

SECTION 01450
QUALITY CONTROL

PART 1 – GENERAL

1.01 SUMMARY

- A. The requirements of this Section are primarily related to performance of the Work beyond furnishing of manufactured products.

1.02 DEFINITIONS

- A. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

1.03 INSPECTION AT PLACE OF MANUFACTURE

- A. **Inspection at Plant:** Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the Engineer at the place of manufacture.
- B. **Inspection Not a Waiver:** The presence of the Engineer at the place of manufacture, however, shall not relieve the Contractor of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the Contractor and said duty shall not be avoided by any act or omission on the part of the Engineer.

1.04 SAMPLING AND TESTING

- A. **Sampling and Testing Methods:** Unless otherwise indicated, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered; however, the Owner reserves the right to use any generally-accepted system of sampling and testing which, in the opinion of the Engineer will insure the Owner that the quality of the workmanship is in full accord with the Contract Documents.
- B. **Testing Waiver:** Any waiver by the Owner of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements of the Contract Documents.
- C. **Faulty Work Correction:** Notwithstanding the existence of such waiver, the Engineer reserves the right to make independent investigations and tests, and failure of any portion of the Work to meet any of the requirements of the Contract Documents shall be reasonable cause for the Engineer to require the removal or correction and reconstruction of any such Work, in accordance with the Standard General Provisions.

1.05 DOCUMENTATION

A. Written Test Reports of Each Test and Inspection

1. As a minimum, include the following:
 - a. Date of test and date issued project title and number, testing laboratory name, address, telephone number, and name and signature of laboratory inspector.
 - b. Date and time of sampling or inspection and record of temperature and weather conditions.
 - c. Identification of product and specification section, location of sample, test, or inspection in the Project, type of inspection or test with referenced standard code, certified results of test.
 - d. Compliance with Contract Documents and identifying corrective action necessary to bring materials and equipment into compliance.
 - e. Provide an interpretation of test results, when requested by Engineer.

B. Certificates

1. Certificates of Successful Testing or Inspection. Submit when testing or inspection is required by laws and regulations or governing agency or specified in the individual specification sections.

- ### **C. Statements of Qualification: Evidence of qualification, certification, or registration. As required in these Contract Documents to verify qualifications of professional land surveyors, engineers, materials testing laboratories, specialty subcontractors, trades, consultants, installers, and other professionals.**

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Inspection: The Contractor shall inspect materials or equipment upon arrival on the job site, as well as immediately prior to installation, and reject damaged and defective items.
- B. Measurements: The Contractor shall verify measurements and dimensions of the Work, as an integral step of ordering materials and equipment and of starting each installation.
- C. Manufacturer's Instructions: Where installations include manufactured products, the Contractor shall comply with the Manufacturer's applicable instructions and recommendations for storage and installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in the Contract Documents.

END OF SECTION

SECTION 01458
TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.01 SUMMARY

- A. Requirements and responsibilities for Project laboratory testing services.

1.02 SUBMITTALS

- A. Submittals shall be per Section 01330 – Submittal Procedures.
- B. All test results within 7 days of receipt from the testing laboratory or third-party testing agency.

1.03 INDEPENDENT TESTING

- A. Contractor shall pay for services of an independent testing laboratory for:
 - 1. Soils: Gradation, moisture density standards determination, and in place density tests required by Division 2.
 - 2. Concrete: Mix design, consistency, air content, and compressive test cylinder casting, and compression testing required by Section 03300 – Cast-in-Place Concrete.
 - 3. Flexible Pavement: Mix design and components in accordance with Section 02740 – Flexible Pavement.
- B. All other tests, specified within the Project Manual, shall also be the responsibility of the Contractor, unless otherwise noted in the individual sections.
- C. The Owner reserves the right to require the Contractor to pay for the cost of any additional tests that are required due to failure, poor workmanship, testing delays due to incomplete work, or other non-Owner/Engineer related circumstances.

1.04 RESPONSIBILITIES OF CONTRACTOR

- A. Cooperate with laboratory personnel and provide access to Work.
- B. Contractor shall assist and accommodate collection of samples by Owner's agent.
- C. Provide preliminary representative samples of materials to be tested to laboratory in required quantities.
- D. Furnish copies of test reports to the Owner.
- E. Furnish casual labor and facilities:
 - 1. To provide access to Work to be tested.

2. To assist laboratory personnel to obtain and handle samples at the site.
 3. To facilitate inspections and tests.
 4. For laboratory's exclusive use for storage and curing of test samples.
- F. Notify Owner and laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests, in no case shall notification be less than 48 hours before the required test.
- G. Contractor shall be responsible for Contractor's quality control tests.
- H. Provide Engineer with copy of all test results within 7 days of receipt from the testing laboratory using the Testing Results Transmittal Form as described in Section 01999 – Project Forms.
- 1.05 RESPONSIBILITIES OF OWNER**
- A. Owner will provide the Contractor with a copy of all test results within 7 days of receipt from the testing laboratory for Owner paid testing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

- B. All streets in the construction area used by Contractor's trucks or any other equipment hauling material to and from the area whether within the contract limits or adjacent thereto shall continuously be kept clean and shall be serviced by continuous use of sprinkling trucks to control dust.
- C. Institute dust and mud control until streets are accepted by the public agency responsible for maintenance or Contractor is relieved of the responsibility by such agency.
- D. Sprinkling for dust shall be at the Contractor's expense.
- E. Keep haul roads free from dirt, rubbish, and unnecessary obstructions.
- F. Any damage to roadway surfaces from the direct or indirect result of the Contractor's operation shall be repaired by the Contractor to the satisfaction of the responsible agency.

1.06 STAGING AREAS

- A. The Contractor shall be responsible to secure and pay for temporary staging areas for all equipment and material storage.
- B. A construction staging area will be provided by the Owner. It is located at 403 Poole Lane— its Wastewater Treatment Facility. Staging areas are limited and must be maintained and returned to Owner in original condition or better. Owner will direct and designate which areas may be used when and for how long. If other staging is obtained, Contractor shall provide agreement language to Owner and be responsible for all fees and special requirements. Contractor shall be responsible for the security of all equipment and materials.

Comment [AK3]: Confirm staging area with City

1.07 STORAGE OF EQUIPMENT AND MATERIALS IN PUBLIC STREETS

- A. Construction materials may not be stored in streets, roads, or highways after unloading except where such street or road is provided with a detour. All such materials or equipment not installed or used in the construction shall be stored elsewhere by the Contractor at Contractor's expense unless Contractor is authorized additional storage space.
- B. Excavated material, except that which is to be used as backfill in the adjacent trench, may not be stored in public streets, roads, or highways unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.

1.08 PARKING SPACE FOR CONTRACTOR'S EMPLOYEES

- A. Employees of the Contractor shall park vehicles in:
 1. Designated staging areas secured by the Contractor.
 2. Designated Project areas approved by the Owner if available.
 3. Rights-of-Way as approved by encroachment permits.

Comment [KK4]: This would only apply if the city will r an encroachment permit. Otherwise we delete this statement.

1.09 STREET CLOSURES, DETOURS, BARRICADES

- A. The Contractor shall comply with all applicable State, County, and City requirements for closure of streets. The Contractor shall provide barriers, guards, lights, signs, temporary bridges, flaggers and other persons; advise the public of detours and construction hazards; and notify local newspapers of detours. The Contractor shall also be responsible for compliance with additional public safety requirements which may arise during construction. Contractor shall furnish and install, and upon completion of work, promptly remove all signs and warning devices.
- B. Not less than 7 days prior to closing, or partially closing, or reopening any street, the Contractor shall notify, in writing, the local Fire Protection District, Sheriff or Police Department, the local School District, Engineer, Owner, the State Highway Patrol; and other city, county, and State offices as may be appropriate. All road closures shall be approved in writing by Owner. All roads shall be opened at the end of each workday.
- C. Not more than one cross street shall be temporarily closed at any time unless prior written authorization is granted by Engineer.

1.10 ADVISORIES TO THE PUBLIC

- A. Contractor shall provide adequate signage on affected streets to notify the public of the anticipated start and completion dates for work on each street within the project area. Variable message boards or temporary signs complying with MUTCD requirements shall be used. Contractor shall also provide separate notification of specific dates and time periods when each street, driveway or section of street will be closed to all traffic.

1.11 SIGNS, LIGHTS, AND DEVICES

- A. All signs, lights, barricades, and use of flaggers shall conform to the requirements set forth in the *California Manual on Uniform Traffic Control Devices* by the California Department of Transportation, and the *Manual on Uniform Traffic Control Devices* by the Federal Highway Administration.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01570
TEMPORARY CONTROLS

PART 1 – GENERAL

1.01 SUMMARY

- A. Information for appropriate controls and safety measures for environment, erosion, water resources, and cultural resources.

1.02 ENVIRONMENTAL POLLUTION

- A. Maintain all work areas within and outside the project boundaries free from environmental pollution, which would be in violation of any federal, state, or local regulations.
- B. Give special attention to the effect of Contractor's operations upon surroundings. Take special care to maintain natural surroundings undamaged.

1.03 WATER RESOURCES

- A. Perform Work not to create conditions injurious to fish or to their habitat, or which would make water unsuitable for private, municipal, or industrial use.
- B. Take special measures to prevent chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides, insecticides, lime, wet concrete, cement, silt, or organic or other deleterious material from entering waterways.
- C. If waste material is dumped in unauthorized areas, remove material and restore area to condition of adjacent, undisturbed area.
 - 1. If necessary, excavate contaminated ground and disposed of as directed by Engineer and replace with suitable compacted fill material with surface restored to original condition.
 - 2. Dispose of waters used to wash down equipment in a manner to prevent their entry into a waterway.

1.04 EROSION CONTROL

- 1. Contractor shall provide temporary erosion control work as required by local agencies and Project permits during the life of the Contract. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project, and to minimize damage to the work, adjacent property, streams, and other bodies of water.
- 2. Temporary erosion control accommodations shall conform with the State of California's *Construction Site Best Management Practices (BMP) Field Manual and Troubleshooting Guide*, latest edition.
- 3. If the Project work will disturb more than one acre, a CalEPA Construction Stormwater Permit is required for the Project. The Contractor shall adhere to the requirements of the Permit mandated Stormwater Pollution Prevention Plan (SWPPP).

4. If a CalEPA Construction Stormwater Permit is not required for the Project, the Contractor shall develop and adhere to an erosion control plan which conforms with the requirements of the State of California's *Construction Site Best Management Practices (BMP) Field Manual and Troubleshooting Guide*, latest edition.
- B. Contractor shall maintain the erosion control measures and facilities in proper condition such that they will individually and collectively perform the functions for which they were designed. To ensure the effectiveness and proper maintenance of the measures and facilities, the Contractor shall make periodic inspections at sufficiently frequent intervals to detect any impairment of the structural stability, adequate capacity, or requisites of the herein approved measures and facilities that might impair their effectiveness. The Contractor shall take immediate steps to correct any deficiencies found to exist.
 - C. Temporary erosion control will be required for all finished slopes and surfaces within 48 hours of the stoppage of construction activities and/or 24 hours prior to a precipitation event. If the Owner determines that water pollution and/or erosion could occur due to seasonal limitations, the nature of the material, or the Contractor's progress, temporary water pollution/erosion control measures shall be taken immediately.
 - D. Clearing and grubbing operations shall be so scheduled and performed that grading operations and erosion control features can follow immediately. If the project conditions do not permit this scheduling, temporary water pollution/erosion control measures will be required between successive construction stages.
 - E. Repair and reestablish grades to the specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction.
 - F. Stabilize all slopes, channels, ditches or any disturbed area as soon as possible after the final grade or final earthmoving has been completed.
 1. Maintain any erosion and sedimentation control facility required or necessary to protect areas from erosion during the stabilization period.
 2. Provide Visqueen sheeting and/or erosion control matting, properly anchored, to control erosion of cut or fill slopes and related construction.
 - G. Upon completion of the project, stabilize all areas that were disturbed by the project to prevent accelerated erosion. The Contractor shall coordinate temporary water pollution/erosion control work with permanent drainage and erosion control work as required by the State of California's *Construction Site Best Management Practices (BMP) Field Manual and Troubleshooting Guide* or SWPPP to ensure that effective and continuous water pollution/erosion control is maintained during the construction of the Project.
 1. The Owner may require the Contractor's operations to be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.
 - H. Compliance with the requirements of this section shall not relieve the Contractor from his responsibility to comply with other provisions of the Contract.

1.05 CONSTRUCTION NOISE CONTROL

- A. Conduct all work as necessary so that no noise emanating from the process or any related tool or equipment will exceed legal noise levels.
- B. Use appropriate construction methods and equipment; furnish and install acoustical barriers as necessary.
- C. Equip all internal combustion engines in vehicles and construction equipment with effective mufflers.

1.06 OIL SPILL PREVENTION AND CONTROL

- A. Prevent, contain, and clean up the spilling of oil, fuel, and other petroleum products used in Contractor's operations.
- B. Discharge of oil from equipment or facilities into State waters or onto adjacent land is not permitted under State water quality regulations.
- C. At a minimum, take the following measures regarding oil spill prevention, containment, and cleanup:
 - 1. All land-based oil and products storage tanks shall be diked or located so as to prevent spills from escaping to the water.
 - 2. Diking and subsoils shall be lined with impervious material to prevent oil from seeping through the ground and dikes.
- D. Emergency Spill Response Notification:
 - 1. Under state law, CalEPA must be notified when any amount of regulated waste or hazardous material that poses an imminent threat to life, health, or the environment is released to the air, land, or water, or whenever oil is spilled on land or to waters of the state. The spiller is always responsible for reporting a spill. Failure to report a spill in a timely manner may result in enforcement actions. If you are not responsible for a spill, making the initial notification does not make you liable. However, please consult with CalEPA's response team before attempting any type of response or cleanup. Also notify Owner and Engineer.
 - 2. If oil or hazardous materials are spilled to state waters, the spiller must notify both federal and state spill response agencies. The federal agency is the National Response Center at 1-800-424-8802. For state notification, call the Governor's Office of Emergency Services Warning Center at 1-800-852-7550. A CalEPA spill responder will normally call reporting party back to gather more information. The agency will then determine its response actions. Also notify Owner and Engineer.

1.07 AIR POLLUTION CONTROL

- A. Do not discharge smoke, dust, or other contaminants into the atmosphere that violate the regulations of any legally constituted authority.

- B. Furnish all labor, equipment, and means required wherever and as often as necessary to prevent Contractor's operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. Required dust control measures may include hourly passes with a water truck or fixed sprinkling systems.
- C. Comply with specific requirements of air quality control laws.
- D. Perform corrective measures for damage resulting from dust originating from the work.
- E. Continue dust abatement measures until relieved of further responsibility by the Owner.

1.08 CONSTRUCTION CLEANING

- A. Keep the site and other areas used in a neat and clean condition, free from any accumulation of rubbish.
- B. Dispose of rubbish and waste materials and establish regular intervals of collection and disposal.
- C. Keep haul roads free from dirt, rubbish, and unnecessary obstructions.
- D. Equipment and material storage shall be confined to areas approved by the Owner.
- E. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor's expense, all in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.

1.09 ARCHAEOLOGICAL OR CULTURAL RESOURCES

- A. Work is subject to the provisions of laws and regulations pertaining to the preservation of archaeological and cultural resources.
- B. In the event that any archaeological or cultural resource is uncovered during the work, all work shall cease until an inspection and evaluation of the site has been made by an archaeologist to ensure that archaeological data are properly preserved. Notify Owner who will in turn notify the proper authorities and arrange for inspection and evaluation.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01590
PROTECTION OF EXISTING PROPERTY AND FACILITIES

PART 1 – GENERAL

1.01 SUMMARY

- A. Protect and maintain all underground or aboveground utilities and structures affected by the Work; all lawns, shrubs, trees, fences, rockeries, etc.; and parking strips or private property crossed by or adjacent to the site.
- B. Repair and restore damage to the satisfaction of Owner.
- C. Related Sections
 - 1. Section 01570 – Temporary Controls

1.02 PROTECTION OF PROPERTY AND EXISTING FACILITIES

- A. Provide protections necessary to prevent damage to private, County, State, and Federal property and facilities.
- B. Provide protections necessary to prevent damage to structures, foundations, hardscape, streets, walls, etc. resulting from addition or removal of water, vibration or shaking from explosives or compaction effort, foundation undermining, or any other activities which may cause damage.

1.03 PROTECTION OF EXISTING UTILITIES

- A. Make all arrangements necessary for the protection of utilities and services where Contractor's operations could cause damage or inconvenience to railway, telephone, television, power, oil, gas, water, sewer, irrigation systems, or other utility or service.
- B. Locate all utilities that may interfere with or be damaged by the Work.
- C. Neither Owner nor Engineer shall be responsible to Contractor for damages because of the Contractor's failure to protect utilities encountered in the Work.
- D. Replace existing utilities or structures removed or damaged by Contractor during construction, unless otherwise provided for in these Contract Documents.

1.04 NOTICE TO UNDERGROUND UTILITIES LOCATE SERVICE

- A. In accordance with CA Code 4216, call 811 for underground utility locate service before beginning Work.

1.05 PROTECTION OF TREES AND VEGETATION

- A. Protect existing trees and other vegetation indicated to remain in place against cutting, breaking or skinning of roots, skinning and bruising of bark, or smothering of trees by stockpiling

materials within dripline. Provide necessary temporary guards to protect trees and vegetation to remain in place.

- B. Make every effort to minimize damage and cutting major tree roots during excavation operations. Provide protection for larger tree roots exposed or cut during excavation operations.

1.06 PROTECTION OF SURVEY MONUMENTS

- A. Preserve all existing Federal, State, County and private survey monuments, unless unavoidable due to requirements of Work. When it is unavoidable to disturb these monuments, notify Engineer at least two weeks in advance of the proposed Work in order that Engineer will have ample opportunity to reference these monuments for later replacement by Contractor.
- B. Replaced or reset monuments shall be of acceptable type and quality, placed in a manner consistent with recognized engineering and surveying practices.

1.07 REPAIR OF DAMAGED WORK OR PROPERTY

- A. Repair or replace or arrange for the repair or replacement of all such damage to roads, highways, ditches, bulkheads, walls, bridges, culverts, utilities, barricades, lights, or other property, caused by Contractor, whether such damage be at the site or caused by transporting or hauling to or from the site to the satisfaction of the Owner.
- B. Any material damaged by the Contractor's operations shall be replaced with new material unless otherwise approved by Owner.
- C. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in execution of Work, or in consequence of non-execution of Contractor, restore, or have restored at Contractor's expense, such property to a condition similar and equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring same, or make good damage or injury in some other manner acceptable to Engineer.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01600
PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; and product delivery, storage, and handling.

1.02 DEFINITIONS

- A. Products:
1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock; may also include existing materials or components required for reuse.
 2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change the meaning of such other terms used in the Contract Documents as those terms are self-explanatory and have well recognized meanings in the construction industry.
 3. Items identified by manufacturer's product name, including make or model designation, indicated in the manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.03 SUBMITTALS

- A. Administrative Submittals: Schedule of factory tests required by Contract Documents. Identify tests for which Engineer's presence has been specified.
- B. Quality Control Submittals:
1. Factory Tests: As specified in the individual sections of the Specifications.
 - a. Procedures: Preliminary outlines.
 - b. Final accepted procedures prior to start of factory testing.
 - c. Test Documentation: Results of successful testing, including certification of procedures and results.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at the project location's elevation, in feet, above sea level.
- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of minus 10 degrees F to 105 degrees F, and annual rainfall averaging 12 inches per year.

1.05 SOURCE QUALITY CONTROL

A. Factory Testing:

1. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.
2. Calibration Instruments: Bear the seal of a reputable laboratory certifying that instrument has been calibrated within the previous 12 months to a standard endorsed by NIST.
3. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

1.06 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Match-mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with a strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing lists and bills of materials with each shipment.
- C. Spare Parts, Special Tools, Test Equipment, Expendables, and Maintenance Materials:
 1. Furnish as required by the Specifications prior to whichever occurs first:
 - a. Starting functional testing.
 - b. Operation of the equipment by the Owner.
 - c. 75 percent project completion.
 2. Properly package to avoid damage, in original cartons insofar as possible. Replace parts damaged or otherwise inoperable.
 3. Firmly fix to, and prominently display on, each package:
 - a. Minimum 3-inch by 6-inch manila shipping tag with the following information printed clearly:
 - 1) Manufacturer's part description and number.
 - 2) Applicable equipment description.
 - 3) Quantity of parts in package.
 - 4) Equipment manufacturer.
 - 5) Applicable specification section.
 - 6) Name of Contractor.
 - 7) Project name.
 4. Deliver materials to site.

5. Notify Engineer and Owner upon arrival.
- D. Store in accordance with the manufacturer's recommendations. Protect equipment from exposure to the elements and keep thoroughly dry and dust free at all times. Protect painted surfaces against impact, abrasion, discoloration, or other damage. Grease or oil all bearings and similar items.
- E. Request a minimum 7-day advance notice of shipment from manufacturers.
- F. Factory test results shall be reviewed and accepted by Engineer before product shipment as required in individual specification sections.

1.07 DELIVERY AND INSPECTION

- A. Deliver products in accordance with the accepted current progress schedule and coordinate to avoid conflict with work and conditions at the site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label date of manufacture and shelf life, where applicable. Include UL labels on products so specified.
- C. Unload products in accordance with manufacturer's instructions for unloading, or as specified. Record the receipt of products at the site. Inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from the site and expedite delivery of identical new undamaged products and remedy incomplete or lost products to provide that specified, so as not to delay the progress of the work.

1.08 HANDLING, STORAGE, AND PROTECTION

- A. Handle products in accordance with the manufacturer's written instructions, and in a manner to prevent damage. Store products, upon delivery, in accordance with manufacturer's instructions, with labels intact and legible, in approved storage yards or sheds. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the work.
- C. Store electrical, instrumentation, control products, and equipment with bearings in weather tight structures maintained above 60 degrees F and below 100 degrees F. Protect electrical, instrumentation, control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.

- D. Store fabricated products above ground, on blocking or skids, and prevent soiling or staining. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
- E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- F. Hazardous Materials: Prevent contamination of personnel, the storage building, and the site. Meet the requirements of the product specifications, codes, and manufacturer's instructions.

PART 2 – PRODUCTS

2.01 PRODUCT REQUIREMENTS

- A. Provide manufacturer's standard materials suitable for service conditions unless otherwise specified in the individual specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance requirements.
- C. Like items of products furnished and installed in the work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, and manufacturer's services and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- E. Provide interchangeable components of the same manufacture and for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Provide materials and equipment listed by UL wherever standards have been established by that agency.
- I. Equipment Finish:
 - 1. Provide manufacturer's standard finish and color, except where specific finish or color is indicated.

2. If manufacturer has no standard color, provide equipment with ANSI No. 61, light gray color.
- J. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- K. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, start-up, and operation until final acceptance by Owner.

2.02 METAL CASTINGS

- A. Free of voids, cracks, wormholes, and other casting defects.
- B. In accordance with applicable ASTM Standards.

2.03 LUBRICATION

- A. Require no more than weekly attention during continuous operation.
- B. Convenient and accessible. Oil drains with bronze or stainless steel valves and fill plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
- C. Provide constant-level oilers or oil level indicators for oil lubrication systems.
- D. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

PART 3 – EXECUTION

3.01 FABRICATION AND MANUFACTURE

- A. Manufacture parts to U.S.A. standard sizes and gauges.
- B. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
- C. Design structural members for anticipated shock and vibratory loads.
- D. Use 1/4-inch-minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
- E. Modify standard products as necessary to meet specifications.

3.02 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install materials or equipment showing such effects. Remove damaged material or equipment from the site and expedite delivery of identical new material or equipment. Delays to the work resulting from materials or equipment damage, which necessitates procurements of new products, will be considered delays within Contractor's control.

3.03 INSTALLATION

- A. Drawings show general locations of equipment, devices, and raceways, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Install and apply assembled components in accordance with original component manufacturer's written instructions.
- E. Repaint painted surfaces that are damaged prior to equipment installation and acceptance by the Owner.
- F. Handle, install, connect, clean, condition, operate, and adjust products in accordance with manufacturer's instructions and as may be specified. Retain a copy of manufacturers' instruction at site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed work.
 - 2. Arrange for transportation, storage, and handling of products that require off-site storage, restoration, or renovation. Include costs for such work in the contract price.

3.04 FIELD TESTING

- A. In accordance with individual specification sections.

3.05 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other start-up activities.

3.06 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, start-up, and operation prior to acceptance of equipment by Owner.

END OF SECTION

**SECTION 01720
FIELD SURVEYING**

PART 1 – GENERAL

1.01 SUMMARY

- A. Work includes all professional survey services necessary for complete layout and construction staking of the proposed Work by the Contractor.

1.02 SURVEY CONTROL

- A. Vertical and horizontal datum are based on the coordinates and benchmarks shown on the Drawings or as provided by the Owner prior to the start of construction. The Contractor shall locate and protect Owner furnished control points prior to starting the Work and preserve control points during construction. The Contractor shall re-establish all control points disturbed by its operations at no cost to Owner.
- B. The Contractor shall be responsible for the preservation of all existing survey monuments or permanent benchmarks. Any monuments or benchmarks disturbed or destroyed by Contractor shall be referenced and replaced by a licensed land surveyor. A corner record or record of survey, as appropriate, shall be filed by the licensed land surveyor as required by the California Code with the appropriate local government agencies.

1.03 SURVEYS PROVIDED BY THE CONTRACTOR

- A. All survey work needs for construction shall be the sole responsibility of the Contractor.
- B. If the stakes are disturbed during Construction, the Contractor shall re-stake, as needed.
- C. The Contractor shall identify on the project schedule the above Work items from coordinating with the Engineer.

1.04 REQUIRED CONTRACTOR SUPPORT

- A. The Contractor shall provide sufficient space and safe facilities to enable the Engineer to set control points and perform other Work required by this specification.
- B. Requests for surveying by the Contractor shall be made at least 2 days prior to the need if not provided by the Contractor. The amount of requested surveying shall amount to a minimum of 1 day of field work per request, unless otherwise approved by the Engineer. Delays due to Contractor's failure to give timely notice to the Engineer for surveying services are at the sole risk and expense of the Contractor.

1.05 UTILITY DATA

- A. Utility information shown on the Drawings is the best available data. The Contractor is responsible for obtaining the services of a locating company for location of utilities throughout the project.

- B. Many utilities may in fact be abandoned utilities. The Contractor must confirm with the Owner's maintenance staff on the status of utilities.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Identification: Verify location of benchmarks and control points provided by the Engineer.
- B. Verify layout information shown on the Drawings in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval from the Engineer. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly notify Engineer if project control points are destroyed.

3.02 PERFORMANCE

- A. Work from lines and levels established by the field survey. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
 - 1. Advise entities engaged in construction activities of marked lines and levels provided for their use.
 - 2. As construction proceeds, check every major element for line, level, and plumb.

END OF SECTION

SECTION 01770
CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. Key tasks that must be completed to close out this Contract.
- B. Related Sections
 - 1. Section 01780 – Record Drawings
 - 2. Section 01785 – Guarantees
 - 3. Section 01999 – Project Forms

1.02 SUBSTANTIAL COMPLETION

- A. Contractor shall complete all the work within the time designated in the Agreement unless modified by Change Order or the Certificate of Substantial Completion.
- B. Should the Owner or Engineer consider that Work is not Substantially Complete:
 - 1. Owner shall notify the Contractor in writing stating reasons thereof.
 - 2. Contractor shall complete Work and send subsequent written notice(s) to Owner and Engineer certifying that Work or designated portion of the Work is Substantially Complete.
- C. Contractor shall submit all warranty certificates at the time of application for Substantial Completion. The guarantee and warranty periods begin with the date of Final Acceptance. However, in connection with any specific equipment certified by the Owner as completed and its use or operation thereof for its intended purpose is assumed by the Owner, the warranty period for such equipment shall begin with the beginning date of such use or operation.

1.03 FINAL CLEANING

- A. General Cleanup:
 - 1. Before Final Acceptance, the Contractor shall remove and obliterate, insofar as feasible, all objects or disturbances of the ground that mar the landscape and were caused by his operations, whether or not part of the improvement.
 - 2. Rubbish, excess materials, temporary structures, and discarded equipment shall be removed and disposed of daily.
 - 3. Fill holes and grade to smooth land contours. Shape ends of cuts and fills to fit adjacent terrain.

4. Hand rake disturbed areas to remove loose objects including rock and clods in excess of 2 inches in any dimension.
5. Sweep pavement, curb and gutter, sidewalks and driveways.

1.04 FINAL INSPECTION

- A. Final inspection shall be conducted in accordance with the Contract.

1.05 FINAL SUBMITTALS

- A. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Engineer, as applicable:
 1. Final Record Drawings.
 2. Written guarantees, where required.
 3. Technical Manuals and instructions.
 4. Maintenance stock items, spare parts, and special tools.
 5. Completed and approved record documents.
 6. Certificates of inspection and certificates of acceptance by local governing agencies.
 7. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.
 8. Release form from all property owners for which the Contractor has made agreements.

1.06 FINAL PAYMENT

- A. Submit final pay request to Owner in accordance with the Contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01780
RECORD DRAWINGS

PART 1 – GENERAL

1.01 SUMMARY

- A. Requirements and procedures for Record Drawing preparation, updates, review, and submittal.

1.02 DEFINITIONS

- A. Record Drawings refer to those documents maintained and annotated by the Contractor during construction and are defined as:
 - 1. A neatly and legibly-marked set of Contract Drawings showing the final as-built location and size of piping, structures, and any other major elements of the Work.
 - 2. Additional as-built documentation, such as schedules, lists, drawings, and standard details, included in the Contract Documents or Shop Drawings.
 - 3. Contractor as-built layout and installation drawings.

1.03 RECORD DRAWING REQUIREMENTS

- A. Unless otherwise specified, Record Drawings shall be full size and maintained in a clean, dry, and legible condition.
- B. Record documents shall not be used for construction purposes and shall be available for review by the Engineer during normal working hours at the Contractor's field office.
- C. At the completion of the Work, prior to final payment, completed Record Drawings shall be submitted to the Engineer. The Contractor is responsible for submission of the completed Record Drawing set for all portions of the Work including those portions performed by subcontractors. The Record Drawing submitted will be rejected unless all Contract Drawings and all disciplines are included. Submit original with color markup as described below.
- D. Marking of the Drawings shall be kept current and shall be done at the time the material and equipment is installed.
- E. Changes shall be made to the Record Drawing when items are installed 0.25 feet horizontal or 0.1 feet vertically or more from the location designated on the Contract Drawings.
- F. Annotations to the record documents shall be made with an erasable colored pen or pencil conforming to the following color code:
 - 1. Additions/Modifications: Red.
 - 2. Deletions: Green.
 - 3. Comments: Blue.

- G. Legibly mark to record actual depths and slopes, horizontal and vertical location of underground raceways, cables, and appurtenances referenced to permanent surface improvements.
- H. The Contractor's Record Drawings will be reviewed monthly by the Engineer for completeness prior to preparing the progress estimate for payment. If the Record Drawings do not reflect the work performed, a portion of the payment for that item of work will be withheld from the progress estimate.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01785
GUARANTEES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section defines Contractor responsibilities and procedures to guarantee the equipment and facilities installed under this Contract. Requirements of this specification do not release the Contractor from fulfilling those requirements as stated in Supplementary Conditions of this Contract. Specific guarantees above and beyond the basic one-year guarantee are indicated in the technical specification sections.
- B. Related Sections
 - 1. Section 00700 – General Conditions
 - 2. Section 01999 – Project Forms

1.02 GUARANTEE REQUIREMENTS

- A. For a period of 365 consecutive calendar days, commencing on the guarantee start date (but commencing only as to such portions of the Work so possessed or used), the Contractor shall, upon the receipt of notice in writing from the Owner or Engineer, promptly correct any defective Work.
 - 1. If the defective Work cannot be corrected, or if the corrected Work has been rejected by the Owner or Engineer, the Contractor shall promptly remove it from the site and replace it with non-defective Work, all at no cost to the Owner.
 - 2. The Owner is hereby authorized to make such corrections if, ten days after giving of such notice to the Contractor, the Contractor has failed to make or undertake the corrections or removal/replacement with due diligence.
 - 3. In case of an emergency where, in the opinion of the Owner, delay could cause serious loss or damage, corrections, or replacement may be made prior to or concurrent with notice being sent to the Contractor. All expenses in connection with such corrections or replacement, including costs for professional services, will be charged to the Contractor. This guarantee shall be extended for a period equal to the time of correction or replacement.
- B. Acceptance of the work shall not extinguish any covenant or agreement on the part of the Contractor to be performed or fulfilled under this Contract which has not, in fact, been performed or fulfilled at the time of such acceptance. All covenants and agreements shall continue to be binding on the Contractor until they have been fulfilled.
- C. The guarantee provided in this section shall be in addition to those specific guarantee or warranty requirements for particular equipment and/or work items indicated in the Specifications, and in addition to any other rights or remedies available to the Owner under this Contract or at law.

1.03 DETERMINATION OF GUARANTEE DATES

- A. As required in Section 00700 – General Conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 DOCUMENTATION

- A. Guarantee dates as required in Section 00700 – General Conditions shall be recorded and submitted to the Owner or Engineer on the Guarantee Documentation Form as provided in Section 01999 – Project Forms.
- B. The guarantee information shall be documented by specification section, in the same order as presented in the Operations and Maintenance manuals.
- C. Vendor information, including point-of-contact, company name, company address, and company emergency telephone number, shall be included for applicable equipment and components of the facility.

3.02 GUARANTEE RESPONSE

- A. The Owner or Engineer or appointed representative shall be the point-of-contact for response to guarantee-related problems during the one-year guarantee period. The Owner or Engineer shall evaluate the problem and initiate the guarantee response by the appropriate vendor or contractor.
- B. For special guarantees extending beyond the one-year guarantee period, Owner personnel shall contact the appropriate vendor directly as identified on the Guarantee Documentation Form.
- C. Upon notification of need for guarantee response, the Contractor shall provide written notification to the Owner initiator, indicating scheduled time of response so that Owner maintenance personnel may be scheduled to be on hand to provide assistance and witness the repair. Guarantee work may only be undertaken on Mondays through Fridays, from 7:00 a.m. to 5:00 p.m., unless the Owner gives express written consent for the performance of the work at other times.
- D. Items requiring guarantee response within the one-year guarantee period shall have a completely new guarantee period established from the time of repair. The Contractor shall provide written verification of the newly established guarantee period to the Owner or Engineer upon completion of the repair.

END OF SECTION

SECTION 01999
PROJECT FORMS

PART 1 – GENERAL

1.01 SUMMARY

- A. Information and use of forms that will be used during the performance of Work.

1.02 FORMAT

- A. The forms listed below will be used for performance of the Work as indicated. This is not a complete listing of all required forms. The Contractor shall properly complete all forms required by the Contract Documents or the Project Manager. The Project Manager shall review and approve all submitted forms. If submitted forms are not acceptable, the Contractor shall resubmit forms in an acceptable format. Substitution of forms by Contractor may occur upon review and approval of Project Manager prior to use.
- B. Electronic Versions: Forms will be provided in either Microsoft Word, Microsoft Excel, or PDF format.

1.03 FORMS

- A. Application for Payment (EJCDC Form)
- B. Weekly Quantity Installed Certification Form
- C. Change Order (EJCDC Form)
- D. Submittal Transmittal
- E. Guarantee Documentation Form
- F. Certificate of Substantial Completion (EJCDC Form)
- G. Release and Certificate of Payment

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 COMPLETING FORMS

- A. All documents are to be filled out by the Contractor using the format provided by the Project Manager. It is at the discretion of the Project Manager if other forms or formats will be accepted.

3.02 SIGNING FORMS

- A. Original hand-written signatures are acceptable for all documents. The Contractor is to fill out the document either digitally or legibly prior to signing the hard copy.
- B. Use of digital signatures will be discussed and agreed upon before use.

END OF SECTION

Division 2
Site Construction

SECTION 02300

EARTHWORK

PART 1 – GENERAL

1.01 SCOPE

- A. This Section includes the following:
 - 1. Excavating and backfilling for pavement repairs.
 - 2. Excavating and backfilling for curb and gutter replacement.
 - 3. Restoration of existing facilities/improvements/landscaping.

1.02 RELATED SECTIONS

- A. Sections:
 - 1. Section 01330 – Submittal Procedures

1.03 DEFINITIONS

- A. Backfill: Material used to fill an excavation.
 - 1. Bedding and Haunching: The bedding and haunching portion of trench backfill, unless noted otherwise on the Contract Drawings, shall be defined as a minimum 6-inch thick layer of material immediately below the bottom of the pipe, to the spring line of the pipe, and extending over the full width of trench bottom in which the pipe is bedded.
 - 2. Initial Backfill: The backfill placed beside and over pipe in a trench. This portion of trench backfill includes the full width of trench bottom to a horizontal level of 12 inches above the top of the pipe, as shown on the Contract Drawings.
 - 3. Intermediate Backfill: The intermediate backfill portion includes the portion of the trench from the top of the initial backfill to the bottom of the trench restoration zone (street zone) in paved or unpaved roadway areas or to the finish surface grade in non-roadway areas, as shown on the Contract Drawings.
 - 4. Trench Restoration Zone (Street Zone): The trench restoration zone includes the asphalt concrete pavement and aggregate base section placed over the intermediate backfill, as shown on the Contract Drawings.
- B. Borrow Soil: Satisfactory soil imported from off-site for use as embankment fill or backfill.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for Extra Work.
 2. Bulk Excavation: Excavation of a broad nature that is not trenching. Generally, more than 10 feet in width and more than 10 feet in length.
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- D. Embankment fill: Satisfactory soil materials used to raise existing grades.
- E. Rock excavation: Removal of solid material which by actual demonstration cannot, in the Owner's opinion, be reasonably loosened or ripped by a hydraulic excavator or backhoe loader with a minimum 110 flywheel horsepower and that must be systematically drilled and blasted or broken with power-operated hammers or other such equipment or removal of solid rock boulders greater than 6 feet in their longest dimension.
- F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, underground utility structures, or other man-made stationary features constructed above or below the ground surface.
- G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of an embankment fill or backfill immediately below subbase, base, topsoil, or other subsequent fill materials.
- H. Utilities: Underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- I. Geogrid: Geosynthetic material used to reinforce soils and similar materials.

1.04 REFERENCE SPECIFICATIONS

- A. Caltrans Standard Specifications, State of California, Department of Transportation, Standard Specifications, latest edition.
- B. Referenced sections of the Caltrans Standard Specifications are hereby incorporated into these Specifications in their entirety including any sections referenced there within, except measurement and payment.

1.05 SUBMITTALS

- A. Submittals are to be in accordance with Section 01330 – Submittal Procedures.
- B. Submit one copy of load delivery ticket for each load of imported material paid by tonnage delivered to the jobsite. Ticket shall identify tonnage.
- C. Product Data: For each type of the following manufactured products required:
 1. Geogrid.

- D. **Material Test Reports:** From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Laboratory compaction curves according to ASTM D 1557 for each on-site and borrow soil material proposed for embankment fill or backfill.
 - 2. Classification according to ASTM D 2487 of soil material proposed for embankment fill, initial backfill, intermediate backfill, and structure backfill.
 - 3. Gradation analysis according to ASTM C 136 for all imported materials with a specified gradation.
- E. **Materials Disposal Plan:** Written plan identifying methods and location of disposal of surplus soil material, unsuitable backfill material, demolished materials, and waste materials.
- F. **Record Drawings** identifying and accurately locating all grading revisions and changes to trench alignments.

1.06 EXCAVATION SAFETY

- A. Install and maintain shoring, sheeting, bracing, and sloping necessary to support the sides of excavations, to keep and to prevent any movement, which may damage adjacent facilities, or endanger life and health. Install and maintain shoring, sheeting, bracing, and sloping as required by OSHA and other applicable governmental regulations and agencies.
- B. The Contractor shall be solely responsible for making all excavations in a safe manner. Provide appropriate measures to retain excavation side slopes and prevent rock falls to ensure that persons working in or near the excavation are protected.

1.07 CODES, ORDINANCES, AND STATUTES

- A. Contractor shall be familiar with, and comply with, all applicable codes, ordinances, statutes, and bear sole responsibility for the penalties imposed for noncompliance.

1.08 TOLERANCES

- A. All material limits shall be constructed within a tolerance of 0.1-foot for horizontal layout or dimensions and within a tolerance of 0.03-foot for vertical layout with reference to elevation or grade with the following additional requirements:
 - 1. Minimum thicknesses and slopes shall be as shown on the Plans.
 - 2. All grading shall be performed to maintain slopes and drainage as shown.
 - 3. Where aggregate base is to be placed on the grading plane, the grading plane at any point shall not be more than 0.05 feet above the grade established by the Engineer.

1.09 QUALITY ASSURANCE & TESTING

- A. The Contractor will retain the services of an approved, independent materials testing laboratory to perform compaction testing services.

B. Compaction testing of bedding, fill and backfill materials will be performed, at locations determined by the Engineer, to ensure compliance with the Contract Drawings and Specifications. If a test fails, the failed area shall be reworked to the satisfaction of the Engineer and tester and retested. Two tests shall be allowed at any location of work. The Contractor is responsible for the costs of any additional testing required after the second test.

C. Testing Methods

1. ASTM C117 Standard Test Method for Materials Finer than No. 200 Sieve by Washing
2. ASTM C136 Standard Method for Sieve Analysis of Fine and Coarse Aggregate
3. ASTM D1556 Density of Soil in Place by the Sand-Cone Method
4. ASTM D1557 Test Methods for Moisture Density of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18-inch Drop
5. ASTM D2922 Density of Soil and Soil-Aggregate in Place by Nuclear Methods
6. ASTM D3017 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods

D. Frequency of Testing

1. Maximum Dry Density and Optimum Moisture Content Testing, ASTM D1557, to be performed on each different class or type of material, and additional tests as necessary when a previous test is suspect, due to changes in the material, as determined by the Engineer. Additional test locations will be randomly selected by the Engineer or Owner.
2. Density of Soil In-Place by Sand Cone or by Nuclear Methods Testing shall be performed at the locations, intervals, and frequency as determined by the Engineer or Owner. The following minimum frequencies shall apply:
 - a. Intermediate Backfill Zone: A minimum of one test per foot of thickness and per 500 square yards.
 - b. Street Zone (Aggregate Base Section): A minimum of one test for every 500 lane-feet of roadway.
 - c. PCC Apron and Curb and Gutter: A minimum of one test for every 250 linear feet of PCC flatwork or curb.
3. The Owner reserves the right to require testing at greater or lesser frequencies.

E. Testing Tolerances

1. Percent Compaction: Not less than as specified on the Contract Drawings or in these Specifications.
2. In-Place Moisture Content: As required to achieve minimum relative compaction.

3. Soft or Yielding Surfaces: Regardless of percent relative compaction obtained by test, areas which are soft and yield under the load of construction equipment are to be removed and replaced at no additional cost.

1.10 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earthwork operations.
 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Do not commence site earthwork operation until temporary erosion and sedimentation control measures are in place.
- C. Existing utilities shown on the Plans are approximate. At least two (2) working days prior to starting work on the project, the Contractor shall contact Underground Service Alert (USA) for location. The locations of various utilities shown on the Plans are solely an accommodation to the Contractor without any representation or guarantee concerning completeness and/or accuracy. The Contractor is responsible for ascertaining the location of, and protection for, all utilities to be encountered in the performance of the required work.
- D. Existing Utilities: Do not interrupt utilities serving facilities on or adjacent to the project unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Engineer's written permission.

PART 2 – PRODUCTS

2.01 SOIL MATERIALS

- A. Unsuitable Materials Not to Be Incorporated into the Work
 1. Organic matter such as peat, mulch, organic silt or sod
 2. Expansive clays
 3. Material containing excessive moisture
 4. Poorly graded coarse material
 5. Particle size in excess of 4 inches
 6. Frozen soils

7. Material which will not achieve density and/or bearing requirements
8. Construction debris such as asphalt or broken concrete

B. Backfill:

1. **Intermediate Backfill:** Excavated native material processed to meet the following requirements. If native material cannot meet the following requirements, then imported material meeting the requirements shall be used for Intermediate Backfill:
 - a. The material shall be granular in nature, shall be free of rock or gravel larger than three (3) inches in any dimension, and shall be free of debris, waste, frozen materials, vegetation, silt and other deleterious or organic matter.
 - b. The material shall be sufficiently graded such that it can be compacted to specified levels.
 - c. It shall be screened and processed to provide a uniform gradation and moisture content.
2. **Geogrid:** The geogrid reinforcing shall conform to the following criteria:
 - a. AASHTO Recommended Practice for Geosynthetic Reinforcement of the Aggregate Base Course of Flexible Pavement Structures, AASHTO PP46, April 2001 Interim Edition of the AASHTO Provisional Standards.
 - b. AASHTO Standard Specification for Highway Bridges (1997 Interim)
 - c. AASHTO Guide for Design of Pavement Structures (1993)
 - d. ASTM D 7748 - Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles and Related Products
 - e. ASTM D 6637- Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-rib Tensile Method
 - f. ASTM D 4354 - Practice for Sampling of Geosynthetics for Testing
 - g. ASTM D 4759 - Practice for Determining the Specification Conformance of Geosynthetics
 - h. ASTM D 5818 - Practice for Obtaining Samples of Geosynthetics from a Test Section for Assessment of Installation Damage
 - i. Geosynthetic Research Institute (GRI) GRI-GG2 - Standard Test Method for Geogrid Junction Strength
 - j. Geosynthetic Research Institute (GRI) GRI-GG9 - Torsional Behavior of Bidirectional Geogrids When Subjected to In-Plane Rotation

- k. The geogrid shall be integrally formed and deployed as a single layer having the following characteristics (ALL VALUES ARE MINIMUM AVERAGE ROLL VALUES, UNLESS A RANGE OR CHARACTERISTIC IS INDICATED):

Test	Test Method	Units	Value
Aperture Stability Modulus at 20 kg-cm	GRI-GG9	m-N/deg	0.32
Rib Shape	Observation	N/A	Rectangular or Square
Rib Thickness	Callipered	In (mm)	0.03 (0.76)
Aperture Size	I.D. Callipered	(mm)	(25 to 33)
Junction Efficiency	GRI-GG2	%	93
Flexural Stiffness	ASTM D 7748	mg-cm	250,000
Minimum True Initial Modulus in Use	ASTM D 6637	lb./ft (kN/M)	15,170 (226.4)

- l. Geogrid shall be Tensar BX1100, or approved equal.

2.02 COMPACTION EQUIPMENT

- A. Compaction equipment shall be of suitable type and adequate to obtain the densities specified, and shall provide satisfactory breakdown of materials to form a dense fill.
1. If inadequate densities are obtained, larger and/or different types of additional equipment shall be provided by the Contractor.
 2. Hand-operated equipment shall be capable of achieving the specified densities.
- B. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compaction effort.

2.03 MISCELLANEOUS

- A. Materials for Site Restoration shall be the same or equal to the materials existing prior to construction.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect and maintain erosion and sedimentation controls.

3.02 EXCAVATION

- A. Excavate to indicated gradients, lines, depths, and elevations. Excavate such that walls are vertical per the details shown on plans.
- B. All existing pavement shall be saw cut to a neat line which is wider than the excavation area as indicated on the Plans.
- C. Excavated material shall be processed by crushing, screening, hand-picking, or any reasonable method determined by the Contractor to create a suitable material for use as intermediate backfill material.
- D. .
- E. Complete backfill of excavation areas by the end of each work day. **NO OPEN EXCAVATIONS SHALL BE LEFT OPEN OVERNIGHT.**
- F. Excavated material determined by the Engineer to be unsuitable, or in excess of the amounts required for backfill shall be disposed of legally by the Contractor off site at no additional cost to the Owner.

3.03 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavations as directed by Engineer, without additional compensation.

3.04 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- B. The stockpiles shall also be protected from contamination with unsatisfactory excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material. If the Contractor fails to protect the stockpiles and any material becomes unsatisfactory as a result, such material shall be removed and replaced with satisfactory on-site or imported material from approved sources at no additional cost to the Owner.

3.05 BACKFILL

- A. Compact subgrade to receive backfill prior to placement of geogrid as required by the Plans.
- B. Place geogrid in the excavation area per the Plans.
- C. Place and compact intermediate backfill according to the requirements of the details on the Construction Drawings.
- D. Surface restoration shall be according to Article "RESTORATION" of this specification.

3.06 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent embankment fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified relative compaction.

3.07 COMPACTION

- A. Backfill: All intermediate backfill shall be compacted to the relative compaction specified according to the details on the Construction Drawings or the appropriate Encroachment Permit.
- B. Maximum loose lift dimensions for all backfill shall be:
 - 1. Mechanically-Operated Compaction Equipment: 8 inches.
 - 2. Hand-Operated Compaction Equipment: 4 inches.
 - 3. Maximum loose lift dimensions shall be adjusted if, in the opinion of the Engineer or based on test results, adequate compaction is not being obtained.

3.08 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.
- B. Allow testing agency to inspect and test subgrades and each embankment fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work complies with requirements.
- C. Testing agency will test compaction of soils in place according to Part 1.09 of this Specification. Tests will be performed at locations and frequencies as instructed by the Engineer.

- D. When testing agency reports that subgrades, embankment fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.09 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 RESTORATION:

- A. All areas disturbed by the project shall be restored to their pre-project condition, including reinstalling, repairing or replacing existing landscaping, vegetation, irrigation, pavements, pavers, curbs, gutters, driveways, sidewalks, shoulders, or other improvements removed or damaged during the Project.
 - 1. Pavement Located in the Right-of-Way: Pavement Restoration shall be in accordance with the Plans and Specifications.
 - 2. Drainage Courses: All ditches, swales and other drainage courses shall be restored to pre-project condition. No drainage paths shall be altered as a result of this project.
 - 3. Driveways and other paved areas outside the Right-of-Way shall be replaced with a pavement section matching or exceeding the existing section. The material shall match the existing driveway material.
 - 4. Landscaping: All trees, shrubs, ground cover, irrigation, or other landscape features damaged or destroyed as a result of this project shall be replaced. All landscaping and irrigation shall be restored to pre-project condition.

3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it.

END OF SECTION

SECTION 02740
FLEXIBLE PAVEMENT

PART 1 – GENERAL

1.01 SUMMARY

- A. Work includes all labor, materials, equipment, and services necessary for supply and placement of asphalt concrete pavement.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01330 – Submittal Procedures
- B. Section 02300 – Earthwork

1.03 SUBMITTALS

- A. Submit in accordance with Section 01330 – Submittal Procedures copies of a report from a testing laboratory verifying that aggregate material and asphalt binder conform to the specified gradations or characteristics.
- B. Mix design based on Hveem Method for asphalt concrete.

1.04 REFERENCE SPECIFICATIONS

- A. Standard and General Specifications: Where reference is made to Standard or General Specifications, reference shall mean: California Department of Transportation (Caltrans), Standard Specifications, latest edition, excluding measurement and payment.

PART 2 – PRODUCTS

2.01 AGGREGATES FOR BASE COURSES

- A. Aggregate for base courses for road construction and for shoulder gravel shall meet the requirements of Caltrans Spec Section 26-1.02C (Class 3 Aggregate Base, 3/4 inch Maximum).

2.02 PLANTMIX AGGREGATE

- A. Aggregate for asphalt cement shall be Type A, 1/2-inch, maximum, medium graded, meeting the requirements of Caltrans Spec Section 39.
- B. Aggregate shall be produced from commercial-quality aggregates consisting of broken stone, crushed gravel or natural rough-surfaced gravel, and sand, in any combination.

2.03 ASPHALT CEMENT PAVEMENT

- A. Asphalt cement for paving shall be PG 64-10 in accordance with Caltrans Spec 39-2.01B(3).

2.04 BINDER/TACK COAT

- A. Binder or tack coat be SS1-h shall conform to the requirements of Section 39 and 94 of the Caltrans Spec.
- B. All saw cut edges and other vertical edges at the limits of paving shall receive a tack coat.

PART 3 – EXECUTION

3.01 PAVEMENT REMOVAL

- A. Initially cut asphalt concrete pavement with pneumatic pavement cutter or other equipment at the limits of the excavation and remove the pavement. After backfilling the excavation, saw cut asphalt concrete pavement to the full depth of pavement at a point not less than 6 inches outside the limits of the excavation or the previous pavement cut, whichever is greater, and remove the additional pavement.
- B. Saw cut concrete pavement, including cross gutters, curbs and gutters, sidewalks, and driveways, to the full depth of pavement at a point 1 foot beyond the edge of the excavation and remove the pavement.
- C. The concrete pavement may initially be cut at the limits of the excavation by other methods prior to removal and the saw cut made after backfilling the excavation. If the saw cut falls within 3 feet of a concrete joint or pavement edge, remove the concrete to the joint or edge.
- D. Make arrangements for and dispose of the removed pavement.
- E. Final pavement saw cuts shall be straight along both sides of trenches, parallel to the pipeline alignment, and provide clean, solid, vertical faces free from loose material. Saw cut and remove damaged or disturbed adjoining pavement. Saw cuts shall be parallel or perpendicular to the pipeline alignment or the roadway centerline, unless otherwise shown on Contract Documents.

3.02 SUBGRADE PREPARATION

- A. Place and compact specified aggregate base under all areas to receive asphalt cement to the depths, lines, and grades specified on the Drawings and as required to match existing roadway construction.
- B. Prepare subgrade in accordance with Section 28-1.03B of the Caltrans Spec.

3.03 PROOF ROLLING

- A. Proof roll the prepared base material surface to check for unstable areas. Proof rolling shall be accomplished using a water truck or similar equipment with a rear axle load of at least 18,000 pounds with tires inflated to at least 65 psi. Paving work shall begin only after areas have been corrected and are ready to receive paving. The Engineer must be present during proof rolling.

3.04 PLACING AGGREGATE BASE COURSE

- A. Place aggregate base course to a minimum thickness as specified for the roadway. Compact to 95% relative compaction. Install in accordance with Caltrans Spec.

3.05 COMPACTION OF AGGREGATE BASE AND LEVELING COURSES

- A. Compaction and rolling shall begin at the outer edges of the surfacing and continue toward the center. Apply water uniformly throughout the material to provide moisture for obtaining the specified compaction. Compact each layer to the specified relative compaction before placing the next layer.

3.06 PLACING TACK COAT

- A. Apply tack coat on surfaces to receive finish pavement at the rate of 0.08 to 0.13 gallons per square yard per Section 39 of the Caltrans Spec. Apply tack coat to metal or concrete surfaces that will be in contact with the asphalt concrete paving.

3.07 PLACING ASPHALT CEMENT

- A. Place asphalt within 24 hours of applying primer and tack coat in accordance with Section 39 of the Caltrans Spec.
- B. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- C. Develop rolling with consecutive passes to achieve an even and smooth finish, without roller marks. Finish grade of asphalt patches shall match existing adjacent pavement exactly, without bumps, depressions, or other irregularities.
- D. After pavement is in place, seal all joints.

3.08 SURFACE TOLERANCE

- A. Finished grades shall not deviate more than 0.01 foot in 12 feet in elevation parallel with the road centerline and 0.02 foot in 12 feet in elevation transverse to the centerline from the grades indicated in the drawings.
- B. Finished grade shall not deviate more than 0.02 foot in elevation from the grade indicated in the Contract Drawings. Slopes shall not vary more than 1/4 inch in 10 feet from the slopes shown in the Contract Drawings.
- C. After paving has been installed and compacted, spray water over the entire paved area. Correct any areas where water collects and does not drain away.

3.09 INSPECTION AND ACCEPTANCE

- A. The Engineer will inspect all hot mix asphalt patching work. Asphalt paving that exhibits incorrect grades, excessive unevenness, depressions, humps, or joint misalignments will be rejected by the Engineer and shall be completely replaced with new pavement at no additional cost to the Owner.

3.10 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for a minimum of 2 days.

END OF SECTION

Division 3
Concrete

SECTION 03100
CONCRETE FORMS AND ACCESSORIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

1.02 WORK INCLUDED

- A. This Section of Work shall include all labor, materials, appliances, equipment, and accessories necessary to prepare forms to receive all concrete for the building structure as specified in Specification Section 03300 – Cast-In-Place Concrete.
- B. All inserts, anchors, bolts, pipe sleeves, and other embedded items shown on the Drawings shall be installed under this Section of the Work.
- C. All inserts, anchors, bolts, etc., specified in conjunction with other trades shall be furnished and installed by the trade concerned and under the supervision of the General Contractor.

1.03 RELATED WORK

- A. The Work of this Section shall be closely coordinated with that of:
 - 1. Section 02300 – Earthwork
 - 2. Section 03300 – Cast-In-Place Concrete

1.04 REFERENCED STANDARDS

- A. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. ACI 347 - Recommended Practice for Concrete Formwork.

1.05 QUALITY ASSURANCE

- A. Construct and erect concrete formwork in accordance with ACI 318, ACI 347, and applicable construction safety regulations for the place of work.

1.06 COOPERATION WITH OTHER TRADES

- A. The Contractor shall coordinate his work with that of other trades to ensure that the Work will be carried out in an orderly fashion. Embedded items such as anchor bolts, bearing plates, metal frames, inserts, sleeves, chases, boxes, rough bucks and nailing blocks provided by others, shall be set as part of the Work of this Section.
- B. Make provisions for all mechanical and electrical work required to be built into formwork.

PART 2 – PRODUCTS

2.01 LUMBER

- A. #2 and better Douglas Fir.

2.02 PLYWOOD

- A. APA, PLYFORM, Class I or II, BB-Exterior, not less than 5/8 inches thick and graded in compliance with Product Standard PS 1.
- B. For exposed finish concrete surfaces, use new plywood or material with a medium density overlay finish.

2.03 FORM TIES

- A. Dayton Superior or approved equal. Wire ties will not be permitted. Contractor may propose other systems of tying forms, but they must be approved by the Engineer before use. Use 1 inch breakback cones where exposed.

2.04 FORM OIL

- A. Non-staining mineral oil, mineral oil emulsions, microcrystalline wax emulsions and/or resin emulsions as approved for compatibility with paint.

2.05 TAPE

- A. Arno #320 or 3M #471, white, two-inch wide minimum.

2.06 CORNER FORMS, RECESS AND CHAMFER STRIPS

- A. Burke, Greenstreak or Vulco. PVC plastic shapes to produce the profile shown.

PART 3 – EXECUTION

3.01 PREPARATORY PROVISIONS

- A. Prior to placing forms, the Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper installation of his Work, and shall not proceed until all unsatisfactory conditions have been corrected.
- B. Prior to placing forms, insure that:
 - 1. Soil Compaction Tests on subgrade have been approved.
 - 2. The placement of aggregate base is complete.

3.02 DESIGN

- A. The design and engineering of all formwork shall be the responsibility of the Contractor. The design shall be in conformance with ACI 347. Thickness, gauges, spacing, etc., shall be

determined by the Contractor to adequately allow for the design pressures of the concrete and the specified dimensional tolerances.

- B. The Contractor shall be responsible for the examination and acceptance of all conditions affecting the proper construction and/or installation of the Work of this Section, and shall not proceed until all unsatisfactory conditions have been corrected. Commencing work shall be construed as acceptance of all conditions by the Contractor as satisfactory for the construction and/or installation of the Work.

3.03 FORM MATERIAL

- A. Forms shall be constructed of the materials best suited for obtaining desired finish of the concrete surfaces. Wood forms on exposed surfaces shall be free from cupping, warpage, or loose knots.
- B. Form materials may be re-used, provided they produce finish surfaces equal to those of the original forms. Before re-use, thoroughly clean and recondition in every respect.

3.04 COATING

- A. Forms shall be coated prior to placement of reinforcing with an approved form oil. In no instance shall a coating be used that will interfere with the application and/or adhesion of paint or any other material to be applied to the surface of the concrete.
- B. Joints between form panels on exposed faces shall be sealed with tape at the time of erection of the forms, as required to prevent the leakage of mortar or loss of fines.

3.05 CONSTRUCTION

- A. Erect to lines, shapes, and dimensions, and in precise position to form the lines and designs indicated; suitable for removal without prying against the concrete. Make forms tight, without cracks or holes, and prevent the leakage of mortar or loss of fine particles from the concrete. Knots that have loosened leaving holes, holes that are not used, and cracks that have opened up, shall be covered with sheet metal for unexposed concrete. Construct formwork as follows:
 1. Wales and studding shall be of adequate size and strength, braced and spaced to prevent bulging or sagging of forms. Stud spacing shall be compatible with the thickness and grade of form plywood used. Deflections of form materials shall not exceed 1/360.
 2. Use rods and cones or other suitable devices to form the concrete to proper thickness. No wood other than built-in bucks or nailing blocks shall be allowed to remain permanently in the forms.
 3. Forms, screeds, and templates are required as necessary to hold lines and elevations, and to securely hold reinforcing and embedded items in place.
 4. Chamfer all corners with PVC chamfer strips.

3.06 NEAT FORMS - FOUNDATIONS

- A. All footings shall be formed unless neat excavations can be provided as follows:

1. Sides of excavations shall be cut vertical, and bottom corners shall be essentially square. Rounded loose corners are not acceptable.
2. Excavation width shall be 4 inches wider than shown on the Drawings (i.e. 2 inches each side of footing).
3. Adequate devices are provided to support reinforcing, and to accurately maintain location of embedded items during concrete placement.
4. Loose soils, which accumulate during placement of reinforcing, must be able to be readily removed prior to concrete placement.

3.07 EMBEDDED ITEMS

- A. Bolts, inserts, and other items embedded in the concrete shall be accurately secured so that they shall not be displaced during the placing and compacting of the concrete. Set embedded bolts with templates in accordance with layouts or Shop Drawings of the Manufacturer. Stabbing of bolts is not allowed.
- B. Do not embed piping, other than electrical conduit, in concrete. Locate conduit to maintain strength of the structure at a maximum. If necessary, increase the thickness of the concrete so that the outside diameter of the conduit does not exceed 30 percent of the concrete thickness.
- C. Do not place conduit in slabs-on-grade or suspended slabs. Typically, all conduit shall be embedded in base materials. When conduit must be placed on top of the aggregate base and embedded in the concrete slab on grade, the conduit shall not encroach into slab more than 1 inch at any location. Where more than three (3) conduits run parallel, conduits shall be spaced to provide 3 inches clear between, or conduits shall be embedded in base material.
- D. Form openings and chases as indicated or necessary to receive, pass, and clear other work; verify sizes with the Mechanical and other trades before forming. Give close attention to the location of boxes, cans, and sleeves for others.
- E. Form reglets, rebates, seats, and pockets as indicated or necessary to receive or engage the work of others. Verify dimensions and details prior to forming.
- F. Chamfer or tool all exposed edges.

3.08 CLEANING

- A. Just prior to the placement of concrete, all dirt, chips, sawdust, rubbish, and water or ice shall be removed from the forms.

3.09 REMOVAL OF FORMS

- A. Do not remove forms or supports until concrete has hardened sufficiently to resist damage from removal operations. Do not pry against concrete during form removal.
- B. Formwork for exposed surfaces shall remain in place until the concrete has cured at a temperature above 50 degrees F for a total of 5 days.

- C. Do not remove forms from the sides of walls until the concrete has reached a minimum age of 24 hours. Curing of concrete shall not be interrupted after forms have been removed.
- D. Do not place backfill material against structure walls until the concrete has reached an age of 14 days and not before concrete develops a minimum strength of 3,000 psi. Contractor shall exercise care during placement and compaction of backfill material to prevent over compacting to the point of displacing the wall line.
- E. Contractor shall exercise care to protect the concrete structures from superimposed loading created by construction equipment.
- F. Do not remove forms for suspended concrete for a minimum of 21 days, and not before concrete has attained its full design strength.

3.10 TOLERANCES

- A. The following maximum tolerances shall be allowed for form construction:
 - 1. Footing thickness: $\pm 1/2$ inch.
 - 2. Wall and Footing Centerline Location: $\pm 1/4$ inch.
 - 3. Conspicuous Lines and Levels: 1/4-inch variation in 20 feet, except visible lines shall appear straight, true, and free from sudden transitions.
 - 4. Deflection of Form Materials: 1/360 times span.
 - 5. Slab Thickness: + 1/2 inch, - 1/4 inch.
 - 6. Embedded Anchor Bolts: $\pm 1/16$ inch.
 - 7. Flight of Stairs: Rise $\pm 1/8$ inch, Thread $\pm 1/4$ inch.
 - 8. Consecutive Steps: Rise $\pm 1/16$ inch, Thread $\pm 1/8$ inch.
 - 9. All Other: $\pm 1/4$ inch in 10 feet and 1/2 inch overall.

3.11 CLEANING UP

- A. During the progress of the Work, the premises shall be kept free from debris and waste material resulting from the Work in this Section. Upon completion, all surplus material and debris shall be removed from the site.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Furnish all materials and labor necessary to complete Cast-In-Place Concrete as indicated, specified herein, or both. The Work of this Section includes but is not necessarily limited to the following:
1. Foundations.
 2. Miscellaneous pits, trenches, etc.
 3. Slabs-on-grade.
 4. Walls.
 5. Inserts as indicated on Structural Drawings.
 6. Exterior site work shown on Structural Drawings.
 7. Grouting of steel plates.
 8. Epoxy anchors.
 9. Quality control.
- B. All flatwork and associated concrete improvements shown on Site and Architectural Drawings.

1.02 WORK EXCLUDED

- A. The Work of this Section excludes the following:
1. Anchors, sleeves, inserts, frames, and plates which are furnished under other Sections of the Specifications.
 2. Drainage fills and/or base fills.

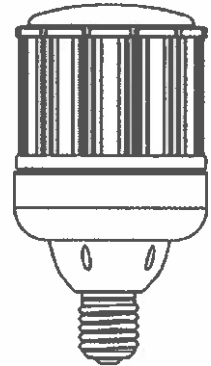
1.03 RELATED SECTIONS

- A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.
- B. Section 03100 – Concrete Formwork
- C. Section 02300 – Earthwork



Before You Begin

HID Retrofit Lamp User Manual



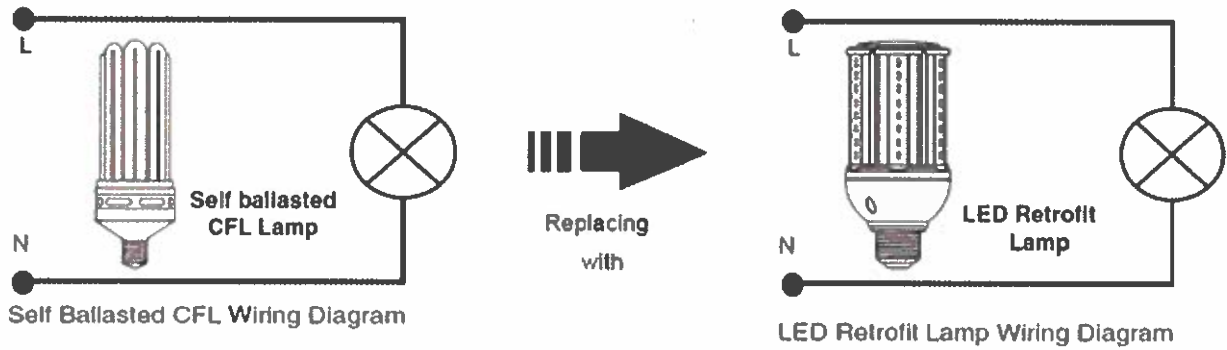
Read These Instructions Completely and Carefully

WARNING

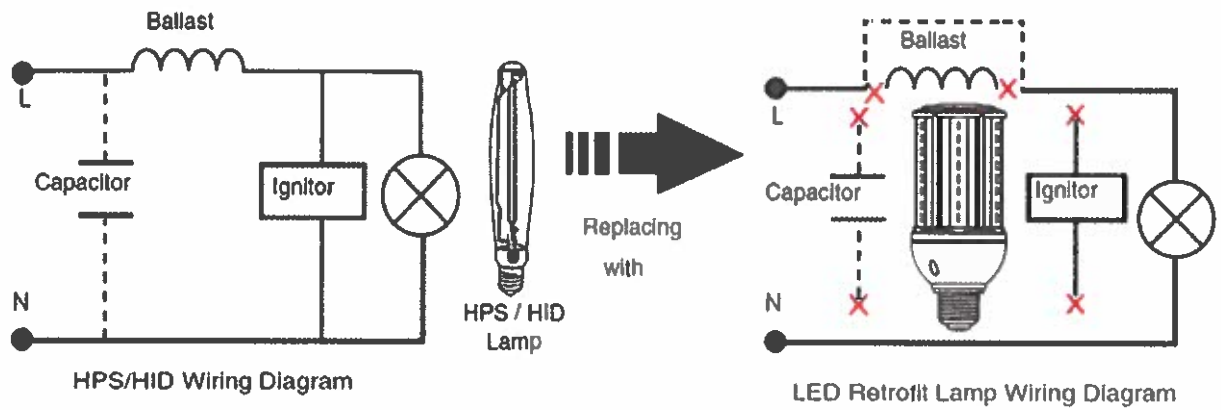
Risk of electric shock

- Disconnect power from the luminaire and follow proper lockout/tagout procedures before installation or maintenance. Contact a qualified electrician for installation.
- These HID retrofit lamps require 100V-277V input voltage.
- These HID retrofit lamps require all ballasts, capacitors, and starters to be bypassed/removed.
- Suitable for use in dry or damp locations only. Do not use where directly exposed to liquid, vapor, rain.
- THIS DEVICE IS NOT INTENDED FOR USE WITH EMERGENCY EXITS.
- ADDED WEIGHT OF THE DEVICE MAY CAUSE INSTABILITY OF A FREE-STANDING PORTABLE LUMINAIRE.
- USE ONLY WITH A PORTABLE LUMINAIRE THAT IS PROVIDED WITH A SHADE.
- This device is not intended for use with dimmers or remote controls.
- This device is suitable for enclosed fixtures, however ensure that there is adequate space around the device for heat dissipation. 54W: (93)D X (265)H mm 80W-120W: (410)D X (390)H mm
- 27W above are only suitable for base-up & base-down installation.

Replacing Self Ballasted CFL Lamp



Replacing HPS/HID Lamp



Trending Searches [\\$5.99/ea LED T8 Tubes](#) [175W MH Equal LED Wall Pack Only \\$59.99](#) [Standard Shaped LEDs only \\$0.99/ea](#)
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Home / LED Light Bulbs / LED Corn Bulbs / 2000-5000 Lumens / 4000-4500 Kelvin / Medium Base



PLT

2200 Lumens - 18 Watt - LED Corn Bulb

70W Metal Halide Equal - 4000 Kelvin - Medium Base - 120-277V - PLT 3102B

120V - 277V

Lighting can be confusing!**Expert Help - Call Now**
1-972-525-0501

- UL listed, can be used in indoor or outdoor applications
- Features a medium (E26) base for easy installation
- Illuminates 2200 lumens
- Utilizes 56 LEDs

[View More Details](#)

\$25.65 ea.
Retail Price \$29.84

Quantity



SKU: PLT-3102B

PRODUCT DETAILS

REVIEWS

FAQ'S

Brochures & Spec Sheets

 [PLT 3102B Spec Sheet](#)

 [PLT 3102B Installation Instructions](#)

 [PLT 3102B IP Rating Chart](#)

 [PLT 3102B Photometrics](#)

Brand	PLT
MPN (Part No.)	3102B
Energy Star	No
CE Certified	No
UPC	814934021013
Base Type	Medium (E26)
Case Quantity	24
Color	Cool White
Warranty	5 Years
Dimmable	No
Life Hours	50,000
Wattage	18 Watt
Color Temperature	4000 Kelvin

Diameter	2.76 in.
Height	6.54 in.
Beam Angle	280 Degree
DLC Listed	No
CRI	80
Lumens	2,200
Metal Halide Equal	70 Watt
Voltage	120/208/240/277
Safety Rating	ETL
Enclosed Fixture Rated	Yes
Lumens per Watt	122
California Approved	No

Description

This LED corn bulb is applicable for fully enclosed pole top fixtures such as acorn-style street lights as well as various commercial settings like that of warehouses, shopping malls, and parking lots. Start replacing your 70-Watt metal halides with this 18-Watt LED corn bulb and cut maintenance and energy costs compared to traditional bulbs.

- UL listed, can be used in indoor or outdoor applications
- Features a medium (E26) base for easy installation
- Illuminates 2200 lumens
- Utilizes 56 LEDs

When retrofitting HID fixtures with LED lights, ballast must be bypassed when present.



Changing The Way The World Buys Light Bulbs.

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2140 Merritt Dr, Garland, TX 75041

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LED Corn Bulb Lamp Series



5 Years Warranty

Specifications

Model	PLT-3102B
Rate Power	18W
Input Voltage	AC100-277V 50-60Hz
CCT	4000K
Power Factor	≥ 0.9
CRI	>80
Lumen	2250 lm
LED Quantity	56LEDs 0.3W
LED LM80	Yes



Rubycon

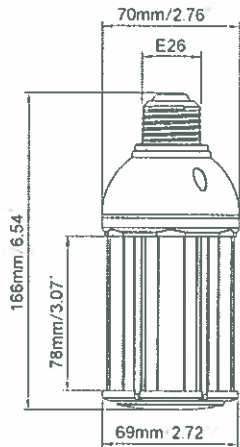


E26

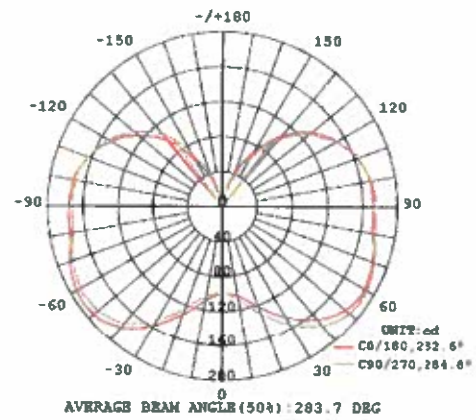


JAE Connector

Dimension



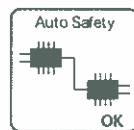
Luminous emittance



Long Lifespan of 10years



Reliability Test



Safety Protection Circuit



No Mercury
No UV Light



Big Saving (87%)
on Electricity Costs

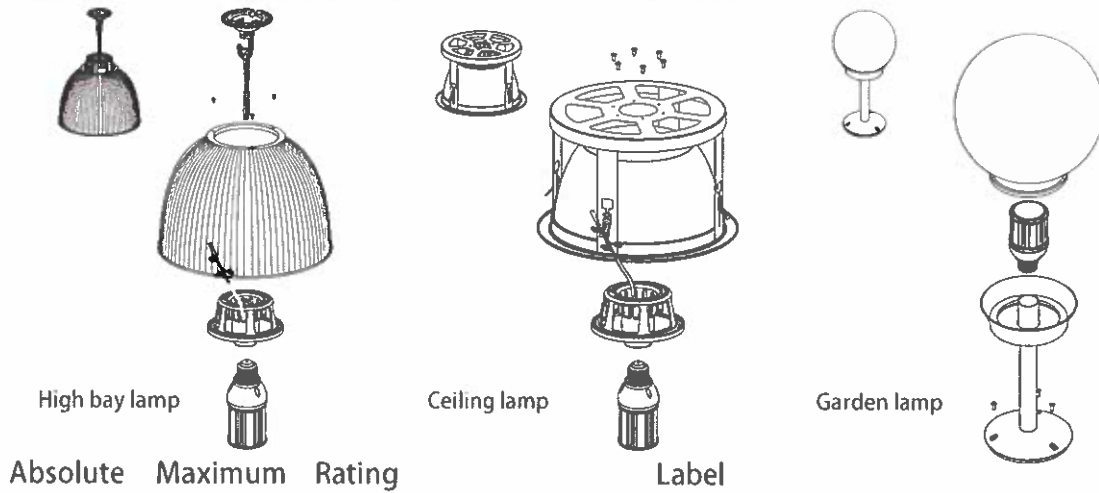


Usable in Enclosed
Luminaires



Omni Wide Angle

Installation



Absolute Maximum Rating

Parameter	Rating	Units
Aluminum Heat Sink Temperature	57	C
Operating Temperature	-20 ~ +65	C
Storage Temperature	-40 ~ +80	C
Equilibrium Temperature	25	C

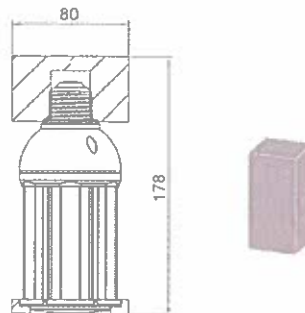
Label

LED Corn Bulb lamp
Model PLT-3102
AC100-277V 50-60Hz
Power: 17W CCT 4000K

LED Corn Bulb lamp
Model PLT-3102
AC100-277V 50-60Hz
Power: 17W CCT 4000K

Product Packing Specification

Packing Details	
Pack Quantity	24pcs
Net Weight	0.76lbs/345g
Gross Weight Per CTN	22.04lbs / 10kg
Box Size	83*83*195mm
CTN Size	350*265*410mm









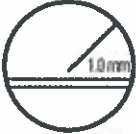

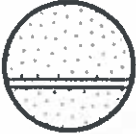








⚠ CAUTIONS

- Make sure remove the traditional ballast before replace the LED corn light.
- Don't take apart the product or replace mechanical and electronic components.
- Don't stare at the strong light for a long time as it may cause injury to eyes.

IP Rating Chart

IP ratings are represented by combining the first and second digits of the following columns. See example below.

1st Digit - SOLID		2nd Digit - LIQUID	
Degree of protection against solid objects		Degree of protection against water	
	No Protection 0		No Protection 0
	Protected against a solid object greater than 50mm, such as a hand. 1		Protected against water drops. 1
	Protected against a solid object greater than 12.5mm, such as a finger. 2		Protected against water drops at a 15 degree angle. 2
	Protected against a solid object greater than 2.5mm, such as a wire. 3		Protected against water spray at 60 degree angle. 3
	Protected against a solid object greater than 1.0mm, such as a thin strap. 4		Protected against water splashing from any angle. 4
	Dust Protected. Prevents ingress of dust sufficient to cause harm. 5		Protected against water jets from any angle. 5
	Dust tight. No ingress of dust. 6		Protected against powerful water jets and heavy seas. 6
Example:			Protected against the effects of temporary submersion in water. (30 minutes at 3 feet) 7
 <p>IP65</p> <ul style="list-style-type: none"> Protected against water jets from any angle. Dust tight. No ingress of dust. 			Protected against the effects of permanent submersion in water. (Up to 13 feet) 8



Community Programs

About the Programs

USDA Rural Development's Community Programs help create and maintain strong, vibrant rural communities through investments in essential public services and infrastructure projects. Eligible applicants include public bodies, nonprofits and federally-recognized tribes, and population limits vary by program. For complete details on our Community Facilities or Water and Wastewater programs visit us online at www.rd.usda.gov/ca or contact one of our staff near you.

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Wastewater Energy Efficiency Assessment

City of Loyalton

PWS CA4690001



Loyalton Wastewater
Energy Efficiency Assessment
California Rural Water Association
May 10th, 2019

The Mission of the California Rural Water Association is to provide training, technical assistance, resources and information to assist water and wastewater utilities in achieving high standards of service.

Energy Efficiency Program Overview:

The California Rural Water Association has implemented a program to assist water and wastewater utility systems to evaluate and lower their energy consumption and associated costs. Your energy efficiency assessment considers current and past energy use, identifies the primary energy consuming components, and identifies methods to lower energy use and costs. The California Rural Water Association Energy Efficiency Program is made possible through a grant to the National Rural Water Association from the United States Department of Agriculture. The Energy Efficiency Program is just one of many initiatives that are currently in place to support the mission of the California Rural Water Association. Please visit our website to learn more about all the services available from your association. www.calruralwater.org





Executive Summary:

The CRWA Energy Efficiency Circuit Rider (Jim Caporusso) toured the District's facilities on May 10th, 2019, accompanied by Employee Keith Jordin & Ken Bennett. The City has been very proactive with cost saving having installed a choline generator at the wastewater treatment facility. However, there is potential for significant energy and cost savings in the arena of lighting systems. Re-lamping to take advantage of LED technology may reduce annual lighting energy consumption by 44 percent (In study areas). The total cost of the re-lamping project is about \$721 resulting in a very attractive return on investment of only about 6 months.



Project Overview:

Loyalton sits on the southeast side of Sierra Valley, a huge beautiful valley that was once a lakebed for a lake the size of Lake Tahoe. Maidu and Washoe Indians were the first inhabitants of the valley, coming in the summer to hunt and fish. Everything changed in this area with the gold rush of 1849. More than 16,000 miners came to the county trying to get rich, but most of the miners came to the west side of Sierra County. In the 1850s the Loyalton and Sierra Valley area began to develop as an agricultural and cattle-raising area, and soon logging became one of the major industries. Smith's Neck was the city's original name, but because of their Loyalty to the Union during the Civil War it became known as Loyalton. In 1901 Loyalton was incorporated as a dry town and its size was set at 50 square miles making it the second largest city in California after Los Angeles!

The City provides Wastewater service for a population of approximately 850 persons through about 350 active service connections. The effluent is aerated in settling ponds before being pumped and used for irrigation in a neighboring field. The wastewater treatment plants interior lighting systems are fluorescent tubes with metal halide bulbs being used for the exterior illumination. The scope of the energy efficiency assessment is limited to interior/exterior lighting at the Wastewater Treatment Plant.



Energy Efficiency Observations/Opportunities:

The City has a history of selecting pumping equipment and controllers that are very energy efficient. This is evident in their drinking Water Treatment Facility. However, the City could very easily improve overall energy efficiency by implementing a re-lamping program to take advantage of the maturing LED lighting technology. Prices for LED lamps have come down dramatically over the past few years with more and more manufacturers entering the market. The City purchases electric power from Plumas – Sierra Rural Electric at a pricing rate of about 18 cents per kWh. It is estimated the District is currently consuming about 13,991 kWh's each year for lighting alone (In the areas studied). A simple re-lamping program will significantly reduce energy consumption associated with lighting by 44%. The City's Wastewater Plant utilizes outdated 48-inch T-12 fluorescent lamps for lighting office spaces and storage spaces, while the shop uses T-8 fluorescent lamps and the exterior illumination appears to be Metal Halide.

Energy Efficiency Recommendations:

A simple project to re-lamp the indoor fluorescent fixtures at the Wastewater Office and shop has the potential to save 7,740 kWh of energy every year with an annual cost savings of \$1,348. The initial capital investment for the project is about \$721 and some of the refit could be accomplished using in-house personnel. The Return on Investment for the lighting project is only about 6 months. Please See Table 1: Loyalton Wastewater Lighting Analysis for details regarding each opportunity for lighting retro-fit. Please note that any retro-fit to LED lighting has benefits beyond cost and energy savings. LED bulbs and tubes last many times longer than traditional fluorescent and incandescent lamps. Also, LED tubes contain no mercury and thereby eliminates an environmental hazard.

Attachments:

Table 1: Loyalton Wastewater Lighting Analysis

Description of Suggested Items;

4 ft. LED Tubes: (PLT T8, #LBP8F2350B)

Wall Pack: (#AC106135/1.0L)

Note this attachment may include the Pricing Information, Cut Sheet, Ballast Compatibility Chart, Spec Sheet and Installation Guide.

USDA Rural Utility Service Area Specialist Directory

Sources of Funding:

Funding for the capital expense of re-lamping to LED Technology may be available from Funding for the capital expense of re-lamping to LED Technology may be available from

Plumas-Sierra Rural Electric. Rebate link is here: <https://www.psrec.coop/energy/rebates/>

Funding may also be available through the USDA Rural Utility Service (see attached Area Specialist directory)

Important Final Notes:

This report is not to be used as a final Bill-of-Materials for the bulk purchase of LED Lamps. More and more new products are coming into the market almost every day. The suggested LED Replacement

tubes are B Type tubes due to the age of some of the fixtures. There is a possibility of re-lamping the exterior wall packs and street lights. This would be more cost effective than replacement if the sensors are still in working order. Please refer to descriptions/information listed below. It is strongly suggested the District purchase just a few lamps that are of similar characteristics to those shown in this report to further verify compatibility, light color, and intensity. Lamps have been selected that are reasonably priced, correct for the application, and of similar light quality to the lamps being replaced. Try before you buy in bulk!

As technology advances, what was once too costly to own has now become the standard.

Color Temperature

Measured in Kelvin (K), color temperature is a scale describing how warm (yellow) or cold (blue) the color output of a light or fixture. Warm T8 tubes are in the 3000-3500K range and recommended for reception areas, hotel lobbies, and other locations where you want an inviting atmosphere. Cooler color temperatures in the 3500-5000K range give a brighter, cleaner look for office buildings, classrooms, hospitals, and commercial kitchens.

Direct Wire vs. Plug-n-Play

The technology for T8 tubes has advanced to the point where they are available in the traditional direct wire or the newer plug-and-play options. Plug-and-play T8 lamps operate with the fixture's existing fluorescent ballast, so no rewiring is necessary. The direct wire LED tubes run off of the line voltage that flows straight to the sockets. With this option the fixture's ballast must be bypassed and removed. Direct wire LED tube lights were traditionally wired at just one end and required the use of non-shunted tombstones only. Double-ended LED tubes, these tube light bulbs are wired at both ends to utilize non-shunted or shunted lamp holders. If you're not sure which installation method is right for you, there is also a third option. Hybrid LED tubes these can use either installation method, so it can plug in directly to the fluorescent fixture and work with a compatible ballast when first installed. Then, once the life of the ballast has run out, you can bypass the ballast without needing a new lamp. Check the Ballast Compatibility PDF to help you find the correct fluorescent replacement tubes. Because fluorescent ballasts use a small amount of electricity, direct wire LED tubes offer more in energy savings over the life of the light bulb compared to ballast compatible LED tubes. LED tubes are an excellent way to retrofit fluorescent fixtures without having to replace the entire housing. Depending on the manufacturer, these lights may be called type A, type B, or type A/B.

- Type A: These are ballast compatible lamps, but not every LED tube will be compatible with all ballasts. When replacing fluorescent tubes, make sure to check the Ballast Compatibility PDF on the LED tube product page prior to purchase.
- Type B: Direct wire lamps that are not ballast compatible. These tubes require the ballast to be disconnected and removed from the fixture prior to installation. These lamps are wired directly to line voltage and often require non-shunted sockets, so you may need to change the sockets at the same time.
- Type A/B: Hybrid T8 linear tubes. Similar to type A tubes, these lamps are not compatible with all ballasts. Check the Ballast Compatibility PDF or spec sheet for a full list of fluorescent ballasts that are compatible with these LED tube lights. Alternatively, these tubes can also be used as a direct wire tube which makes these a flexible option. Check the installation instructions or confirm with a licensed electrician if you choose to bypass the ballast.



California
Rural Water Association

Table 1: Loyaltan Wastewater Lighting Analysis

Lighting Location	Existing Lamp Type	Existing Lamp Count	*Actual Watts per Luminary	Total Watts	Total kW	**Hours On per Year	kWh per year	Cost per kWh (\$)	Annual Power Cost	Replacement Luminary	Actual Watts per Luminary	Total kW	kWh per Year	Energy Savings (kWh)	Cost per Year	Annual Savings	Unit Cost of Retrofit	***Total Cost of Retrofit	ROI (months)
Control Room	4ft - Fluorescent Tube, T12 (3Tube)	12	40	480	0.480	2340	1123	\$ 0.1759	\$ 197.57	PLT LED T8, 2300 Lumen, 5K, #LBPF2350B	18	0.216	505	618	\$ 88.91	\$ 108.66	\$ 4.25	\$ 51.00	6
Storage Room	4ft - Fluorescent Tube T12	10	40	400	0.400	2340	936	\$ 0.1759	\$ 164.64	PLT LED T8, 2300 Lumen, 5K, #LBPF2350B	18	0.180	421	515	\$ 74.09	\$ 90.55	\$ 4.25	\$ 42.50	6
Storage Room (24/7)	4ft - Fluorescent Tube T12	2	40	80	0.080	8760	701	\$ 0.1759	\$ 123.27	PLT LED T8, 2300 Lumen, 5K, #LBPF2350B	18	0.036	315	385	\$ 55.47	\$ 67.80	\$ 4.25	\$ 8.50	2
Office	4ft - Fluorescent Tube T12	6	40	240	0.240	2340	562	\$ 0.1759	\$ 98.79	PLT LED T8, 2300 Lumen, 5K, #LBPF2350B	18	0.108	253	309	\$ 58.13	\$ 40.66	\$ 4.25	\$ 25.50	8
Shop	4ft - Fluorescent Tube T8	24	32	768	0.768	8760	6728	\$ 0.1759	\$ 1,183.40	PLT LED T8, 2300 Lumen, 5K, #LBPF2350B	18	0.432	3784	2943	\$ 665.66	\$ 517.74	\$ 4.25	\$ 102.00	2
Exterior	Wall Packs	6	150	900	0.900	4380	3942	\$ 0.1759	\$ 693.40	AC LED, 3000 Lumen, 5K, #AC106135/1 OL	37	0.222	972	2970	\$ 171.04	\$ 522.36	\$ 81.99	\$ 491.94	11
Totals		24		2868	2.868		13,991		\$ 2,463.07			3.194	6,251	7,740	\$ 1,113.29	\$ 1,347.77		\$ 721.44	6

*Actual Watts per Luminary based on industry information for Lamp Wattage plus Watts for Ignitor or Ballast
 ** Hours ON per Year based on Operator Report
 *** Total Cost of Retro-fit does NOT INCLUDE Labor Costs to Remove existing Luminaries and Replace with LED Luminaries
 MH= Metal Halide
 D/D = Dusk to Dawn @ 4380 Hrs

Trending Searches [\\$5.99/ea LED T8 Tubes](#) [175W MH Equal LED Wall Pack Only \\$75.00](#) [Standard Shaped LEDs only \\$0.99/ea](#)
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4 ft. T8 LED Tube - 2400 Lumens - 18W - 5000 Kelvin

Works with Electronic Ballasts - No Rewiring - Plug and Play - 120-277V - Case of 25 - TCP 88LT800008

120V - 277V

Lighting can be confusing!**Expert Help - Call Now**
1-972-525-0501

- Produces a 2400 Lumen output with a 5000K daylight white color temperature
- Can be used with totally enclosed fixtures and damp located areas
- Features a bright 310-degree light beam spread
- Instant-on light with no delay

[View More Details](#)



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View the add-ons that match this product

\$4.75 ea.

Sold **only** by the Case of 25
for **\$118.75**

Quantity

PRODUCT DETAILS

ADD-ONS

REVIEWS

FAQ'S

Brochures & Spec Sheets

 TCP 88LT800008 Specs and Ballast Compatibility

 TCP 88LT800008 Warranty

Brand	TCP
MPN (Part No.)	88LT800008
UPC	194019000073
Base Type	Medium Bi-Pin
Bulb Shape	T8
Case Quantity	25
Compatibility	Instant Start
Lens	Glass
Operation	Plug and Play
Warranty	5 Years
Dimmable	No
Lampholder(s)	Shunted
Life Hours	50,000

Wattage	18 Watt
Color Temperature	5000 Kelvin
Length	47.8 in.
Diameter	1.1 in.
DLC Listed	No
CRI	80
Lumens	2,400
Coating	N/A
Fluorescent Equal	32 Watt
Voltage	120/208/240/277
Safety Rating	UL Damp Location
California Approved	Exempt
System Wattage	21

Description

Upgrade 32-Watt fluorescent tubes to 18-Watt LED tubes and save up to 40 percent on energy consumption. The TCP 88LT800008 LED lamps operate with your existing ballast without having to worry about changing the whole fixture or rewiring, saving you time and money on a professional electrician.

- Produces a 2400 Lumen output with a 5000K daylight white color temperature
- Can be used with totally enclosed fixtures and damp located areas
- Features a bright 310-degree light beam spread
- Instant-on light with no delay

Note: See Ballast Compatibility Chart prior to ordering.



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Direct8™
LED



LED T8 Tube

(Direct Replacement)

TCP has a new generation of LED compatible replacement T8 tubes for linear fixtures. These T8 tubes are compatible with instant start ballasts.

Limitless Options
for the following applications:

- Offices
- Restaurants
- Retail Stores
- Lobbies
- Schools
- Hospitals



5 YEAR WARRANTY



we know light.™



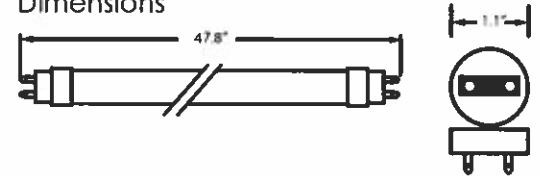
Features and Benefits

- >50% energy savings (based on T8 NBF energy use);
- Long 50,000 hour rated life— minimizes replacements and labor costs;
- Compatible with Instant Start ballasts and most traditional fluorescent ballasts;
- No rewiring of fixture— simply replace fluorescent lamp with LED lamp;
- Instant on/off;
- No mercury— great for all environments;
- Rated for enclosed fixtures;
- No UV.

LED T8 Tube
4 foot



Dimensions



Specifications

Item#	Model	Voltage	Actual Power Consumption	Lumens	CRI	Power Factor	Color Temp.	Min Starting Temp.	DIM/ND	Length	Weight	Lifespan	Cert
TCP-10196	T80425	120-277V (Ballast)	15W	2000lm	>80	>0.9	4100K	-20 C / -5 F	ND	1,213.6mm	190g±5%	50,000 hrs	ETL
TCP-10197	T80425	120-277V (Ballast)	15W	2000lm	>80	>0.9	5000K	-20 C / -5 F	ND	1,213.6mm	190g±5%	50,000 hrs	ETL
TCP-10198	T80433	120-277V (Ballast)	18W	2400lm	>80	>0.9	4100K	-20 C / -5 F	ND	1,213.6mm	190g±5%	50,000 hrs	ETL
TCP-10199	T80433	120-277V (Ballast)	18W	2400lm	>80	>0.9	5000K	-20 C / -5 F	ND	1,213.6mm	190g±5%	50,000 hrs	ETL

NOTE: Use shunted sockets for Instant Start ballasts.

*Calculated **At 120v, ballast dependent

Listing

- ETL Listed – damp location rated
- Approved for open and enclosed fixtures

Warranty

Five years against defects in manufacturing



5 YEAR WARRANTY



**DIRECT8™
LED Tube
Ballast
Compatibility
Guide**

Manufacturer	Series	Model	Voltage
General Electric		GE132MAX-L/ULTRA	UNIV
		GE132MAXP-N/ULTRA	UNIV
		GE232MAX347-N	347
		GE232MAX-N/ULTRA	UNIV
		GE232MAX-G-N/ULTRA	UNIV
		GE232MAXP-H/ULTRA	UNIV
		GE332MAXP-H/ULTRA	UNIV
		GE332MAXP-N/ULTRA	UNIV
		GE332MAX-L/ULTRA	UNIV
		GE332MAX-G-N	UNIV
	GE432MAX347-N	347	
Osram	QHE	2x32T8/ISN-SC	UNIV
	QHE	2x32T8/ISN-SC	347
Philips	Advance	GOPA-2P32-SC	347
	Advance	GOPA-4P32-SC	347
	Advance	ICN-2P32-N	UNIV
	Advance	ICN-3P32-N	UNIV
	Advance	ICN-4P32-N	UNIV
	Advance	IOP-2P32-LW-N	UNIV
	Advance	IOP-3P32-N	UNIV
	Advance	IOPA-4P32-LW-N	UNIV
	Advance	IOPA-4P32-LW-SC	UNIV
	Advance	IOPA-4P32-N	UNIV
TCP		E2P32ISUNVE	UNIV
		E2P32ISUNVHE	UNIV
		E2P32ISUNVLE	UNIV
		E3P32ISUNVE	UNIV
		E3P32ISUNVHE	UNIV
		E3P32ISUNVLE	UNIV
		E4P32ISUNVE	UNIV
		E4P32ISUNVHE	UNIV
		E4P32ISUNVLE	UNIV
Universal Lighting Technologies	Triad	B132IUNVHP-N	UNIV
	Triad	B232IUNVHP-N	UNIV
	Triad	B332IUNVHP-A	UNIV
	Triad	B432IUNVHP-A	UNIV
	Triad	B232I347HP-A	347
	Triad	B432I347HP-000C	347
IOTA		I-320 IOTA EMERGENCY BALLAST	

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**LED Wall Pack with Photocell - 37 Watt
- 3000 Lumens**

Equal to a 100W MH and Uses 63% Less Energy
- 5000 Kelvin - 120-277V - Bronze Finish - AC
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Lighting can be confusing! **Expert Help -
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- Features single-output channel, class 2 LED driver
- Durable industrial grade aluminum housing
- UL listed for outdoor wet locations
- Rated life of up to 50,000 hours
- Includes photocell sensor

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\$81.99 ea.

Retail Price \$89.99

Quantity



SKU: LEDF-AC1001B

\$95.84

PRODUCT DETAILS

ADD-ONS

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 [AC Electronics AC106/35/1.0L Spec Sheet](#)

Brand	AC Electronics
MPN (Part No.)	AC106/35/1.0L
Sensor Type	Photocell
Case Quantity	1
Finish	Bronze
Housing	Aluminum
Lens	Prismatic Glass
Mounting	Industrial-Grade Aluminum LED Drive Bracket
Warranty	5 Years
Weight	7 lb.
Life Hours	50,000
Wattage	37 Watt
Color Temperature	5000 Kelvin

Length	8.2 in.
Height	8.2 in.
Width	12.5 in.
DLC Listed	No
IP Rating	N/A
Lumens	3,000
Metal Halide Equal	100 Watt
Voltage	120/208/240/277
Safety Rating	UL
Max. Ambient Temperature (Celsius)	45 Deg. C
Assembled in the USA	Yes
Lumens per Watt	81

Description

Save up to 63% in electrical costs when switching to the energy efficient AC Electronics AC106/35/1.0L LED wall pack. This 37-Watt wall pack emits 3000 lumens of bright daylight white light, making it an excellent choice for security lighting, exterior entrances, or landscape lighting.

- Features single-output channel, class 2 LED driver
- Durable industrial grade aluminum housing
- UL listed for outdoor wet locations
- Rated life of up to 50,000 hours
- Includes photocell sensor

Calculations based on 2,750 Lumen average for a 100W MH fixture.



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LED Traditional Wall Pack 3000 Lumens with Light Sensor

8.2"H x 12.5"W x 8.2"D



Made In USA

AC Electronics LED Retrofit Kit + Housing vs. Standard HID Lights

Wall Pack Light Source	Input Wattage	Lifespan Hrs/Yrs	Energy Use (24hrs/day) Annual	Annual Cost (maintenance + electricity) @ \$0.11/kWh	Electrical Cost Savings
HID	165	24,000/ 2.7	1446 kWh	\$159.00	
LED	37	50,000/ 5.7	324 kWh	\$35.65	78%

Model Number AC106/35/1.0L

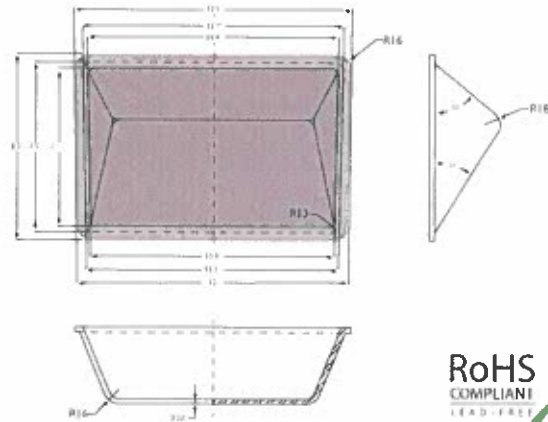


Light Sensor



Includes:

- Single-Output Channel, Class 2 LED Driver, Model Number: AC-35C1.0AUA
- 1 PCB LED Array with 10 LEDs mounted to industrial grade aluminum LED bracket



Specifications

Item	Specification
Input Voltage	120-277V, 50/60 Hz
Fixture CRI	74
LED Color Temperature	5000K
Fixture Lumens	3000
Fixture Efficacy	80 lumen/Watt
Lumen Maintenance	≥79% @ 5 years
Zonal Lumen Performance	Not Measured
Warranty	7 years*
LED Quantity (Brand: Samsung LH351B)	10
LED TMP Temperature @ 25°C	81.5°C
Input Power	37W
Driver Efficiency	84%
Power Factor @ 277V	>0.9
THD @ 277V	<20%
Driver TMP @ 25°C ambient	57°C
Noise	<24dB
EMI	FCC part 15
Max Operating Temperature	45°C Ambient
Min Operation Temperature	-40°C Ambient
Fixture Dimensions/Weight	8.2"H x 12.5"W x 8.2"D /7lbs

Warranty

* AC warrants to the purchaser that this fixture will be free from defects in material or workmanship for a period of 5 years from date of manufacture, when operated at a maximum ambient temperature of 110°F or 45°C, when properly installed and under normal conditions of use.

The warranty excludes damage resulting from improper installation or damage caused by fire or severe weather conditions including, but not limited to, lightning and storms. Evidence of direct exposure to water on the failed units voids the warranty.

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About the Programs

USDA Rural Development's Community Programs help create and maintain strong, vibrant rural communities through investments in essential public services and infrastructure projects. Eligible applicants include public bodies, nonprofits and federally-recognized tribes, and population limits vary by program. For complete details on our Community Facilities or Water and Wastewater programs visit us online at www.rd.usda.gov/ca or contact one of our staff near you.

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Tracy Smith

From: Kathy LeBlanc [ofclerk-cityofloyalton@psln.com]
Sent: Friday, June 07, 2019 9:03 AM
To: bkkpr1-cityofloyalton@psln.com
Subject: FW: New Building

From: Bryan Davey [<mailto:bdavey@sierracounty.ca.gov>]
Sent: Friday, June 07, 2019 8:01 AM
To: ofclerk-cityofloyalton@psln.com
Subject: New Building

We had previously received permission from the City to remodel the Wellness Center on Front Street utilizing the County planning and building process, we issued the building permit and followed our planning process for this project but unfortunately we were not able to find a contractor willing to complete the work at a reasonable price. As a result the Health Department has abandoned the remodel project and made a decision to purchase a modular building to be installed next to the Main office at 704 Mill Street. We would like to utilize the County planning and building process for this project as well and are requesting the City's permission to proceed with this project utilizing a County building permit.

Thank you for your consideration of this request.

Bryan Davey

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