31.8 Installation of PRCB - The installation of PRCB shall comply with Section 306-10 of the Greenbook Specifications, except as follows:

Earthwork shall conform to Section 14 of these Detailed Specifications and the paylines shown on the drawings.

Filter Material shall be used in place of Leveling Bed Material. Filter Material shall be installed, measured and paid for as described in Section 14 of these Detailed Specifications, within the paylines shown on the drawings.

The finishing of joints shall be in accordance with Section 306-10.6 of the Greenbook Specifications with the exception that preformed flexible joint sealant shall NOT be used to fill the joint annular space on the inside of the PRCB Section. The interior annular space of all joints shall be filled with concrete or mortar as otherwise required per the Greenbook Specifications, and troweled smooth so that the PRCB will form a continuous conduit with a smooth uniform interior surface. Tongue and groove ends of the PRCB shall be free from any deleterious substance or condition, which might prevent a satisfactory mortar at the joint.

External Sealing Bands shall be installed on top of the PRCB joints as shown on the Greenbook Specifications.

31.9 12'W x 5'H Precast Reinforced Concrete Box (PRCB) - The contract item 12'W x 5'H Precast Reinforced Concrete Box (PRCB) includes the complete furnishing and installation of the 12'W x 5'H PRCB as specified, exclusive of Earthwork and Filter Material.

31.10 Measurement - Measurement for payment of the contract item 12'W x 5'H Precast Reinforced Concrete Box (PRCB) will be the number of lineal feet installed as specified measured along the centerline of the box in place including curves.

31.11 Payment - The contract price paid for the 12'W x 5'H Precast Reinforced Concrete Box (PRCB) shall include full compensation for all costs incurred under this section.

SECTION 32 – CONTAMINATED GROUNDWATER AND SOIL MANAGEMENT

32.1 Description - This section covers the contract items Groundwater Investigation; Soil and Groundwater Management Safety Plan (SGMSP); Groundwater Testing; Contaminated Groundwater Management (without Discharge); Soil Testing; and Contaminated Soil Disposal.

32.2 General - Due to the presence of a former commercial testing facility at 1841 Hillside Avenue in Norco, California (Wyle Laboratories – now owned by Arrow Electronics), several chemicals were used which contaminated the groundwater at and northwest of Wyle Laboratories with chemicals of concern (COCs) including perchlorate, trichloroethylene (TCE), tetrachloroethylene (PCE), N-Nitrosodimethylamine (NDMA), and other volatile organic compounds (VOCs).

The California Department of Toxic Substances Control (DTSC) oversees the environmental cleanup of the onsite and offsite contamination plume from Wyle Laboratories. The Contractor's attention is directed toward DTSC's EnviroStor website which contains the latest groundwater testing results and site cleanup status for Wyle Laboratories:

http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=33730084

This project is located down gradient of the Wyle Laboratories site within the subareas of offsite contamination as described in reports available on the DTSC's EnviroStor website. Geocon West, Inc. prepared a Soil and Groundwater Management Plan (SGMP) on November 6, 2012 for this project to provide guidance for management of potentially contaminated soil and groundwater that may be encountered. The SGMP can be downloaded from http://rcflood.org/Documents/SGMP_200015006.pdf.

Additionally, Geocon prepared a Geotechnical Report for the project dated July 31, 2012 and revised January 2, 2013, which can be downloaded from http://rcflood.org/Documents/Soils_Report_200015006.pdf.

The SGMP indicates that groundwater encountered in this project is likely to be contaminated due to the presence of COCs in the water. Soil is not anticipated to be contaminated based on test results from the SGMP. Regardless, the SGMP also includes contingencies for identification, handling, transportation, and disposal of potentially contaminated soil if encountered.

Groundwater may be encountered at any point throughout the project, but contaminated groundwater is most likely to be encountered within the following reaches (contaminated reaches):

- South Norco Channel, Stage 6 (Station 28+00 to Station 43+00)
- Norco MDP Line S-1, Stage 1 (Entire Length)

The Contractor shall prepare a Soil and Groundwater Management Safety Plan (SGMSP) that will be subject to the Engineer's review and approval. **At a minimum, the SGMSP must be compatible with all sections discussed further below and in compliance with all health and safety, testing, and disposal requirements outlined in the SGMP except that contaminated groundwater will only be allowed to be legally disposed of at an offsite facility, and surplus soil that has not been identified as being potentially contaminated will not be required to be tested by the Contractor unless directed in writing to do so by the District.** The SGMP also provides recommended approaches for handling soil and groundwater that may or may not be contaminated, but the SGMSP can be tailored to the Contractor's preferred construction means and methods. For example, the Contractor may choose to test any encountered groundwater in-situ rather than extract the groundwater first before testing it as the SGMP recommends. The Contractor shall implement the SGMSP throughout the entire project.

Failure of the Contractor to fully comply with the requirements herein and the SGMSP may result in the suspension of construction operations and liability for any

associated monitoring, fines, penalties, and remediation activities related to the discharge or improper handling of contaminated soil and groundwater.

32.3 Groundwater Investigation - The contract item Groundwater Investigation covers all labor, equipment, and incidentals as necessary to investigate and identify, in advance, if excavations proposed for the work will encounter groundwater and to inform the Contractor in adjusting their work plan to optimize work within the contaminated reaches and preparing and/or amending the SGMSP.

The Contractor shall collect five (5) groundwater samples at Stations 28+50, 30+00, 34+50, 37+00 and 42+30 no later than five (5) working days after issuance of Notice to Proceed, within the contaminated reach of South Norco Channel, Stage 6. Each sample shall be collected at 24" below proposed excavation depth for the proposed facility. Additional investigation borings may be performed at the direction of the Engineer. All samples shall be tested pursuant to Section 32.5.

32.4 Soil and Groundwater Management Safety Plan (SGMSP) - The Contractor shall prepare a project-specific SGMSP for the Engineer's review and approval as described in Section 32.2. This contract item includes all costs associated with developing and implementing the SGMSP that are not otherwise covered in the subsequent sections. The SGMSP at a minimum shall include the following:

- Title sheet and table of contents
- Estimated start and end dates for all work within the reaches where potential contamination is expected
- Worker health and safety plan specific to handling contaminated groundwater and soil. The plan shall be in compliance with Cal-OSHA, Santa Ana Regional Water Quality Board, Department of Toxic Substances, and any other applicable federal, state, and local laws
- Identify triggers that may require testing to confirm if soil is contaminated
- Methods, equipment, and materials that will be used to handle, sample, and/or test any encountered groundwater or potentially contaminated soil
- Methods, equipment, and materials that will be used to handle and legally dispose of any groundwater or soil that has been confirmed to be contaminated
- Measures and backup measures that will be taken to ensure that there will be **zero discharge of contaminated groundwater from the construction site**
- Locations of disposal (if applicable) and transport methods and information

The Contractor shall designate a Site Safety Officer (SSO) who will oversee the field activities and be responsible for implementing the SGMSP. The Contractor shall submit the SGMSP for review and approval 14 working days prior to the start of excavation activities.

Once the plan is approved by the Engineer, excavation activities may proceed. The SGMSP will be amended and updated, subject to the Engineer's approval, as necessary during

earthwork activities. After earthwork activities have been completed, the Contractor shall provide a summary report which shall include the following at minimum:

- A summary of activities associated with contaminated soil and groundwater encountered during site development activities, including excavation limits and groundwater volumes (in gallons), field observations and groundwater sampling procedures, health and safety procedures, etc. Reference to the SGMSP will be acceptable if no significant changes are made from the proposed plan
- A site vicinity map indicating locations and depths of groundwater samples
- Waste hauler's manifests for verification of proper disposal of contaminated groundwater
- Documentation of all quantities as applicable to the measurement and payment of items defined herein

32.5 Groundwater Testing - The contract item Groundwater Testing covers all labor, equipment, lab certificates, chain of custody, and incidentals as necessary for the sampling and testing of groundwater if encountered during initial groundwater investigation and during earthwork construction activities. This item shall also include the preparation of summary reports to be provided to the Engineer.

The Contractor shall test at each location where groundwater is encountered, regardless if it is found within the contamination reaches or not, for the following contaminants as listed in the SGMP and per the following EPA test methods:

- VOCs (TCE, PCE, Bromomethane, Chloroform, Trichloroflouromethane, etc.) by EPA Method 8260B
- Perchlorate by applicable EPA test method
- NDMA by applicable EPA test method

Certification(s) shall be from the laboratory where contaminant tests shall be performed. The laboratory shall be California Department of Public Health certified according to industry standard method and QA/QC procedures.

The Contractor shall provide lab results, chain of custody, and groundwater analysis report to the Engineer for review and acceptance.

Groundwater test results will be compared to the screening limits for characterization in Table 1 below.

Table 1: Screening Limits for Potentially Contaminated Groundwater

Chemical of Concern	Screening Limit* (µg/L)
1,1,1-Trichloroethane (TCA)	10
1,1-Dichloroethane	10
1,1-Dichloroethylene	12

1,2-Dichloroethane	1.0
1,2-Dichloroethylene (sum of cis & trans)	20
1,2-Dichloroethylene (cis)	12
1.2-Dichloroethylene (trans)	20
1,4-Dioxane	2
Benzene	2
Carbon Tetrachloride	1.0
Dichlorobromomethane	10
Ethylbenzene	20
Methyl Ethyl Ketone	241
Methyl Isobutyl Ketone	241
Methyl Tertiary Butyl Ether (MTBE)	26
Naphthalene	20
Perchlorate	12
Tert Butyl Alcohol (TBA)	24
Tetrachloroethene (PCE)	10
Toluene	20
Total Petroleum Hydrocarbons	200
Trichloroethylene (TCE)	10
Vinyl Chloride	1.0
Xylene (total)	20

*Screening limits for all chemicals are per the Maximum Daily Concentration Limits defined in *Effluent Limitations Applicable Into or Tributary to MUN Excepted Receiving Waters* as listed in Order No. R8-2012-0027 and adopted by the Santa Ana Regional Water Quality Control Board.

If the test results indicate that the groundwater is below all screening limits listed in Table 1, the Contractor shall be allowed to either a) use that water for onsite operations such as for Dust Abatement as described in Section 27 of these Detailed Specifications; or b) discharge to surface waters in accordance with the De Minimus Permit, if authorized by the Engineer. Please refer to Section 29 of these Detailed Specifications for further requirements regarding the De Minimus Permit.

If the test results indicate that the groundwater is above the screening limits listed in Table 1, no construction operations affecting the contaminated groundwater will be allowed in the area except pursuant to Section 32.6 below. Groundwater with test results below the screening limits listed above may still be subject to Section 32.6 at the Engineer's discretion.

Additionally, at least one sample from the same soil that contaminated groundwater was in contact with will need to be taken and tested for COCs. Details for soil testing are further described in Section 32.7 below.

32.6 Contaminated Groundwater Management (without Discharge) - The contract item Contaminated Groundwater Management (without Discharge) shall apply when the groundwater test results specified in Section 32.5 are above the screening limits listed in Table 1 or as directed by the Engineer. This item covers all costs (such as, but not limited to, labor, hauling, equipment,

chain of custody, legal disposal, etc., and incidentals, etc.) necessary to legally dispose of the contaminated groundwater per the methods described in the SGMSP. As directed by the Engineer, the Contractor shall dedicate and/or reassign sufficient resources to complete construction in such reaches expeditiously so as to minimize the quantity of groundwater that is required to be disposed. No extra compensation will be provided for such reassignment.

32.7 Soil Testing - The contract item Soil Testing covers all costs associated with testing soil that has been identified as potentially contaminated per triggers identified in the SGMSP, and excavated soil that was in contact with contaminated groundwater.

Soil shall be tested for the contaminants listed in Table 2 and per the applicable EPA test method. This item also includes all costs associated with the Contractor's chosen construction means and methods for conducting such testing. For example, if the Contractor chooses to transport the material away from the excavation and stockpile it for testing, this item includes all costs associated with hauling, loading and unloading (i.e., "double handling"), stockpiling on top of visqueen barrier, protecting and covering the stockpile, etc.

Soil with contaminants exceeding the screening levels in Table 2 shall be removed and disposed of per Section 32.8, or as directed by the Engineer. If testing results show the COCs in the tested soil are below the screening levels in Table 2, the soil may be reused for backfill or exported per Section 14 of these Detailed Specifications as directed by the Engineer.

Table 2: Screening Levels for Potentially Contaminated Soil

Chemical of Concern	Screening Level* (µg/kg)
1,1,1-Trichloroethane (TCA)	7,200,000
1,1-Dichloroethane	16,000
1,1-Dichloroethylene	394,000
1,2-Dichloroethane	2,000
1,2-Dichloroethylene (cis)	82,000
1.2-Dichloroethylene (trans)	600,000
1,4-Dioxane	24,000
Benzene	5,100
Carbon Tetrachloride	2,900
Dichlorobromomethane	1,300
Ethylbenzene	25,000
Methyl Ethyl Ketone	136,973,000
Methyl Isobutyl Ketone	25,864,000
Methyl Tertiary Butyl Ether (MTBE)	210,000
Naphthalene	17,000
Perchlorate	248,000
Tert Butyl Alcohol (TBA)	N/A
Tetrachloroethene (PCE)	33,000
Toluene	4,097,000
Total Petroleum Hydrocarbons	N/A

Trichloroethylene (TCE)	6,000
Vinyl Chloride	1,700
Xylene (total)	2,362,500
N-Nitrosodimethylamine (NDMA)	34

*Screening levels for all chemicals are the minimum of the San Francisco Bay RWQCB's published Environmental Screening Levels for a construction worker exposed to any depth of soil in any land use, the EPA's Regional Screening Levels for Industrial Soil, or the DTSC's Human and Ecological Risk Office (HERO) Note Number 3 modified screening levels.

32.8 Contaminated Soil Disposal - The contract item Contaminated Soil Disposal shall apply when the soil test results specified in Section 32.7 are above the screening limits in Table 2 and as directed by the Engineer. This item covers all costs, including labor and equipment necessary for segregating, hauling, chain of custody, and proper legal disposal including tipping fees of the contaminated soils per the SGMSP, provided that the constituents contaminating the soil are those identified in the SGMP. If soil is discovered that is contaminated with other unrelated constituents, such soil removal will be addressed as Extra Directed Work.

32.9 Measurement - Measurement for payment for the contract item Groundwater Investigation; Groundwater Testing; and Soil Testing will be per the number of locations tested.

Measurement for payment for the contract item Contaminated Groundwater Management (without Discharge) will be the number of gallons of contaminated water disposed of per the SGMSP.

Measurement for payment for contract item Contaminated Soil Disposal will be the number of cubic yards hauled off to the disposal site.

No measurement will be made for the contract item Soil and Groundwater Management Safety Plan (SGMSP), which shall be paid as a lump sum upon approval of the submittal by the Engineer.

32.10 Payment - The contract prices paid for the contract items Groundwater Investigation; Soil and Groundwater Management Safety Plan (SGMSP); Groundwater Testing; Contaminated Groundwater Management (without Discharge); Soil Testing; and Contaminated Soil Disposal shall include full compensation for all costs incurred under this section.

APPENDIX "A"

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

RULE 403

(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)
(Amended June 3, 2005)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) COMMERCIAL POULTRY RANCH means any building, structure, enclosure, or premises where more than 100 fowl are kept or maintained for the primary purpose of producing eggs or meat for sale or other distribution.

(10) CONFINED ANIMAL FACILITY means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including horses, sheep, goats, swine, beef cattle, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(11) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(12) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(13) DAIRY FARM is an operation on a property, or set of properties that are contiguous or separated only by a public right-of-way, that raises cows or

produces milk from cows for the purpose of making a profit or for a livelihood. Heifer and calf farms are dairy farms.

(14) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(15) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(16) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(17) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(18) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(19) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(20) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(21) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic

meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(22) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(23) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(24) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(25) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(26) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(27) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(28) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(29) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(30) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange

County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(31) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(32) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(34) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(35) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(36) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(37) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(6) Beginning January 1, 2006, any person who operates or authorizes the operation of a confined animal facility subject to this Rule shall implement the applicable conservation management practices specified in Table 4 of this Rule.

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation

Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Dairy farms.

(B) Confined animal facilities provided that the combined disturbed surface area within one continuous property line is one acre or less.

(C) Agricultural vegetative crop operations provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(D) Agricultural vegetative crop operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(E) Agricultural vegetative crop operations outside the South Coast Air Basin whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(K) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

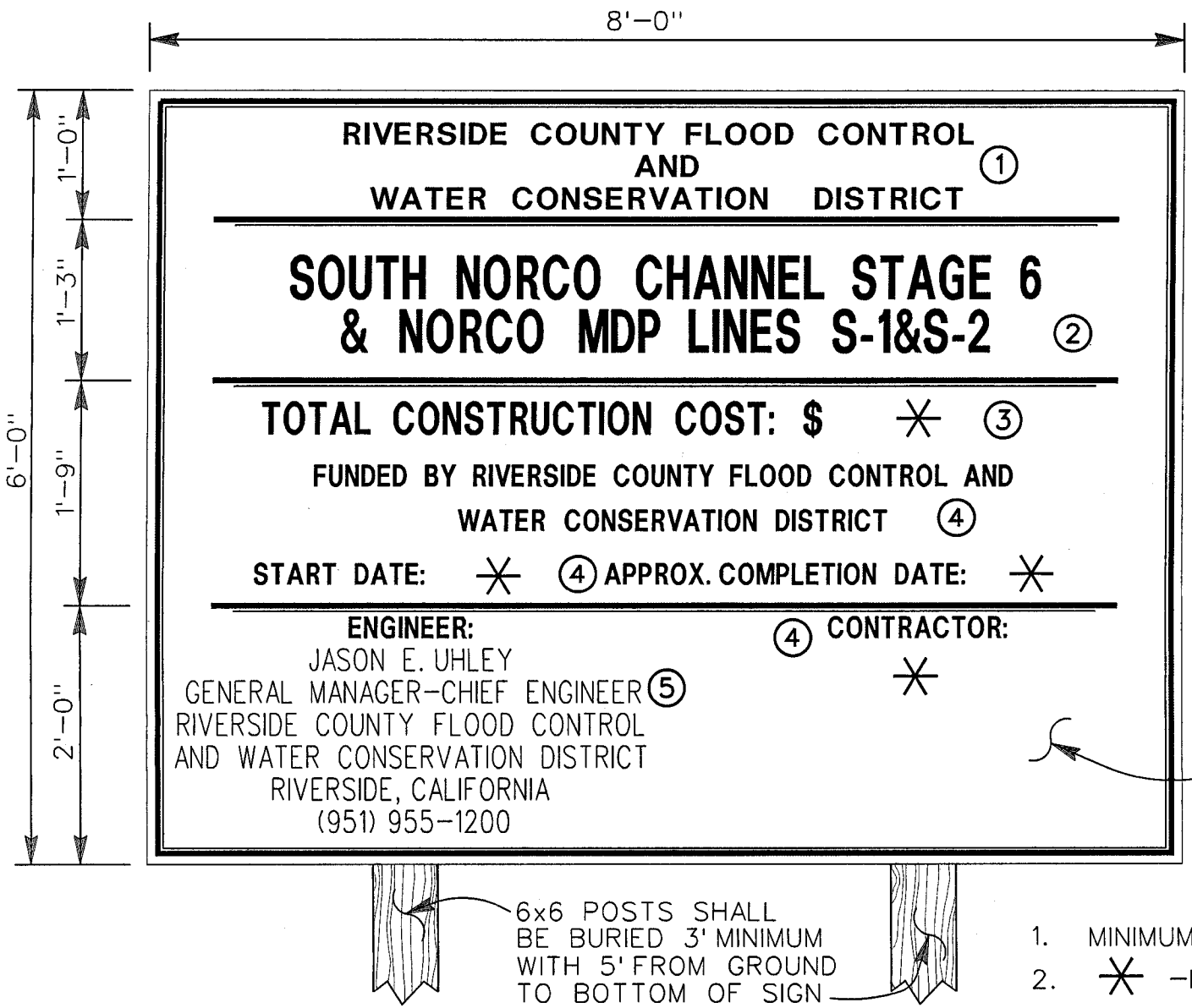
FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling **(Only applicable to Commercial Poultry Ranches)**	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	(3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	(4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	(5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

APPENDIX "B"

PROJECT SIGNS



LETTER SCHEDULE

	SIZE	COLOR
1	2"	BLACK
2	4"	ROYAL
3	3"	ROYAL
4	2"	ROYAL
5	2"	BLACK

APPENDIX "B" PROJECT SIGN

NOTES:

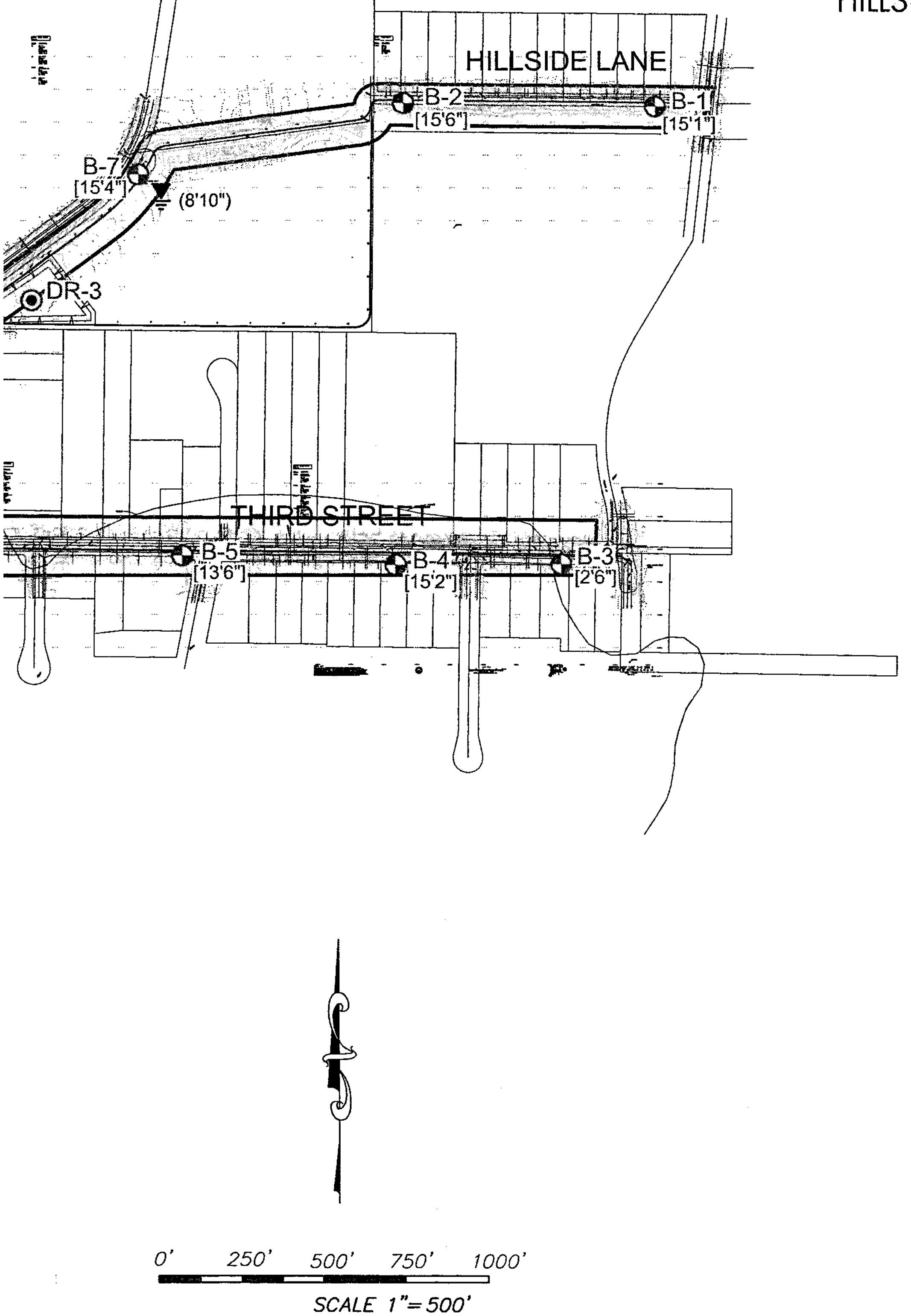
1. MINIMUM SPACING BETWEEN LINES 1".
2. ✳ -INFO. FURNISHED BY ENGINEER
3. ALL LETTERS FILLED AND CENTERED
4. THE STRIPES ARE GOLD AND BLACK ON WHITE BACKGROUND.

APPENDIX "C"

LOG OF SOIL BORINGS
GEOTECHNICAL REPORT

NOTICE: The geotechnical report is included herein for informational purposes only. This report was not prepared for purposes of bid development. It was produced to assist the design engineer regarding overall project feasibility and to make recommendations regarding some design parameters. Contractors are encouraged to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer.

HILLSIDE LANE, THIRD STREET, AND TEMESCAL ROAD
NORCO, CALIFORNIA



GEOCON LEGEND

B-16 ....APPROX. LOCATION OF GEOTECHNICAL BORING

DR-3 ....APPROX. LOCATION OF DOUBLE RING INFILTRATION TEST

[30'6"]........APPROX. TOTAL DEPTH OF BORING

........APPROX. DEPTH OF SEEPAGE

........APPROX. DEPTH OF GROUNDWATER

........APPROX. LOCATION OF SITE BOUNDARY

GEOCON
WEST, INC.

PROJECT NO. T2521-22-01

BORING B-1

ELEV. (MSL.) 698 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					3" ASPHALT CONCRETE			
				SM				
	B1@1			SC	**UNDOCUMENTED FILL (Qudf)** Silty SAND, poorly graded, medium dense, moist, dark reddish brown, fine- to medium-grained, some coarse sand, trace clay, trace mica	24	124.6	9.2
2	B1@1-5							
	B1@3				**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Clayey SAND, poorly graded, medium dense, moist, dark reddish brown, fine-to medium-grained, some silt -becomes dense, some pinhole porosity	65	128.7	9.8
4								
	B1@5			ML	Sandy SILT, hard, moist, light reddish brown, some medium to coarse sand	90/11.5"	122.9	12.6
6								
	B1@7			SM	Silty SAND, poorly graded, very dense, moist, yellowish brown, fine- to medium-grained, some coarse sand	50/2.5"	123.7	9.3
8								
10	B1@10				-granitic derived sand, brownish red, fine- to coarse-grained -becomes well graded, brownish gray, trace mica	50/3"		
12								
14								
	B1@15				-no recovery	50/1"		

Total depth: 15'1"
No groundwater
No caving
Backfilled with cuttings

Figure A-1,
Log of Boring B-1, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

BORING B-2

ELEV. (MSL.) 679 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SM	1 1/2" ASPHALT CONCRETE			
	B2@1			CL	**UNDOCUMENTED FILL (Qudf)** Silty SAND, poorly graded, medium dense, moist, dark brown, fine- to medium-grained, some coarse sand	22	125.2	11.7
2								
	B2@3			SC	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Sandy CLAY, firm, moist, reddish brown, some coarse sand	68	129.7	10.8
4					Clayey SAND, poorly graded, dense, moist, light reddish brown, fine- to medium-grained, some coarse sand, trace mica, no porosity			
	B2@5				-becomes medium dense	46	130.9	9.6
6								
	B2@7			CL	Sandy CLAY, stiff, moist, reddish brown, fine- to medium-grained, some mica	38		
8								
10	B2@10			SM-SC	Silty SAND to Clayey SAND, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained, some mica	46		
12								
14								
	B2@15			SC	Clayey SAND, poorly graded, dense, moist, reddish brown, fine- to medium-grained, some coarse sand, trace mica, no porosity, olive brown sandy clay in the shoe	80		
					Total depth: 15'6"			
					No groundwater			
					No caving			
					Backfilled with cuttings			

T2521-22-01 LOGS.GPJ

Figure A-2,
Log of Boring B-2, Page 1 of 1

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	BORING B-3 ELEV. (MSL.) 698 DATE COMPLETED 5/25/12 EQUIPMENT HOLLOW STEM AUGER BY: PDT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**4" ASPHALT CONCRETE ON 5" BASE**			
				SM	**UNDOCUMENTED FILL (Qudf)** Silty SAND, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained, some coarse sand			
2					Encountered unmarked PVC pipe (white), pipe not broken, hole abandoned Total depth: 2'6" hole abandoned due to unmarked utility No groundwater No caving Backfilled with cuttings			

Figure A-3,
Log of Boring B-3, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS	☐ ... SAMPLING UNSUCCESSFUL	◧ ... STANDARD PENETRATION TEST	■ ... DRIVE SAMPLE (UNDISTURBED)
	⊠ ... DISTURBED OR BAG SAMPLE	◪ ... CHUNK SAMPLE	▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

BORING B-4

ELEV. (MSL.) 689 DATE COMPLETED 5/25/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**5" ASPHALT CONCRETE**			
				SC	**UNDOCUMENTED FILL (Qudf)** Clayey SAND, well graded, medium dense, moist, reddish brown, fine- to coarse-grained			
2	B4@2.5			SC	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Clayey SAND, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained, some coarse sand -becomes moist, trace olive mottling	20	123.1	12.8
4	B4@5					41		
6				SM	Silty SAND, poorly graded, medium dense, moist, mottled olive and reddish brown, carbonates			
8	B4@7.5			SC-CL	Clayey SAND to Sandy CLAY, hard, moist, olive with some reddish brown mottling	86/9"	124.5	10.2
10	B4@10				**GRANITIC BEDROCK (Kcg)** Monzogranite, weathered, medium-grained, reddish, grayish brown, friable, excavates as a medium-grained sand	50/2"		
12								
14								
	B4@15				-no recovery, becomes less weathered	50/2"		

Total depth: 15"2"
No groundwater
No caving
Backfilled with bentonite grout

Figure A-4,
Log of Boring B-4, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▮ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

BORING B-5

ELEV. (MSL.) 676 DATE COMPLETED 5/25/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					5" ASPHALT CONCRETE ON 6" BASE			
2	B5@2.5			SM	VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa) Silty SAND, poorly graded, dense, moist, brownish red, fine- to medium-grained, some coarse sand	63	129.1	10.1
4								
6	B5@5				-becomes reddish brown, trace carbonates	54		
8	B5@7.5					44	132.2	8.3
10	B5@10				-becomes fine- to coarse-grained, some clay	45		
12								
	B5@13					45		
					Total depth: 13'6" No groundwater No caving Backfilled with bentonite grout			

Figure A-5,
Log of Boring B-5, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-6

ELEV. (MSL.) 660 DATE COMPLETED 5/25/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**5" ASPHALT CONCRETE ON 5" BASE**			
2	B6@1-4			SC	**VERY OLD ALLUVIAL CHANNEL DEPOSITS (Qvoa)** Clayey SAND, poorly graded, medium dense, moist, gray brown, fine- to medium-grained, some coarse grains, micaceous, some silt			
	B6@2.5					28	123.9	12.9
4				SM	Silty SAND, well graded, very dense, moist, olive with reddish brown mottling, fine- to coarse-grained, micaceous			
6	B6@5					50/5"	117.7	16.9
8	B6@7.5				-becomes reddish brown with some olive mottling, trace fine gravel	96		
10	B6@10		▽		-becomes dense, seepage at 10'	56		

Total depth: 10'6"
Seepage at 10'
No caving
Backfilled with bentonite grout

Figure A-6,
Log of Boring B-6, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▩ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◪ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

BORING B-7

ELEV. (MSL.) 667 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					Grass (School playground)			
				CL	**UNDOCUMENTED FILL (Qudf)** Sandy CLAY, poorly graded, moist, dark brown, fine-grained			
2	B7@2.5				-some medium sand, trace coarse sand	25		
4				SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, medium dense, moist, mottled reddish brown and olive, fine- to medium-grained, trace carbonates			
6	B7@5.5					52		
8	B7@7.5		▼	ML	Sandy SILT, stiff, moist, mottled reddish brown and olive, fine-grained, some carbonates	34	108.2	22.2
10	B7@10			SM	Silty SAND, poorly graded, dense, wet, mottled reddish brown and olive, fine- to medium-grained, some carbonates	65		
12					-becomes very dense, olive, fine- to coarse-grained, micaceous			
14	B7@15				-cobble in shoe	50/4"	113.3	18.3

Total depth: 15'4"
Groundwater at 8'10"
No caving
Backfilled with cuttings

Figure A-7,
Log of Boring B-7, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-8

ELEV. (MSL.) 662 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	B8@1-4			SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained, some coarse sand			
2	B8@2.5					27		
4								
	B8@5			SC	Clayey SAND, poorly graded, dense, moist, brownish olive, fine- to medium-grained, trace carbonates	63		
6								
	B8@7.5			SM-SC	Silty SAND to Clayey SAND, poorly graded, very dense, moist, olive, fine- to coarse-grained, coarse sand is white, trace carbonates	50/3"		
8								
10	B8@10				-sand is granitic derived	50/4"		
12								
14								
	B8@15				-no recovery	50/3"		

Total depth: 15'3"
No groundwater
No caving
Backfilled with cuttings

Figure A-8,
Log of Boring B-8, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ... SAMPLING UNSUCCESSFUL
- ... STANDARD PENETRATION TEST
- ... DRIVE SAMPLE (UNDISTURBED)
- ... DISTURBED OR BAG SAMPLE
- ... CHUNK SAMPLE
- ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

BORING B-9

ELEV. (MSL.) 654 DATE COMPLETED 5/25/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B9@2.5			SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, loose, moist, reddish brown, fine- to medium-grained, some mica	12	119.7	12.9
4								
6	B9@5				-becomes very dense, some carbonates	50/3"		
8	B9@7.5			SM-SC	Silty SAND to Clayey SAND, poorly graded, very dense, moist, mottled reddish brown and olive, fine- to medium-grained, some coarse sand, trace mica, trace carbonates	50/5"	115.4	15.5
10	B9@10			CL	Sandy CLAY, poorly graded, hard, moist, reddish brown, fine- to medium-grained, micaceous	77		
12								
14				SM	Silty SAND, poorly graded, medium dense, moist, reddish brown, fine-grained, micaceous, some mafic staining			
	B9@15					49		

Total depth: 15'6"
Groundwater at 13'1"
No caving
Backfilled with bentonite grout

T2521-22-01 LOGS.GPJ

Figure A-9,
Log of Boring B-9, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-10

ELEV. (MSL.) 652 DATE COMPLETED 5/25/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, medium dense, moist, reddish brown, fine- to medium-grained			
2	B10@2.5					16	116.9	14.6
				SC	Clayey SAND, poorly graded, very dense, moist, reddish brown, fine- to medium-grained, some coarse sand, carbonates			
4								
	B10@5					96/10"		
6								
	B10@7.5					96/9"	123.8	12.7
8			▼					
	B10@10					87/11"		
10								
				SP	SAND, poorly graded, medium dense, wet, reddish brown, medium- to coarse-grained, some fine sand, some silt			
12								
14								
	B10@15					27		
					Total depth: 15'6" Groundwater at 9'1" No caving Backfilled with bentonite grout			

Figure A-10,
Log of Boring B-10, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◪ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-11

ELEV. (MSL.) 650 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, medium dense, moist, dark reddish brown, fine- to medium-grained, micaceous			
2	B11@2.5					17		
4								
6	B11@5				-becomes very dense, dark red, some olive mottling, some mafic staining	94/11"	118.3	15.5
8	B11@7.5					50/6"		
10	B11@10				-becomes reddish brown, trace carbonates	50/5"		
12								
14			▽					
	B11@15				-becomes dense, wet, trace clay, micaceous	67		
					Total depth: 15'6" Seepage at 15' No caving Backfilled with cuttings			

Figure A-11,
Log of Boring B-11, Page 1 of 1

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▮ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-12

ELEV. (MSL.) 645 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2				SC	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Clayey SAND, poorly graded, medium dense, moist, brownish red, fine- to medium-grained, some mica			
4	B12@2.5			SM	Silty SAND, poorly graded, medium dense, moist, brownish red, fine- to medium-grained, some mica	40		
6	B12@5			ML	Sandy SILT, hard, moist, reddish brown, some clay, some mafic staining, some olive mottling	50/5"		
8	B12@7.5			ML-CL	Sandy SILT to Sandy CLAY, hard, moist to wet, reddish brown, fine-grained, trace medium sand, some mica, trace carbonates	50/4"		
10	B12@10			SM-SC	Silty SAND to Clayey SAND, poorly graded, dense, moist to wet, reddish brown, fine- to coarse-grained, micaceous, trace gravel	66		
12								
14								
16	B12@15				-increase in coarse sand	66		
18								
20	B12@20			SM	Silty SAND, well graded, very dense, wet, mottled olive and brown, fine- to coarse-grained, some mafic staining, some mica, trace clay	82/11"		
22			▼					
24								
26	B12@25				-increase in silt content	77		
28					-becomes olive, coarse sand is white, trace mica, granitic clast in shoe			

T2521-22-01 LOGS.GPJ

Figure A-12,
Log of Boring B-12, Page 1 of 2

SAMPLE SYMBOLS

☐ ... SAMPLING UNSUCCESSFUL ◧ ... STANDARD PENETRATION TEST ■ ... DRIVE SAMPLE (UNDISTURBED)

▨ ... DISTURBED OR BAG SAMPLE ◪ ... CHUNK SAMPLE ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. T2521-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-12** ELEV. (MSL.) 645 DATE COMPLETED 5/24/12 EQUIPMENT HOLLOW STEM AUGER BY: PDT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B12@30					50/3"		
					Total depth: 30'3" Groundwater at 22'11" No caving Backfilled with cuttings			

Figure A-12,
Log of Boring B-12, Page 2 of 2

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-13

ELEV. (MSL.) 642 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
				SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, dense, moist, mottled olive and reddish brown, fine- to medium-grained, trace coarse sand			
2	B13@2.5				-becomes very dense	50/4"		
4								
6	B13@5			SC-SM	Clayey SAND to Silty SAND, poorly graded, dense, moist, reddish brown, fine- to coarse-grained	57		
8	B13@7.5				-becomes moist to wet, some mafic staining	54		
10	B13@10			SM	Silty SAND, poorly graded, dense, wet, brown with mafic staining, fine- to coarse-grained, common clay	57		
12								
14								
16	B13@15				-becomes very dense	90/11"		
18					-becomes fine-grained, trace medium sand			
20	B13@20		▼	SC	Clayey SAND, poorly graded, very dense, wet, brown, fine-grained, trace medium sand	98/11"		
22								
24								
26	B13@25			SM	Silty SAND, poorly graded, very dense, wet, olive, fine- to medium-grained, some white granitic derived coarse sand	81/3"		
28					-becomes fine-grained, micaceous			

T2521-22-01 LOGS.GPJ

Figure A-13,
Log of Boring B-13, Page 1 of 2

SAMPLE SYMBOLS
- ☐ ... SAMPLING UNSUCCESSFUL
- ▨ ... DISTURBED OR BAG SAMPLE
- ◧ ... STANDARD PENETRATION TEST
- ◣ ... CHUNK SAMPLE
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. T2521-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-13** ELEV. (MSL.) 642 DATE COMPLETED 5/24/12 EQUIPMENT HOLLOW STEM AUGER BY: PDT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
30	B13@30			SP	SAND, poorly graded, very dense, wet, olive, fine- to coarse-grained, some silt, micaceous	50/5"		
					Total depth: 30'6" Groundwater at 20' No caving Backfilled with cuttings			

Figure A-13,
Log of Boring B-13, Page 2 of 2

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2521-22-01

BORING B-14

ELEV. (MSL.) 642 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0		SM	**UNDOCUMENTED FILL (Qudf)**			
		CL	Silty SAND, poorly graded, loose, dry, brown, fine- to medium-grained, trace coarse sand, surface debris (branches, logs)			
2	B14@2.5		**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Sandy CLAY, hard, moist, reddish, yellowish brown, fine-grained	44		
4		SM	-some brown and dark brown mottling			
			Silty SAND, poorly graded, dense, moist, light brown, fine- to medium-grained, trace carbonates			
6	B14@5.5		-becomes very dense, some reddish brown mottling, some mafic staining, common clay	88/11"		
8	B14@7.5		-some clay	84/10"		
10	B14@10	SC	Clayey SAND, well graded, very dense, moist, mottled olive and light reddish brown, fine- to coarse-grained, coarse sand is granitic derived, some silt, trace carbonates	50/5"		
12						
14						
16	B14@15		-decrease in coarse sand	50/5"		
18						
20	B14@20	SM	Silty SAND, poorly graded, very dense, moist, olive and reddish brown, fine- to medium-grained, some coarse sand, some clay, micaceous	92/11"		
		SM	Silty SAND, poorly graded, very dense, moist, reddish brown, fine- to medium-grained, some coarse, some clay, micaceous, some carbonates			
22						
24						
26	B14@25		-increase in coarse sand	50/5"		
		CL	Sandy CLAY, hard, moist, olive, fine- to medium-grained, cuttings are wet at the bottom of the hole			
			-chattering auger at 27'			
			Total depth: 27' due to refusal			
			Groundwater at 24'			
			No caving			

Figure A-14,
Log of Boring B-14, Page 1 of 2

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ▮ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◣ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. T2521-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-14** ELEV. (MSL.) 642 DATE COMPLETED 5/24/12 EQUIPMENT HOLLOW STEM AUGER BY: PDT	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
					Backfilled with cuttings			

Figure A-14,
Log of Boring B-14, Page 2 of 2

T2521-22-01 LOGS.GPJ

SAMPLE SYMBOLS	... SAMPLING UNSUCCESSFUL	... STANDARD PENETRATION TEST	... DRIVE SAMPLE (UNDISTURBED)
	... DISTURBED OR BAG SAMPLE	... CHUNK SAMPLE	... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

PROJECT NO. T2521-22-01

BORING B-15

ELEV. (MSL.) 640 DATE COMPLETED 5/24/12

EQUIPMENT HOLLOW STEM AUGER BY: PDT

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
2	B15@1			SM	**VERY OLD ALLUVIAL FAN DEPOSITS (Qvoa)** Silty SAND, poorly graded, dense, slightly moist, light reddish brown, fine- to medium-grained, some gravel -no gravel, becomes fine-grained	77	118.5	3.6
4	B15@4				-becomes medium dense, moist	21	121.0	8.3
6								
8	B15@7			SC	Clayey SAND, poorly graded, medium dense, wet, mottled reddish brown and light brown	29	116.0	15.8
10	B15@10			SM	Silty SAND, poorly graded, very dense, moist, reddish brown, some mafic staining, trace carbonate	50/2"	122.8	13.5
12								
14								
	B15@15			ML	Sandy SILT, hard, moist, mottled grayish brown and reddish brown, fine-grained, trace mica	89/11"		

Total depth: 15'6"
No groundwater
No caving
Backfilled with cuttings

T2521-22-01 LOGS.GPJ

Figure A-15,
Log of Boring B-15, Page 1 of 1

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ▨ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2521-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**BORING B-16** ELEV. (MSL.) _____ DATE COMPLETED **5/25/12** EQUIPMENT **HOLLOW STEM AUGER** BY: **PDT**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0					**8" ASPHALT CONCRETE**			
					Total depth: 8" Asphalt thickness on Temescal Road			

Figure A-16,
Log of Boring B-16, Page 1 of 1

T2521-22-01 LOGS.GPJ

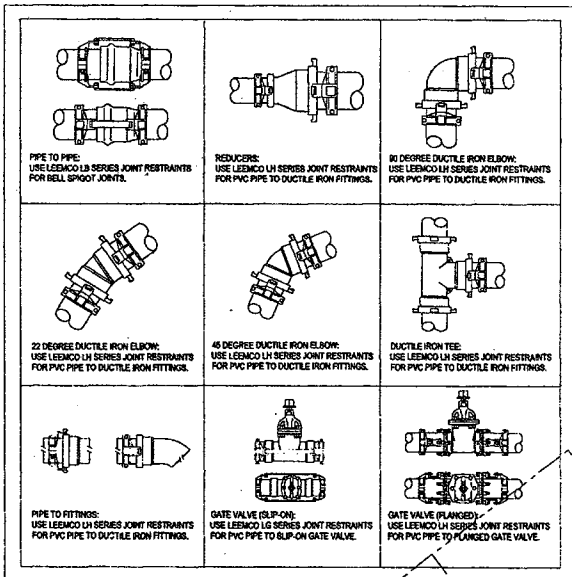
SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◺ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

APPENDIX "D"

SCHOOL DISTRICT RECORD DRAWINGS



PIPE TO PIPE:
USE LEEMCO LB SERIES JOINT RESTRAINTS FOR BELL SPIGOT JOINTS.

REDUCERS:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

90 DEGREE DUCTILE IRON ELBOW:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

22 DEGREE DUCTILE IRON ELBOW:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

45 DEGREE DUCTILE IRON ELBOW:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

DUCTILE IRON TEE:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

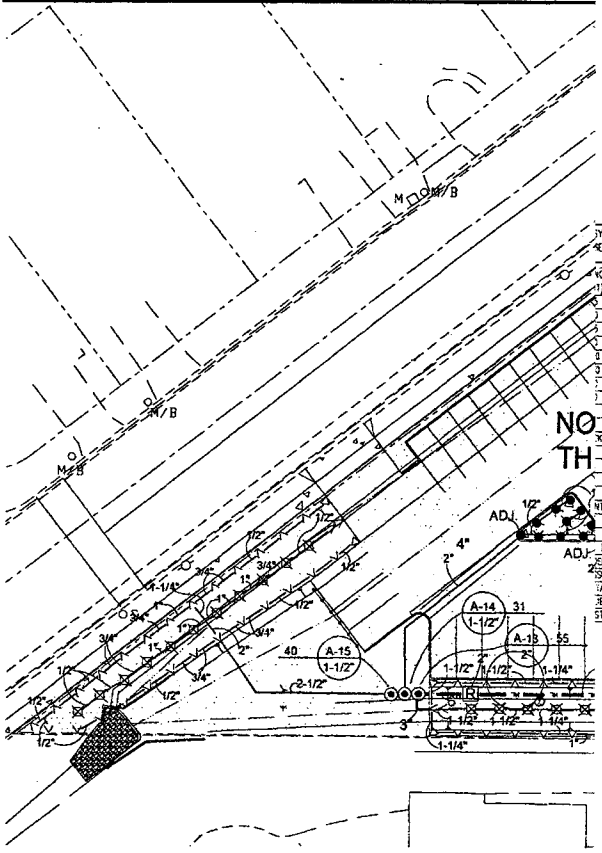
PIPE TO FITTINGS:
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO DUCTILE IRON FITTINGS.

GATE VALVE (SLIP-ON):
USE LEEMCO LG SERIES JOINT RESTRAINTS FOR PVC PIPE TO SLIP-ON GATE VALVE.

GATE VALVE (FLANGED):
USE LEEMCO LH SERIES JOINT RESTRAINTS FOR PVC PIPE TO FLANGED GATE VALVE.

NOTES:
1-USE LEEMCO JOINT RESTRAINT SYSTEM ON ALL DUCTILE IRON FITTINGS AND AT DIRECTIONAL CHANGES IN MAIN LINE DIRECTION AND AT ALL COUPLING WITHIN 50 FEET OF THE DIRECTIONAL CHANGE.
2- INSTALL ALL DUCTILE IRON FITTINGS AND JOINT RESTRAINTS PER LEEMCO INSTALLATION GUIDES AND SPECIFICATIONS.

PVC PIPE NOTES:
4" AND LARGER USE RUBBER GASKETED PIPE WITH CAST IRON FITTINGS AND MECHANICAL JOINT RESTRAINTS.
3" AND SMALLER USE SOLVENT WELD PIPE WITH PVC SCHEDULE 80 FITTINGS. TYPICAL.



SYSTEM SECTION A-11			CALCULATION FLOW 97 GPM
WIDTH 1)	GPM	ACCUM. G.P.M.	PRESSURE LOSS (PSI)
5	13.9	13.9	0.192
)	9.5	23.4	0.142
5	13.9	37.3	0.618
2	27.8	65.1	0.75
0	27.8	92.9	2.03
0	194	194	1.38
)	391	391	0.43
)	391	391	0.57
	IRRIGATION METER (4")		12.5
	BFLOW PREVENTER (6")		13
	FITTINGS		0.92
	GATE VALVE		0.06
	MASTER VALVE (4")		4
	FLOW SENSOR (4")		7
	NTROL VALVE (2-1/2")		2.5
	ELEVATION CHANGES		0
	TOTAL SYSTEM LOSSES		41.09
	ED AT FARTHEST HEAD		50
	SURE NEEDED AT P.O.C		91.09
	TATIC WATER PRESSURE		60
	ED BY BOOSTER PUMP		55
	STEM DESIGN PRESSURE		115

BMLA, Inc.
LANDSCAPE ARCHITECTURE & SITE PLANNIN
119 NORTH MAPLE STREET, SUITE N
CORONA, CA 92880
PHONE: (909) 737-1124 FAX: (909) 737-
719 S. McCLELLAND STREET, SUITE B
SANTA MARIA, CA 93454
PHONE: (805) 348-1393 FAX: (909) 737-

REGISTERED LANDSCAPE ARCHITECT
BAXTER C. MILLER
RLA# 2136
SIGNATURE
8/30/03
EXP. DATE
STATE OF CALIFORNIA

NIS LANDSCAPE ELECTRICAL "AS BUILTS"

REVISIONS	DATE	BY
1	PLAN CHECK COMMENTS	8-7-03
2		
3		
4		
5		
6		
7		

PROJECT DESCRIPTION

IMPROVEMENTS FOR:
NORCO INTERMEDIATE SCHOOL
TEMESCAL AVENUE
NORCO, CA

PREPARED FOR:
Corona Norco Unified School District
2820 Clark Ave.
Norco, CA 92860
CONTACT: Don Lussier
PHONE: 909-736-5000
FAX: 909-736-5047

SHEET DESCRIPTION

IRRIGATION PLAN PROJECT 'B'

DATE PREPARED: 11/21/02
DRAWING SCALE: 1"=30'-0"
DRAWN BY: SIE
DESIGNED BY: SIE
CHECKED BY: BEM

DIGALERT
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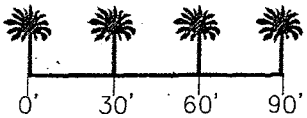
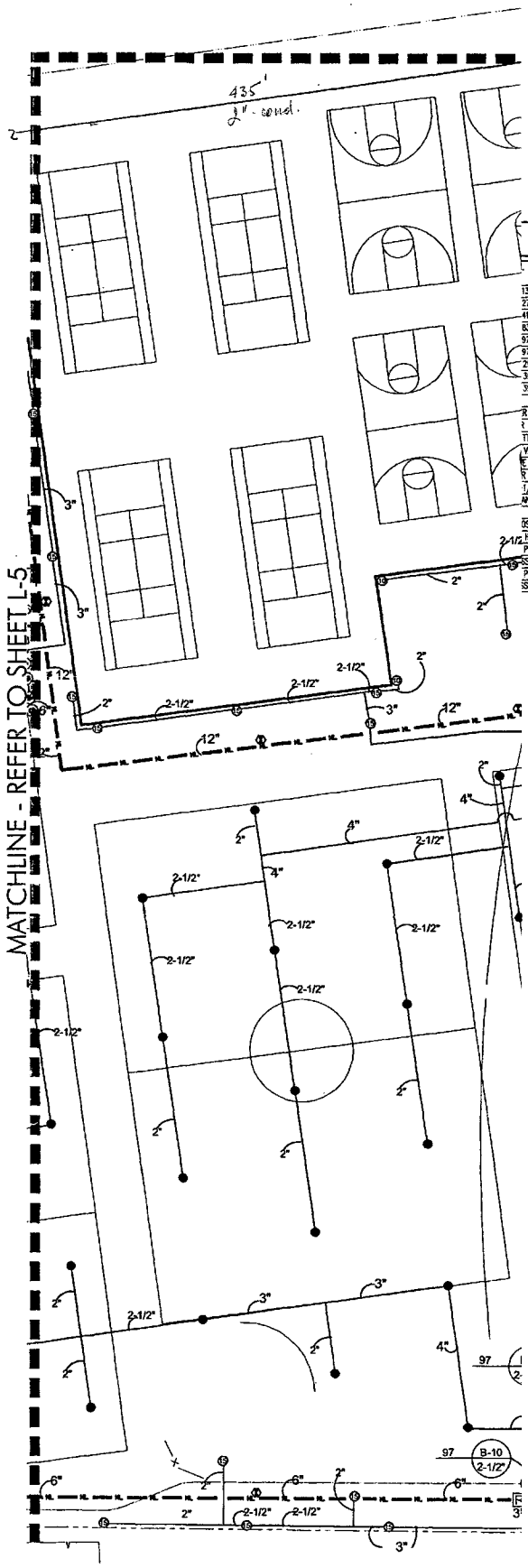
A PUBLIC SERVICE BY UNDERGROUND SERVICE ALERT



NORTH

L-5

Sheet 5 of 00



BMLA, Inc.
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719 S. McCLELLAND STREET, SUITE B
SANTA MARIA, CA 93454
PHONE: (805) 348-1393 FAX: (909) 737-6551

REGISTERED LANDSCAPE ARCHITECT
MAYER E. MILLER
R.L.A.# 2156
SIGNATURE
8/30/03
EXP. DATE
STATE OF CALIFORNIA

REVISIONS	DATE	BY
1		
2		
3		
4		
5		
6		
7		

PROJECT DESCRIPTION

IMPROVEMENTS FOR:

NORCO INTERMEDIATE SCHOOL
TEMESCAL AVENUE
NORCO, CA

PREPARED FOR:

Corona Norco Unified School District
2820 Clark Ave.
Norco, CA 92860

CONTACT: Tom Molter
PHONE: 909-736-3316
FAX: 909-736-7199

SHEET DESCRIPTION

IRRIGATION PLAN

DATE PREPARED: 11/01/02
DRAWING SCALE: 1"=30'-0"
DRAWN BY: MU
DESIGNED BY: STS
CHECKED BY: BEM

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0' 30' 60' 90'

NORTH

L-6

PVC PIPE NOTES:
4" AND LARGER USE RUBE
CAST IRON FITTINGS AND
RESTRAINTS.
3" AND SMALLER USE SOL
PVC SCHEDULE 80 FITTIN

CALCULATION FLOW 97 GPM	
P.M	PRESSURE LOSS (PSI)
	0.11
	0.228
	0.207
	0.37
	0.77
	2.51
	2.37
	2.15
	0.91
	0.57
	12.5
	13
	1.53
	0.06
	4
	2
	2.5
	3.5
	49.29
	50
	99.29
	60
	55
	115

AUTOMATIC IRRIGATION CONTROLLER 'C', IRRITROL SYST
TO BE ENCLOSED IN A VANDAL RESISTANT CONTROLLE
CONTROLLER AND ENCLOSURE TO BE PROVIDED AS
ASSEMBLY AS MANUFACTURED BY UNITED GREEN TE
CA1-IR1-18/RSP/RRA/. TELEPHONE (800) 427-0779. GROUN
WITH 1/2" BY 5-FOOT COPPER GROUND ROD. 110/120 VOL
-OUT AT THIS LOCATION BY CONTRACTOR.

SPECIAL NOTE:
LOCATE VALVES C1 THROUGH C6 NEAR THE CONCRE
AS PER THE REQUEST OF CNUSD MAINTENANCE DEPT.
COORDINATE THIS WORK PRIOR TO ANY INSTALLATIO
WITH THE CNUSD MAINTENANCE DEPT. THE CNUSD
MAINTENANCE DEPT. WILL PROVIDE A PROTECTIVE HA
RAILING TO ABATE TRAFFIC THROUGH THIS AREA.

NORTH

BMLA, Inc.
LANDSCAPE ARCHITECTURE & SITE PLANNING
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SANTA MARIA, CA 93454
PHONE: (805) 348-1393 FAX: (909) 737-6551

REGISTERED LANDSCAPE ARCHITECT
BAXTER E. MILLER
R.L.A.# 2134
SIGNATURE
8/30/03
EXP. DATE
STATE OF CALIFORNIA

REVISIONS	DATE	BY
1		
2		
3		
4		
5		
6		
7		

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DATE PREPARED: 11/01/02
DRAWING SCALE: 1"=30'-0"
DRAWN BY: MU
DESIGNED BY: STS
CHECKED BY: BEM

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0' 30' 60' 90'

L-7

Sheet 7 of 18

APPENDIX "E"

CITY OF NORCO
TECHNICAL PROVISIONS

CITY OF NORCO

TECHNICAL PROVISIONS

FOR

WATER LINE RELOCATION IMPROVEMENTS SOUTH NORCO CHANNEL STAGE 6, NORCO MDP LINE S-1 AND NORCO MDP LINE S-5 STAGE 1

PROJECT SPECIFIC SCOPE OF WORK

Description of Work

This project includes the construction of water main relocation improvements in Temescal Avenue and Third Street within the City of Norco. Specific improvements include:

1. Removal of existing waterlines and appurtenances at five locations to accommodate the South Norco Channel Stage 6, Norco MDP Line S-1 and Norco MDP Line S-5 Stage 1 storm drain facilities.

2. Removal and disposal of existing 6-inch, 8-inch and 10-inch steel water lines and appurtenances.

3. Construction of water main improvements including various Ductile Iron Pipe Asphaltic coated and Cement Lined, pipe sizes (8" through 12"), blow-offs, air-valve assemblies, fittings, valves, polyethelene tube encasement, etc.

4. Install new 1" and 2" water service connections. Reconnect new water services to existing private residential system at the property line. Relocate water meters to current City of Norco Standards. Reconnect customer side of meter from new meter location to property line.

Payment for providing and maintaining temporary access/ramping to adjacent property owners driveways until the waterline improvements are complete shall be considered to be included in the Riverside County Flood Control and Water Conservation District's (RCFCWCD) contract lump sum price paid for the City of Norco Waterline Relocations, and no additional compensation will be allowed.

WORK ITEM DESCRIPTIONS

All construction shall comply with the applicable sections of the American Water Works Association Standards (AWWA), Standard Specifications for Public Works Construction (Standard Specifications), the State of California Department of Transportation Standard Specifications (Caltrans Standard Specifications), latest editions and these Special Provisions.

Construction methods shall comply with applicable sections of Part 3 "Construction Methods" of the Standard Specifications and these Special Provisions.

Unless otherwise specified, all excess excavation or removed material shall become the property of the Contractor, and shall be disposed of by him away from the site of Work.

COOPERATION AND COLLATERAL WORK

Cooperation shall be in accordance with Subsection 5-6, "Cooperation," and Subsection 7-7, "Cooperation and Collateral Work," of the Standard Specifications and these Special Provisions.

The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral, and essential work by others and coordinating with the work by others. The City, other contractors and utilities shall have the right to operate within or adjacent to the work site during the performance of such work.

The construction of the RCFCWCD storm drain facilities and associated utility relocations, which includes gas line and electrical, telecommunication facility relocations that may be ongoing at the same time as this project.

Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified or should work of any other nature be under way by other forces within or adjacent to those limits, the Contractor shall cooperate with all the other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.

Should the Contractor be delayed by the City, and such delay could not have been reasonably foreseen or prevented by the Contractor, the Engineer will determine the extent of the delay, the effect on the project, and any extension of time. Should any agency or utility company's work result in delays to the Contractor's work schedule, the Contractor shall be entitled only to an equivalent extension of time for the completion of the contract, and shall not be entitled to damages due to downtime and idled equipment or additional payments over and above the agreed upon contract lump sum price paid for the City of Norco Waterline Relocations.

Full compensation for compliance with the preceding requirements shall be considered as being included in contract lump sum price paid for the City of Norco Waterline

Relocations and no additional compensation will be allowed therefore.

CLEAN UP

Throughout all phases of construction, including suspension of work and until the final acceptance, the Contractor shall keep the site clean and free from rubbish and debris.

The Contractor shall remove and dispose of all loose material and debris caused by construction operations from the construction site on a daily basis.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All clean up costs shall be included in the contract lump sum price paid for the City of Norco Waterline Relocations.

Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

Excess material from trench excavations shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the Specifications or Engineer.

Failure of the Contractor to comply with the Engineer's clean up orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

Before final inspection of the work, the Contractor shall clean the right-of-way, private property, material sites, and all ground occupied by the Contractor in connection with the work of all rubbish, excess materials, falsework, temporary structures, and equipment. All parts of the work shall be left in a neat and presentable condition.

The full compensation for various items of work and for collecting and disposing of loose material and debris from the job site shall be considered as included in the contract lump sum price paid for the City of Norco Waterline Relocations and no additional compensation will be allowed therefore.

DUST CONTROL

Dust control shall be performed in accordance with Subsection 7-8.1, "Clean up and Dust Control," of the Standard Specifications, South Coast Air Quality Management District (SCAQMD) Rule 403, the general Provisions and the following Provision.

Dust resulting from the Contractor's performance of the work, either inside or outside, the right-of-way shall be controlled by the Contractor. Dust control includes the action necessary to prevent, reduce or control dust within the work area as required to complete

the work. The Contractor shall carry out proper and efficient measures to prevent his operations from producing dust in amounts damaging to property or causing a nuisance, or harm to persons living nearby or occupying buildings in the vicinity of the work. The Contractor shall control dust 24 hours a day, seven days a week. The methods to be used for controlling dust in the construction area and along haul roads shall be approved by the Engineer prior to starting any work. The Rule 403 Implementation Handbook published by the SCAQMD, contains a detailed listing of reasonably available dust control measures.

Dust or dirt accumulations generated by the Contractor's operations shall be cleaned and removed by the Contractor from all areas as designated by the Engineer. Areas to be cleaned shall include, but not be limited to swimming pools, interiors of any structures including residences and places of business, exteriors of any structures including roofs, patios, driveways, and any other areas as required. The Contractor shall retain a professional cleaning service for the cleaning of swimming pools, and the interior and exterior of structures. The cost for cleaning and removal of dust or dirt shall be at the Contractor's expense and no additional compensation will be made therefore.

Water for use in dust control shall, at the option of the City, be potable or non-potable. Non-potable water shall consist of reclaimed waste water or non-potable water developed from other sources.

If the Contractor uses reclaimed waste water in the work, the sources and discharge of reclaimed waste water shall meet the California Department of Health Services Water Reclamation Criteria and the Regional Water Quality Control Board requirements. The Contractor shall obtain either a waste water discharge permit or a waiver from the Regional Water Quality Control Board. Copies of permits or waivers from the Regional Water Quality Control Board shall be delivered to the engineer before using reclaimed waste water in the work.

Water shall be applied in the amounts, at the locations, and for the purposes designated in the Special Provision and these Specifications, and as order by the Engineer.

Water for compacting base and surfacing material, and for laying dust, shall be applied by means of pressure-type distributors or pipe lines equipped with a spray system or hoses with nozzles that will ensure a uniform application of water.

All equipment used for the application of water shall be equipped with a positive means of shut-off.

Unless otherwise permitted by the City Engineer or unless all the water is applied by means of pipe lines, at least one mobile unit with a minimum capacity of 1,000 gallons shall be available for applying water on the project at all times.

Full compensation for all direct and indirect costs incurred for work performed or materials used to control dust resulting from the Contractor's performance of the work and caused by public traffic, either inside or outside the right-of-way shall be considered as included in the contract lump sum price paid for the City of Norco Waterline Relocations for the

various items of work involved, including all deposits and/or rental costs to establish a water supply source, and no additional compensation will be allowed therefore.

PAYMENT

All the requirements stated above shall be included in the contract lump sum price paid for the City of Norco Waterline Relocations and no additional compensation shall be allowed therefore. Full compensation for all costs included in Mobilization, Insurance, Permit Fees and Bonds; and Traffic Control, shall be considered as included in the contract lump sum price paid for the City of Norco Waterline Relocations and include full compensation for all material, labor, plant, equipment, furnishing all transportation, and hauling in accordance with the RCFCWCD's "Special Provisions", the standard specifications and these special provisions.

WORK ITEM 1 –CLEARING, GRUBBING, GENERAL EARTHWORK, GRADING, MISCELLANEOUS REMOVALS, AND RESTORATION

The work included in this work item shall consist of all the work described in Subsection 7-9, "Protection and Restoration of Existing Improvements", Subsection 300-2, "Unclassified Excavation," and Subsection 300-1, "Clearing and Grubbing," of the Standard Specifications.

Brush and other organic matter shall be removed from the area of the proposed improvements and from any area where soils of construction materials will be stockpiled. The CONTRACTOR shall make all necessary excavation to construct and work as shown on the Plans and shall remove all pipes, trees, stones, debris, and other obstructions that may be encountered in making the excavation.

The following items of work shall be included in the contract lump sum price paid for the City of Norco Waterline Relocations which include but not limited to Clearing, Grubbing, General Earthwork, Grading, Miscellaneous Removals, and Restoration and no additional compensation will be allowed:

a) General excavation, earthwork, and grading not included specifically in any other work items.

b) All unclassified excavation activities, including the stock piling of usable material for use in the project.

c) Removal of all sub-grade, base, crushed rock, and AC/PCC surfaces and to the lines and limits shown on the plans and as directed by the Engineer, and shall include excavating, over-excavating, loading, hauling, depositing, spreading, scarifying sub-grade and recompacting sub-grade.

d) All removed material shall be removed from the project site the same day. Stockpiling of materials within the right-or-way, City parking lots, or other City-improved property shall not be allowed unless written permission is given by the Engineer. The Contractor shall be responsible for obtaining a suitable disposal site for this material and pursuant to Subsection 300-2.6 "Surplus Material," of the

Standard Specifications, shall upon request, file with the Engineer the written consent of the owner of the property upon which he intends to dispose of such material.

e) Abandoned water services, fire hydrants, water mains, where any portion of such structure is within 1 foot of the excavation areas, or within 1 foot of original ground, or where shown on the plans to be removed, shall be completely removed and disposed of accordingly. Holes resulting from the removal of water mains and fire hydrants shall be backfilled with soil from the surrounding area the same day the water appurtenances are removed and compacted to a minimum relative compaction of ninety percent (90%).

f) Removal and disposal of existing water lines and any other abandoned utilities and appurtenances that may interfere with the improvements, including air relief assemblies, meter boxes, blow-offs, fittings, valves, pipe, etc;

g) Relocation and salvaging to City's maintenance yard other usable material, including fire hydrants, horse trail fencing and street signage.

h) The Contractor shall dispose all materials not being salvaged outside of the right-of-way and shall pay for all costs for disposal.

RESTORATION OF EXISTING IMPROVEMENTS

The restoration of existing improvements shall be in accordance with the applicable provisions of these Special Provisions, the Standard Specifications, Standard Drawings, and the following requirements:

1. In the event a portion of curb, gutter, or monolithic curb and gutter is damaged by the CONTRACTOR'S operations, a minimum of 20 feet of curb, gutter, or curb and gutter shall be removed and replaced regardless of how short a length is damaged. One end of said 10-foot section may be taken at a joint or scoring line and the other end shall be measured the minimum distance of 10 feet there from. If said 10 feet falls within 3 feet of a joint or scoring line, then the removal shall extend to said joint of scoring line.

2. If a concrete driveway is damaged and is a single monolithic structure, it shall be removed in its entirety and replaced.

3. If the stored signs are damaged during construction, they shall be restored or replaced to a condition equal or better than the existing.

Unless otherwise specified, all excess excavation or removed material shall become the property of the CONTRACTOR, and shall be disposed of by the CONTRACTOR away from the site of Work.

All existing bituminous pavement and concrete to be joined shall be cut in a clean straight line along the join line by use of concrete cutting saws. Compensation for this requirement shall be considered as included in the bid price in the proposal form and no additional

compensation will be made therefore. If the edge of any existing concrete to be joined with new work is damaged by the Contractor's operations, the existing concrete shall be again saw cut parallel to the original cut and such additional portion replaced at the CONTRACTOR'S expense.

PAYMENT

All the requirements stated above shall be included in the contract lump sum price paid for the City of Norco Waterline Relocations and no additional compensation shall be allowed therefore. Full compensation for all costs in Work Items included in Clearing, Grubbing, General Earthwork, Grading, Miscellaneous Removals, and Restoration, shall be considered as included in the contract lump sum price paid for the City of Norco Waterline Relocations and include full compensation for all material, labor, plant, equipment, furnishing all transportation, and hauling in accordance with the standard specifications and these special provisions. No separate payment will be made for grading, disposal of excess materials and all other appurtenant items for which separate payment is not specifically provided in the contract lump sum price.

WORK ITEMS 2-15 INSTALL DUCTILE IRON PIPE, VALVES, UNIVERSAL AIR VALVE ASSEMBLY, BENDS, TEES, REDUCERS, BLIND FLANGES AND 1" AND 2" WATER SERVICES

SECTION 1 – GENERAL

1-01 PLANS AND SPECIFICATIONS

Construction of all water system improvements by contract and/or intended to be dedicated to the City of Norco will be governed by plans and specifications approved by the Director of Public Works. All work shall be in accordance with these plans and specifications and shall be inspected by the Public Works Department to insure conformity.

In cases of conflict of information, the following documents will have precedence in the order listed:

1. Special Provisions to the specifications and construction plans of the City of Norco.
2. Water construction plans approved by the City of Norco's Director of Public Works or his/her authorized representative.
3. Permits and licenses from affected agencies.
4. The City of Norco Public Works Department - Water Utility Specifications, herein called Specifications.

5. The applicable requirements of the Standard Specifications for Public Works Construction, "Green Book", as last revised, herein called Standard Specifications.

Conflicts and discrepancies noted by the Contractor shall be brought to the attention of the Director of Public Works or his authorized representative. Instructions will be given by the Engineer to provide a complete and satisfactory project. Unless otherwise determined by the Engineer, the most stringent/restrictive condition shall apply.

Provisions of reference specifications and publications of any scientific or technical society or other organization noted in these specifications and plans shall have the same effect as if written herein, unless expressly modified by these specifications. Any reference specification or publication in the absence of designation to the contrary, shall be understood to refer to the latest revision of the specification, standard, method, or publication as of the date of the beginning of the work.

1-02 DEFINITIONS

a. City or Engineer — The Director of Public Works of the City of Norco, or his/her authorized representative.

b. Owner/Developer — The person or organization having legal responsibility for construction of water system improvements in conjunction with development of property.

c. Contractor — The individual, partnership, corporation, joint venture, or other legal entity having a contract with the City to perform the construction of water system improvements. In the case of improvements being done under a permit issued by the City, the party that is issued the permit shall be construed to be the Contractor.

d. Superintendent — The field representative of the Contractor, present at the job site at all times during work, which is authorized to receive and fulfill instruction from the City.

e. Consultant — The agent of the Developer or independent engineer who has responsibility for the design and drawing of construction documents.

f. Or approved equal — A product equivalent to that specified in these water utility standard specifications and approved by the Public Works Department before start of construction. No approved equal product is intended, unless so stated in these specifications.

g.	Plans	Those drawings accompanying the specifications that show the location, nature, extent and form of the work, together with applicable details.
h.	Water Supplier	The City of Norco who owns and operates the City's public water system.
i.	Regulatory Agency	State Water Resources Control Board (SWRCB), Division of Drinking Water (DDW).

1-03 ABBREVIATIONS

Whenever the following abbreviations are used in these specifications, the meaning shall be interpreted as follows:

a.	ANSI	American National Standards Institute
b.	ASTM	American Society for Testing and Materials
c.	AWWA	American Water Works Association
d.	CAL/OSHA	Division of Industrial Safety of the State of California
e.	DIPRA	Ductile Iron Pipe Research Association
f.	FM	Factory Mutual research
g.	NSF	National Sanitation Foundation
h.	SWRCB	State Water Resources Control Board
i.	UL	Underwriter's Laboratory
j.	W.A.T.C.H	Work Area Traffic Control Handbook

1-04 LICENSES, PERMITS, AND FEES

The Contractor shall have a Class "A" General Engineering Contractor's License valid in the State of California and shall meet all the applicable requirements of the Norco Municipal Code.

The Contractor and/or Developer shall obtain all necessary permits, licenses, or agreements required by any legally constituted agencies, pay all fees, and give all necessary notices required for the construction of the work.

Prior to beginning any work, a water permit and an encroachment permit from the Public Works Department including any required deposits and bonds, are required for excavation in the public right-of-way within the City of Norco. Pavement repair shall be made by a licensed paving contractor and shall conform to these

Specifications and the Standard Specifications. The contractor is responsible for all costs associated with the work performed, including any corrections or repairs. In the event the Contractor fails to complete the work or make any required corrections/repairs, any and all costs incurred by the City will be deducted from the deposit or the surety will be billed for these expenses. Said deposit or bond shall be retained by the City for payment and for material and labor.

Before the Contractor or any sub contractor performs work, it shall be necessary for each company to obtain a business license from the City of Norco Fiscal and Support Services Department.

1.05 INSPECTION

The construction of any water system improvement intended for dedication to the City and used for public water service shall be subject to inspection and approval/acceptance by the City. Such inspection will assure that all phases of the work are in compliance with these Specifications. The City's designated inspector will be the representative selected shall coordinate the various responsibilities of the Public Works Department throughout the work. RCFCWCD will schedule pre-construction meeting with the Public Works Department prior to construction.

The inspector shall have access to the work area and shall be furnished every reasonable facility for ascertaining full knowledge of the progress, material, and workmanship used to complete the work. The Contractor shall provide at least 24 hours advance notice of major phases of construction for purposes of inspection. All material shall be approved prior to placement and all water system works shall be visually inspected prior to backfilling.

The Engineer shall have the authority to suspend the work wholly, or in part, for such time as it may deem necessary due to failure of the Contractor to perform any provisions of the plans or specifications. The work may only continue when the defective material or construction method is recognized as corrected by the Engineer.

1.06 GUARANTEE

The Contractor shall guarantee the work against defective material or workmanship for a period of one year from the date of completion of the contract and/or acceptance of the work by the City. Damage due to acts of God or from sabotage and/or vandalism is specifically exempted from the guarantee. When defective materials and/or workmanship are discovered which requires repairs to be made under this guarantee, all such works shall be done by the Contractor at his own expense and shall begin within five working days after written notice of such defects has been given to him/her by the City. Should the Contractor fail to repair such defective materials or workmanship within five working days thereafter, the City may cause the necessary repairs to be made and charge the Contractor with the actual cost of all labor and materials required.

In emergencies demanding immediate attention, the City shall have the right to repair the defects and charge the contractor with the actual cost of all labor and materials required. Any repair works preformed as herein specified shall be done under the provisions of the original work specifications

2-01 OPEN TRENCH OPERATIONS

Unless specified differently on the plans or as supplemented herein, open trench operations, excavation, bedding, backfill, and resurfacing shall conform to the applicable requirements of Section 306-1 of the Standard Specifications and City of Norco Standard Drawings 401, 402 and 403.

2-01.01 Permits and Licenses

See section 1-04 of these Specifications for permit and license requirements.

2-01.02 Inspection

See section 1-05 of these Specifications for inspection requirements.

2-01.03 Traffic Control

The Contractor shall conduct his operations to cause the least possible obstruction to traffic inconvenience to the public. On arterial highways, lane closures require a traffic control plan completed by a registered civil or traffic engineer subject to approval from the Engineer. Lane closures are restricted to the hours between 8:30 a.m. and 3:30 p.m. At least one lane of traffic must be maintained in each direction between these hours. All traffic lanes shall be open to traffic during all other hours. On minor residential streets, one lane of traffic shall be maintained for each direction at all times. If two travel lanes cannot be maintained, the roadway may be reduced to one 14-foot-wide lane between the hours of 8:00 a.m. and 4:00 p.m. Adequate flagmen, no less than two, whose sole duties shall consist of directing traffic, shall be provided at such times as the street is restricted to one lane of traffic. At least one 14-foot-wide lane controlled by flagmen shall be provided on all intersecting minor streets. A separate permit is required from the Public Works Department for all work in public streets.

The Engineer reserves the right to alter the above traffic conditions as required during construction.

The Contractor shall be required to provide and maintain all barricade delineators, flashers, signs, including temporary "No Parking" signs' and other safety equipment as set forth in the latest edition of Caltrans "California Manual on Uniform Traffic Control Devices" (CA MUTCD) and the Work Area Traffic Control Handbook" (W.A.T.C.H). All necessary traffic control devices shall be in place prior to the start of work.

On all designated or striped Bicycle Routes the Contractor shall install standard warning signs per the WATCH Manual at locations approved by the Engineer.

Where traffic must cross open trenches, the Contractor shall provide suitable bridges at street intersections and driveways. Hydrants under pressure, valve pit covers, valve boxes, meter boxes, fire or police call boxes, or other utility controls shall be left unobstructed and accessible during the construction period.

2-01.04 Surveying

Refer to RCFCWCD "Special Provisions" regarding surveying.

2-01.05 Potholing

The plans show the position of pipes, conduits, poles and other structures as they are believed to exist. The contractor, before commencing any excavation shall determine from records, potholing, uncovering, or otherwise, the existence, exact position, and ownership of these or other facilities. It is the Contractor's responsibility to protect any pipes, conduits, poles, or any other existing improvements.

Potholing shall be done a minimum of 10 working days in advance of commencing any excavation and sub-structure information forwarded to the Engineer for review.

2-01.06 Sheeting and Shoring

All trench excavations shall be adequately secured to provide safe working conditions, and protection to adjacent facilities and structures. The contractor shall comply with all rules, regulations, and orders of Occupational Safety and Health Administration (OSHA).

Prior to any trench excavation where the depth of trench is greater than five feet, the Contractor shall submit to the Engineer a detailed shoring plan prepared, stamped and signed by a Civil or Structural Engineer registered in the State of California. The shoring plan shall show the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of trench failure. Excavation shall not begin until the Engineer has accepted the plan and received a copy of the OSHA permit.

Sheeting and shoring shall not place any undue strains on existing utilities or structures, nor on completed sections of construction. Sheeting and shoring may be removed during backfilling, provided adequate protection is provided at all times. The Contractor shall be responsible for any damages to existing utilities or structures due to placement, removal or failure of any sheeting and/or shoring system.

The Contractor shall repair or have repaired any damages as soon as practical.

2-01.07 Secured Trenches

Pipe trenches or other large excavations shall be backfilled or securely covered at the close of each working day, to the satisfaction of the Engineer. The Contractor shall fence any trench excavations that are necessary to be left open at night. Any trench that is left open shall be permitted only upon review and approval by the Engineer.

Covering of trenches with steel traffic plates shall be done in accordance with City of Norco Specifications and as directed by the Engineer. All steel plate covers shall be skid resistant (X-plates only) and shall be installed flush with adjacent pavement in accordance with City of Norco Standard Drawing 403. For equestrian trails, all trenches must be secured with X-plates and covered in 3" of decomposed granite.

No backfill material or construction equipment may be stored on any City street without prior approval from the Engineer.

2-01.08 Tie-Ins

All tie-ins shall be excavated one working day in advance and covered with traffic plates or as required by the Engineer.

2-01.09 Interruption of Water Service

No valve or other control on the existing water system shall be operated for any purposes by the Contractor without approval of the Engineer. All consumers affected by such operation shall be given a notice letter at least two working days before the operation advising of water service outage and the probable time when service will be restored. All such service interruption notices shall be prepared and distributed by the City to ensure proper notification is completed.

2-02 TRENCH EXCAVATION

Unless specified differently on the plans or as supplemented herein, trench excavation shall be in accordance with the details shown in the City of Norco Standard Drawings 401 and 402 and in accordance with Section 306-1.1 of the Standard Specifications.

The maximum length of open trench shall be the distance of pipe installed in one day. Shorter lengths of open trench may be necessary and may be ordered by the Engineer to meet traffic, weather, and other safety requirements.

In areas of new development, water main installation will not be permitted until the sub grade is established and the storm drain and sewer installation has been completed. Pipe shall be placed to the grade and depth specified on the plans. When not specified, pipe shall have a 42 to 48 inch cover from finished grade.

2-02.01 Removal of Surface Improvements

Unless specified differently on the plans or supplemented herein, bituminous pavement, concrete pavement, curbs, sidewalks, or driveways removed in connection with construction shall be removed in accordance with City of Norco Standard Drawings 401 and 402 and Section 306-1.1.5 of the Standard Specifications.

If the width of the remaining pavement between the final saw cut edge of the trench and the edge of the gutter is less than 36 inches, removal and new pavement shall extend to the edge of gutter.

Concrete sidewalk removal done in connection with water system work shall be saw cut to the nearest score marks. Concrete curbs, gutters and cross gutters shall be tunneled whenever possible. With prior approval of the Engineer, the concrete may be saw cut in such a manner in which there shall not be less than six feet to the nearest cold joint or expansion joint.

2-02.02 Abandoning Structures (non-potable water related)

Whenever existing pipes, culverts, or conduits are cut and abandoned, their open ends shall be securely closed by a redwood plug, a solid mechanical cap, a wall of concrete no less than six inches thick, or as directed by the Engineer.

2-02.03 Protecting and Replacing Existing Structures

Insofar as practicable during the progress of the work, the property of any owner of a public utility or pole line, pipeline, sewer, culvert, cable, conduit, or storm drain, in-line structures, or lateral and services, or any other structures, or improvements, and all fences shall not be disturbed but shall be maintained in good operating condition at the expense of the Contractor. These requirements shall apply to all structures and improvements both inside and outside the right-of-way provided by the City. Wherever in the judgment of the Contractor, the economical performance of the work requires a temporary or permanent removal of any of the property named above in this section, the Contractor shall make arrangements with the owner of the same for its temporary or permanent removal, or for other changes that may be necessary in order to perform the work more readily. All expense of maintenance, removal reconstruction, and repair of said property shall be borne by the Contractor.

Whenever the Contractor makes agreements with owners for the removal and restoration of said property, the materials furnished and the methods of making such removal and restoration shall be satisfactory to the owner and the Engineer. In the event the Contractor disturbs,

disconnects, or damages any of said property prior to making the necessary arrangements with the owners thereof, the Contractor shall immediately give notice to the property owner and the Contractor shall assume all responsibilities connected therewith. All property removed shall be reconstructed or restored promptly as is reasonably possible in approximately its original location and in condition as good as when removed and subject to the inspection of the owners or governing body having jurisdiction over same.

2-02.04 Excess Excavating Material

All excavated materials in excess of that required in the finished work shall immediately be hauled away and disposed of at a legally permitted site. The Contractor shall be responsible for all damages and claims that may arise from the disposal of the excess material. The contractor shall provide a signed release from the property owner.

2-03 TRENCH BEDDING

Unless specified differently on the plans or as supplemented herein, trench bedding shall be placed in accordance with the requirement shown in City of Norco Standard Drawings 401 and 402 and in accordance with Section 306-1.2.1 of the Standard Specifications.

For water main installations, the pipe zone referenced in City of Norco Standard Drawings 401 and 402, Bedding B material shall be substituted for Bedding A material. Jetting of trench bedding may be permitted, subject to the approval of the Engineer.

2-04 TRENCH BACKFILL

Unless specified differently on the plans or as supplemented herein, trench backfill shall be placed in accordance with the requirements shown in City of Norco Standard Drawings 401 and 402 and in accordance with Section 306-1.3 of the Standard Specifications.

The Contractor shall compact the trench backfill material to the bottom of the structural section within one day after installation of the pipe. No flooding or jetting of the backfill will be allowed to achieve compaction without prior approval by the Engineer.

If the Engineer determines that the Contractor is not able to obtain the required compaction in areas under curbs, cross gutters or other structures, trench backfill underneath these structures shall be 1-sack cement sand slurry or as specified by the Engineer.

2-05 COMPACTION TEST

Unless determined otherwise, compaction tests will be taken along the pipelines, in the pipe zone, above the pipe zone, and at ground surface or subgrade at 200 foot intervals or less, or as directed by Engineer, and along all large service and

fire hydrant laterals. The Engineer must be present when compaction tests are taken.

2-06 TEMPORARY RESURFACING

Unless permanent resurfacing is to be placed immediately, temporary bituminous resurfacing, a minimum of two inches thick or as otherwise specified, shall be placed and properly maintained by the Contractor as determined by the Engineer.

Temporary resurfacing shall be placed in accordance with Section 306-1.5.1 of the Standard Specifications and shall be placed as soon as trench backfill is complete and shall remain in place until permanent resurfacing is placed. Prior to permanent resurfacing, temporary resurfacing shall be removed and discarded at a legal disposal site at Contractor's expense. Temporary asphalt paving as specified above shall be a minimum two inches thick or as specified by the Engineer.

At the end of each day, temporary striping shall be placed complying with the plans, as specified or as directed by the Engineer. Temporary striping shall conform to Section 214 of the Standard Specifications.

2-07 TRENCH RESURFACING

Unless specified differently on the plans or supplemented herein, trench resurfacing shall be placed in accordance with the requirements shown in the City of Norco Standard Drawings 401 and 402 and in accordance with Section 306-1.5.2 of the Standard Specifications.

Contractor shall place structural section other than surface course within five days of completion of backfill.

Concrete sidewalks, curbs and gutters, driveways and other structures shall be replaced in accordance with the applicable requirements

2-08 GENERAL

All materials and equipment installed in City of Norco's water system shall meet all state and federal standards, as well as standards developed by nationally recognized organizations such as AWWA, ANSI and NSF. In order to protect human health, all materials, chemicals, lubricants, and products in contact with drinking water shall be tested and certified as meeting NSF/ANSI Standard 60 (Drinking Water Treatment Chemicals-Health Effects) and NSF/ANSI Standard 61 (Drinking Water System Components-Health Effects).

In addition, all materials coming in contact with potable water shall be lead-free per California Health & Safety Code Section 116875. All materials are required to be certified as lead-free by NSF or other ANSI accredited certifier per SB 1334.

2-08.01 Protection of Metal Surfaces

All buried metal surfaces on valves, flanges, bolts, nuts, tie rods, turn buckles, restraint devices, couplings, and other appurtenances in contact with the earth and backfill materials shall be coated with a

minimum 30 mils of JS160H Mastic manufactured by Protecto Wrap Co., 30 mils of Bituminous Mastic 50-HT by Utility Coating Company, or approved equal. In addition to this coating, all metal surfaces as previously described, shall be encased in 8 mils polyethylene protective wrapping and tape wrapped to the pipe barrel in accordance with AWWA C-105 and Sections 4-02.03 and 5-03.04 of these Specifications.

2-09 DUCTILE IRON PIPE

Ductile iron pipe shall conform to the requirements of AWWA Standard C151. Unless otherwise specified, size 4 inch through 12 inch shall be Pressure Class 350. Pipes greater than 12 inch and up to 24 inch in diameter shall be Thickness Class 52. Pipes larger than 24 inches in diameter and all above ground pipes shall be Thickness Class 53. Special order pipe sizes, such as 10 inch and 14 inch, are not allowed unless otherwise authorized by the Public Works Department.

2-09.01 Pipe Joints

Ductile iron pipe shall be furnished in 18 foot nominal laying lengths and shall be bell and spigot type having a push-on joint employing a single rubber gasket, made of EPDM, to effect the joint seal, in accordance with AWWA Standard C111 , as manufactured by "TYTON®" from U.S Pipe, "FASTITE®" from AMERICAN Pipe or approved equal.

Where restrained joints are indicated on the plans or on Standard Drawings, push-on joints shall be restrained in accordance with the requirements of Section 4-01.06 of these Specifications.

2-09.02 Lining and Coating

All ductile iron pipes and fittings shall be factory cement mortar lined with seal coat in accordance with AWWA Standard C104, "Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water", and coated with bituminous material as specified in AWWA C151. Mortar lining of pipe or fittings in the field is not permitted.

2-09.03 Polyethylene Protective Wrapping

All buried ductile iron and gray iron pipes and fittings shall be polyethylene wrapped. Polyethylene protective wrapping ("Polywrap") shall conform to the requirements of ANSI/AWWA Standard C105/A21.5, "Polyethylene Encasement for Ductile-Iron Pipe Systems", and be 8 mils thick (minimum) tubing of virgin polyethylene, as manufactured by Dupont Alathon, U.S.1. Petrothene resin, or approved equal.

Tubing shall be taped and secured with general purpose polyethylene tape, 2 inches wide and 10 mils thick as manufactured by Scotchrap No. 50, Plicoflex No. 340, Protecto Wrap No. 200, Polyken No. 900, or approved equal.

2-10 SPECIAL APPLICATIONS USING POLYVINYL CHLORIDE PIPE

At the sole discretion of the Public Works Department, polyvinyl chloride (PVC) pipe material for distribution main may be used. PVC Pipe shall be Pressure Class 235 (DR 18), unless otherwise specified, conforming to the requirements of AWWA Standard C900 "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 inch through 12 inch, for Water Transmission and Distribution" or C905 "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inch Through 48 inch" for pipe sizes larger than 12 inches in diameter.

2-10.01 Pipe Joints

PVC shall be furnished in 20 foot nominal laying lengths and have bell-end push-on joints employing a single elastomeric gasket in accordance with AWWA Standard C900 and C905.

2-10.02 Pipe Services and Appurtenances

All service saddles, sleeves, fittings, restraining devices, and other appurtenances used on PVC Pipe shall be approved by the Public Works Department prior to use.

2-10.03 Restrained Joint PVC Pipe

Restrained joint non-metallic couplings for PVC pipe shall be CERTALOK™ C900 RJIB system manufactured by CertainTeed Corporation, Eagle LOC 900 manufactured by JM Pipe, or approved equal.

See Section 4-04 for additional thrust restraint system for PVC pipe.

2-10.04 Installation of Curvature

Where the pipeline in non-restrained joint and to be installed in a curved alignment, the radius of curvature and specific alignment shall be shown on the plans and shall be accomplished by means of deflecting the pipeline at the joints with couplings. Couplings used in a curved alignment, where required deflection is between one and five degrees, shall be High Deflection Couplings, Class 305 manufactured by CertainTeed Corporation, or approved equal.

Contractor shall not exceed the manufacturer's recommendation for deflection for the couplings. Bending of the PVC is not allowed.

2-10.05 Markings

PVC Pipe shall be legible and permanently marked in ink with the following information.

- Manufacturer and Trade Name
- Nominal Size and DR Rating/Pressure Class
- Hydrostatic Proof Test Pressure

- [NSF-61]
- Manufacturing Date Code

2-10.06 Workmanship
The beveled end of any PVC pipe shall be cut off before the pipe is inserted into a mechanical joint fitting.

2-10.07 Fittings for PVC Main Line
Main line PVC pipe fittings shall be as called for on the construction plans. All fittings shall be ductile iron fittings per Section 4-07.

2-10.08 Tracer Wire and Warning Tape
Copper tracer wire and warning tape shall be installed per Section 5-03.02.

2-11 THRUST RESTRAINING MATERIALS
All mechanical thrust restraining devices shall be ductile iron except as noted for FIELD LOK gaskets. All devices shall withstand a working pressure of at least 250 psi with minimum safety factor of 2.

2-11.01 Mechanical Joints –
Restraining devices for mechanical joint fittings shall be incorporated with the design of a follower gland and grip ring restraining mechanism that utilizes contact with entire circumference of pipe for restraint. The ring shall flex to accommodate deflection allowed in a mechanical joint after burial. If the mechanism is not available in the specified O.D., a similar wedge action restraint utilizing partial contact with circumference of pipe shall be used. Glands shall be manufactured of ductile iron conforming to ASTM A536.

Approved Mechanical Joint Restraining System Manufactures For 4"-12"

Romac Industries, Inc.	GripRing ™ (PVC or DIP)
Ford Meter Box Co., Inc.	Uni-Flange Block Buster™ 1300 (PVC or DIP)

Approved Mechanical Joint Restraining System Manufactures For 14"-48"

Romac Industries, Inc.	Romagrip™ (PVC or DIP)
EBAA IRON, Inc.	Megalug Series 1100(DIP), 2000 (PVC)
Smith-Blair	Cam-Lock ™ (PVC or DIP)
Ford Meter Box Co., Inc.	Uni-Flange Block Buster™ 1300 (PVC or DIP)

2-11.02 Flanged Adapters

Flange adapters shall be fully restrained wedge activated type with a minimum working pressure of 250 psi and a safety factor of 2. Outside and inside surfaces of flange adapters shall be epoxy coated.

Flange Adapters shall be manufactured from ductile iron per ASTM A536 and shall have bolt circles and bolt holes to meet ANSI B16.1 – Class 125 or Class 250 if required and shown on the plans.

Approved Flange Adapter Manufacturers

EBAA IRON, Inc.	Megaflange™ Series 2100(PVC or DIP)
Romac Industries, Inc.	Field Flange™ (DIP)
Ford Meter Box Co., Inc.	Uni-Flange 900 - Adapter Flange (PVC)
	Uni-Flange 400 - Adapter Flange (DIP)
Smith-Blair	Flange-Lock™ (PVC or DIP)

2-11.03 Push-On Pipe Joints

Where restrained joints are indicated on the plans, push-on TYTON® joints shall be restrained with "Field-Lok" gaskets as manufactured by U.S Pipe, and FASTITE® joints shall be restrained with "Fast-Grip" gaskets from AMERICAN Pipe or approved equal.

Restrained joint pipe is an acceptable option for restraint of push-on joint pipe. Restrained push-on joint pipe and fittings shall be capable of being deflected after assembly.

Approved Restrained Pipe Manufacturers

U.S Pipe	'TR-Flex"
American Pipe	"Flex-Ring"
Pacific States Cast Iron Pipe Co.	Thrust-Lock™

2-11.04 Concrete

Concrete thrust blocks shall be Class 520-C-2500 concrete. If thrust block is to be disturbed or backfill is to be placed prior to developing its required strength, additional thrust restraining methods approved by the Engineer shall be installed. Concrete chemical accelerating admixtures, such as calcium chloride, are not allowed unless approved by the Engineer.

2-12 MAIN LINE COUPLINGS

Sleeve-type couplings shall provide a flexible, watertight connection between two plain ends of pipe as shown on the construction plans or as directed by Engineer. For ductile iron and gray iron pipe, all couplings shall be ductile iron solid sleeve type conforming to AWWA C110, with mechanical joint ends and long body no less than 12 inches.

For steel, all couplings shall be standard steel couplings, with body no less than seven inches long. Bolts for exposed steel couplings shall be hot-dip galvanized. Bolts for buried steel couplings shall be Type 316 stainless steel. The Contractor shall strictly follow the torque limitations and shall use N-5000 Loctite® anti-seize/rust preventer lubricant manufactured by the Henkel Company, or approved equal. All sleeve type steel couplings shall be fusion bonded epoxy lined and coated with Scotchkote 6233, as manufactured by 3M/Corrosion Protection Products, or approved equal.

Buried metal surfaces shall receive additional protective coating and wrapping after they are assembled as per Section 4-01.01.

Approved Sleeve-Type Couplings for Ductile Iron, Cast Iron and PVC Pipe

Clow®	MJ Solid Long Sleeves
Tyler Corporation	5-144L Long Solid Sleeves
Romac Industries, Inc.	RFCA or PVS-RFCA
Krausz Industries	Hymax
Smith Blair	Top Bolt 421

Approved Flexible Couplings for Steel Pipe

Smith Blair, Inc.	411 Steel Couplings
Smith Blair, Inc.	421
Smith Blair, Inc.	Quantum® Coupling Wide-Range
Romac Industries, Inc.	Model XR501
Krausz Industries	Hymax

Approved Flexible Couplings for Transition to Belgian Cast Iron Pipe

Smith Blair, Inc.	OMNI 441 Ductile Iron Couplings
Smith Blair, Inc.	421
Smith Blair, Inc.	Quantum® Coupling Wide-Range
Romac Industries, Inc.	Macro HP
Krausz Industries	Hymax

2-13 SLEEVES AND CLAMPS

2-13.01 Tapping Sleeves

Tapping sleeves shall have a stainless steel body with removable bolts. The outlet, body, flange, bolts and nuts shall be 18-8 type 304 stainless steel. All welds shall be fully passivated to restore stainless characteristics. Flange shall conform to AWWA Standard C207, "Steel Pipe Flanges for Waterworks Service-Sizes 4 Inch through 144 Inch", Class D ANSI 150 lb. with drilling recessed to accept standard tapping valves per MSS-SP 60. Bolt holes shall straddle pipe centerline. Shell gasket shall seal the full circumference of the pipe.

Approved Stainless Steel Tapping Sleeve Manufactures

Ford Meter Box Company, Inc.	FTSS
JCM	Model 432
Power Seal	Model 3480
Romac Industries, Inc.	SST III
Smith Blair	Model 238

2-13.02 Repair Clamps

Repair clamps shall have a full circle (one-section) band with removable drop-in bolts. The band shall be 18-8 type 304 stainless steel. Bolts, washers and nuts shall be high strength, low alloy steel per ASTM A242 and AWWA C111. Clamp shall have a lap type EPDM gasket with molded tapered ends to provide equalized sealing at the lap joint on any pipe within the clamps' range. The clamps shall have a built-in outside diameter (O.D.) range that fits several pipe-outside diameters within the clamp's nominal pipe size range.

Approved Stainless Steel Repair Clamp Manufactures

Ford Meter Box Company, Inc.	F1
Romac Industries, Inc.	CL1
Smith Blair, Inc.	226
Krausz Industries	Hymax

2-14 MAIN LINE PIPE FITTINGS

Main line pipe fittings shall be supplied in accordance with AWWA Standard C110, "Ductile-Iron and Gray-Iron Fittings, 3 inch through 48 inch for Water and Other Liquids". Short body type fittings conforming to AWWA Standard C153 "Ductile-Iron Compact Fittings 3 inch through 24 inch for Water Service" may be used. All fittings shall have mechanical joints unless otherwise specified. All fittings shall be made of ductile iron. Fittings up to 24 inch size shall be 350 psi pressure ratings and over 24 inch size shall be 150 psi pressure rating. Fittings shall be cement mortar lined in accordance with AWWA Standard C104, 'Cement Mortar Lining for Ductile – Iron Pipe and Fittings for Water." Fittings shall be coated with a bituminous material as specified in AWWA Standard C151.

2-14.01 Mechanical Joints

Mechanical Joints shall conform to the requirements of AWWA Standard C111, "Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings."

2-14.02 Flanged Joints

Flanged fittings shall conform to the requirements of AWWA C110 or C153. Flanges shall be drilled to ANSI B16.1, 125lb. standard bolt template. The 250 lb. Flanges, when required, shall be drilled to ANSI B16.1, 250 lb. standard bolt template.

2-14.03 Gaskets

Gaskets for flanged joints shall be made of EPDM rubber, either ring or full-faced, and ⅛ inch thick, bolt holes pre-punched, conforming to the requirements of AWWA C111 and ANSI B16.32. Whenever blind flanges are shown, the gasket shall consist of ⅛ inch thick synthetic rubber that shall cover the entire inside surface of the blind flange and shall be cemented to the surface of the blind flange.

2-14.04 Bolts and Nuts for Mechanical Joints and Flanged Fittings

Tee-head bolts and hexagonal nuts for all mechanical joints shall be high strength, low alloy steel, meeting the current provisions of ANSI/AWWA 0111/A21.11 Standard "Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings," and must be Cor-Ten as manufactured by NSS Industries, or approved equal.

Hexagonal bolts, nuts and washers for flanged fittings shall be zinc plated, high strength, low-carbon steel conforming to the chemical and mechanical requirements of ASTM A307, Standard Specifications for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength, Grade A.

Stainless steel nuts and bolts are required for above ground installations, steel pipe installations and stainless steel tapping sleeves. For all stainless steel nuts and bolts, the Contractor shall strictly follow the torque limitations and shall use N-500 Loctite® anti-seize/rust preventer lubricant manufactured by Henkel Company or approved equal.

All buried nuts and bolts shall be coated after assembly as per Section 4-00.01.

2-15 MAIN LINE VALVES

For water mains, resilient seated gate valves shall be used for 4 to 12 inches and butterfly valves for 14 inches and larger lines, unless shown differently on the plans

or directed by the Engineer. All ferrous components of valves shall be ductile iron and coated with fusion bonded epoxy.

All valves shall open by turning the wrench nut left (counter-clockwise).

Prior to factory valve assembly, all internal and external ferrous metal surfaces shall be coated with a fusion bonded epoxy with a minimum dry film thickness of 10 mils. Coating shall conform to AWWA Standard C550, "Protective Epoxy Interior Coating for Valves."

2-15.01 General

Valves should be ductile iron body, fusion bonded epoxy lines, non-rising stem butterfly or fully encapsulated resilient wedge disk type gate valve and shall not have more than two internal moving parts. All valves shall open by turning the wrench nut counter-clockwise. Operating nut for butterfly valves shall be placed at the north or east side of the water line.

When required, above ground installations shall be resilient seat/wedge disk type valves with outside screw and yoke.

All bronze parts shall contain no more than 7% zinc, nor more than 2% aluminum. Stems shall be low zinc bronze, and equipped with a 2 inch operating nut conforming to AWWA C515. The valve manufacturer shall employ a positive physical means of indicating the specified stem material to insure ready recognition during inspection. The bolts and nuts on the bonnet shall be stainless steel type 304 or 316 with an anti-seize lubricant.

The ductile iron interior and exterior of all valves shall be protected with 10 mils (nominal) fusion bonded epoxy. Coating shall conform to AWWA Standard C213 and C550 and shall be certified to NSF 61. Field repair of epoxy lining is not permitted.

For above ground or vault installation, exterior coating to valves shall be as per Section 5-10.

Resilient wedge type gate valves with a flanged end may be used as "tapping valves."

All valves shall be provided with an epoxy coat stem extension if depth of valve nut exceeds five feet. All valve extensions shall be centered in the valve well by use of a guide and shall be operated freely without binding after installation.

2-15.02 Gate Valves

Gate valves twelve inch and below shall conform to the requirements of AWWA Standard C509 Resilient-Seated Gate Valves and shall be "full wall ductile iron."

All gate valves shall be ductile-iron body equipped with double O-ring stem seals, EPDM O-rings, and stainless steel bolts.

Approved Gate Valve Manufactures	
Clow	C515
US Pipe	Model # A-USP2
Mueller	A-2362

2-15.03 Butterfly Valves

Butterfly valves shall conform to the requirements of AWWA Standard C504. Valves shall have a minimum working differential pressure across the valve disc of 150 psi for class 150B valves and 250 psi for class 250B valves. Valves shall be flanged short-body or restrained mechanical joint as indicated per the Construction Drawings. Flanges for both Valve Class 150B and 250B shall be drilled per ANSI B16.1, 125-pound standard bolt pattern. Valves shall be designed for buried installation.

Component	Material	Specifications
Body	Ductile Iron	ASTM A-536, Grade 65-45-12
Valve Shaft	Stainless Steel	Type 304 and Type 316
Exposed body, cap, screws, bolts and nuts including squeeze-pins		
	Stainless Steel	ASTM A-276, Type 316
Disc	Ductile Iron	ASTM A-536, Grade 65-45-12
Valve Seat	EPDM Rubber	ASTM D-412
O-Rings	Synthetic Rubber	ASTM D-2000

Valve seat material shall be peroxide cured EPDM rubber seat and shall be fastened integrally with the valve body. The valve disc shall be furnished with a stainless steel seating edge to mate with the rubber seat in the valve body. Valves with the seat located on the disc shall not be accepted.

The ductile iron interior and exterior shall be factory coated with NSF 61 approved 16 mils DFT high solids 2 part epoxy of no less than 65% conforming to AWWA standard C550, as manufactured by Amerlock® 400, Tnemic 141, or approved equal.

Valve operators shall be the manual type. Valve actuator shall be supplied and installed on the valve by the valve manufacturer. Gear actuators shall be for buried service applications and shall come furnished with a standard 2" AWWA operating nut. The operators shall be of travelling nut type with adjustable stops for valves smaller than 24 inches in size. The operator for valves 24 inches and larger shall be worm gear type.

Approved Butterfly Valve Manufactures

Mueller	B-3211, Lineseal XP2
Pratt	Groundhog, HP 250
DeZurik	BAW
Clow	4500 Series

2-15.04 End Connections and Gasket Materials

Gaskets shall conform to the requirements of Section 4-07.03 of these Specifications.

Valves shall have mechanical joints or flanged ends, or a combination of both. Unless otherwise shown on plans, all buried gate valves installed at fittings shall be flanged by mechanical joints, with the flange abutting the fitting.

2-15.05 Combination Air Release Valves

Unless otherwise specified, combination air release valves shall be of a single housing that combines the operating features of both an air/vacuum and an air release valve. They shall permit automatic escape of large quantities of air from pipelines when it is being filled, permit large quantities of air to enter pipeline when it is being emptied, and allow accumulating air to escape while pipeline is in operation under pressure. Combination air release valves shall be manufactured to meet or exceed the requirements of AWWA Standard C512, "Air-release, Air/Vacuum, and Combination Air valves for Waterworks Service."

Prior to factory valve assembly, all internal and external ferrous metal surfaces shall be coated with a fusion bonded epoxy with a minimum dry film thickness of 10 mils. Coating shall conform to AWWA C550 and shall be ANSI/NSF Standard 61 certified. Field repair of epoxy lining is not permitted.

There shall be a downward facing screen vent on the valve outlet that meets OSHA requirements.

Approved Air Release Valve Assembly Manufacturers

	1"	2"
ARI	D040	D040
Pratt	WVC10-564-300	WVC20-332-300

2-15.06 Valve Can Assembly

Valve can assembly materials and approved manufactures/models are shown on City of Norco Standard Drawing 470.

2-16 SERVICE LATERAL INSTALLATION

All valves and fittings for use in one inch and two inches service laterals from the main to the meter shall conform to the requirements of AWWA Standard C800, "Underground Service Line Valves and Fittings," and meet the California Health and Safety Code Section 116875. Materials in contact with potable water shall be lead free per SB1334. All corporation stops and angle meter valves used for copper installations shall have compression connection for copper tubing. Approved manufactures are Jones, Ford, McDonald, and Mueller, as shown on City of Norco Standard Drawings 410 and 412.

2-16.01 Corporation Stops

All corporation stops shall have inlet iron pipe (IP) threads as specified by AWWA C800 with outlet being a compression connection for copper tubing.

2-16.02 Angle Meter Valves

All angle meter valves shall be full port "ball" type, have a locking wing on the key operator, and with full 360 degrees rotation of tee head (less stop). All valves for ⅝ x ¾ inch and 1 inch meters shall have a compression inlet and a meter swivel nut outlet. All 2 inch valves shall have a compression connection inlet for two 2 inch copper tubing and a meter flange outlet slotted to accommodate 1½ inch and 2 inch meters. Slots should not extend to the outside edge of flange – open slots are not accepted.

2-16.03 Copper Tubing

Copper tubing for service laterals shall be one inch or two inches seamless, annealed, Type "K" meeting the requirements of ASTM B-88, "Specifications for Seamless Copper Water Tube."

Copper tubing shall be furnished in coils or straight lengths as follows:

Size	Form	Length
1" & 2"	Coils	60' to 100'
2"	Straight Lengths (rigid)	20'

Coils shall be wound in a single layer flat with a minimum 24 inch inside diameter.

2-16.04 Red Brass Pipe

Brass pipe shall conform to the requirements of the "Specifications for Seamless Red Brass Pipe, Standard Sizes" ASTM Specification B-43, and referenced in the appendix to AWWA Standard C800.

2-16.05 Service Saddles

For 1 inch and 2 inch service taps, service saddles are required for all types of pipe. Service saddle outlets shall be tapped as specified by AWWA C800. Outlet threads for 1 inch and 2 inch service saddles shall be iron pipe threads (IP). All service saddles for cast or ductile iron pipe shall be bronze conforming to ASTM B-62 with double strap. All service saddles for PVC pipe, AWWA Standard C900, shall be bronze conforming to ASTM B-62, incorporating stainless steel bands in place of the standard bronze straps. Approved manufactures and catalog numbers are shown on City of Norco Standard Drawings 410 and 412.

Service tapping to concrete cylinder pipes shall only be made under special approval by the Public Works Department.

2-16.06 Meter Boxes and Vaults

Meter boxes and vaults shall be constructed of straight wall polymer concrete. Where required, meter boxes shall have traffic loaded rating covers. All Covers that are exposed to foot traffic have a slip resistant surface that meet the American with Disabilities Act slip resistance requirements. Contractor is responsible for selecting a meter box or vault that is sized appropriately to accommodate all required water materials specified in Standard Drawings. The meter lid must include a properly sized cut-out to fit a Sensus Model 520M radio transceiver. Contractor is required to submit said meter box or vault to the City for review and approval prior to installation.

Approved Manufacturer
Armorcast Products Company

2-17 LARGE SERVICE INSTALLATION

2-17.01 Meter Assembly

All large service installations, except fire lines, shall include a meter, backflow device, and provisions for a temporary bypass line and test tee. For three-inch and larger service laterals, meter size, type and

manufacturer, bypass, test tee, and backflow device are shown on City of Norco Standard Drawings 415.

Meter Manifolds - For projects that require the installation of multiple meters the City may elect to require a manifold of meters to be installed off of one service lateral that can meet all flow demands. All manifolds shall be designed and approved by the Engineer.

2-17.02 Tapping Tees
See Section 4-06.01 of these Specifications for tapping requirements.

2-17.03 Backflow Prevention Assemblies and Fire Lines
See Section 3 of these Specifications for backflow prevention assembly and fire line requirements.

2-17.04 Guard Posts
Where required by the plans or by the Engineer if field conditions so dictate, guard posts shall be installed. The number, size and specific location of such posts will be determined by the Engineer if not shown on the plans. Guard posts shall be per City of Norco Standard Drawing 431.

2-18 METERS

The Public Works Department will provide the required water meter for each new service. All fees for new services and meters must be paid prior to the new meter being provided.

2-18.01 Positive Displacement Types
The use of positive displacement meters requires prior approval by the Public Works Department and will be authorized only on a case by case basis. All meters shall consist of a bronze main case with serial numbers stamped on the main case. All meters shall be read in cubic feet.

2-18.02 Turbine Types
The use of turbine meters requires prior approval by the Public Works Department and will be authorized only on a case by case basis. When authorized, all turbine meter installations shall include a strainer and shall conform to AWWA C701. All meters shall consist of a bronze main case with serial numbers stamped on the main case. All meters shall be read in cubic feet.

2-18.03 Compound Types
The use of compound meters requires prior approval by the Public Works Department and will be authorized only on a case by case basis. When authorized, all compound meter installations shall include a

strainer and shall conform to AWWA C702. All meters shall consist of a bronze main case with serial numbers stamped on the main case. All meters shall be read in cubic feet.

2-18.04 Multi-Jet Types

The use of multi-jet meters requires prior approval by the Public Works Department and will be authorized only on a case by case basis. When authorized, all multi-jet meter installations shall conform to AWWA C708. All meters shall consist of a bronze main case with serial numbers stamped on the main case. All meters shall be read in cubic feet.

2-19 DEVIATION FROM SPECIFICATIONS

Any deviation from these specifications shall be submitted in writing by the Contractor to the Engineer. Said submittals shall be delivered to the Engineer to allow sufficient time for review. The Engineer's determination will be provided in writing and must be available to the Contractor two (2) working days prior to construction schedule.

2-20 MATERIAL CERTIFICATIONS

All water system materials furnished for installation by Contractor shall be provided with clear manufacturer's markings and labeling indicating that the material furnished meets the standards and requirements of these Specifications. All materials shall be new, not previously used, and of current manufacture. In addition, the engineer may request that a written manufacturer's statement be provided indicating that a material conforms to the standards and requirements of these Specifications.

All materials shall be subject to inspection. No materials shall be installed until accepted by the Engineer.

A copy of invoices of all materials furnished by the Contractor shall be furnished to the Engineer as proof of compliance with these specifications upon request.

All like materials shall be of one manufacture for any particular project.

2-21 GENERAL

Unless specified differently on the plans or as supplemented herein, installation of ductile iron pipe, valves, fittings, fire hydrants, and appurtenances shall conform to the applicable requirements of AWWA C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances," and the applicable provisions of the Ductile Iron Pipe Research Association (DIPRA) "Guide for the Installation of Ductile Iron Pipe." Installation of Polyvinyl Chloride (PVC) Pressure pipe shall conform to the requirements of AWWA Standard C605, "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water."

The Contractor shall furnish all labor, equipment and materials required to construct, install, and complete the ductile iron pipelines, connections, valves, fittings, fire hydrants, thrust restraints, and all other appurtenances as shown on the plans and specified herein.

The interior of all pipes, valves, fittings, and fire hydrants shall be kept free from dirt and foreign materials at all times during the progress of the work and left clean at the completion of installation.

2-22 CONSTRUCTION MATERIALS

The Contractor shall furnish only approved materials per Section 4, "Materials" and Section 8, "Referenced City of Norco Standard Drawings," of these Specifications. All materials shall be new and of the best quality for their intended use. All like materials shall be of one manufacturer for any particular project.

2-23 INSTALLING WATER MAIN PIPE

The pipe and fittings shall be inspected for defects prior to lowering in trench. All lumps, blisters, excess coating, and other foreign materials shall be removed from the bell and spigot ends of each pipe. The outside of the spigot and the inside of the bell shall be wiped clean and dry and shall be free from oil and grease before the pipe is laid.

Pipe shall be lowered into the trench with fabric or other approved slings. Under no circumstances shall pipe be dropped, pushed off the bank, or allowed to fall into the trench. Every precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the trench. If the pipe-laying crew cannot put the pipe into the trench and in place without getting soil into it, the Public Works Department may require that before lowering the pipe into the trench, a temporary plug be placed over each end and left there until the connection is to be made to the adjacent pipe. During laying operations, no debris, tools, clothing or other materials shall be left in the pipe.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by watertight plug or other means approved by the Public Works Department. This provision shall apply during lunch-hour breaks as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

2-23.01 Laying Ductile Iron Pipe, Bends, and Fittings

Installation of pipes, bends and fittings shall be in accordance with AWWA Standard C600, "Installation of Ductile-Iron Water Mains and Their Appurtenances". Whenever it is necessary to deflect pipe from a straight line either in the vertical or horizontal plane to avoid obstructions or where long radius curves are required, the amount of deflection allowed shall not exceed that required by DIPRA for a satisfactory joint and shall be approved by the Engineer. Short lengths of pipe may only be used at locations where fittings are to be installed or in situations

where adequate total horizontal and/or vertical joint deflection may not be obtained by using a standard length of pipe.

Except where necessary in making connections with other water pipelines, or where otherwise authorized by the Engineer, pipe shall be laid with the bells facing in the direction of installation. For lines on appreciable slopes, bells shall face upgrade unless directed otherwise by the Engineer.

During laying operations, no debris, tools or other foreign materials shall be placed in the pipe. When pipe lay operation is not in progress, the open ends of pipe shall be kept tightly closed by watertight expandable plugs or other means approved by the Engineer.

No pipe or appurtenances shall be laid in water or when, in the opinion of the Engineer, trench or weather conditions are unsuitable for such work.

After pipe has been set in trench, exterior of spigot and interior of bell shall be thoroughly cleaned. A water-soluble, NSF 61 approved and nontoxic lubricant as approved by pipe manufacturer shall be applied to rubber gasket. Pipe ends shall be aligned, and spigot shall be pulled into bell with come-along devices, or hoists with chains and slings, unless permitted otherwise by the Engineer. If a pry bar is used, a timber header shall be placed between the pipe and the pry bar before the spigot is pushed into bell. A feeler gage shall be used to determine if each joint has been properly assembled.

2-23.02 Polyethylene Protective Wrapping

Unless otherwise shown on the plans, polyethylene protective wrapping (Polywrap) for ductile iron pipe shall be furnished and installed on all buried water lines, except where water lines are within steel casing pipe, in accordance with the requirements of AWWA Standard C105, "Polyethylene Encasement for Ductile Iron Pipe Systems," Section 4 of these Specifications, and as supplemented herein. Polywrap shall be installed so as to prevent any sections of the pipe, fittings, valves, services, or appurtenances from contacting the soil. The polywrap shall be taped to provide a snug fit along the pipe.

Any punctures, tears or other damages shall be patched with polyethylene wrap and tape. Openings for service taps, blow offs or similar appurtenances shall be cut in the polywrap during backfilling of the trench. Rock or other materials that could damage the wrapping shall not be allowed in the backfill.

2-23.03 Protection of Metal Surfaces

All exposed metal surfaces of the valves, flanges, bolts, nuts, tie-rods, turn buckles, etc., in contact with the earth and backfill materials shall be coated with a minimum of 30 mils of bitumastic coating prior to backfilling. In addition to this coating, the main and fittings shall be encased in polyethylene wrapping as described in Section 5-03.04.

2-23.04 Thrust Restraints

Unless shown differently on the plans or as directed by the Engineer, thrust restraints shall be required at all bends, tees, pipe ends, and fire hydrant bury. Thrust restraints through other mechanical means as specified in Section 4-04 of these Specifications shall also be incorporated.

2-23.05 Flushing

After the pipeline has been completely installed, flushing of the pipeline shall be done per the requirements of Section 6 of these Specifications.

2-24 VALVE BOX ASSEMBLY

Unless specified differently on the plans or as supplemented herein, installation of a valve box assembly shall conform to the requirements of City of Norco Standard Drawings 470. All buried gate and butterfly valves shall be boxed with the valve cover flush with the finish street pavement grade. The valve box riser shall rest on the bonnet of the gate valve and shall be cut to the required length to assure a level and/or flush fit to finish grade. The valve box shall be installed so as not to transmit shock loads or stress to the valve. All valve boxing shall be installed straight and plumb and centered over the valve operating nut. All active valves shall be accessible at all times during construction operations.

A valve stem extension is required when the depth from finished grade to the operating nut is greater than 60 inches. The valve stem extension shall be per City of Norco Standard Drawing 471.

Excavation and backfill for a valve box assembly shall be per Section 2 of these Specifications.

2-25 LARGE SERVICE LATERALS, BACKFLOW ASSEMBLIES, AND FIRE LINES

Unless specified differently on the plans or as supplemented herein, installation of large service laterals (3-inch and larger) shall conform to City of Norco Standard Drawings 415 and 416.

The Contractor shall be responsible for preparation of the necessary design plan showing the proposed large service installation together with meter and appurtenances, backflow assemblies and fire lines. The plan shall be submitted to the Engineer for review and must be approved prior to the beginning of construction. All licenses and permits, and other requirements shall be in accordance with the requirements of Section 1 of these Specifications.

The horizontal runs of all above ground large services, backflow assemblies, and fire lines shall be installed in a level position.

No sewers and water laterals shall be laid in the same trench.

Contractor shall field paint all aboveground, bare, or exposed piping and appurtenances of large services, backflow assemblies, and fire lines in accordance with the applicable field painting requirements addressed later in this Section.

2-25.01 Meters

All large service installations shall include a meter and provisions for a temporary bypass line. Meters shall conform to size, type and manufacturer as shown on the plan or per City of Norco Standard Drawing 415. The Engineer reserves the right to specify the type of meter if, in the Engineer's sole opinion, a specific type of meter is best suited for the proposed application. Meters shall read in cubic feet.

Meter Manifolds - For projects that require the installation of multiple meters the City may elect to require a manifold of meters to be installed off of one service lateral that can meet all flow demands. All manifolds shall be designed and approved by the Engineer.

2-25.02 Backflow Assemblies

Unless specified differently on the plans, all larger service installations shall include backflow assemblies per Section 3 of these Specifications.

2-25.03 Fire Lines

Unless specified differently on the plans or as supplemented herein, installation of fire lines shall conform to City of Norco Standard Drawings 416 and 451.

2-26 SMALL SERVICE LATERALS

All materials for one inch and two inch diameter service laterals shall be supplied and installed by the Contractor per Section 4 and City of Norco Standard Drawings 410 and 412, respectively. The service lateral shall consist of a double strap service saddle, corporation stop, copper tubing, angle meter stop, meter, customer valve, meter box assembly and materials necessary to reconnect existing (customer) house pipe. Reconnection of house pipe shall be with like material. Reconnected copper pipe shall have soldered connections. Reconnected galvanized pipe shall include dielectric union at the brass nipple connection, downstream of meter box.

Meter Manifolds - For projects that require the installation of multiple meters the City may elect to require a manifold of meters to be installed off of one service lateral that can meet all flow demands. All manifolds shall be designed and approved by the Engineer.

Service laterals shall be installed perpendicular to the centerline of the street with a four inch "W" letter chiseled into the curb face opposite the location of the corporation stop.

Meter boxes shall be brought to grade upon construction of concrete sidewalks and grading of parkway. Meter boxes for 1 inch service laterals located in areas subject to traffic loading, or located behind rolled curbs shall be installed with traffic bearing covers. Regardless of location, all meter boxes for 1½ inch and 2 inch meters shall be installed with traffic bearing covers.

No sewers and water laterals shall be laid in the same trench.

All new services shall be installed before new mains are pressure tested and chlorinated.

2-26.01 Backfill Compaction

Backfill and compaction requirements in the area adjacent to the copper tubing service later shall conform to Section 2 of these Specifications. Compaction of backfill materials by mechanical means directly over the exposed service tubing shall not be allowed unless approved by the Engineer.

2-26.02 Backflow Assemblies

Unless specified differently on the plans or as supplemented herein, installation of backflow assemblies for small installations shall conform to City of Norco Standard Drawing 412, 415, 450, 451 and Section 3 of these Specifications.

2-27 CONNECTION TO THE EXISTING DISTRIBUTION SYSTEM

The Contractor shall make the connection to the existing distribution system as shown on plans or as directed by the Engineer. All connections must be made in the presence of the Engineer. Proper hydrostatic testing, disinfecting and flushing of new facilities must take place per Section 6 of these Specifications prior to permanent connections.

2-27.01 Pressure Tapping

The Contractor may tap cast iron and ductile iron distribution mains under pressure as approved by the Engineer (no-size on size tapping). The exterior surface of the pipe shall be cleaned to provide a smooth surface for the tapping sleeve. The tapping sleeve shall be secured to the pipe to prevent movement during the tapping process. The Engineer may require the Contractor to install a flanged tee to accommodate the new service lateral.

Pressure tapping of concrete cylinder pipe requires prior written approval by the Engineer.

2-27.02 Shutdown of Main

All work necessary to shut down an existing distribution main for the benefit of the Contractor shall be operated by the Public Works Department. Under no circumstances shall the Contractor operate valves, hydrants, and other appurtenant equipment on the existing distribution system.

It shall be the Contractor's responsibility to coordinate the necessary shutdown schedules through the Engineer assigned to the project. Scheduled shutdowns shall require sufficient time to allow operation personnel to review, approve, and develop an appropriate program.

The City will make a concerted effort to isolate the system as planned with the Contractor. If a water-tight shut down cannot be achieved, the Contractor shall be prepared to employ necessary pumping equipment to remove the water from the trench. City shall not be responsible for any delays due to system shutdown and isolation.

All emergency situations shall be reported immediately to the City at (951) 270-5602 (7 am to 6 pm) and after-hours at (951) 371-1143 (6 pm to 7 am). When an extensive and/or lengthy main shutdown is required, the Engineer will determine what temporary service connections may be required. The Contractor shall furnish all necessary hoses, piping, valves, tank trucks and associated labor required to provide such temporary service at no cost to the City. All piping, hoses, and associated equipment used in temporary service connections shall be

flushed and disinfected in accordance with Section 6 of these Specifications.

In making connections to existing mains, the Contractor shall perform the work in the shortest time possible and shall do the work in such a manner and as such time that will cause the least inconvenience to water users because of shutoff water services. No valves or other controls on the existing distribution system shall be operated for any purpose by the Contractor without the approval of the Engineer. All consumers affected by such operation shall be given a notice letter at least two working days before the operation advising of water service outage and the probable time when service will be restored. All such service interruption notices shall be prepared and distributed by the City to ensure proper notification is completed.

All tie-in locations shall be excavated a minimum of one working day in advance of final connection to expose the affected portions of existing pipelines and to allow time for the necessary measurements, assembly of materials and equipment, and assuring that all pre-assembled piping and fittings will be compatible with the existing main.

The Engineer may postpone or reschedule any shutdown operations if for any reasons he feels that the Contractor is improperly prepared with competent personnel, equipment, or materials to proceed with connection work. If it appears the connection to the existing distribution main cannot be made in the time specified, the City shall order necessary corrective measures at the Contractors expense.

2-27.03 Transfer of Jurisdiction of Completed Work

The Contractor shall be aware that once a physical connection is made to the City's system, the valves and appurtenances are under the City's jurisdiction and shall only be operated by authorized City personnel on a prearranged program schedule. The transfer of jurisdiction does not relieve the Contractor of any responsibilities for the quality of work or materials.

2-28 ABANDONMENT OR REMOVAL OF EXISTING WATER MAINS, VALVES, AND APPURTENANCES

Existing water mains, valves and appurtenances shall be abandoned at the locations as shown on the plans. Contractor shall abandon the existing water main facilities after transferring of jurisdiction of the new main to the City. Contractor shall use 1-sack slurry to fill all abandoned waterlines. Existing water mains, valves and appurtenances denoted to be removed shall have the interfering portions of existing facilities completely removed and legally disposed of by the Contractor in accordance with local, state and federal laws.

2-29 FIELD PAINTING

The Contractor shall field paint all above ground, bare, or exposed piping and appurtenances in accordance with the applicable specifications and plans. Unless specified differently on the plans or as supplemented herein, painting of water system installations as identified below shall conform to the applicable requirements of Section 310 of the Standard Specifications and in accordance with manufacturer's recommendations. Contractor shall not spray paint during windy conditions.

2-29.01 Surface Preparation

Remove all dirt, grease and oil from surfaces to be painted by washing the surface with cleaner/degreaser, commercial detergent or other approved cleaning methods. Loose rust, scale and deteriorated coatings shall be removed by sandblasting, scraping and wire brushing, or power tool cleaning. Galvanized and non-ferrous surfaces shall be solvent cleaned.

Care should be taken to protect outside screw and yoke (OS&Y) gate valve stems, meter registry, glass, brass test cocks, I.D. tags and other surfaces identified by the Engineer during surface preparation. These items should be masked off and not receive any primer finished coat.

2-29.02 Primer Finished Coat

All installation surfaces shall be primed with Gray Primer aerosol spray coating (2 mils). The first finished coat may be applied after primer has dried.

The following installations shall have two finished coats (2 mils each) aerosol spray coating. The second finish coat shall be applied within 1 hour or after 48 hours. Listed below are installations and associated colors and manufacturer's paint catalog numbers:

Dark Green	Black	Safety Red
Fireline Assemblies	Steel Plate Meter Box Covers	Private Fire Hydrants
Large Meter Assemblies		Valve Stem Extensions
Backflow Assemblies	Fire Dept. Connections	

The following installations shall have two finished coats (2 mils each) aerosol spray coating. The second finished coat shall be applied after 24 hours. Listed below are installations and associated colors and manufacturer's paint catalog numbers:

Safety Yellow
Public Fire Hydrants

Air Release Assembly Covers (metal)
Guard Posts

FILLING, TESTING, AND CHLORINATION

Upon completion of laying, joining, and backfilling, and after pipe lengths comprising the line are not less than 7 days old, and prior to resurfacing, pipeline shall be hydrostatically tested. CONTRACTOR shall provide all necessary thrust restraint required for the hydrostatic testing. Where any section of the piping contains concrete thrust blocks or encasement, do not make the pressure test until at least 10 days after the concrete has been placed. When testing mortar-lined or PVC piping, fill the pipe to be tested with water and allow it to soak for at least 48 hours to absorb water before conducting the pressure test.

The Contractor shall furnish all equipment, labor and material, including water, for testing and disinfecting the pipelines. All tests of the piping shall be made in the presence of the City. All pipelines and appurtenances shall be thoroughly flushed out with water prior to testing. Prior to performing the test, the section of pipeline to be tested shall be filled with water and placed under a slight pressure for at least 48 hours. Prior to pipeline loading video inspection of water pipelines shall be performed in the presence of the Inspector. Prior to inspection, the equipment to be used shall be disinfected and lines shall be drained. Complete videotapes and a detailed report of the inspection shall be furnished to the City.

The Contractor shall pressure test the pipeline in conformance with AWWA C605. Testing shall occur at the rated pressure of the pipe as measured at the lowest point in the tested section. Required test pressure shall then be applied and maintained for a 4-hour period. Water required to maintain test pressure shall be measured by meter or other means acceptable to City.

Disinfection shall be accomplished by chlorination after the line has been tested for leakage. Prior to chlorination, the pipeline shall be thoroughly flushed. A chlorine-water mixture shall be applied by means of a solution-feed chlorinating device. The chlorine solution shall be applied at one end of the pipeline through a tap, in such a manner that as the pipeline is filled with water the dosage applied to the water entering the pipe shall be about 50 ppm or enough to meet the requirements herein. Care shall be taken to prevent the strong chlorine solution in the pipeline being disinfected from flowing back into the pipeline supplying the water.

As an alternate to that indicated above the Tablet Method as specified in AWWA Standard C651, Section 5.1 may be approved by the City when the pipeline is less than 500 feet long, less than 12 inch diameter, and constructed as specified in AWWA Standard C651, Section 5.1. Tablet application shall be in accordance with Table of AWWA Standard C651, Section 5.1.

Chlorinating water shall be retained in the pipeline long enough to destroy all non-spore

forming bacteria. This period shall be at least 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at other representative points shall be at least 25 ppm. This procedure shall be repeated, if necessary, until samples of water, as determined by the City, show the pipeline to be in a sterile condition. During the process of chlorinating the pipeline, all valves or other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water. Care shall be exercised such that no valve shall be opened that allows the heavily chlorinated water to enter portions of the pipelines, which are already in service.

Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its lengths shows upon test, a chlorine residual of less than one (1) mg/l. In the event chlorine is normally used in the source of supply, the chlorine test shall indicate chlorine residual less than or equal to that carried in the system.

The Contractor shall provide all equipment and supplies for performance work and shall flush water at locations or by procedures approved by the City. Permission and permits from regulatory agencies for discharging water shall be obtained by the Contractor. The Contractor shall (at his expense) apply a reducing agent to the solution to neutralize residual chlorine or chloramines remaining in the water. Flow of water shall be controlled to prevent erosion, damage to vegetation, and altering ecological conditions. After final flushing, and before the water pipeline is placed in service, water samples shall be taken and tested for bacteriological quality. If the initial disinfection fails to produce satisfactory samples, the disinfection process shall be repeated until satisfactory samples have been obtained. Once samples are satisfactory and the City has given approval, the pipeline may be placed in service. After passing an initial bacteriological test with a negative Coliform Test but having a high plate count, the Contractor may, with the approval of the City, be allowed to flush using a 6" or greater connection to the City's domestic system.

An acceptable test shall be a negative Total Coliform 24 hour Presence/Absence Test and a standard plate count (Heterotrophic Plate Count or HPC) of less than 100 colony-forming units (cfu) per milliliter.

Alternately a plate count of no more than 50% greater than the City's incoming supply water to the project area will be considered passing.

All disinfection testing shall be at the Contractor's expense and shall be inspected/monitored by the City. Bacteriologic samples will be taken by City personnel and tested at a City approved laboratory.

CONTROL OF WATER

The CONTRACTOR shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of all water entering the excavations or other parts of the work. Ground water shall not be allowed to rise around pipe installations until jointing compound in the joints has set.

The CONTRACTOR shall dispose of the water from the work in a suitable manner without