sectional surveys performed in accordance with Section 1.02 of this Section. Finish grade surfaces beyond the construction tolerances stated in Section 02200 or otherwise established by the Engineer will not be included in computing the amounts of the aggregate base for payment purposes.

H. ASPHALT-CONCRETE:

The number of tons of imported asphalt-concrete measured for payment will be the actual tonnage placed as determined by waybills and delivery tickets. Finish grade surfaces beyond the construction tolerances stated in Section 02400 or otherwise established by the Engineer will not be included in computing the amounts of the asphalt-concrete for payment purposes.

I. GEO-GRID:

Geo-Grid will be measured for payment by the square yards of material placed and accepted in the completed work. Geo-Grid areas will be determined based on the number of full rolls of material and the surface area of each roll of material used to complete the work.

J. PULLBOXES AND ELECTRICAL CONDUIT:

The lump sum bid amount for installing pullboxes and electrical conduit will be computed on a percent completed basis in accordance with the cost breakdown provided in the Schedule of Values.

The lump sum bid amount for installing pullboxes and electrical conduit shall include all materials, labor and equipment required to install pullboxes and electrical conduit as shown on the Plans.

The lump sum price shall be full compensation for all materials, preparation and for installation of these materials and for all labor, equipment, tools and incidentals to complete this task.

K. SIPHON MODIFICATIONS:

The lump sum bid amount for siphon modifications will be computed on a percent completed basis in accordance with the cost breakdown provided in the Schedule of Values.

The lump sum bid amount for siphon modifications shall include all materials, labor and equipment required to modify siphons as shown on the Plans.

The lump sum price shall be full compensation for all materials, preparation and for installation of these materials and for all labor, equipment, tools and incidentals to complete this task.

L. EXTEND ARMY CORP. DRAIN LINE:

The lump sum bid amount for extending the Army Corp. drain line will be computed on a percent completed basis in accordance with the cost breakdown provided in the Schedule of Values.

The lump sum bid amount for extending the Army Corp. drain line shall include all materials, labor and equipment required to modify siphons as shown on the Plans.

The lump sum price shall be full compensation for all materials, preparation and for installation of these materials and for all labor, equipment, tools and incidentals to complete this task.

M. BACKFILL EXISTING DITCHES:

Backfilling Existing Ditches will be measured for payment by the linear foot of ditch backfilled and accepted in the completed work.

N. INCLINOMETER MODIFICATIONS:

Inclinometer Modifications will be measured for payment by the number of units installed and accepted in the completed work.

O. SETTLEMENT PLATES:

Settlement Plates installed will be measured for payment by the number of units installed and accepted in the completed work.

P. HYDROSEED AND EROSION CONTROL:

Hydroseed and erosion control will be measured for payment by the acre of hydroseed and erosion control placed and accepted in the completed work. Limits of hydroseed and erosion control shall be the 2-dimensional or flat planar area as shown on the Drawings, or as otherwise established by the Engineer.

Q. DRAINAGE MODIFICATIONS:

Payment for drainage modifications shall be paid for on a Time and Material basis. For bidding purposes, a placeholder value of \$10,000 has been included on the bid schedule.

PART 2 (NOT USED)

PART 3 (NOT USED)

END OF SECTION

DIVISION 2 - SITE CONSTRUCTION

SECTION 02010 – MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Mobilization shall consist of preparatory work and operations including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of all facilities necessary for work on the project, and for all other work and operations which must be performed, or costs incurred prior to beginning work on the various Contract items on the project site.
- B. Demobilization shall consist of work and operations necessary to disband all mobilized items.

PART 2 –MEASUREMENT AND PAYMENT

2.02 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

PART 3 (NOT USED)

END OF SECTION

SECTION 02020 – CLEARING, GRUBBING AND STRIPPING

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform the clearing, grubbing and stripping and removal of unsuitable material from the work area as shown on the Drawings, or as otherwise directed by the Engineer.

1.02 DESCRIPTION

- A. This work shall consist of removal of natural and artificial objectionable material from and within the areas of construction and such other areas as designated. Any clearing and grubbing required shall be performed in advance of trenching, excavation, grading, material placement, and pipe placement operations.

1.03 ORDER OF WORK:

- A. The Contractor shall follow the order of work described in this Section. Wherever a reference is made to establishment or verification of lines, grades, or locations, such establishment or verification shall be made by, or under the direction of, a licensed surveyor provided by the Contractor and working at the Contractor's expense.
 - 1. No clearing, grubbing or stripping shall commence until the limits for such work and the limits of the work area have been established by the Contractor and approved by the Engineer.
 - 2. Following approval by the Engineer of the landside clearing limit, clearing, grubbing and stripping may proceed.
 - 3. Following completion and approval of clearing, grubbing and stripping, a cross-sectional survey of the levee shall be performed in accordance with "Measurement and Payment" Section SC-27 of the Supplemental Conditions.
 - 4. All clearing, grubbing, and stripping work shall be completed at least three hundred (300) feet in advance of new compacted levee embankment construction.

PART 2 - CONSTRUCTION

2.01 CLEARING AND GRUBBING

- A. Clearing shall consist of the complete removal and disposal of all trees, stumps, down timber, snags, brush, vegetation, old piling, stone, fencing, existing or abandoned structures and debris above the ground surface, except obstructions shown on the Drawings requiring relocation.
- B. Grubbing shall consist of the removal of all old paving, concrete or masonry products, stumps, roots, and limbs larger than one-inch diameter or longer than one foot, and other buried objectionable matter encountered below the ground surface, except structures shown on the Drawings requiring protection or relocation.
- C. The Contractor shall remove all abandoned foundations, debris, and other materials that remain after buildings or other structures have been removed.
- D. Grubbing depth shall extend to full extent necessary to remove all objectionable matter or as directed by Engineer.
- E. No clearing or grubbing shall occur unless the Engineer or Engineer's representative is present.
- F. The Contractor shall preserve and protect any plants and trees as designated and marked by Engineer prior to commencement of site work. Pruning and/or trimming of marked trees may be required.

2.02 STRIPPING

- A. After Engineer's inspection and approval of cleared and grubbed areas, stripping may proceed. The entire work area as shown on the Drawings or as otherwise directed by the Engineer, shall be stripped to remove all vegetation, major root zones, highly organic materials, recent sediments, and loose, weak, or other objectionable materials. It is anticipated that the average depth of stripping will not exceed three (3) inches.

2.03 DISPOSAL OF MATERIAL

- A. All organic material resulting from clearing, grubbing and stripping shall be removed from the jobsite and hauled to an approved off-island disposal site. All other unsuitable excavated material as described in these Specifications, as well as existing pipe, structures, well equipment and other items designated for removal and disposal, shall be removed from the project site by the Contractor. Such materials shall be removed from the project area before the date of completion of the work under the Specifications.
- B. Under no circumstances shall any materials removed by the Contractor be buried or burned within the project work areas or disposed of by dumping in the waterways.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

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SECTION 02030 – ASPHALT-CONCRETE ROAD SURFACE REMOVAL

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform all operations necessary for grinding and removal to stockpile of existing county road asphalt-concrete surfacing from the work area as shown on the Drawings, or as otherwise directed by the Engineer.

1.02 DESCRIPTION

- A. This work shall consist of grinding and removal of the existing county road asphalt-concrete surfacing and transporting this material to on-island stockpiles.

PART 2 – CONSTRUCTION

2.01 ASPHALT-CONCRETE ROAD SURFACE REMOVAL

- A. The existing county road asphalt-concrete surfacing shall be pulverized to meet the grading requirements in the following table.

Pulverized Asphalt-Concrete Grading Requirements	
Sieve Size	Percent Passing
2"	100
1½"	90-100

- B. Pulverizer milling teeth shall extend at least one inch (1") into the existing aggregate subbase and not more than three inches (3") into the existing aggregate subbase.
- C. Pulverized asphalt-concrete materials shall be removed to expose clean aggregate subbase. Material shall be stockpiled separately from all other stockpiles and construction materials to prevent contamination.

2.02 CONSTRUCTION EQUIPMENT

- A. Equipment, machinery and tools used for road surface removal shall be maintained in a satisfactory working and good mechanical condition and subject to the approval of the Engineer.
- B. Only equipment suitable to produce the quality of work and materials required shall be permitted to operate on the project.

- C. Equipment shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the work to completion within the time limit specified.
- D. The Contractor shall provide adequate and suitable equipment to meet the requirements, and, when so directed by the Engineer, shall remove unsuitable, unsatisfactory, and unsafe equipment from the work and discontinue its operation.

PART 3 – MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02040 –ASPHALT-CONCRETE ROAD AGGREGATE SUBBASE REMOVAL

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform all operations necessary for excavation and removal to stockpile of the county road aggregate subbase from the work area as shown on the Drawings, or as otherwise directed by the Engineer.

1.02 DESCRIPTION

- A. This work shall consist of removal of aggregate base material from the county road subbase and transporting this material to on-site stockpiles.

PART 2 - CONSTRUCTION

2.01 AGGREGATE SUBBASE ROAD SURFACE EXCAVATION

- A. The existing aggregate base county road subbase materials shall be removed to full depth to expose clean, earthen materials.
- B. Aggregate base materials shall be selectively excavated, removed and stockpiled in accordance with quality. Quality of excavated material shall be determined by Engineer and Engineer's representative who shall visually grade and direct limits of selective excavation. Excavated aggregate base material will be graded based on its cleanliness and ability to be re-used as suitable road surfacing material. Material graded to be suitable for re-use shall be selectively excavated and stockpiled. Material graded to be unsuitable shall be wasted. It is anticipated that the upper three (3) to six (6) inches of the existing aggregate base road surface shall be graded as suitable for re-use.

2.02 DISPOSITION OF MATERIALS

- A. Aggregate base materials graded to be suitable for re-use shall be stockpiled.
- B. Aggregate base materials graded as unsuitable for reuse shall be separately stockpiled or incorporated into the levee embankment fill, as directed by Engineer. Aggregate base incorporated into levee embankment fill shall be thoroughly blended with embankment material such that a homogeneous earthen blend is generated containing no pockets or lenses of coarse-grained materials and all rock particles are completely encapsulated by fine-grained materials.

2.03 CONSTRUCTION EQUIPMENT

- A. Equipment, machinery and tools used for road surface excavation shall be maintained in a satisfactory working and good mechanical condition and subject to the approval of the Engineer.
- B. Only equipment suitable to produce the quality of work and materials required shall be permitted to operate on the project.
- C. Equipment shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the work to completion within the time limit specified.
- D. The Contractor shall provide adequate and suitable equipment to meet the requirements, and, when so directed by the Engineer, shall remove unsuitable, unsatisfactory, and unsafe equipment from the work and discontinue its operation.
- E. Equipment Weight: Weight of equipment shall be limited to a maximum gross loaded axle weight of 16,000 pounds, unless prior written authorization is given by Engineer.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02060 – COMPACTED EMBANKMENT LEVEE FOUNDATION

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform all operations necessary for preparation of the levee surface to receive compacted embankment.

1.02 DESCRIPTION

- a. This work shall consist of scarification, moisture conditioning and compaction of levee surface exposed after excavation of County road materials and preparation of the existing levee crest subgrade. The work includes moisture conditioning and compaction of subgrade, placement, moisture conditioning and compaction of road subgrade excavations, and existing levee ground surface after clearing, grubbing and stripping has been completed.

PART 2 - CONSTRUCTION

2.01 COMPACTED EMBANKMENT LEVEE FOUNDATION:

- A. Work area to receive compacted levee embankment material shall be cleared, grubbed and stripped as described in Section 2020.
- B. Levee subgrade exposed following County road subgrade excavation that receives embankment fill shall be scarified to a uniform depth of six (6) inches, moisture conditioned and compacted. Compaction of the levee foundation surface shall be by a minimum of eight (8) passes (one pass is two-way coverage) of a tamping roller over the entire area.
- C. Between approximate levee stations 706+50 to 733+50, subgrade along levee crest shall be exposed by removing top twelve (12) inches of existing levee crest. Exposed levee crest foundation shall be scarified to a uniform depth of six (6) inches, moisture conditioned and compacted. Compaction of the levee foundation surface shall be by a minimum of eight (8) passes (one pass is two-way coverage) of a tamping roller over the entire area. Excavated material shall be thoroughly blended and reincorporated into levee embankment fill such that a homogeneous earthen blend is generated containing no pockets or lenses of coarse-grained materials and all rock particles are completely encapsulated by fine-grained materials.
- D. Landside bench areas to receive embankment fill shall be scarified to a uniform depth of six (6) inches, moisture conditioned and compacted. Compaction of levee foundation

shall be by a minimum of eight (8) passes (one pass is two-way coverage) of a tamping roller over the entire surface.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

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SECTION 02100 – COMPACTED EMBANKMENT

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform all operations necessary for the construction of compacted levee embankments and other incidental earthwork required to complete the work, as shown on the Drawings, as hereinafter specified, and as directed by the Engineer.

1.02 DESCRIPTION

- A. This work shall consist of moisture conditioning, placement and compaction of imported levee embankment to the lines, grades and slopes shown on the Drawings or as directed by Engineer.

PART 2 - CONSTRUCTION

2.01 CONSTRUCTION QUALITY CONTROL TESTING:

- A. This section covers the quality control inspection, sampling, and testing of all supplies, services and/or workmanship required to be performed under the contract. The Engineer shall perform all quality control inspection and/or testing required by this contract as stated in Section SC-25.
- B. The Contractor shall comply with the inspection requirements of the Engineer and shall provide all information or samples necessary to maintain the Engineer's quality control program. The Contractor shall remove surface material and render such assistance as necessary to facilitate sampling and testing.
- C. The Engineer's quality control program will assure that all supplies and services required under the Contract conform to contract requirements, whether constructed or processed by the Contractor or procured from subcontractors or vendors.
- D. Engineer will sample and perform all soil analyses of contractor-supplied materials. Soil analysis will include determining soil properties pursuant to the relevant materials specification; including developing compaction curves necessary for documenting on-site relative compaction.
- E. Compaction testing will be tested in accordance with ASTM D 6938-8a at a rate of at least one test for every 1,000 cubic yards of material placed.
- F. Gradation of embankment material will be tested in accordance with ASTM C 136-06 and D 1140-00 at the rate of at least one test for every 10,000 cubic yards of material

placed with additional test required when visible changes in borrow material occur or as directed by Engineer.

- G. Construction of the levee embankment shall be performed under the observation the Engineer to assist in determining if the work conforms to these Specifications. The Contractor shall take such precautions as necessary to protect the Engineer from injury due to the Contractor's operations during the observation and testing operations.

2.02 COMPACTED EMBANKMENT MATERIALS

- A. New compacted levee embankments shall be constructed of compacted earthfill materials obtained from approved borrow sources as described in Section 1.17.1 "Borrow Source" of the Technical Specifications.
- B. Compacted earthfill materials shall consist of naturally occurring or Contractor blended low to medium plasticity soils (CL, SC, or SM according to the Unified Soil Classification System). Compacted earthfill materials shall have a liquid limit of less than forty-five (45) and a plasticity index greater than seven (7) and less than thirty (30) when tested in accordance with ASTM D 4318-10. Material shall have a minimum 20% passing the No. 200 sieve when tested in accordance with ASTM C 117-92 / D 1140-00.
- C. The compacted embankment material shall not contain any earthen (CL, SC or SM) chunks or clods greater than 1-inch diameter. Maximum particle size of rock particles shall not exceed four (4) inches however; particles must be completely surrounded by fine-grained materials.
- D. Compacted earthfill materials shall be free of roots, grass and any other organic materials. Materials shall not be contaminated with or contain any recycled materials, trash, rubbish, broken tile, concrete, asphalt, metal objects or other objectionable substances or materials.

2.03 CONSTRUCTION

- A. Materials to be compacted shall be placed and spread in horizontal layers not more than six (6") inches in thickness prior to compaction. When, in the opinion of the Engineer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified before the succeeding layer is placed thereon.
- B. New compacted embankment shall be keyed into the existing levee slope on each lift. Native material from key shall be moisture conditioned and thoroughly blended with imported material before next lift is placed. The embankment shall be compacted to a minimum of ninety-five (95) percent of maximum density as determined by ASTM-D698-70.

- C. Compaction equipment shall operate along lines parallel or concentric with the centerline of the levee being constructed, and no material variation therefrom will be permitted.
- D. Material placed within one (1) foot depth of the existing levee grade shall be compacted by a minimum of eight (8) passes (one pass is two-way coverage) of a tamping roller over the entire area.

2.04 MOISTURE CONTROL

- A. Moisture shall be uniformly distributed throughout the layer prior to compaction and shall be between two (2) percent below and one (1) percent above the optimum moisture content in the compacted fill as determined by ASTM D698-70.
- B. The application of water shall be done at the site of excavation.
- C. Manipulate fill materials as required to achieve uniform moisture content within the limits stated above. Supplement, as required, by sprinkling during placement and compaction.
- D. If the material for any reason becomes too wet to permit placement as compacted embankment as specified herein, the wet materials shall be dried to the prescribed moisture content before placing in the embankments.

2.05 CONSTRUCTION STAGING

- A. Construction shall be coordinated such that the embankment is constructed in stages, with construction of the lower elevations of levee first. The first stage of construction shall include construction of the temporary public road. Subsequent to the completion of the temporary public road and removal of the existing asphalt-concrete county road and aggregate subbase, the stability toe berm and levee embankment shall be constructed in four (4) foot lifts, each followed by a minimum one hundred twenty (120) day waiting period. This waiting period may be extended in the event of levee movement, cracking or other structural concerns. It is anticipated that a total of four (4) lifts each followed by a minimum one hundred twenty (120) day waiting period will be required to reach finished grade of the stability toe berm and embankment.
- B. The construction stages shall be determined by the Contractor prior to construction and outlined in the construction schedule presented at the pre-project meeting as described in "Preconstruction Conference" of Section 01020 of the Technical Specifications. Construction staging is subject to Engineer's approval.
- C. Construction staging shall consider work window restrictions for special habitat areas as described in Section 01060.

2.06 CONSTRUCTION MATERIALS STAGING

- A. Imported embankment material shall not be temporarily placed or stockpiled within the work area to depths in excess of four (4) feet at any time during the process of construction. Materials delivered to the site shall be graded to depths not exceeding two (2) feet within 4 hours of initial placement. Placement of non-compacted imported embankment materials shall be kept separate and distinct from completed compacted embankment.

2.07 CONSTRUCTION EQUIPMENT

- A. Equipment, machinery and tools used for placement of levee embankment fill shall be suitable for placement, compaction and sloping and shall be maintained in a satisfactory working and good mechanical condition and subject to the approval of the Engineer.
- B. Only equipment suitable to produce the quality of work and materials required shall be permitted to operate on the project.
- C. Equipment shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the work to completion within the time limit specified.
- D. The Contractor shall provide adequate and suitable equipment to meet the requirements, and, when so directed by the Engineer, shall remove unsuitable, unsatisfactory, and unsafe equipment from the work and discontinue its operation.
- E. Compaction equipment shall be one or more of the following:
 - 1. **Tamping Rollers:** Tamping roller is a heavy duty sheepsfoot roller, drawn by a crawler tractor, with two drums abreast and may also have two drum pairs in tandem or approved equivalent.
The roller shall be equipped with cleaning fingers, so designed and attached as to prevent the accumulation of material between the tamping feet, and these cleaning fingers shall be maintained in their full length throughout the periods of use of the roller.
 - 2. **Self-Propelled Tamping Rollers:** Self-propelled tamping rollers shall have wheels with tamping foot design in a chevron pattern which gives traction, penetration and compaction. Foot pattern shall be reversed on trailing drums to prevent overprinting lead drums.
The roller shall be equipped with cleaning fingers, so designed and attached as to prevent the accumulation of material between the tamping feet, and these cleaning fingers shall be maintained in their full length throughout the periods of use of the roller.
 - 3. **Padded-Drum Vibratory Rollers:** Padded-drum vibratory rollers shall be of single drum design with pads positioned in a chevron pattern over the face of the drum.

- F. Watering equipment shall consist of tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable widths of surface. All equipment used for the application of water shall be equipped with a positive means of shut-off. Unless otherwise permitted by the Engineer, at least one (1) mobile unit with a minimum capacity of 4,000 gallons shall be dedicated for applying water on the embankment fill operations at all times.
- G. Equipment Weight: Weight of equipment shall be limited to a maximum gross loaded axle weight of 16,000 pounds, unless prior written authorization is given by Engineer.

2.08 GRADE TOLERANCES

- A. Allowable tolerances for the finished fill sections shall be as follows:
 - 1. Material placed or excavated on the embankment slopes and stability toe berm shall not vary more than 0.30 foot above or 0.00 foot below the designated grade.
 - 2. Material placed on the levee crown roadways shall not vary more than 0.30 foot above or 0.00 foot below the grades specified.
 - 3. Roadway width tolerances for embankment material placed on the levee crown shall not vary more or less than 0.50 foot in width.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02150 – SIPHON MODIFICATIONS

PART 1 - GENERAL

1.01 SCOPE

- B. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to perform all operations necessary for the modification of existing siphons, and other incidental work required to complete the work, as shown on the Drawings, as hereinafter specified, and as directed by the Engineer.

1.02 DESCRIPTION

- A. This work shall consist of the excavation, removal, replacement/extension and backfill of existing siphon pipes and irrigation structures at two (2) locations along the levee as shown on the Drawings.
- B. Items to be removed and wasted as shown on the Drawings shall be disposed in accordance with Section 02020 of these Specifications.
- C. Provision of Water Supply During Construction: The Contractor shall actively maintain the capability of providing the required irrigation water flowrates during the period the respective water lines are out of service due to construction.

PART 2 – CONSTRUCTION

2.01 MATERIALS

A. Steel Pipe and Fittings:

- 1. Steel piping for water lines shall be of "structural" grade or better. Pipe shall be welded or seamless with plain ends, or beveled ends suitable for welding as described in this Section. The minimum wall thickness of all new pipe shall be $\frac{1}{4}$ ".

B. Coatings

- 1. Protective materials for steel pipe, except as hereinafter specified, shall be mechanically applied in a factory or plant especially equipped for the purpose, and touched up, as specified, in the field after completion of welding. The materials shall consist of coal tar enamel in accordance with AWWA C203. The exterior surface shall be coated and wrapped in accordance with AWWA C203.

C. Flanges

1. Steel flanges, compatible with the specified steel pipe, shall be used only on above ground installations or where shown on the Drawings or when approved. A full face cloth inserted rubber gasket shall be used with flanges.

2.02 EXCAVATION

A. Excavation For Removal Of Existing Siphon Pipe

1. Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to one-half (1/2) the depth of the excavation, but in no instance closer than two (2) feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed to maintain the stability of the bottom and sides of the excavation. Unauthorized over excavation shall be backfilled in accordance with Section 02100 at no additional cost to the District. Unsatisfactory material or unstable material encountered below the grades shown shall be removed as directed and replaced with satisfactory material, and payment therefore will be made in accordance with Article 10, entitled "Changes in the Work" of the Contract.

B. Trench Excavation For New Siphon Pipe

1. The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as recommended in the manufacturer's installation manual. The trench width below the top of the pipe shall not exceed that recommended in the installation manual. Where no manufacturer's installation manual is available, trench walls below the top of the pipe shall be vertical. Trench walls shall be shore cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of the pipe shall be twelve (12) inches total for pipes with outside diameters (O.D.'s) of less than four (4) inches. The trench width for pipe O.D.'s greater than four (4) inches shall be twenty-four (24) inches plus the pipe O.D.
2. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of three (3) inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.
3. Where unyielding material is encountered in the bottom of the trench, such material shall be removed six (6) inches below the required grade and replaced with compacted earthfill as provided in Section 02100 of these Specifications.

4. Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with compacted earthfill as provided in Section 02100 of these Specifications. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the District.
5. Stockpiles of satisfactory materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment. Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the District. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Engineer.

2.03 INSTALLATION

A. Joints

1. Field joints for connecting new sections of steel pipe shall be single-V butt welded. Field joints for connecting new steel pipe with existing steel pipe shall be single-V butt welded. Upon prior approval of the Engineer, a mechanical gasketed sleeve coupling may be used for these joints.
2. Transition couplings for joining steel pipe with existing plastic pipe shall be steel sleeve-type gasketed mechanical couplings with factory-applied enamel coating.
3. The Contractor shall provide a water-tight connection for joining steel pipe to existing concrete pipe. The connection shall be water-tight under operating head conditions.
4. Specials and fittings may be made of standard steel tube turns or segmentally welded sections, with ends to accommodate the type of couplings or joint specified for the pipe. Dimensions of steel-pipe fittings shall be in accordance of AWWA C208. The thickness of pipe fittings and specials shall be not less than the thickness specified for the pipe with which they are used. Protective materials for fittings that cannot be mechanically lined and coated shall be lined and coated by hand using the same materials as are used for the pipe with the same number of applications of each material carefully and smoothly applied.

B. Handling

1. Coated steel pipe shall be handled in conformance with AWWA C203. Pipe and accessories shall be handled so as to insure delivery to the trench in sound, undamaged

condition. Particular care shall be taken not to injure the pipe coating. If the coating of any pipe or fitting is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. No other pipe or materials of any kind shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends of the pipe. The interior of the pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the District. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

C. Placement

1. Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe.
2. Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be five (5) degrees unless a lesser amount is recommended by the manufacturer. Short-radius curves and closures shall be formed by short lengths of pipe or fabricated specials specified hereinbefore.
3. Trench excavation shall conform to Section 2.02 of this Section.
4. Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the water line materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. The full length of each section of pipe shall rest solidly upon the pipe bed. Pipe that has the grade or joint disturbed after laying shall be taken up and relayed. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until jointing is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substances will enter the pipes or fittings. Where any part of the coating is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner.
5. Backfill shall conform to Section 2.04 of this Section.
6. Field welding shall be in accordance with AWWA C206-83, Field Welding of Steel Water Pipe. The Contractor shall notify the Engineer whenever welding of pipes and preparatory work is being done.
7. Field jointing shall conform with AWWA C203. Any defective area found in the coating of pipe and joints shall be repaired in such manner that the required areas will be at least equal in thickness to the minimum coating for the pipe.

8. Field jointing tape coating shall conform to AWWA C203.

2.04 TRENCH BACKFILL

A. Backfill and Compaction

1. Backfill material shall consist of compacted earthfill as described in Section 02100 – COMPACTED EMBANKMENT of these Specifications. Backfill shall be placed in layers not exceeding six (6) inches loose thickness for compaction by hand operated machine compactors, and eight (8) inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least ninety-seven percent (97%) maximum density in accordance with ASTM D698 unless otherwise specified.
2. Trenches shall be backfilled to the grade shown. The trench shall not be backfilled until all specified tests are performed. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

2.05 CLEANUP

- A. Upon completion of the Siphon Modifications, all debris and surplus materials resulting from the work shall be removed.

PART 3 – MEASUREMENT AND PAYMENT

3.01 PAYMENT

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02200 – AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to surface the levee crest road, the new county road subbase and temporary ramps and road with an aggregate base material where indicated in the Drawings. The Work shall be performed in accordance with this Specification and shall conform to the lines, grades, notes and typical sections shown on the Drawings.

PART 2 – CONSTRUCTION

2.01 SUBGRADE:

- A. Aggregate base shall be placed on the on a subgrade which has been suitably cleared, graded and compacted pursuant to these Specifications. No aggregate base shall be placed without prior approval of the subgrade by the Engineer.

2.02 AGGREGATE BASE MATERIALS

- A. Reclaimed Aggregate base material shall be material excavated from Road Surface Excavations which was graded by Engineer to be suitable for re-use and stockpiled.
- B. Imported Aggregate base material shall comply in all respects with Section 26-1.02B of the Caltrans Standard Specifications for Class 2 aggregate base, three-quarters (3/4) inch maximum. All imported aggregate base material shall be new, not recycled. Aggregate base must be clean and shall not consist of processed reclaimed asphalt concrete, Portland cement concrete (PCC), lean concrete base (LCB), cement treated base (CTB), or any combination of any of these materials.
- C. When Reclaimed Aggregate Base Material is available, no aggregate base shall be imported without the prior approval of Engineer. Reclaimed aggregate base shall be utilized exclusively and exhaustively prior to import of new aggregate base material.

2.03 CONSTRUCTION EQUIPMENT:

- A. Equipment, machinery and tools used for placement of aggregate base shall be suitable for placement, compaction and grading and shall be maintained in a satisfactory working and good mechanical condition and subject to the approval of the Engineer.
- B. Only equipment suitable to produce the quality of work and materials required shall be permitted to operate on the project.

- C. Equipment shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the work to completion within the time limit specified.
- D. The Contractor shall provide adequate and suitable equipment to meet the requirements, and, when so directed by the Engineer, shall remove unsuitable, unsatisfactory, and unsafe equipment from the work and discontinue its operation.
- E. Compaction equipment shall be one or more of the following:
 - 1. Smooth-Drum Vibratory Rollers: Smooth-drum vibratory rollers shall be used for compacting aggregate base course materials and shall meet the following requirements:

Weight:	Not less than 15,000 pounds
Drum Diameter:	48 inches or more.
Drum Length:	66 inches or more.
Vibratory Centrifugal Force:	Not less than 30,000 pounds.
Vibratory Frequency:	1,800 vibrations per minute.
- F. Watering equipment shall consist of tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable widths of surface. All equipment used for the application of water shall be equipped with a positive means of shut-off. Unless otherwise permitted by the Engineer, at least one (1) mobile unit with a minimum capacity of 4,000 gallons shall be dedicated for applying water on the embankment fill operations at all times.
- G. Equipment Weight: Weight of equipment shall be limited to a maximum gross loaded axle weight of 16,000 pounds, unless prior written authorization is given by Engineer.

2.04 PLACEMENT AND COMPACTION:

- A. Aggregate base shall be delivered to the roadbed as a uniform mixture. The material as spread shall be free from pockets, lenses or streaks of coarse or fine material.
- B. At the time aggregate base is spread, it shall have a moisture content sufficient to obtain the required compaction. Moisture added to aggregate base shall be uniformly distributed and applied in a manner so as to avoid segregation.
- C. After spreading and watering, aggregate base shall be compacted to a minimum of 95 percent of maximum density as determined by ASTM D1557.

2.05 GRADE TOLERANCES:

- A. The top surface of the roadbed shall be trimmed, shaped and finished to the designated grade and cross section. The finished surface shall be of uniform texture. Light blading and watering during final compaction may be necessary for the finish surface to conform

to the lines, grades and cross sections. Should the surface for any reason become rough, corrugated, uneven in texture, or traffic marked prior to completion, such unsatisfactory portion shall be scarified, reworked, watered and thoroughly recompact to conform to the specified requirements, or replaced as directed.

- B. At all points, a tolerance of one-tenth (0.1) of a foot above and five-hundredths (0.05) below the grade or thickness established on the plans and specifications will be permitted in the final dressing, unless otherwise directed by the Engineer.
- C. At locations where the specified aggregate base thickness or finish grade elevation is not obtained, the Contractor shall take corrective measures as are necessary to obtain that thickness. A deduction will be made if the Contractor does not take such corrective measures to correct deficiencies.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02400 – ASPHALT-CONCRETE

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to surface the new county road with asphalt-concrete where indicated in the Drawings. The Work shall be performed in accordance with this Specification and shall conform to the lines, grades, notes and typical sections shown on the Drawings.

PART 2 – CONSTRUCTION

2.01 ASPHALT-CONCRETE MATERIALS

- A. Asphalt-Concrete shall conform the requirements in Section 39 “Asphalt Concrete,” of the Standard Specifications of the State of California, Department of Transportation (Latest Edition), and these special provisions.

1. General

- a. Asphalt-Concrete shall be Type “A”
- b. The Contractor’s operations shall be conducted in a manner that will not harm or damage existing facilities or improvements.
- c. At locations where public traffic is routed over the base grade, the Contractor shall plan the paving operations to minimize the delay of traffic.
- d. The Contractor, when required to provide for the passage of public traffic through the work, shall do so in accordance with the provisions of Section 12, “Construction Area Traffic Control”, of the Sacramento County Standard Construction Specifications (Latest Edition).

2. Mix Formula and Design

- b. The Contractor shall submit to the Engineer for approval a job mix formula and mix design. Mix designs shall be accompanied by current test results that indicate compliance with these Specifications. A job mix formula shall be submitted by the Contractor for each designation of asphalt concrete, based on samples of conforming aggregate materials supplied for each source or supplier proposed by the Contractor, with optimum binder content determined per California Test Method 367 with the exception that CKE test shall be waived and Caltrans Test Method 309 shall be used to determine the Maximum Theoretical Density of the mixture. The job mix formula shall establish a single percentage of aggregate

passing each required sieve size, a percentage of asphalt binder to be added to the aggregate. The Asphalt-Concrete binder content shall be based on 4.0% air voids.

- c. Where more than one source or supplier is designated to supply asphalt-concrete, those mixes will be kept separated. The mixes shall not be intermixed in the same lift of section of pavement. The Contractor shall submit paving plans showing, in advance, where the mixes from each source will be used. This plan will be subject to approval by the Engineer.

3. Aggregates and Binders

- a. The aggregate gradation shall conform to the following:

Aggregate Gradation
(Percent Passing)

³/₄" AC Type "A"

Sieve Size	Target Value Limits	Allowable Tolerance
1"	100	-
³ / ₄ "	90-100	TV±5
¹ / ₂ "	70-90	TV±6
No. 4	45-55	TV±7
No. 8	32-40	TV±5
No. 30	12-21	TV±4
No. 200	2-7	TV±2

- b. The asphalt binder grade shall comply with Section 92, "Asphalts" of the Standard Specifications of the State of California, Department of Transportation (Latest Edition) and the following: Conventional dense graded asphalt shall use PG 70-10 binder.
- c. Quality control testing shall be performed in a timely manner. Quality control test results shall be provided to the Engineer upon request. For the purpose of quality control, the Contractor shall perform the following tests:

Quality Characteristic	Action Limit	Test Method	Testing Frequency	Point of Sampling
Gradation	Per Specified Tolerance	Cal. Test 202	1/500 tons ⁽¹⁾	Composite cold feed or hot bins ⁽²⁾
Mix Asphalt Content	±0.5%	Cal. Test 379 or 382	1/1000 tons ⁽¹⁾	From truck, windrow or behind paver

⁽¹⁾ One per day minimum.

⁽²⁾ At continuous mix plants from composite cold feed belt. At batch plants from hot bins.

2.02 HAULING EQUIPMENT

- A. Vehicles used for hauling asphalt-concrete mixtures shall have tight, smooth, metal beds and shall be free from dust, screenings, excessive petroleum oils, volatiles or other mineral spirits that may affect the mix being hauled. Trucks shall be provided with tarpaulins or cargo covers of sufficient size and weight to protect the entire load. Loads shall be covered when necessary to achieve the specified density and finish quality.

2.03 ASPHALT-CONCRETE PLACEMENT METHOD

A. General:

1. Paving work shall be a continuous non-stop operation with delivery trucks arriving in a uniform manner. The Engineer will meet daily with the Contractor to evaluate the Contractor's operations to the work time restrictions.
2. The asphalt-concrete shall be delivered to the site in a thoroughly blended condition and shall be spread by a self-propelled asphalt paving machine in such a manner as to avoid segregation during the placing operations. Initial rolling shall be performed immediately after placement. No asphalt-concrete shall be placed when the atmospheric temperature is below 50°F, except as follows:
 - a. When asphalt concrete is placed as a base course, the asphalt concrete may be placed when the ambient temperature is 40°F and rising, if the material is deposited directly onto the hopper of the paving machine.
 - b. No paving work whatsoever shall be allowed when the roadway is moist or damp. No paving work whatsoever shall be allowed when it is raining. For the purpose of this provision, "raining" shall mean any weather condition that causes the roadway to become moist or damp. In the case of sudden precipitation, all paving work must stop immediately, all asphalt-concrete on site not yet placed and all asphalt-concrete in transit from the plant shall be rejected and no payment will be allowed.
3. Any time new asphalt concrete is to be placed in contact with existing asphalt-concrete, the surface shall be cleaned and a tack coat of asphaltic emulsion shall be applied to ensure proper bond. Asphaltic emulsion shall be applied to vertical edges of any existing pavement, curbs and gutters adjoining the area to be paved. Asphaltic emulsion shall be on the high viscosity type subject to the approval of the Engineer, and shall conform to sections 39 and 94 of the Standard Specifications of the State of California, Department of Transportation (Latest Edition).
4. Unless otherwise specified, the minimum compacted thickness of asphalt-concrete shall be the thickness shown on the Plans. The tolerance for minimum thickness for all operations shall be 0.01 feet. The tolerance for maximum thickness for asphalt

concrete structural sections less than 0.35 feet thick shall be 0.02 feet.

B. Spreading

1. All mixtures shall be spread at a temperature of not less than 260°F.
2. Mechanical Spreading Equipment
 - a. In addition to the requirements in Section 39-1.10 “Spreading and Compacting Equipment” of the Standard Specifications of the State of California, Department of Transportation (Latest Edition), equipment shall be equipped with automatic screed controls and a sensing device or devices. A twelve-foot (12’) long straightedge shall be required on all paving machines.
 - b. The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The paver shall be equipped with distributing screws to place the mixture uniformly in front of the screed.
 - c. The screed shall be equipped with a controlled heating device for use when required. The screed shall strike off the mix to the depth and cross-section specified.
 - d. The material being placed in the abutting lanes shall be tightly crowded against the face of the previously placed lane. The paving machine shall be positioned to overlap the existing mat only to the extent that the material placed against the joint is tightly crowded against the vertical face at the joint and that the conform raking leaves no ridges or depressions. Before compacting or pinching the joint, the coarse aggregate in the overlapped material that has dislodged through raking shall be removed from the pavement surface and discarded.
 - e. When placing asphalt-concrete to lines and grades established by the Engineer, the automatic controls shall control the longitudinal grade. Grade and slope references shall be furnished, installed and maintained by the Contractor. A ski device shall be used to roadways with two or more lanes in any one direction, or if required by the Special Provisions. The minimum length of the ski device shall be twenty-seven feet (27’), and the entire length shall be utilized in activating the sensor.
 - f. When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device. When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same manner as when placing the initial mat.

- g. Should the automatic screed controls fail to operate properly during any day's work, the Contractor may use manual control of spreading equipment for the remainder of that day. However, the equipment shall be corrected or replaced with alternative automatically controlled equipment conforming to the requirement in this Section before starting another day's work.

C. Joints

1. Lines for the paver to follow in placing individual lanes shall be parallel to the centerline of the roadway or to a baseline established by the Engineer. Longitudinal pavement joints shall be within six inches (6") of the lane lines shown on the plans or as specified in the Special Provisions.
2. Transverse construction joints and temporary runoff tapers shall be constructed so that no gradual ramping down of the mat occurs back from the joint. Bond breaking paper may be required under the runoff taper for later removal if specified by the Special Provisions.

D. Compacting

1. The Contractor shall furnish equipment capable of producing the required compaction. For vibratory rollers, the vibratory mode shall automatically shut off when machine direction is changed.
2. All asphalt concrete paving shall be constructed to produce material with a density of not less than 92% (CTM 309) except for base course paving. Asphalt placed directly on subgrade or aggregate base (base course paving) shall be not less than 90%, nor greater than 97% (CTM 309)
3. Density on minor streets shall be determined by nuclear gage testing or approved nondestructive testing method. For all such paving, the Contractor shall provide quality control testing at locations based on a random sampling plan with not less than one test per five hundred (500) tons. If the density does not fall within the density range, the Contractor may test at two additional locations within the same 500 tons and average the results of all of the three tests. This averaged result shall fall within the above-specified range. The Contractor shall notify the County inspector prior to paving and provide contact information for Contractor's testing personnel. The Agency reserves the right to conduct parallel quality assurance testing at its discretion in accordance with Caltrans test methods, 308, 309, and 375.

2.04 ASPHALT-CONCRETE PLACEMENT AND ACCEPTANCE TESTING

- A. Except as detailed above, materials testing necessary to determine conformance with the requirements of this Section, excluding bituminous distributor testing, will be performed by the Engineer and the cost thereof will be borne by the Engineer.

B. Pavement Density Testing

1. Pavement density will be determined by comparing the average density of cores taken from the compacted pavement to the Maximum Theoretical Density as determined by California Test 309 (CT 309).

C. Lot Sizes

1. The pavement will be accepted for density on a lot basis. A lot will consist of five hundred (500) tons or portions thereof.

D. Maximum Theoretical Density (Rice)

1. Bituminous mixture for Maximum Theoretical Density shall be randomly sampled on a lot basis.

E. Core Density

1. Cores for determining the density of the compacted pavement shall be taken on a lot basis, a minimum of three (3) cores per lot, on a random basis, and in the presence of the Inspector. The lot size shall be as indicated above. The cores shall be taken in accordance with the Special Provisions and as directed by the Engineer. The density of each core shall be determined per CTM 308.
2. Core samples for determination of the density of completed pavements shall be obtained by the Contractor at the Contractor's expense, and no additional compensation will be paid. The core samples shall be four inches (4") in diameter. The Contractor may utilize a nuclear density gage for preliminary testing. Dry ice may be used for cooling the pavement prior to coring. The number and locations of the samples will be agreed upon in the field by the Engineer and the Contractor. Samples shall be neatly cut with a saw, core drill, or other approved equipment. The Contractor shall provide the core samples the Engineer within two (2) hours after final compaction. Special arrangements must be made with the Engineer's material testing laboratory if the Contractor wishes test results within less than twelve (12) hours for night paving or normal work performed late in the day.
3. The Engineer will meet in the field with the Contractor and mutually agree on several locations for compaction testing for the given lot and provide a reference marker on the side of the road. The actual test location will be randomly selected from the several agreed-upon locations.

2.05 GRADE TOLERANCES:

- A. The top surface of the new county road shall be finished to the designated grade and cross section.
- B. At all points, a tolerance of one-tenth (0.1) of a foot above and five-hundredths (0.05) below the grade or thickness established on the plans and specifications will be permitted, unless otherwise directed by the Engineer.
- C. At locations where the specified asphalt-concrete thickness or finish grade elevation is not obtained, the Contractor shall take corrective measures as are necessary to obtain that thickness. A deduction will be made if the Contractor does not take such corrective measures to correct deficiencies.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

SECTION 02900 – HYDROSEED AND EROSION CONTROL

PART 1 - GENERAL

1.01 SCOPE

- A. The work covered by this Section consists of furnishing all labor, equipment, and materials necessary to apply specified hydroseed and erosion control treatments to all finished levee embankment slopes and other disturbed areas where indicated in the Drawings. The Work shall be performed in accordance with this Specification and shall conform to the lines, grades, notes and typical sections shown on the Drawings.

1.02 SUBMITTALS

- A. The contractor shall submit manufacturer's letters of compliance and manufacturer's literature for the following items:
 - 1. Seed Mix (or individual items)
 - 2. Mulches
 - 3. Fertilizer

1.03 Product delivery, storage and handling

- A. All products shall be delivered to the site in manufacturer's unopened standard containers bearing original labels showing quantity, analysis and name of manufacturer.
- B. All materials shall be stored in designated areas and in such a manner as to protect them from weather or other conditions that might damage or impair the effectiveness of the product.

PART 2 – CONSTRUCTION

2.01 HYDROSEED AND EROSION CONTROL MATERIALS

A. SEED

- 1. Seed shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of the Notice Inviting Bids. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. The percentage of pure live seed (PLS) shall equal at least eighty percent (80%). Weed seed in the mix shall not exceed point five (0.5) percent by weight.

2. Seed species and Rate of Application:

	<u>Rate Per Acre</u>
<u>Common Name (Botanical Name)</u>	
Nassella (Stipa) pulchra	14 pounds
Leymus triticoides	5 pounds
Vulpia microstachys	9 pounds
Elymus trachycaulus (or Elymus glaucus)	3 pounds
Hordeum brachyantherum	<u>4 pounds</u>
 TOTAL	 35 pounds

3. No seed inoculation is required.

B. FERTILIZER:

1. Commercial fertilizer shall be granulated, organic slow release product with a guaranteed analysis for nitrogen, phosphorus and potassium of 7-2-1. Fertilizer product shall be uniform in composition, dry and free flowing, delivered in containers labeled in accordance with applicable State regulations and bearing the warranty of the producer for the grade furnished.
2. Rate of Fertilizer Application: Fertilizer shall be distributed uniformly at the rate of one thousand two hundred (1,200) pounds per acre.

C. MULCH:

1. Rice straw shall be used to eliminate the introduction of dryland weeds. Straw shall be provided in baled form for hand-spreading. It shall be air-dried and new with no signs of mold.
2. Rate of Mulch Application: Straw mulch shall be hand-spread or blown on at a rate of 4,000 pounds/acre (if blown-on, it shall be followed with a hydro-mulch tackifier at 200 lbs/acre).

D. WATER:

1. Water shall be furnished by the Contractor, and shall be free of soil, acid, alkali, salt, and other substances that would be harmful to the growth of grass. The source shall be subject to the approval of the Engineer prior to use.

E. INSPECTION AND TESTS:

1. All inspections and tests will be performed by the Engineer and/or designated revegetation consultant.

F. SOIL PREPARATION:

1. General: Unless otherwise directed, the extent of Project areas to be seeded shall be the slopes of the new levee and ramps as shown on the Drawings.
2. Debris Removal: All wire, rubbish, rocks or other material which might hinder proper grading, seedbed preparation and subsequent maintenance shall be removed from the site and disposed of as directed, prior to soil preparation.
3. Grading: On areas to be seeded, the finished grades shall be maintained in a true and even condition. No abrupt humps, ridges or other interferences shall be allowed on the finish grade. No depressions, ridges or other features, which may direct or accumulate runoff or cause ponding of water within project area shall be allowed. Site shall be graded smooth and even prior to seedbed preparation.
4. Seedbed Preparation: Prior to seeding, the planting surface shall be "roughed up" by creating depressed seedbed pockets. Seedbed pockets shall be created by "track-walking" tractors up and down the slope or by other similar mechanical means where horizontally oriented depressions are required. Seedbed pockets shall be one (1) to two (2) inches deep and capable of capturing seed and water runoff and shall extend the length and width of the area to be seeded. Depressions shall be roughly twelve (12) inches apart from top to bottom of planting area.

G. SEEDING:

1. All seeds and fertilizer shall be mixed prior to application. The seed/fertilizer mix shall be broadcast by mechanical hand or power-operated spreaders. Spreader shall be fitted with an application-regulating device that insures even application. The mix shall be applied to achieve one hundred (100) percent coverage of all designated areas.
2. If inspection indicates that areas have been skipped or seeded at less than the specified rate, the Engineer may require the sowing of additional seed on these areas at no additional cost to the District.

H. PROTECTION:

1. Areas susceptible to vehicular or heavy foot traffic shall be protected by erecting suitable barricades immediately after seeding is completed and/or by placing warning signs of a type approved.

I. INSTALLATION AND ESTABLISHMENT SCHEDULE:

1. Seedbed preparation: Preparation shall be accomplished concurrent with the finished grading of each segment of the Project. All slopes brought to finished grade after October 1 of each year shall be prepared for seed on a daily basis.

2. Seeding: Seeding may begin immediately after construction is complete. All seeding must be completed for the season prior to October 15, unless directed otherwise by the Engineer.
3. Mulching: All mulch applications shall be concurrent with seed application and in no case shall be more than one day behind the application of seed.

J. MAINTENANCE

1. Repair:
 - a. General: When any portion of the ground surface becomes gullied or otherwise damaged following seeding within the period of the Contractor's responsibility, the affected portion shall be repaired to reestablish the condition and grade of the soil prior to planting and shall then be reseeded as specified for initial planting, all at no additional cost to the District.
 - b. Reseeding: When it becomes evident that the expected stand of grass will not be productive on certain areas, the Engineer will require that these areas be reseeded with the same seed and quantity as specified for the initial seeding. Reseeding shall be completed within fourteen (14) days following notification and these areas shall be maintained by watering as specified above until the acceptable grass is established.

PART 3 –MEASUREMENT AND PAYMENT

3.01 PAYMENT:

- A. See Section 01200 of these Technical Specifications.

END OF SECTION

DIVISION 16 – ELECTRICAL

PART 1 GENERAL

1.01 DESCRIPTION

- A. This section covers the contract items Conduits of the various types and sizes, 2 Inch Junction Box with Cover Plate, Pull Boxes of the various types and sizes, Warning Tape, and Traffic Reflector Post.
- B. The contract items include elbow fittings, bushings, hubs, identification tags, channel, clamp supports, expansion and deflection fittings, joint and conduit wall entrance seal, nuts, bolts, washers, and other appurtenances as required. The contract items include earthwork and Controlled Low Strength Material (CLSM), as specified in Section 03006 – Concrete and Reinforcing Steel.
- C. The contract item Junction Box with Cover Plate includes conduit bodies and junction boxes with cover plates.

1.02 RELATED SECTIONS

- A. Supplementary General Conditions, General Conditions, Division 1 sections, and Drawings apply to this section. This section may require direct correlation with the following sections of the contract:
 - 1. Section 02300 – Earthwork.
 - 2. Section 03006 – Concrete and Reinforcing Steel.
 - 3. Section 16050 – Basic Electrical Materials and Methods.

1.03 REFERENCES

- A. The following publications form a part of this specification to the extent referenced. Application of these publications shall conform to Document 00702 – Interpretation of the Contract, Paragraph 2:
 - 1. National Electrical Code (NEC).
 - 2. National Electrical Safety Code (NESC).
 - 3. California Electrical Code (CEC).
 - 4. National Electrical Manufacturer’s Association (NEMA).
 - 5. California General Order 128 (G.O. 128).
 - 6. Underwriters Laboratories, Inc. (UL).

7. American National Standards Institute (ANSI).

B. Materials for the conduit system shall conform to the industry standards as applicable and as specified herein.

1.04 SUBMITTALS

A. Submit the following:

1. Product catalog data, and specify which product is selected.
2. Conduit and pull box system layout, and cable layout.
3. Connection diagram.

PART 2 PRODUCTS

2.01 CONDUIT

A. Intermediate Metal Conduit: Intermediate metal conduit (IMC) shall be hot-dip galvanized, including threads, and shall conform to UL 1242 and ANSI C80.6. Each length shall bear the UL label, name of manufacturer, and, at intervals of 60 inches, the letters IMC.

1. IMC sizes shall be from 3/4 inch minimum, to 4 inches maximum.

B. Intermediate Metal Conduit Fittings:

1. Conduit fittings for intermediate metal conduits shall be galvanized malleable iron conforming to ANSI C80.4.
2. Fittings for intermediate metal conduit shall be factory coated and products of the same manufacturer as the conduit.

C. Rigid Nonmetallic Conduit:

1. Rigid nonmetallic conduit shall be smooth-wall, polyvinyl chloride (PVC) conduit and fittings for underground installation conforming to ASTM F 512, Schedule 80.
2. PVC conduit sizes shall be as shown.

D. Rigid Nonmetallic Conduit Fittings:

1. Conduit fittings shall conform to ANSI C80.4.

E. Liquid-tight Flexible Metal Conduit: Liquid-tight flexible metal conduit shall be galvanized steel with a copper bonding conductor between the spiral segments, an extruded synthetic jacket overall and shall conform to UL 360.

1. Flexible conduit sizes shall be 3/4 inch minimum to 2 inches maximum.
2. The following manufacturers offer products that may be acceptable for incorporation into the work, subject to acceptance of product information submittals:
 - a. Carol Cable, UTXL;
 - b. International Metal Hose, ULLT;
 - c. Or equal.

2.02 JUNCTION BOXES

- A. Conduit Body: Conduit bodies shall be galvanized malleable iron complete with gaskets and covers.
 1. The following manufacturers offer products that may be acceptable for incorporation into the work, subject to acceptance of product information submittals:
 - a. Crouse-Hinds, Form 8 Condulet;
 - b. Appleton, Form 35 Unilet;
 - c. Or equal.
 2. Conduit bodies for coated conduit shall be factory coated and products of the same manufacturer as the conduit.
- B. Junction boxes shall have matching cover, and shall conform to U.L. 514. Junction boxes shall be single or multigang, 3 inch deep type boxes.
 1. Boxes for lighting fixtures and junction boxes for 1 inch and smaller conduit connection installation shall be round.
 2. The following manufacturers offer products that may be acceptable for incorporation into the work, subject to acceptance of product information submittals:
 - a. Single or multi-gang boxes shall be Crouse-Hinds, Type FD; Appleton, Type FD; or equal.
 - b. Round boxes shall be Thomas and be Crouse-Hinds, Type GFR; Appleton, Type JBLX; or equal.

2.03 PULL BOXES

- A. Pull boxes shall be precast concrete boxes with covers.

1. Pull Box: The pull box shall include:
 - a. Precast concrete pull box.
 - b. Pull box covers shall be steel traffic covers.
 - c. Iron grate and trim.
 - d. Channels.
 - e. Cover shall have inscription as directed.
 - f. Pull box sizes shall be as shown and as listed in the following table:

<u>Pull Box Locations</u>	<u>Internal Dimensions</u>		
JPA	12 inches	18 inches	30 inches

2. Acceptable Manufacturers:
 - a. Christy Concrete Products;
 - b. Brooks Products;
 - c. Or equal.

2.04 WARNING TAPE

- A. The warning tape shall be bright red plastic with 3 inch minimum width. The tape shall not delaminate when wet and shall be resistant to insects, acids, alkalis, and other corrosive elements in the soil.
- B. Warning shall be “CAUTION BURIED ELECTRICAL LINE BELOW” in bold black letters 1 to 1-1/2 inches high and shall be repeated approximately every 30 inches. The letters shall be nonerasable and shall last with the tape for a minimum of 40 years.
- C. Warning tape shall have a metallic coating to provide for detection by metal detector.
- D. Acceptable Manufacturers:
 1. Condux International, Inc.;
 2. Allen Systems, Inc.;
 3. Or equal.

2.05 TRAFFIC REFLECTOR POSTS

- A. Traffic reflector posts shall be bright red plastic with 3 inch minimum width reflector on each. Posts shall be installed 10 feet apart along the route of any conduit's ductbank..

2.06 CONDUIT EXPANSION COUPLINGS:

- A. Conduit expansion couplings shall be (PVC, Schedule 80) for underground installation conforming to ASTM F 512, and shall be the same make as the fitted conduit as shown.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: Conduit shall be installed with necessary fittings and supports, only strap-type wrenches shall be used.
 - 1. Conduit bends shall be free from kinks, indentations, or flattened surfaces and shall be made in long sweeps wherever possible. Bending radius shall not be less than required by the NEC. Bends shall be made cold to prevent damage to protective coatings.
 - 2. Field cuts shall be made with a metal cutting saw. Burrs and sharp edges at the ends of metal conduits shall be removed.
 - 3. Male threads shall be tapered. Running threads will not be allowed. Conduit threads shall be coated with a graphite or zinc sealing material before making joints.
- B. Applications:
 - 1. Conduit stubbing out of concrete slab and installed exposed shall be IMC.
 - 2. Direct-burial and duct bank conduits shall be PVC Schedule 80 unless otherwise directed.
 - 3. Exposed conduit runs shall be straight and shall be parallel with each other and with the centerline of the room in which they are located unless otherwise directed. Exposed conduits runs shall be rigidly supported from the walls or ceiling at intervals of not more than 5 feet with expansion anchors.
 - 4. Conduits for equipment connections subject to movement, noise transmission or vibration shall be terminated using a length of liquid-tight flexible metal conduit in accordance with the NEC. When conduit used as grounding conductor the

liquid-tight flexible metal conduit 1-1/2 inches and larger in diameter shall be provided with a separate ground conductor. Liquid-tight flexible metal conduit shall not exceed 6 feet in length at any location.

C. Methods:

1. Buried conduits and duct bank shall be installed in trenches, surrounded by 3 inches of material as shown, and shall have burial depth not less than specified in NEC (Article 300-5), Title 23 (Article 124), and as shown. Installation shall be in accordance with the NEC and G.O. 128 as applicable.
2. Conduit runs shall be made with approved couplings, unions and joints to provide electrical continuity and maintain the coating system. Only strap-type wrenches shall be used.
3. Conduit runs shall be installed in the approximate locations shown and shall be routed to avoid interference with structures, foundations and equipment.
4. Conduit to be embedded in concrete shall be held securely in position while concrete is placed. Embedded conduits shall be located in the center one-third of wall or slab. Conduits may be stacked in no more than two tiers, with not less than 2 inches between tiers. Conduits within a tier shall be spaced 3 diameters apart, except at stubout locations.
5. After conduit is installed and before concrete or backfill is placed, a mandrel shall be drawn through the conduit runs in the Engineer’s presence. If the mandrel fails to pass through, a new bend or length of conduit shall be installed at the points of obstruction.
6. Metal mandrels shall have hemispherical ends and shall have the following dimensions:

Conduit Size Inch	Mandrel Size Inch	
	Diameter	Length
3/4	0.62	1.24
1	0.78	1.57
1-1/2	1.20	2.42
2	1.55	3.10
3	2.30	4.60
4	3.02	6.04
5	4.20	7.50
6	4.46	8.92

7. Ends of conduits shall be plugged to prevent the entrance of concrete, sand or other foreign material. As soon as practical after forms are stripped, conduit runs shall be remandrelled and swabbed clean with dry rags. If the mandrel fails to pass, a new conduit shall be installed as a replacement as near as possible to the abandoned conduit. When conduit is clean and dry, plugs shall be replaced and left in place until wire or cable is pulled. Spare conduits shall remain plugged.
- D. After form removal, the inside of boxes, covers, and threads for attaching devices shall be cleaned of concrete and the conduit plugged unless cable is to be pulled immediately.
 1. Conduits terminating metal boxes or cabinets shall be secured with two locknuts and have a grounding-type insulated bushing installed on the end.
 2. Seals shall be used where required. The sealing material shall be Graybar, Permagum; 3M, Scotchfill; or equal.
 - E. Outlet and junction boxes shall be securely mounted to structures or masonry walls as shown. Additional supports between structure members shall be provided as required to correctly locate boxes.
 - F. Pull boxes shall be installed flush with the finished grade. Unless otherwise shown, a 6 inch bed of clean gravel shall be placed under pull boxes.
 - G. Connections to outdoor boxes shall be watertight.

3.02 FIELD QUALITY CONTROL

- A. Conduits shall be measured after being installed, and the actual lengths shall be entered on the conduit schedules, and a completed copy of the schedules shall be provided to the Engineer.
- B. Buried or embedded conduits shall not be covered until inspected by the Engineer.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Measurement for payment for the contract items Conduits of the various type and sizes, and Warning Tape will be by the linear foot of each size and type placed in the work.
- B. Measurement for payment for the contract items 2 Inch Junction Box with Cover Plate, Pull Boxes of the various types and sizes, and Traffic Reflector Post will be by the number of each placed in the work.

4.02 PAYMENT

- A. The contract prices will be paid for CONDUITS; CONDUITS EXPANSION COUPLINGS of the various types and sizes; 2 INCH JUNCTION BOX WITH COVER PLATE; PULL BOXES of the various types and sizes; WARNING TAPE; and TRAFFIC REFLECTOR POST; which prices shall include full compensation for all costs incurred under this section.

END OF SECTION