

SECTION 31 23 33 - TRENCHING, BACKFILLING & COMPACTING

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Trenching, backfilling and compacting.
2. Surface restoration.

B. Related work in other Sections:

1. Selective demolition: Section 02 41 13 .
2. Earthwork: Section 31 00 00.
3. Storm Drainage Utilities: Section 33 40 00.
4. Piped Utilities: Section 33 00 00.
5. Sanitary Sewerage Utilities: Section 33 30 00.
6. Water Utilities: Section 33 10 00.

1.02 QUALITY ASSURANCE

A. Reference standards: The applicable provisions of the following govern the work of this Section.

1. American Society for Testing and Materials (ASTM).
 - a. D1556: Density of Soil in Place by Sand Cone Method.
 - b. D1557: Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using a 10 lb (4.5 kg) Rammer and 18" (457mm) drop.
2. California Department of Transportation (CDT).
 - a. Standard Specifications.
 - b. Standard Test Methods: No. 202, 216, and 231.
3. CAL/OSHA Regulation for Construction: Section 29 CFR.

TRENCHING, BACKFILLING & COMPACTING

- B. The degree of compaction specified herein shall be determined by California Test Method No. 216 or No. 231. Unless otherwise noted, the percentage specified shall be the minimum allowable.

1.03 SUBMITTALS

- A. Submit Product Data under 2.01 Materials, certifying that each material item complies with specified requirements.

1.04 SITE CONDITIONS

- A. Comply with OSHA Construction Safety Orders, and specifically with those provisions dealing with trenching and underground construction.

1.05 SYSTEM DESCRIPTION

- A. Definitions:

1. A trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation.
2. Excavations for appurtenant structures, such as but not limited to manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall be deemed to be in the category of trench excavation.

- B. Unless otherwise indicated on the Drawings, excavation for pipelines shall be open cut.

2.00 PRODUCTS

2.01 MATERIALS

- A. Select backfill material:

1. Sand or granular materials, free from organic matter, of the quality herein specified. Select backfill material shall have a size and gradation falling within the following limits when determined by California Test No. 202:

Sieve Size	Percentage Passing Sieve
1"	100
No. 4	50-100
No. 200	5 max.

2. The minus 200 portion of the material expressed as a percentage multiplied by the Plasticity Index shall not exceed 100.

- B. Detectable tape: Detectable tape shall be 5.0 mil composition film containing metalized foil laminated between layers of inert plastic film, such as Detectable Terra Tape or approved equal. The tape shall be highly resistant to alkalis and acids found in the soil.

TRENCHING, BACKFILLING & COMPACTING

The tape, when buried 4' deep, shall be detectable by buried pipe or cable locating equipment. The tape shall be 3" wide and bear a continuous printed message warning of the type of utility buried beneath.

3.00 EXECUTION

3.01 PREPARATION

A. General:

1. Prior to trenching excavate at locations where new lines cross other utilities of uncertain depth and determine the elevation of the utility in question to ensure that the new line will clear the potential obstruction.
2. If, after excavation, the crossing utility does present an obstruction, then the line and grade of the new line will be adjusted as directed by the Engineer to clear the utility.

3.02 TRENCHING

A. General:

1. Trenching shall include removal of all water and materials that interfere with construction. Remove water which may be encountered in the trench by pumping or other methods during the pipe laying, bedding and backfill operations. Material shall be sufficiently dry to permit approved jointing.
2. Excavation shall include the construction and maintenance of bridges required for vehicular and pedestrian traffic, support for adjoining structures and where necessary, the rearrangement and repair of adjoining utilities.
3. It shall be the Contractor's responsibility to direct vehicular and pedestrian traffic through or around his work area at all times.
4. Except as specified in other Sections, the Contractor shall relocate, reconstruct, replace or repair, at his own expense, existing utilities, walls, fences, services, other structures or improvements of what ever nature, which are in the line of construction or which may be damaged, removed, disrupted or otherwise disturbed by the Contractor whether specifically identified on the Drawings or not. The Contractor shall connect such utilities to existing systems and leave all in a workable and operating condition.
5. Tree roots over 2" in diameter and crossing pipelines shall be protected by using hand excavation; refer to Section 31 10 00. Hand excavation shall mean excavation using the smallest piece of motorized equipment available in combination with manual use of hand equipment, with the intent to minimize the damage to low hanging tree limbs, tree roots and utilities.

- B. Existing paving and concrete: The following supplements the requirements of Section 31 10 00.

TRENCHING, BACKFILLING & COMPACTING

1. Existing pavement over trench shall be sawcut, removed and hauled away from the job. Existing pavement shall be neatly sawcut along the limits of excavations. If a longitudinal pavement joint or edge of pavement is located within 3' of the limit of excavation, all intervening pavement shall be removed and replaced after completion of backfilling.
2. Existing concrete over the trench shall be sawcut to a minimum depth of 1½" in straight lines either parallel to the curb or at right angles to the alignment of sidewalk. No section to be replaced shall be smaller than 30" in either length or width. If the sawcut would fall within 30" of a construction joint, expansion joint, or edge, or within 12" of a score mark, the concrete shall be removed to the joint, edge or mark.
3. Place boards or other suitable material under backhoe outrigging to prevent damage to paved surfaces.

C. Trench Width:

1. The maximum allowable trench widths at the top of the pipe shall be the following:

Pipe Type	Trench Width (Max.)
Cast-iron	Outside diameter of barrel plus 18"
Ductile-iron	Outside diameter of barrel plus 18"
PVC	Outside diameter of barrel plus 18"
VCP	Outside diameter of barrel plus 18"
Concrete cylinder	Outside diameter of barrel plus 18"
Welded steel	Outside diameter of barrel plus 18"
Corrugated metal	Outside diameter of barrel plus 18"
RCP	Outside diameter of barrel plus 18"

- a. The maximum trench width shall be inclusive of all shoring.
 - b. If the maximum trench width is exceeded, the Architect may direct the Contractor to embed or cradle the pipe in concrete at no additional charge to the Owner.
2. In no case shall the free working space on each side of the pipe barrel be less than 6".

D. Open trench:

1. The maximum length of open trench shall be 300' or the distance necessary to accommodate the amount of pipe installed in a single day, whichever is greater. No trench shall be left open at the end of the day.
2. Provisions for trench crossings and free access shall be made at all street crossings, driveways, water gate valves and fire hydrants.

TRENCHING, BACKFILLING & COMPACTING

E. Excavation bracing:

1. The excavation shall be supported and excavation operations conducted in accordance with the California Industrial Accident Commission, State of California, Division of Industrial Safety requirements, and OSHA.
2. The Contractor shall, at his own expense, furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of all excavations (whether above or below the pipe grade), and to prevent any movement which could in any way diminish the required trench section or otherwise injure or delay the work. The sheeting and bracing shall be withdrawn to prevent any earth movement that might overload the pipe.

F. Excavated material:

1. Material excavated and not required for backfill shall be immediately removed and properly disposed of off the Owner's site.
2. Material excavated in streets and roadways shall be laid alongside the trench and kept trimmed to minimize inconvenience to public traffic.
3. Provisions shall be made whereby all storm and wastewater can flow uninterrupted in gutters or drainage channels.
4. Excavated material shall not be stored on landscaping.

3.03 PIPE BEDDING

- A. Bedding excavation: Excavate the trench below the grade of the pipe bottom to the following minimum depths:

Pipe Type	Depth
Cast-iron	6"
Ductile-iron	6"
PVC	6"
VCP	6"
Concrete cylinder	4"
Welded steel	4"
Corrugated metal	3"
RCP	3"

- B. Stabilization of trench bottom: When the trench bottom is unstable due to wet or spongy foundation, trench bottom shall be stabilized with gravel or crushed rock. The Engineer will determine the suitability of the trench bottom and the amount of gravel or crushed rock needed to stabilize a soft foundation. Soft material shall be removed and replaced with gravel or crushed rock when ordered by the Soils Consultant.

TRENCHING, BACKFILLING & COMPACTING

- C. Placement of bedding material: Sufficient select backfill material as specified in Paragraph 2.01 A (above) shall be placed in trench and tamped to bring trench bottom up to grade of the bottom of pipe. The relative compaction of tamped material shall be not less than 90% as determined by ASTM D1556 or California Test 216. It is the intent of these Specifications to provide uniform bearing under the full length of pipe to a minimum width of 60% of the external diameter.

3.04 TRENCH BACKFILL

A. Initial backfill:

1. Prior to trench backfill, the Owner's Representative will inspect the condition of the trench and laying of pipe.
2. Select backfill material as specified in Paragraph 2.01 A (above) shall be used for initial backfill. After the pipe has been properly laid and inspected, select backfill material shall be placed on both sides of the pipe and compacted to final depth as follows:

Pipe Type	Depth
Cast-iron	12" above top of pipe
Ductile-iron	12" above top of pipe
PVC	12" above top of pipe
VCP	12" above top of pipe
Concrete cylinder	12" above top of pipe
Welded steel	12" above top of pipe
Corrugated metal	½ outside diameter of pipe
RCP	(Pipe spring line)

3. Compaction:

- a. Initial backfill compaction shall be by mechanical means. The initial backfill material shall be hand tamped in layers not exceeding 4" in uncompacted depth and shall be brought up uniformly on both sides of the pipe to avoid bending or distortional stress. After hand tamping, the relative compaction of the initial backfill material shall be not less than 90%.
- b. Compaction testing will be in accordance with one or more of the following methods: California Test No. 216, California Test No. 231, ASTM 1556, or ASTM 1557.

- B. Detectable Tape: In trenching continuing non-metallic pipes, detectable tape shall be placed on top of the initial backfill, except with reinforced concrete pipe where the tape shall be placed 12" above top of pipe.

C. Subsequent Backfill:

TRENCHING, BACKFILLING & COMPACTING

1. Above the level of initial backfill, the trench shall be backfilled with native material from trench excavation or with select imported material. Subsequent backfill shall be free of vegetable matter, stones, or lumps exceeding 3" in greatest dimension, and other unsatisfactory material. The Soil Engineer shall approve the backfill material prior to replacement.
 2. Subsequent backfill compaction shall be by mechanical means. The backfill material shall be placed in layers not exceeding 6" in loose depth, and each layer shall be thoroughly compacted before succeeding layers are placed. The use of machine tampers, except manually held types, shall not be permitted.
 3. Relative compaction shall be at least 90%.
- D. Backfill Cap: trench backfill shall be capped with 12 inches of backfill compacted to 95% of relative compaction. Lift shall be no more than 6".

3.05 TRENCH SURFACING

- A. General: In areas to be improved under separate contract, the trench shall be backfilled and graded to the level of adjacent surfaces. No mounds of earth shall be left along the trench.
- B. Temporary surfacing in areas to remain in use by the public:
1. Temporary surfacing shall be 2½" of cut back asphalt on 12" of Class 2 aggregate base.
 2. Temporary surfacing shall be laid within one day after backfilling.
 3. Before the trenching area is opened to traffic, excess dirt, rock and debris shall be removed and the street surface shall be swept clean.
 4. Temporary surfacing shall be maintained to prevent the occurrence of mudholes and prevent the surface from settling below 1" or rising more than 1" from the existing pavement grade.

3.06 INSPECTION

- A. Pipes shall be inspected/tested prior to backfilling and compaction, tests as required shall be performed to ensure compliance with these Specifications. The test(s) shall be conducted at no cost to the Owner.
- B. A final inspection upon completion of the paving operation shall be made to ensure conformity with the existing pavement surface.

END OF SECTION 31 23 33

SECTION 33 00 00 - PIPED UTILITIES

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Connection to existing systems.
2. Pipe installation and connection to building stubouts.

B. Related work in other Sections:

1. Trenching, backfilling and compacting: Section 31 23 33.
2. Storm Drainage Utilities: Section 33 40 00.
3. Sanitary Sewerage Utilities: Section 33 30 00.
4. Water Utilities: Section 33 10 00.

1.02 QUALITY ASSURANCE

- A. Refer to specific utility Sections as noted above.

1.03 HANDLING

- A. Inspect materials delivered to site for damage. Unload and store with minimum handling. Store materials on site in enclosures or under protective covering. Store plastic piping, insulation, joint materials, fittings, valves and rubber gaskets under cover out of direct sunlight. Do not store materials directly on ground. Keep interiors of pipes and fittings free of dirt and debris.
- B. Handle pipe, fittings, valves and other accessories in such a manner as to ensure deliver to the trench in sound and undamaged condition. Take special care to avoid injury to coatings and linings on pipe and fittings; make satisfactory repairs if coatings or linings are damaged. Carry pipe to the trench; do not drag it.
- C. The pipe will be inspected at destination to assure compliance with specified requirements. Any pipe or couplings that are found to be defective or that do not meet the requirements of the Specifications shall be replaced. Rejection of 10% of any shipment shall be cause of, and will be considered sufficient reason for, rejection of the entire shipment.

2.00 PRODUCTS

- A. Refer to specific utility Sections as noted above.

3.00 EXECUTION

- A. Any connections to public improvements require notification of, and inspection by the City or Public Utility Company.

3.01 CONNECTION TO EXISTING SYSTEM(S)

- A. Make connections to existing lines at a time which will cause a minimum of disruption to the existing system. Any service interruption(s) shall be coordinated with and approved by the Engineer. Overtime costs shall be paid for by the Contractor.
- B. Contractor shall coordinate with and arrange for "hot" tap connections to existing mains by forces of the Water Service Agency. Owner will pay separately for work to be done by the Water Service Agency.

3.02 PIPE INSTALLATION

- A. Laying and jointing of pipe and fitting shall be in accordance with the manufacturer's recommendations. Joint deflections shall not exceed the maximum recommended by the manufacturer. There shall be no shoulder or unevenness along the interior of the pipe at the shoulder joints.
- B. Provide proper facilities for lowering sections of pipe into trenches. Do not under any circumstances drop or dump pipe, valves, fittings or other appurtenances into trenches. Do not drag pipe with preformed rubber joint seals against trench walls and damage the seals.
- C. Cut pipe accurately to measurements established at the site and work into place without springing or forcing. Do not use pipe or fitting that does not allow sufficient space for proper installation of jointing material.
- D. Pipe fittings, valves and accessories shall be carefully inspected before and after installation and those found defective shall be replaced. Remove fins and burrs from pipe and fittings. Before the pipe is laid, the interior of the joint of the preceding pipe and fitting shall be carefully cleaned. After each section of the pipe has been laid to line and grade and jointed to the preceding section, and after jointing procedure has commenced, there shall be no movement of the pipe in subsequent operations.
- E. Take care to place sand under the haunches on either side of the pipe. Lay bell and spigot pipe with the bell end pointing in the direction of laying. Drainage and sewerage pipe shall be laid uphill commencing at the lowest invert elevation. Grade the pipeline in straight lines, taking care to avoid the formation of any dips or low points. Wood support blocking will not be permitted. Lay pipe so that the full length of each section of pipe and each fitting will rest solidly on the pipe bedding; excavate recesses to accommodate bells, joints and couplings.

- F. Before the Contractor leaves the work at any time, the pipe shall be securely closed at its open end. After the work is completed, the pipe shall be carefully and thoroughly cleaned of all refuse, earth or any objectionable material.

3.03 STRUCTURES AND APPURTENANCES

- A. Structures and appurtenances shall be installed at the locations and to the lines and dimensions and/or as herein specified.
- B. Valves shall be set plumb and valve boxes shall be centered over valve stems.
- C. Connections in manholes shall be constructed with concrete channels directed toward the outlet pipe or as indicated on the plans.
- D. Penetrations into manholes, vaults and building walls shall be by preformed breakout or coredrill holes. Breakout or coredrill holes in concrete structures shall be grouted all around to prevent groundwater infiltration.

END OF SECTION 33 00 00

SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES

1.00 GENERAL

1.01 DESCRIPTION

A. Principal work in this Section:

1. Sanitary sewer pipelines.
2. Pipeline testing.

B. Related work in other Sections:

1. Trenching, backfilling and compacting: Section 31 23 33.
2. Piped Utilities: Section 33 00 00.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Applicable provisions of the Sanitation Agency Design and Construction Standards govern the work of this Section.

1.03 SUBMITTALS

A. Submit the following:

1. Product data for sanitary sewer piping specialties.
2. Shop Drawings for pre-cast concrete sewer manholes, cleanout boxes, including frames and covers.

2.00 PRODUCTS

2.01 SANITARY SEWER PIPES

A. One of the following:

1. Vitrified clay pipe (VCP) conforming to ASTM C700. Pipe shall be extra strength, unglazed, with bell and spigot joints conforming to ASTM C425 per Sanitation Agency Standards.
2. Polyvinyl chloride (PVC) pipe per ASTM D3034, SDR 26.

2.02 MANHOLES

SANITARY SEWERAGE UTILITIES

- A. Manholes: Precast concrete of the size and shape shown on the Drawings and conforming to ASTM C478. Equivalent cast-in-place structures may be used at the Contractor's option per Sanitation Agency Standards.
- B. Frames and covers: Cast iron conforming to Section 55-2.03 and 75-1.02 of the CDT Standard Specifications. Manhole covers shall have the words SANITARY SEWER in letters not less than 2" high cast into the cover. The clear opening for manhole covers shall be 24"; Phoenix Iron Works P-1090 or equal per Sanitation Agency Standards.

3.00 EXECUTION

3.01 PIPELINE TESTING

- A. New sections of sanitary sewer shall be air tested in accordance with the Sanitation Agency Standards or using the following procedures:
 - 1. Test is conducted between two consecutive manholes, or as directed by the Owner's Representative.
 - 2. The test section of the sewer line is plugged at each end. One of the plugs used at the manhole must be tapped and equipped for the air inlet connection for filling the line from the air compressor.
 - 3. Service laterals, stubs and fittings into the sewer test section shall be properly capped or plugged and carefully braced against the internal pressure to prevent leakage by slippage and blow outs.
 - 4. Connect air hose to tapped plug selected for the air inlet. Then connect the other end of the air hose to the portable air control equipment which consists of valves and pressure gauges used to control the air entry rate to the sewer test section and to monitor the air pressure in the pipe line. More specifically, the air control equipment includes a shut off valve, pressure regulating valve, pressure reduction valve and a monitoring pressure gauge having a pressure range from 0-5 psi. The gauge shall have minimum divisions of .10 psi and an accuracy of + 0.40 psi.
 - 5. Connect another air hose between the air compressor (or other source of compressed air) and the air control equipment. This completes the test equipment set-up. Test operations may commence.
 - 6. Supply air to the test section slowly, filling the pipe line until a constant pressure of 3.5 psig is maintained. The air pressure must be regulated to prevent the pressure inside the pipe from exceeding 5.0 psig.
 - 7. When constant pressure of 3.5 psig is reached, throttle the air supply to maintain the internal pressure above 3.0 psig for at least 5 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall. During this stabilization period, it is advisable to check all capped and plugged fittings with a soap solution to detect any leakage at these connections. If leakage is detected at any cap or plug, release pressure in the line and tighten leaky caps

SANITARY SEWERAGE UTILITIES

and plugs. Then start the test operation again by supplying air. When it is necessary to bleed of the air to tighten or repair a faulty plug, a new five minute interval must be allowed after the pipe line has been refilled.

8. After the stabilization period, adjust the air pressure to 3.5 psig and shut off or disconnect the air supply. Observe the gauge until the air pressure reaches 3.0 psig. At 3.0 psig commence timing with a stop watch which is allowed to run until the line pressure drops to 2.5 psig at which time the stop watch is stopped. The timer required, as shown on the stop watch, for a pressure loss of 0.5 psig is used to compute the air loss.
9. If the time, in minutes and seconds, for the air pressure to drop from 3.0 to 2.5 psig is greater than that shown in the following table for the designated pipe size, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued at the time.
10. If the time, in minutes and seconds, for the 0.5 psig drop is less than that shown in the following table for the designated pipe size, the section of the pipe shall not have passed the test; therefore, adequate repairs must be made and the line retested.

Time Requirements for Air Testing

Pipe Size (In Inches)	Time	
	Min.	Sec.
4	2	32
6	3	50
8	5	6
10	6	22
12	7	39
14	8	56
15	9	35
16	10	12
18	11	34
20	12	45
21	13	30

(For larger diameter pipe, use the following: Minimum time in seconds = 462 x pipe diameter in feet)

11. For 8" and smaller pipe, only: If, during the five minute saturation period, pressure drops less than 0.5 psig after the initial pressurization and air is not added, the pipe section undergoing test shall have passed.
12. Multi pipe sizes: When the sewer line undergoing test is 8" or larger diameter pipe and includes 4" or 6" laterals, the figures in the table for uniform sewer main sizes will not give reliable or accurate criteria for the test. Where multi pipe sizes are to undergo the air test, the Owner's designated representative can compute the "average" size in inches which is then multiplied by 38.2 seconds. The results will

SANITARY SEWERAGE UTILITIES

give the minimum time in seconds acceptable for a pressure drop of 0.5 psig for the "averaged" diameter pipe.

13. Adjustment required for ground water.
 - a. An air pressure correction is required when the ground water table is above the sewer line being tested. Under this condition, the air test pressure must be increased 0.433 psi for each foot the ground water level is above the invert of the pipe.
 - b. Where ground water is encountered or is anticipated to be above the sewer pipe before the air testing will be conducted, the following procedure shall be implemented at the time the sewer main and manholes are constructed.
 - 1) Install ½" diameter pipe nipple (threaded one or both ends, approx. 10" long) through the manhole wall directly on top of one of the sewer pipes entering the manhole with threaded end of nipple entering inside the manhole.
 - 2) Seal pipe nipple with a threaded ½" cap.
 - 3) Immediately before air testing, determine the ground water level by removing the threaded cap from the nipple, blowing air through the pipe nipple to remove any obstructions, and then connecting a clear plastic tube to the pipe nipple.
 - 4) Hold plastic tube vertically permitting water to rise in it to the ground water level.
 - 5) After water level has stabilized in plastic tube, measure vertical height of water, in feet, above invert of sewer pipe.
 - 6) Determine air pressure correction, which must be added to the 3.0 psig normal starting pressure of test, by dividing the vertical height in feet by 2.31. The result gives the air pressure correction in pounds per square inch to be added.

EXAMPLE

If the vertical height of water from the sewer invert to the top of the water column measures 11.55' the additional air pressure required would be:

$$\frac{(11.55)}{(2.31)} = 5.0 \text{ psig}$$

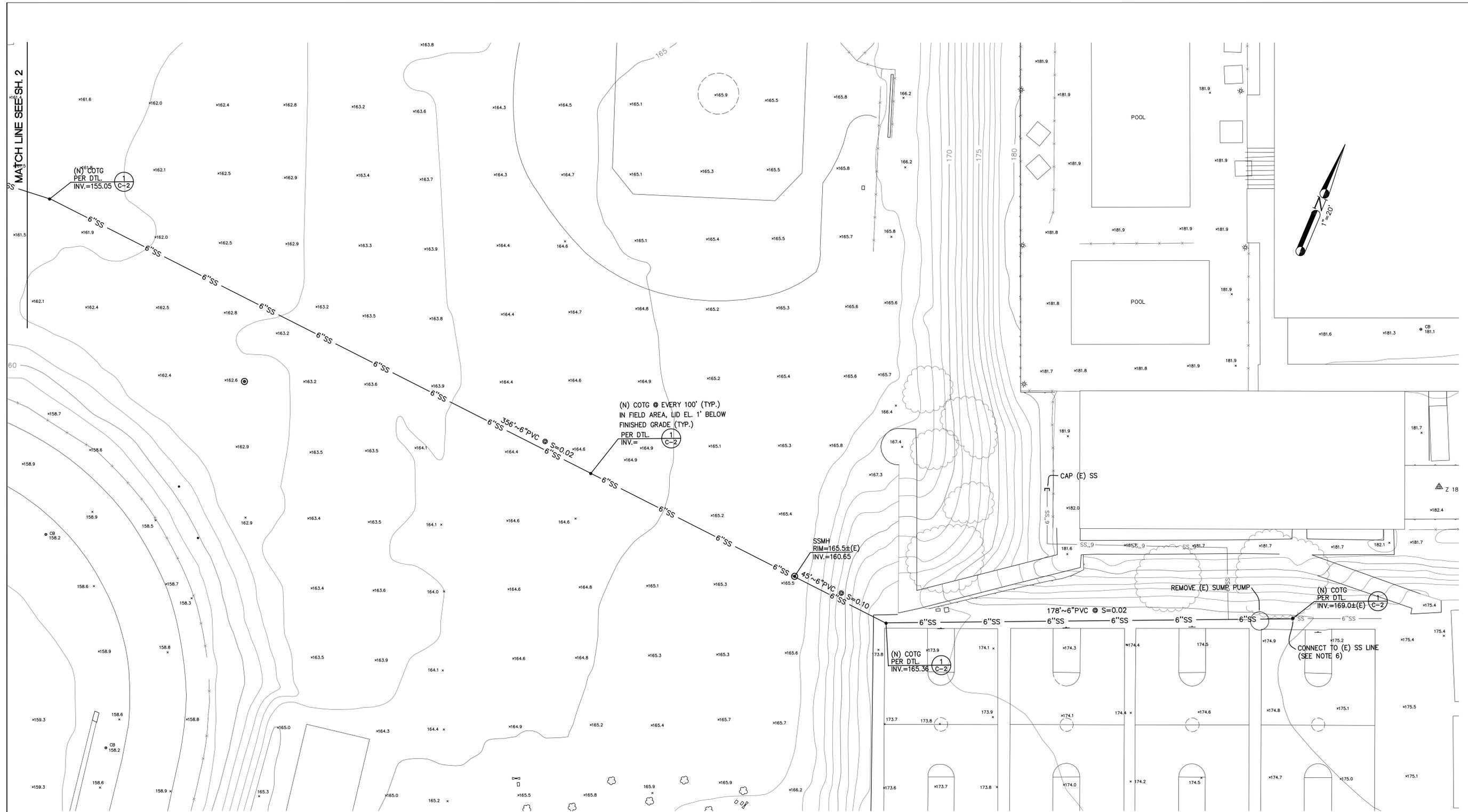
Therefore, the starting pressure of the test would be 3.0 plus 5 or 8.0 psig, and then 1/2 drop becomes 7.5 psig. There is no change in the allowable drop (0.5 psig) or in the time requirements established for the basic air test.

END OF SECTION 33 30 00

BAR SCALE



DATE: 12/13/19 12:13/19 4:14pm UORR: Bndg



UTILITY NOTES:

- THIS SURVEY IS NOT INTENDED TO REPRESENT THE EXACT LOCATIONS, SIZES OR EXTENT OF THE UTILITIES WITHIN THE AREA ENCOMPASSED BY THIS SURVEY. THEREFORE, IT IS THE RESPONSIBILITY OF THE OWNER AND/OR CONTRACTOR TO VERIFY THE LOCATION, SIZE AND EXTENT OF ANY EXISTING UTILITIES PRIOR TO DESIGN OR CONSTRUCTION. CONTRACTORS ARE CAUTIONED TO CONTACT U.S.A. UNDERGROUND AND TO EXERCISE EXTREME CARE IN VERIFYING ALL LOCATIONS PRIOR TO COMMENCING EXCAVATIONS OR OTHER WORK WHICH MAY AFFECT THESE UTILITIES.
- IRRIGATION LATERALS, PARKING LOT LIGHTING WIRING AND SIGNAL WIRING NOT SHOWN. VERIFY LOCATION BEFORE COMMENCING TRENCHING. REPLACE OR REPAIR IMMEDIATELY WHERE BROKEN TO PROVIDE UNINTERRUPTED SERVICE.
- UTILITY ABANDONMENT/REMOVAL: DISCONNECT AND CAP PIPES AND SERVICES TO REMAIN. REMOVE ALL PORTIONS OF ALL UTILITIES WITHIN NEW BUILDING FOOTPRINT AND DISPOSE OF OFF-SITE. OTHERWISE ABANDON IN PLACE U.N.O.
- NOTIFY THE ENGINEER IMMEDIATELY OF ANY UTILITIES ENCOUNTERED THAT ARE NOT SHOWN ON THE DRAWINGS. PRESERVE AND REPAIR ANY UTILITIES THAT ARE DAMAGED AND THAT ARE TO REMAIN.
- CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL CROSSINGS OF NEW UTILITIES WITH EACH OTHER, AND WITH EXISTING UTILITIES. VERIFY EXISTING PIPE LOCATION AND INVERT PRIOR TO INSTALLING NEW UTILITIES. NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OR DEVIATIONS. INSTALL GRAVITY UTILITIES BEFORE WATER & DRY UTILITIES TO ENSURE NO CONFLICTS.
- PRIOR TO CONNECTING TO EXISTING UTILITIES OR INSTALLING UPSTREAM UTILITIES, VERIFY LOCATION, FLOW DIRECTION, SIZE, INVERT OR DEPTH AT POINT OF CONNECTION.
- SAWCUT, REMOVE, & REPLACE EXISTING PAVEMENT, CURBS, SIDEWALKS, & LANDSCAPING TO MATCH (E) AS NECESSARY TO INSTALL NEW UTILITIES AS SHOWN. FOR REPLACING CONCRETE PAVEMENT, USE 18" LONG, #4 DOWELS @ 12" O.C. ON THE CENTER OF THE (N) CONCRETE SECTION AND EMBED A MINIMUM OF 6" INTO (E) CONCRETE WITH EPOXY. FOR LANDSCAPE AREAS, REFER TO ARCHITECTURAL/LANDSCAPE SPECIFICATIONS FOR TOP SOIL REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR PRESERVING & PROTECTING ALL SURVEY CONTROL POINTS. A LICENSED LAND SURVEYOR SHALL REPAIR AND OR REPLACE ANY SURVEY CONTROL POINTS THAT ARE DISPLACED OR DAMAGED.

NOTE:
TOPOGRAPHIC AND BOUNDARY INFORMATION SHOWN HEREON WAS SUPPLIED BY THE OWNER FOR THE USE OF BRIO ENGINEERING ASSOCIATES, INC.

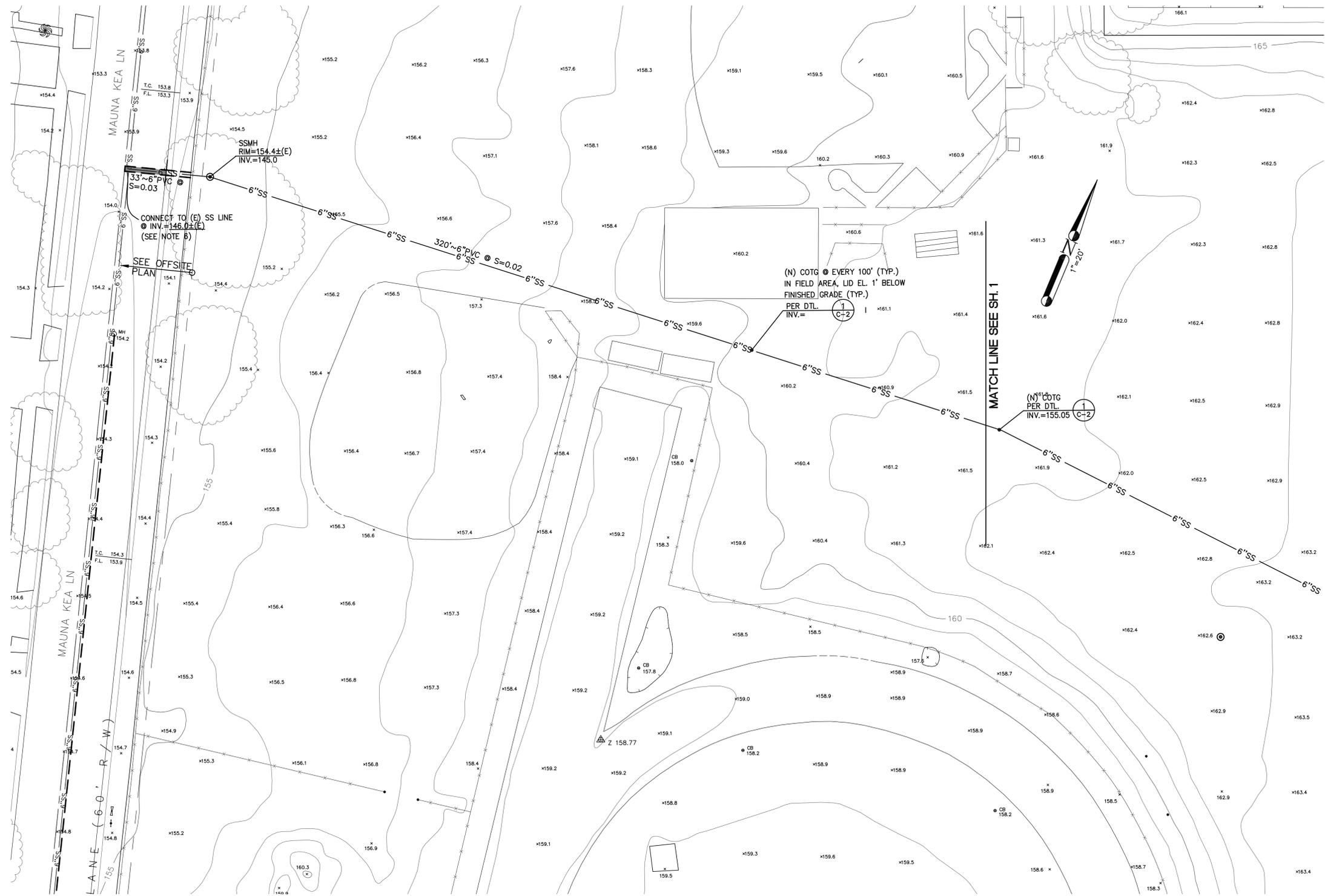
No.	DATE	REVISION

BRIO Engineering
ASSOCIATES, INC.
1475 South Bascom Ave., Suite 202
Campbell, CA 95008-0629
Tel. (408) 241-5494

SANITARY SEWER PLAN

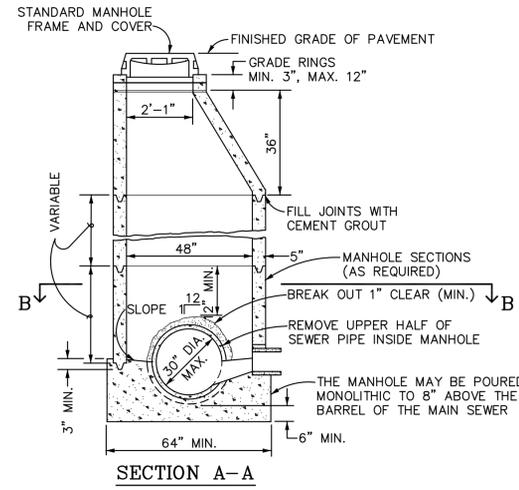
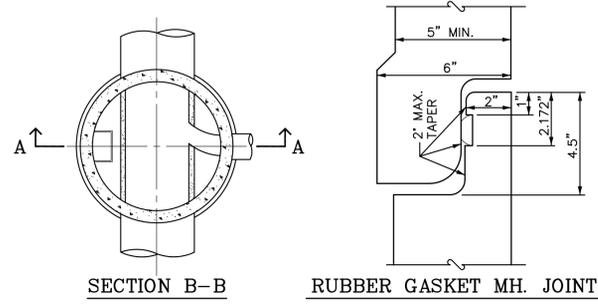
PIEDMONT HILLS SCHOOL
1377 Piedmont Rd,
San Jose, CA 95132

Date:	12/13/19
Designer:	BD
Checked:	BD
Drawn By:	A. DUONG
Scale:	AS SHOWN
Job:	ESSD1927
Sheet	1
Of	Sheet(s)

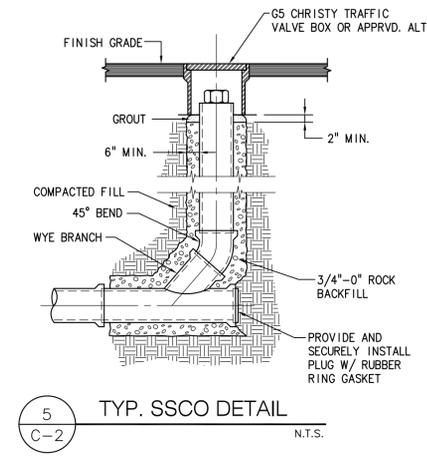
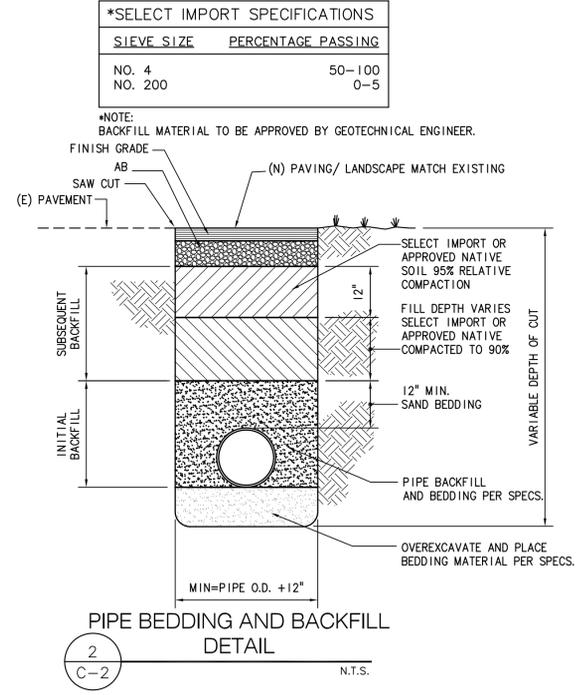


EXISTING	PROPOSED	DESCRIPTION
---	---	PROPERTY LINE
---	---	SETBACK LINE
---	---	LOW-LOW
---	---	LIMIT OF WORK
---	---	CENTER LINE
---	---	EXCEPTION
---	---	EASEMENT LINE
---	---	CONCRETE CURB
---	---	CONCRETE CURB & GUTTER
---	---	SAWCUT/CONFORM LINE
---	---	HEADER BOARD
---	---	TRAFFIC MARKINGS
---	---	SIGN
---	---	ACCESSIBLE RAMP
---	---	FIRE HYDRANT
---	---	EDGE OF PAVEMENT
---	---	FENCE
---	---	STORM DRAIN & SIZE
---	---	PERFORATED PIPE
---	---	SANITARY SEWER & SIZE
---	---	DOMESTIC WATER LINE
---	---	TELEPHONE LINE
---	---	JOINT TRENCH (ELEC., TEL., GAS & CATV)
---	---	FIRE SERVICE LINE & SIZE
---	---	ELECTRIC LINE
---	---	GAS LINE & SIZE
---	---	COMMUNICATION LINE
---	---	(E) UTILITY TO BE ABANDONED OR REMOVED IF IT IS WITHIN THE NEW BLDG FOOTPRINT/FOOTING AREA.
---	---	GRADE BREAK
---	---	CONTOUR LINE
---	---	CLEAN OUT TO GRADE
---	---	CATCH BASIN
---	---	AREA DRAIN
---	---	DRAINAGE ARROW
---	---	BACK FLOW PREVENTOR
---	---	POST INDICATOR VALVE
---	---	FIRE DEPT. CONNECTION
---	---	SANITARY SEWER MANHOLE
---	---	STORM DRAIN MANHOLE
---	---	WATER VALVE
---	---	STREET LIGHT
---	---	GUY WIRE
---	---	JUNCTION POLE
---	---	TELEPHONE BOX
---	---	UNKNOWN UTILITY BOX
---	---	POWER (ELECTRICAL) BOX
---	---	WATER METER
---	---	WATER BOX
---	---	VALLEY GUTTER
---	---	SPOT ELEVATION
---	---	TREE W/SIZE & DRILINE
---	---	TREE W/SIZE & NO DRILINE

<p>Brio Engineering ASSOCIATES, INC. 1475 South Bascom Ave., Suite 202 Campbell, CA 95008-0629 Tel. (408) 241-5494</p>	REVISION
	DATE
	No.
	DATE
<p>SANITARY SEWER PLAN</p>	
<p>PIEDMONT HILLS SCHOOL 1377 Piedmont Rd, San Jose, CA 95132</p>	
Date:	12/13/19
Designer:	
Checked:	BD
Drawn By:	A. DUONG
Scale:	AS SHOWN
Job:	ESSD1927
Sheet	
Of	Sheet(s)



10
C-2
N.T.S.



REVISION	DATE	NO.

Brio Engineering
ASSOCIATES, INC.
1475 South Bascom Ave., Suite 202
Campbell, CA 95008-0629
Tel. (408) 241-5494

SECTIONS & DETAILS PLAN

PIEDMONT HILLS SCHOOL
1377 Piedmont Rd,
San Jose, CA 95132

Date:	12/13/19
Designer:	
Checked:	BD
Drawn By:	A. DUONG
Scale:	AS SHOWN
Job:	ESSD1927
Sheet	
Of Sheet(s)	3