PETITION FOR DECLARATORY STATEMENT
BEFORE THE FLORIDA BUILDING COMMISSION

Company: Cronin Construction Corporation
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DS 2017-058

Statute(s), Agency Rule(s), Code Section(s) on which the declaratory statement is sought:
2014 Florida Building Code, Plumbing

Background:
Cronin Construction Corporation will be performing Underground Utility and Sitework on the Pine Hills Elementary School project, installing the Stormwater Collection System, Sanitary Sewer Collection System, and Potable Water Distribution System as permitted by SJRWMD and FDEP respectively. We are seeking clarification on whether the Florida Building Code, Plumbing applies to the construction and testing of these systems. These systems are shown on Civil Plans, designed by a Professional Civil Engineer licensed in Florida, and installed by Cronin Construction Corporation as a licensed Underground Utility Contractor, as opposed to a licensed Plumbing Contractor which is mandated by the Florida Building Code - Plumbing.

Our scope on this project includes utility work shown on the Civil Plans; the Sanitary Sewer Collection System, the Potable Water Distribution System, and the Stormwater Collection System. Each system includes services that terminate 5' outside of the building.

The Sanitary Sewer Collection System connects to an existing Orange County Utilities Sanitary Main offsite and includes four (4) Sanitary Service stub-outs 5' from the building to the new school. A licensed Plumbing Contractor will make all connections between the building and the site system. (See Exhibit 1.)

The Potable Water Distribution System connects to the Orlando Utility Commission's Main offsite and includes (4) Water Service stub-outs 5' from the building. A licensed Plumbing Contractor will make all final connections between the building and the site system. (See Exhibit 1.)

The Stormwater Collection System drains into onsite ponds and includes six (6) Roof Drain Services and six (6) Condensate Drain Services to within 5' of the building. A licensed Plumbing Contractor will make all final connections between the building and the site system. (See Exhibit 2.)

The Sanitary Sewer Collection System and the Potable Water Distribution System will be privately owned and maintained. (See Exhibit #11.) The Storm Sewer Collection System will also be privately owned and maintained.

QUESTION #1: Does the Florida Building Code, Plumbing apply to Sanitary Sewer Collection Systems from the connection to the existing public utility system to the Sanitary Service stub outs 5' from the building?

ANSWER: We believe the answer is No for the following reasons:

1. *FBC Plumbing Chapter 2, Definitions, Section 202* contains the following definitions:

BUILDING DRAIN. *That part of the lowest piping of a drainage system that receives the discharge from soil, waste and other drainage pipes inside and that extends 30 inches (762 mm) in developed length of pipe beyond the exterior walls of the building and conveys the drainage to the building sewer.*
BUILDING SEWER. *That part of the drainage system that extends from the end of the building drain and conveys the discharge to a public sewer, private sewer, individual sewage disposal system or other point of disposal.*
DRAINAGE SYSTEM. *Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.*

The Sanitary Sewer Collection System on civil plans is the '*Private Sewer*' to which the *Building Sewer* connects; it is the *Point of Disposal*.
PHES Civil Utility Plan shows the Sanitary Sewer Collection System (See Exhibit #1, in green)
PHES Plumbing Site Plan shows the location of the Plumber's Point of Connection 5' outside the building (See Exhibit #3, green arrows)
PHES Specifications contain separate sections for Plumbing and Utilities (See Exhibit #4)

PLUMBING. *The practice, materials and fixtures utilized in the installation, maintenance, extension and alteration of all piping, fixtures, plumbing appliances and plumbing appurtenances, within or adjacent to any structure, in connection with sanitary drainage or storm drainage facilities; venting systems; and public or private water supply systems.*
PLUMBING SYSTEM. *Includes the water supply and distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and sanitary and storm sewers and building drains; in addition to their respective connections, devices and appurtenances within a structure or premises.*

These descriptions encompass the scope of work of a Plumbing Contractor, not the scope of an Underground Utility Contractor. (See Exhibit #5)

3. *FBC Plumbing Chapter 3, General Regulations, Section 312 Tests and Inspections*

312.1 Required tests. The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.10 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and the permit holder shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. All plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submit-ted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain whether the pres-sure has reached all parts of the system.
312.6 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer, filling the building sewer with water, testing with not less than a 10-foot (3048 mm) head of water and maintaining such pressure for 15 minutes.

This testing requirement conflicts with the PHES Specifications (See Exhibit #4, page 14, 3.5 C.1), the plans (See Exhibit #10, page 1 and 2), and standard industry practice of using a low pressure air test for Sanitary Sewer Collection Systems.

4. *FBC Plumbing Chapter 7, Sanitary Drainage, Section 704 Drainage Piping Installation*
704.1 Slope of horizontal drainage piping. Horizontal drainage piping shall be installed in uniform alignment at uniform slopes. The slope of a horizontal drainage pipe shall be not less than that indicated in Table 704.1.
TABLE 704.1 SLOPE OF HORIZONTAL DRAINAGE PIPE

SIZE (inches)	*Minimum Slope (inch per foot)*
2 ½ or less	*1/4*
3 to 6	*1/8*
8 or larger	*1/16*

This conflicts with utility supplier requirements that require desired flow equal to 2 feet per second in Sanitary Sewer Collection Systems be achieved. (See Exhibit #9 PHES Plan Sheet C801, Utility Details, General Notes #1 .)

QUESTION #2: Does the Florida Building Code, Plumbing apply to Potable Water Distribution Systems from the connection to the existing public utility system to the Domestic Water Service stub outs 5' from the building?

Answer: We believe the answer is No for the following reasons:

1. *FBC Plumbing Chapter 2, Definitions, Section 202*:

WATER PIPE.

Riser. *A water supply pipe that extends one full story or more to convey water to branches or to a group of fixtures.*

Water distribution pipe. *A pipe within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.*

Water service pipe*. The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served.*

WATER SUPPLY SYSTEM*. The water service pipe, water distribution pipes, and the necessary connecting pipes, fittings, control valves and all appurtenances in or adjacent to the structure or premises.*

The Water System on civil plans is the '*Water Main*' to which the *Building Water Supply System* connects.

PHES Civil Utility Plan shows the Domestic Water Distribution System (See Exhibit #1 in blue).

PHES Plumbing Site Plan shows the location of the Plumber's Point of Connection 5' outside the building (See Exhibit #3, blue arrows).

PHES Specifications showing the separate sections for Plumbing and Utilities (See Exhibit #4)

PHES Plan Sheet C800 defines the Building Point of Service Connection (See Exhibit #8, Utility Note 3 A and B), and states that the distribution lines and systems are to be installed per FDEP and OUC (See Exhibit #8, Water Note 5.)

2. *FBC Plumbing Chapter 3, General Regulations, Section 312 Tests and Inspections*

312.5 Water supply system test. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 107.

This conflicts with the project Utilities Specifications, and with standard requirements for water mains, of testing at a minimum of 150 psi for no less than 2 hours. (See Exhibit #4, Page 9, 3.2B.)

3. *FBC Plumbing Chapter 6, Water Supply and Distribution, Section 603 Water Service*

603.2 Separation of water service and building sewer. Water service pipe and the building sewer shall be separated by not less than 5 feet (1524 mm) of undisturbed or compacted earth.

Exceptions:

1. The required separation distance shall not apply where the bottom of the water service pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conform to Table 702.3
2. Water service pipe is permitted to be located in the same trench with a building sewer, provided such sewer is constructed of materials listed in Table 702.2 (Conflicts with C800 Separation Requirement Notes).
3. The required separation distance shall not apply where a water service pipe crosses a sewer pipe, pro-vided the water service pipe is sleeved to a point not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing with pipe materials listed in Table 605.3, 702.2 or 702.3.

The Florida Building Code – Plumbing requirements conflict with the FDEP requirements. (See Exhibit #8 and Exhibit #12.)

QUESTION #3: Does the Florida Building Code, Plumbing apply to the Storm Sewer Collection Systems from the connection to the onsite point of disposal (retention ponds), to the Storm Drain Service stub outs 5' from the building and other collection points throughout the site?

ANSWER: We believe the answer is No for the following reasons:

1. *FBC Plumbing Chapter 2, Definitions, Section 202:*
***BUILDING DRAIN**. That part of the lowest piping of a drainage system that receives the discharge from soil, waste and other drainage pipes inside and that extends 30 inches (762 mm) in developed length of pipe beyond the exterior walls of the building and conveys the drainage to the building sewer.*
***BUILDING SEWER**. That part of the drainage system that extends from the end of the building drain and conveys the discharge to a public sewer, private sewer, individual sewage disposal system or other point of disposal.*
***DRAINAGE SYSTEM**. Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.*

The Storm Sewer Collection System on civil plans is the '*Private Sewer*' to which the *Building Sewer* connects; it is the *Point of Disposal*.
PHES Civil Grading and Drainage Plan shows the Storm Sewer Collection System (See Exhibit #2, arrows indicate services for Roof Drains and Condensate Drains).
PHES Plumbing Site Plan shows the location of the Plumber's Point of Connection 5' outside the building (See Exhibit #3, red arrows for Roof Drains and pink arrows for Condensate Drains).
PHES Specifications showing the separate sections for Plumbing and Utilities (See Exhibit #4)

***PLUMBING**. The practice, materials and fixtures utilized in the installation, maintenance, extension and alteration of all piping, fixtures, plumbing appliances and plumbing appurtenances, within or adjacent to any structure, in*

connection with sanitary drainage or storm drainage facilities; venting systems; and public or private water supply systems.

***PLUMBING SYSTEM**. Includes the water supply and distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and sanitary and storm sewers and building drains; in addition to their respective connections, devices and appurtenances within a structure or premises.*

These descriptions encompass the scope of work of a Plumbing Contractor, not the scope of an Underground Utility Contractor. (See Exhibit #5)

2. *FBC Plumbing Chapter 3, General Regulations, Section 312 Tests and Inspections*

312.1 Required tests. The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.10 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and the permit holder shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. All plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submit-ted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain whether the pressure has reached all parts of the system.

312.2 Drainage and vent water test. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.

312.3 Drainage and vent air test. Plastic piping shall not be tested using air. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of not less than15 minutes. Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

312.4 Drainage and vent final test. The final test of the completed drainage and vent systems shall be visual and in sufficient detail to determine compliance with the provisions of this code. Where a smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be held for a test period of not less than 15 minutes.

This testing method applies to the building system, not to the site system which is typically comprised of Reinforced Concrete Pipe and Precast Storm Structures.

3. *FBC Plumbing, Chapter 11 Storm Drainage, Section 1106*

1106.3 Building storm drains and sewers. The size of the building storm drain, building storm sewer and their horizontal branches having a slope of one-half unit or less vertical in 12 units horizontal (4-percent slope) shall be based on the maximum projected roof area in accordance with Table 1106.3. The slope of horizontal branches shall be not less than one-eighth unit vertical in 12 units horizontal (1-percent slope) unless otherwise approved.

The Plumbing Code does not include pipe sizes that are normally used in Storm Sewer Collection Systems. (See Exhibit #13, Page 5.)

In addition, we offer the following documentation for consideration:

Exhibit #6: Chapter 62-604.200 Florida Administrative Code – Definitions; Collection/Transmission Systems and Individual Service Connection.
Exhibit #7: Florida Building Code Informal Interpretation dated February 15, 2005 Report #3512.
Exhibit #13: Excerpts from Florida Building Code - Plumbing
Exhibit #14: Excerpts from PHES Plumbing Specifications

Thank you.

8-4-17

Diane Magnus
Cronin Construction Corporation

ORANGE COUNTY UTILITIES – ASSET TABLES

ASSET TABLES TO BE COMPLETED BY CONTRACTOR WITH SURVEYED AS-BUILT INFORMATION PRIOR TO FDEP WATER AND WASTEWATER CLEARANCES. REFER TO CHAPTER 3 OF THE "ORANGE COUNTY UTILITIES STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL" FOR DETAILED INFORMATION REGARDING COMPLETION OF THE ASSET TABLES

ORANGE COUNTY UTILITIES – GREASE INTERCEPTOR ASSET TABLE

ID NUMBER	PLAN SHEET #	EASTING	NORTHING	ELEVATION	VOLUME (GALLONS)	COMMENTS
G-1	C501				1,250	LOCATE HORIZONTAL CENTER AND VERTICAL TOP
G-2	C501				1,250	LOCATE HORIZONTAL CENTER AND VERTICAL TOP
G-3	C501				1,250	LOCATE HORIZONTAL CENTER AND VERTICAL TOP

ORANGE COUNTY UTILITIES – UTILITY EASEMENT ASSET TABLE

ID NUMBER	PLAN SHEET #	EASTING	NORTHING	ELEVATION	BOUNDARY CORNER TYPE	COMMENTS
E-1	C501				EASEMENT	
E-2	C501				EASEMENT	
E-3	C501				EASEMENT	
E-4	C501				PROPERTY	

ORANGE COUNTY UTILITIES – SANITARY MANHOLE ASSET TABLE

ID NUMBER	PLAN SHEET #	EASTING	NORTHING	RIM ELEVATION	INVERT ELV N	INVERT ELV NE	INVERT ELV E	INVERT ELV SE	INVERT ELV S	INVERT ELV SW	INVERT ELV W	INVERT ELV NW	MANUFACTURE	COMMENTS
S-01	C501													MANHOLE

UTILITY CROSSING TABLE

Crossing	Top Pipe					Bottom Pipe				Separation
No	Type	Size (in)	Invert	Top	Cover	Type	Size (in)	Invert	Crown	(ft)
C-01	Water	10	114.64	115.30	3.90	Water	6	111.62	112.21	2.21
C-02	Storm	4	113.09	114.33	4.07	Sanitary	8	111.61	112.30	1.67
C-03	Storm	4	113.91	114.28	4.04	Water	10	111.54	112.39	1.50
C-04	Sanitary	8	115.09	115.81	2.45	Sanitary	8	111.69	112.38	2.69
C-05	Storm	6	113.10	113.66	2.45	Water	10	112.76	113.61	1.50
C-06	Storm	6	112.93	113.62	3.12	Water	4	111.08	111.41	1.50
C-07	Storm	4	118.57	115.56	2.63	Sanitary	6	112.23	112.92	2.83
C-08	Storm	18	111.94	113.39	4.11	Water	2	110.08	110.26	1.50
C-09	Storm	18	113.23	114.76	2.79	Sanitary	8	112.39	113.08	0.15
C-10	Storm	18	111.91	113.39	3.91	Water	10	109.38	110.23	1.50
C-11	Sanitary	8	112.41	113.10	4.20	Water	2	110.71	110.89	1.50
C-12	Storm	4	115.59	115.94	1.96	Sanitary	8	112.82	113.51	2.06
C-13	Storm	4	115.53	115.88	1.92	Water	10	113.17	114.02	1.50
C-14	Storm	4	115.50	115.85	1.85	Water	2	113.60	113.68	1.50
C-15	Storm	10	114.48	115.31	2.28	Sanitary	8	113.35	114.04	0.42
C-16	Storm	10	113.54	114.39	3.11	Water	10	111.17	112.02	1.50
C-17	Storm	10	113.53	114.38	3.05	Water	4	111.56	112.01	1.50
C-18	Storm	4	114.75	115.10	3.10	Water	10	112.58	113.33	1.50
C-19	Storm	4	114.72	115.07	3.03	Water	4	112.85	113.20	1.50
C-20	Storm	16	112.42	113.56	3.13	Water	16	112.35	113.20	1.50
C-21	Storm	16	112.11	113.54	4.30	Water	4	110.08	110.43	1.50
C-22	storm	6	113.36	115.86	2.58	Sewer	4	110.97	111.66	3.69

STUDENT CAPACITY
MAIN BUILDING DESIGN STUDENT POPULATION = 837
MODULAR BUILDING DESIGN STUDENT POPULATION = 240
TOTAL DESIGN STUDENT POPULATION = 1,077

North

0' 15 30 60

GRAPHIC SCALE IN FEET

LEGEND

- WATER LINE
- SANITARY LINE
- FIRE LINE
- FDC LINE
- FIRE HYDRANT ASSEMBLY
- FIRE DEPARTMENT CONNECTION (4")
- POST INDICATOR VALVE
- GATE VALVE
- C-01 CROSSING NUMBER
- SANITARY MANHOLE
- SP 02 SAMPLE POINT (TOTAL OF 05)

KEYNOTES - UTILITIES

1. 3" PVC WATER SERVICE TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
2. 6" PVC SANITARY SERVICE @ 1.00% MIN. TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
3. GREASE TRAP SHOWN FOR LOCATION PURPOSES ONLY. REFER TO PLUMBING PLAN SHEET P901 FOR GREASE TRAP DETAILS INCLUDING SIZE AND CALCULATIONS. REFER TO PLUMBING PLAN SHEET P101 FOR CONNECTION TO BUILDING.
4. 6" PVC FIRE SERVICE TO BUILDING. REFER TO FIRE PROTECTION PLANS FOR INVERT AT BLDG AND CONTINUATION INTO BUILDING.
5. 6" PVC FIRE SERVICE FROM FDC. REFER TO FIRE PROTECTION PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
6. ADD MANHOLE TO EXISTING SANITARY MAIN FOR CONNECTION OF SCHOOL SEWER.
7. 4" PVC SAN. @1.00% MIN. FROM GREASE TRAP. PIPE INVERT OUT OF GREASE TRAP EQUALS APPROX 114.88.
8. PH SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
9. FDC SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
10. PIV SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
11. 4" PVC SANITARY SERVICE @ 1.00% MIN. TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
12. 2" PVC WATER SERVICE TO BUILDING REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
13. TRAFFIC BEARING CLEANOUT
14. BEFORE ANY WORK IS PERFORMED ON THE EXISTING VCP GRAVITY MAIN, THE CONTRACTOR SHALL CONTACT THE OCU INSPECTOR WHO MUST BE PRESENT FOR THE WORK PERFORMED ON THE VCP GRAVITY MAIN.
15. INSTALL NEW SANITARY MANHOLE S-01 OVER EXISTING 8" VCP. PROVIDE STANDARD PVC CONNECTION AND CONNECT WITH OCU APPROVED FERNCO VCP TO PVC ADAPTORS (BOTH SIDES).
16. CONTRACTOR SHALL MAINTAIN SERVICE OF EXISTING SANITARY SEWER DURING INSTALLATION OF MANHOLE VIA BYPASS OR PUMP AND HAUL.

TYPICAL PIPE BENDS

90° BEND
45° BEND
TEE

NOTE: ALL OTHER PIPE BENDS USED IN DESIGN OF THIS PROJECT ARE NOTED ON THE PLANS

LEGEND:
OPEN CUT
MILL & RESURFACE

STRUCTURE TABLE

S-01
N: 1536769.33
E: 508669.54
TOP ELEV: 114.26
N INV: 110.30
S INV: 110.40

S-02
N: 1536768.48
E: 508861.90
TOP ELEV: 116.00
W INV: 111.19
SE INV: 111.29

S-03
N: 1536712.02
E: 508913.26
TOP ELEV: 118.70
NW INV: 111.96
N INV: 112.06
E INV: 112.06

S-04
N: 1536712.02
E: 509135.52
TOP ELEV: 117.95
W INV: 112.70
N INV: 112.80
E INV: 112.80

S-05
N: 1536712.02
E: 509267.79
TOP ELEV: 117.67
W INV: 113.32
N INV: 113.42
NE INV: 114.59

S-06
N: 1536690.48
E: 508861.53
TOP ELEV: 117.10
N INV: 111.59
SE INV: 111.69

S-07
N: 1536554.08
E: 509154.03
TOP ELEV: 117.10
NW INV: 112.97

GREASE TRAP CALCULATION:
1.5 GAL PER MEAL FOR SCHOOL CAFETERIA FOR MORE THAN ONE GREASE TRAP INSTALLED IN SERIES (PER OCU MANUAL SECTION 2310, PART 7)

MAX MEALS PREPARED PER DAY = 837

GALLONS OF WASTE PER MEAL = 5

LOAD FACTOR
USE 1.0 WITH DISHWASHING MACHINE
USE 0.75 WITHOUT DISHWASHING MACHINE

EFFECTIVE CAPACITY OF GREASE INTERCEPTOR = 3139 GALLONS

REQUIRED CAPACITY OF GREASE INTERCEPTOR = 3139 GALLONS

GREASE TANK SIZE PROVIDED = 1250 GALLONS

NUMBER OF GREASE TANKS PROVIDED = 3

TOTAL GREASE CAPACITY PROVIDED = 3750 GALLONS

CALCULATIONS PROVIDED BY AVCON INC.
5555 E. MICHIGAN ST. SUITE 200 ORLANDO FL 32822

18.3.1* AN APPROVED WATER SUPPLY CAPABLE OF SUPPLYING THE REQUIRED FIRE FLOW FOR FIRE PROTECTION SHALL BE PROVIDED TO ALL PREMISES UPON WHICH FACILITIES, BUILDINGS, OR PORTIONS OF BUILDINGS ARE HEREAFTER CONSTRUCTED OR MOVED INTO THE JURISDICTION. THE APPROVED WATER SUPPLY SHALL BE IN ACCORDANCE WITH SECTION 18.4. THE FIRE FLOW ANALYSIS HAS BEEN PROVIDED IN THE PINE HILLS ELEMENTARY SCHOOL UTILITY CALCULATIONS AS WELL AS THE HGL LETTER. PLEASE REFER TO THE WATER SYSTEM DESIGN SECTION FOR EXISTING WATER SYSTEM CAPACITY INFORMATION. DOCUMENTS ARE INCLUDED IN C0094_PH3_PH3R1_NARRATIVE_CALCS.PDF

18.5.1* THE NUMBER AND TYPE OF FIRE HYDRANTS AND CONNECTIONS TO OTHER APPROVED WATER SUPPLIES SHALL BE CAPABLE OF DELIVERING THE REQUIRED FIRE FLOW AND SHALL BE PROVIDED AT APPROVED LOCATIONS.

DARIN ALEX LOCKWOOD, P.E.
FL P.E. #65534

PHASE 3R1 SUBMITTAL

MATCHLINE – SEE SHEET C502

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	ADDENDUM 1	04/28/17	DAL
2	ADDENDUM 2	04/28/17	DAL

BRPH
Architects, Engineers, Constructors
Offices in Melbourne, Atlanta, Orlando, West Palm Beach, Charleston, Fayetteville, Seattle, St. Louis, Mexico
BRPH PROJECT NO. C0094.000.00
2420 Lakemont Avenue, Suite 300 Orlando, Florida 32814 407-896-9301 v 407-896-9304 f

PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094

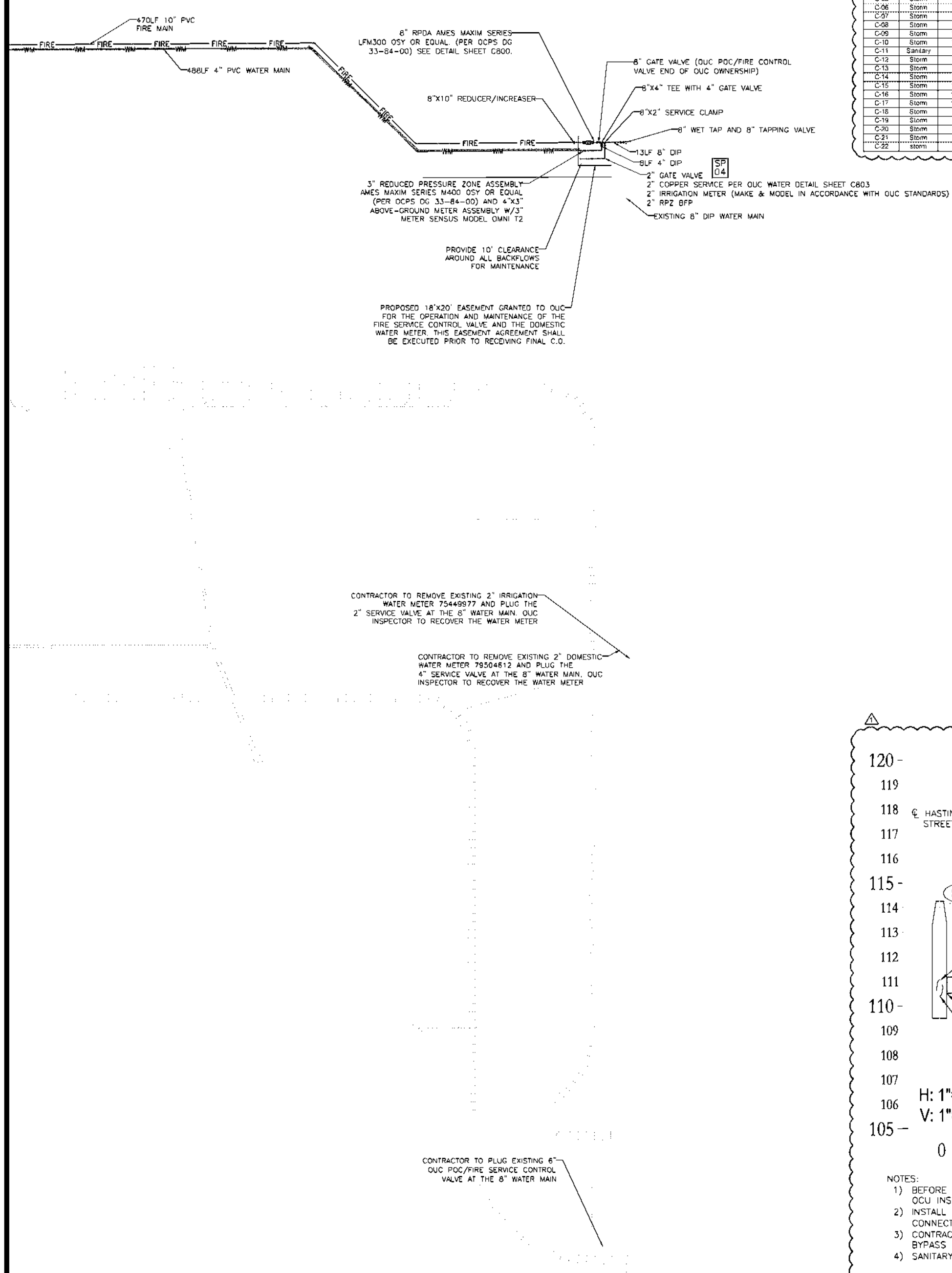
UTILITY PLAN

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

DRAWN:	DJ
CHECKED:	DAL
DATE:	3/6/17
PLT SCALE:	
OCPS DRAWING FILE NAME:	C0094_C501 Utility Plan.dwg
SHEET NUMBER:	C501
OF (Total):	#

Document Name: C0094_C501 Utility Plan.dwg
Document Issue Date: 4/24/2017 10:27 AM

MATCHLINE – SEE SHEET C501



UTILITY CROSSING TABLE

Crossing No.	Top Pipe Type	Top Pipe Size (in)	Top Pipe Invert	Top Pipe Top	Top Pipe Cover	Bottom Pipe Type	Bottom Pipe Size (in)	Bottom Pipe Invert	Bottom Pipe Crown	Separation (ft)
C-01	Water	10	114.44	115.30	3.00	Water	6	111.52	112.21	2.21
C-02	Storm	4	113.99	114.33	4.07	Sanitary	6	111.61	112.30	1.67
C-03	Storm	4	113.91	114.26	4.04	Water	10	111.54	112.39	1.50
C-04	Sanitary	6	115.29	115.81	2.49	Sanitary	8	111.69	112.38	2.89
C-05	Storm	6	115.13	115.65	2.45	Water	10	112.76	113.61	1.50
C-06	Storm	8	112.93	113.62	3.12	Water	4	111.06	111.41	1.50
C-07	Storm	4	115.57	115.55	2.63	Sanitary	6	112.23	112.92	2.63
C-08	Storm	18	111.94	113.59	4.11	Water	2	110.08	110.26	1.50
C-09	Storm	18	113.23	114.76	2.79	Sanitary	8	112.39	113.08	0.15'
C-10	Storm	18	111.91	113.59	3.91	Water	10	109.38	110.23	1.50
C-11	Sanitary	8	112.41	113.10	4.20	Water	2	110.71	110.89	1.50
C-12	Storm	4	115.59	115.94	1.96	Sanitary	8	112.82	113.51	2.06
C-13	Storm	4	115.53	115.88	1.92	Water	10	113.17	114.02	1.50
C-14	Storm	4	115.50	115.85	1.65	Water	2	113.80	113.98	1.50
C-15	Storm	10	114.48	115.31	2.28	Sanitary	8	113.35	114.04	0.42'
C-16	Storm	10	113.54	114.39	3.11	Water	10	111.17	112.02	1.50
C-17	Storm	10	113.53	114.36	3.08	Water	4	111.66	112.01	1.50
C-18	Storm	4	114.75	115.10	3.10	Water	10	112.38	113.23	1.50
C-19	Storm	4	114.72	115.07	3.03	Water	4	112.85	113.20	1.50
C-20	Storm	15	112.12	113.55	3.13	Water	10	112.35	113.20	1.50
C-21	Storm	15	112.11	113.54	4.30	Water	4	110.08	110.43	1.50
C-22	storm	6	115.36	115.88	2.58	Sewer	4	110.97	111.66	3.69

North
0' 15 30 60
GRAPHIC SCALE IN FEET

LEGEND

- WATER LINE
- SANITARY LINE
- FIRE LINE
- FDC LINE
- FIRE HYDRANT ASSEMBLY
- FIRE DEPARTMENT CONNECTION (4")
- POST INDICATOR VALVE
- GATE VALVE
- C-01 CROSSING NUMBER
- SANITARY MANHOLE
- SP 02 SAMPLE POINT (TOTAL OF 05)

TYPICAL PIPE BENDS

- 90° BEND
- 45° BEND
- TEE

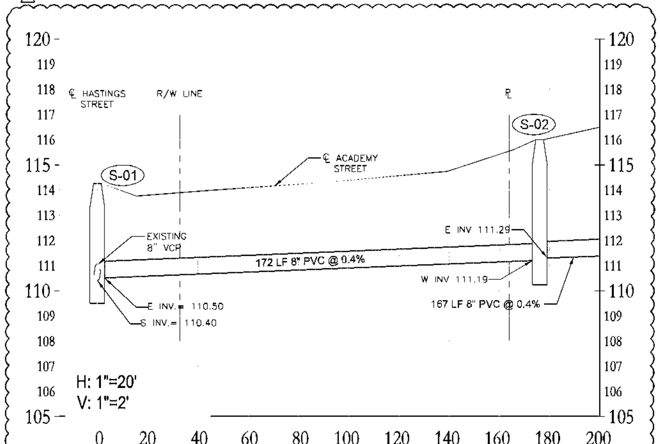
NOTE: ALL OTHER PIPE BENDS USED IN DESIGN OF THIS PROJECT ARE NOTED ON THE PLANS

LEGEND:

- OPEN CUT
- MILL & RESURFACE

KEYNOTES - UTILITIES

- 3" PVC WATER SERVICE TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
- 6" PVC SANITARY SERVICE @ 1.00% MIN. TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
- GREASE TRAP SHOWN FOR LOCATION PURPOSES ONLY. REFER TO PLUMBING PLAN SHEET P901 FOR GREASE TRAP DETAILS INCLUDING SIZE AND CALCULATIONS. REFER TO PLUMBING PLAN SHEET P101 FOR CONNECTION TO BUILDING.
- 6" PVC FIRE SERVICE TO BUILDING. REFER TO FIRE PROTECTION PLANS FOR INVERT AT BLDG AND CONTINUATION INTO BUILDING
- 6" PVC FIRE SERVICE FROM FDC. REFER TO FIRE PROTECTION PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
- ADD MANHOLE TO EXISTING SANITARY MAIN FOR CONNECTION OF SCHOOL SEWER.
- 4" PVC SAN. @1.00% MIN. FROM GREASE TRAP. PIPE INVERT OUT OF GREASE TRAP EQUALS APPROX 114.88.
- FH SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
- FDC SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
- PIV SIGNAGE (REFER TO SHEET C800 FOR DETAILS)
- 4" PVC SANITARY SERVICE @ 1.00% MIN. TO BUILDING. REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
- 2" PVC WATER SERVICE TO BUILDING REFER TO PLUMBING PLANS FOR INVERT AT BLDG. AND CONTINUATION INTO BUILDING.
- TRAFFIC BEARING CLEANOUT
- BEFORE ANY WORK IS PERFORMED ON THE EXISTING VCP GRAVITY MAIN, THE CONTRACTOR SHALL CONTACT THE OCU INSPECTOR WHO MUST BE PRESENT FOR THE WORK PERFORMED ON THE VCP GRAVITY MAIN.
- INSTALL NEW SANITARY MANHOLE S-01 OVER EXISTING 8" VCP. PROVIDE STANDARD PVC CONNECTION AND CONNECT WITH OCU APPROVED FERNCO VCP TO PVC ADAPTORS (BOTH SIDES).
- CONTRACTOR SHALL MAINTAIN SERVICE OF EXISTING SANITARY SEWER DURING INSTALLATION OF MANHOLE VIA BYPASS OR PUMP AND HAUL.



SECTION A-A

NOTES:
1) BEFORE ANY WORK IS PERFORMED ON THE EXISTING VCP GRAVITY MAIN, THE CONTRACTOR SHALL CONTACT THE OCU INSPECTOR WHO MUST BE PRESENT FOR THE WORK PERFORMED ON THE VCP GRAVITY MAIN.
2) INSTALL NEW SANITARY MANHOLE S-01 OVER EXISTING 8" VCP. PROVIDE STANDARD PVC CONNECTION AND CONNECT WITH OCU APPROVED FERNCO VCP TO PVC ADAPTORS (BOTH SIDES).
3) CONTRACTOR SHALL MAINTAIN SERVICE OF EXISTING SANITARY SEWER DURING INSTALLATION OF MANHOLE VIA BYPASS OR PUMP AND HAUL.
4) SANITARY MANHOLE S-01 SHALL NOT BE A DOG HOUSE MANHOLE.

PHASE 3R1 SUBMITTAL

DARIN ALEX LOCKWOOD, P.E.
FL P.E. #60924

REVISIONS	DATE	BY
ADDENDUM 1	04/25/17	DAL

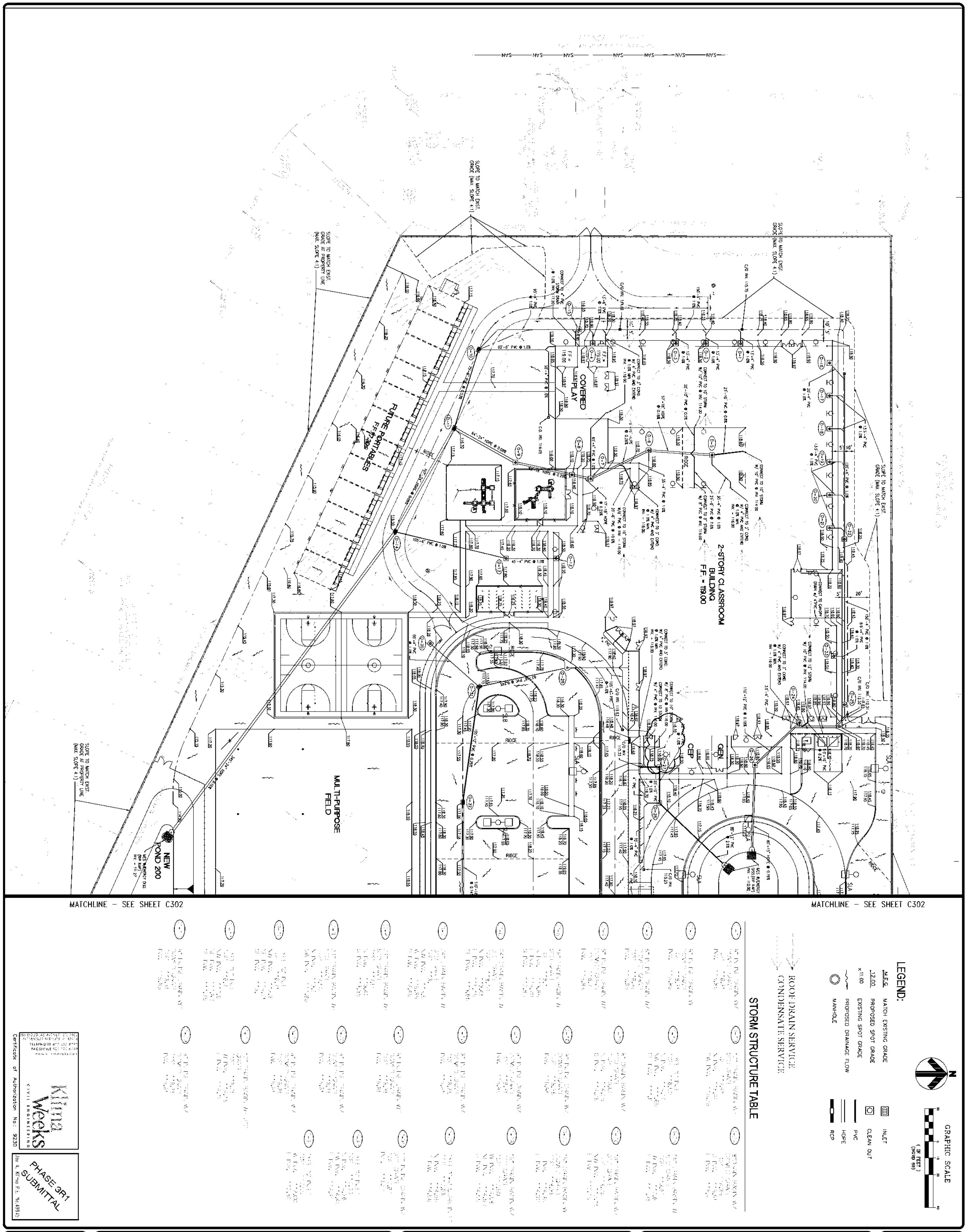
BRPH
BRPH PROJECT NO. C07293.001.00
Architects, Engineers, Constructors
Offices in Melbourne, Atlanta, Orlando, West Palm Beach, Charleston, Huntsville, Seattle, St. Louis, Mexico
2420 Lakemont Avenue, Suite 300, Orlando, Florida 32814
407-896-9301 v 407-896-9304 f
Board of Architecture License No. AA C000149
Board of Professional Engineers License No. 1439

PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094
UTILITY PLAN

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

DRAWN: DJ
CHECKED: DAL
DATE: 3/6/17 PLT SCALE:
OCPS DRAWING FILE NAME: C0094_C501 Utility Plan.dwg
SHEET NUMBER: C502
OF (Total): #

Document Name: C0094_C401-2.dwg
Document Issue Date: 4/24/2017 8:52 AM



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PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094
GRADING AND DRAINAGE PLAN

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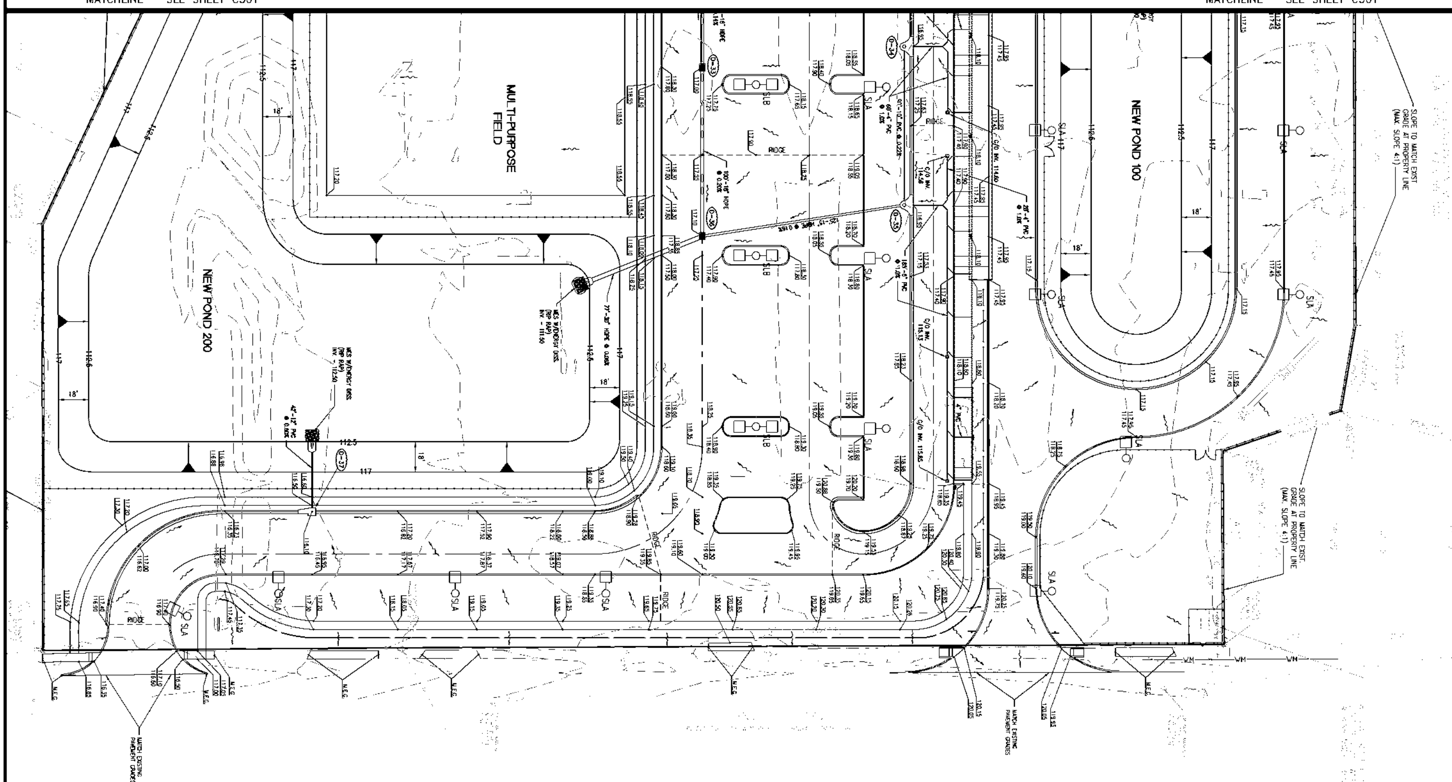
REVISIONS	DATE	BY
1 ADDENDUM 1	04/25/17	MAQ
2 ADDENDUM 2	04/25/17	MAQ

SHEET NUMBER C401

MATCHLINE – SEE SHEET C301

MATCHLINE – SEE SHEET C301



LEGEND:

- M.E.G. MATCH EXISTING GRADE
- 12.00 PROPOSED SPOT GRADE
- x11.00 EXISTING SPOT GRADE
- PROPOSED DRAINAGE FLOW
- MANHOLE
- INLET
- CLEAN OUT
- PVC
- HDPE
- RCP

NOTES

STORM STRUCTURE TABLE

GRAPHIC SCALE
(IN FEET)

Klima Weeks
CIVIL ENGINEERING
Certificate of Authorization No: 9230

PHASE 3R1 SUBMITTAL

Jay A. Klima P.E. No. 49545

REVISIONS	DATE	BY

ORANGE COUNTY PUBLIC SCHOOLS
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PINE HILLS E.S.
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GRADING AND DRAINAGE PLAN

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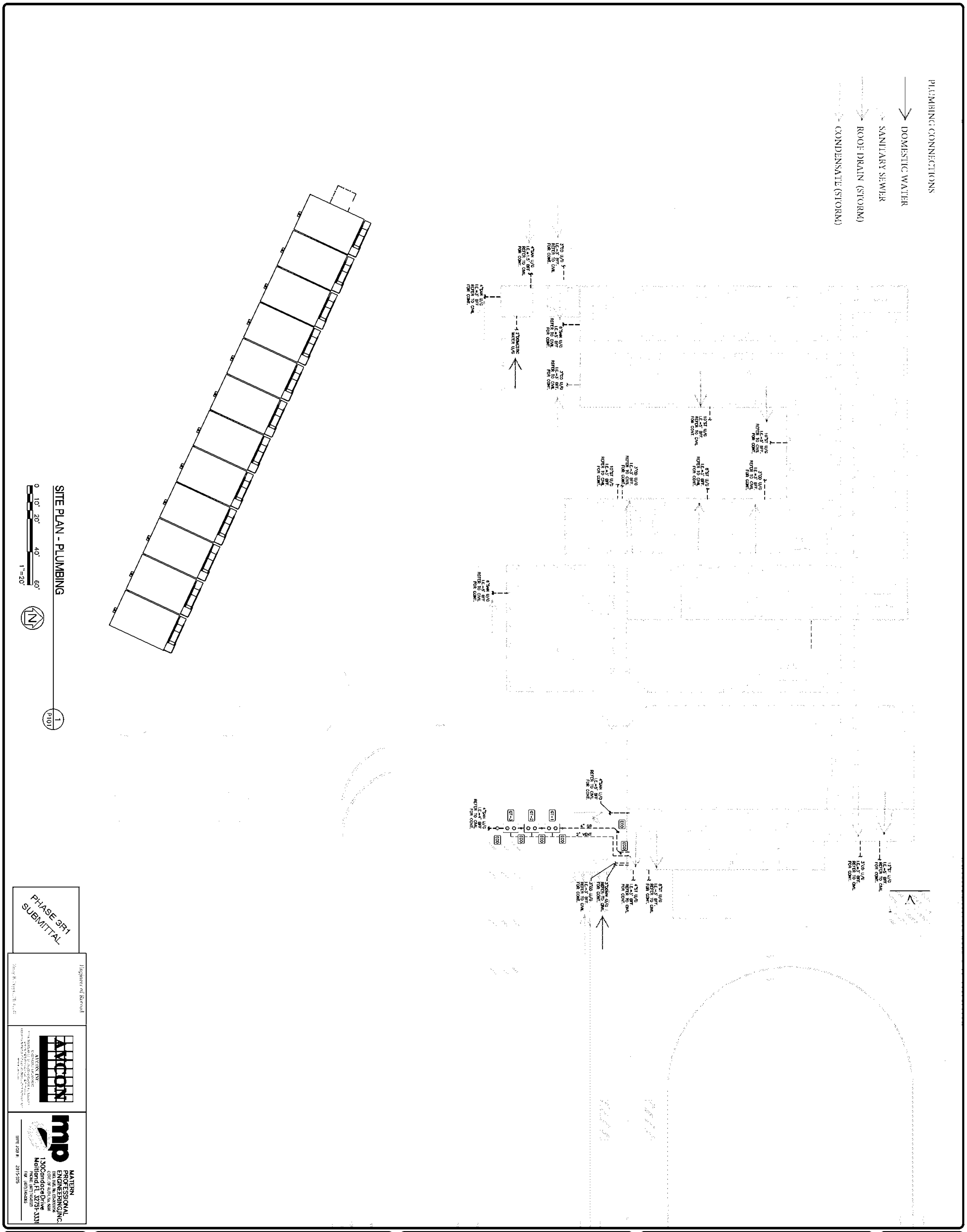
DRAWN: BRC
CHECKED: JAK
DATE: 03/03/17 PLT SCALE: 1:1
SHEET NUMBER:
C402
OF (Total)

Document Name: P101.dwg
Document Issue Date: 3/6/2017 10:23 AM



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Maitland, FL 32751-3331

DRAWN: SE
CHECKED: ZP
DATE: 02/08/17
SHEET NUMBER:
P101
OF (Total):

OC PS

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES

BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094

SITE PLAN - PLUMBING

BRPH
BRPH PROJECT NO.
C07293.001.00

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Architects, Engineers, Constructors

Offices in Melbourne, Atlanta, Orlando, West Palm Beach, Charleston, Huntsville, Seattle, St. Louis, Mexico

Board of Architecture License No. AA C000149
Board of Professional Engineers License No. 1439

REVISIONS	DATE	BY

PROJECT MANUAL
PHASE 3R1

COMPREHENSIVE REPLACEMENT
OCPS PROJECT NO. C0094

PINE HILLS ELEMENTARY SCHOOL
ORANGE COUNTY PUBLIC SCHOOLS

School Board of Orange County, Florida
Design and Construction Facilities Services
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Orlando, Florida 32809

BRPH ARCHITECTS•ENGINEERS
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BRPH PROJECT NO. C07293.001.00

CONSULTANTS

CIVIL

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Altamonte Springs, FL 32714

STRUCTURAL

Advanced Structural Design
1035 S. Semoran Boulevard, Suite 1019
Winter Park, Florida 32792

MECHANICAL / ELECTRICAL PLUMBING

Matern Professional Engineering, Inc.
130 Candace Drive
Maitland, FL 32751

LANDSCAPE

Bonnett Design Group, LLC
400 S. Orlando Ave Ste. 201
Maitland, FL 32751

FOOD SERVICE

LGM Design Group, Inc.
1533 N. Dale Mabry Hwy
Lutz, FL 33548

FIRE PROTECTION

Matern Professional Engineering, Inc.
130 Candace Drive
Maitland, FL 32751

March 6, 2017

Volume No. 1 of 2

VOLUME II – DIVISIONS 20 - 33

DIVISION 33 - UTILITIES

DIVISIONS 34 AND 35 – NOT USED

DIVISIONS 36, 37, 38 AND 39 - RESERVED FOR FUTURE EXPANSION

DIVISION 40 - PROCESS INTEGRATION – NOT USED

DIVISIONS 41 THROUGH 49 - RESERVED FOR FUTURE EXPANSION

END OF TABLE OF CONTENTS

SECTION 33 11 00 - WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

B. For water main construction within the public right-of-way and utility easements (as delineated on the plans) refer to the Standards and Specifications for Water and Wastewater Main Construction by the Orlando Utilities Commission, which is incorporated into these specifications by reference.

1.2 DESCRIPTION OF WORK

A. Extent of water service piping work is shown on the drawings.

B. Exterior water service piping work includes, but is not limited to, the following:

1. Water main and service piping
2. Control valves
3. Fire hydrants
4. Water meters
5. Backflow prevention devices

C. Comply with requirements of Section 03 30 00, Cast-in-Place Concrete for concrete work required in connection with exterior water service piping.

1.3 QUALITY ASSURANCE

A. Installer: A firm with at least two (2) years of successful installation experience on exterior water service piping projects similar to this project.

B. Code Compliance: Comply with applicable portions of National Standard Plumbing Code, local plumbing codes, the NSF International Standard 61, AWWA Standards, the Orlando Utilities Commission standards and the regulations of the Florida Department of Environmental Protection, and NFPA 24.

1.4 SUBMITTALS

A. Product Data: Submit manufacturers' technical data and installation instructions for each major component for the water system materials and products.

B. Submit drawings labeled as "Record Drawings" containing the following information, signed and sealed by a Registered Land Surveyor (State of Florida):

1. Location of water main tied to the project coordinate system or an acceptable base line (base line shall be tied to property lines).
2. Location of each valve, fitting, service line, blow off points, etc.

3. Length and location of service lines.
4. Fire hydrant locations, shut off valve, type of hydrant used, and distance from centerline of pumper nozzle to finish grade.
5. Valve types used.
6. Type of material used, mains and services. Indicate all locations of changed materials including mechanical joint vs. slip joints.
7. Indicate depth of cover over water mains if other than 30 inch, or at 100 ft. intervals (minimum).
8. Dimensions between pipes, elevations of pipes, and actual pipe materials where water lines cross sanitary sewer, reclaimed water and/or storm lines when the separation is less than the minimum 18-inch vertical clearance.
9. Include any additional information specifically required by agencies having jurisdiction and the FDEP permit for this project.

C. An electronic copy of the Record Drawing shall be provided to the Architect in AutoCADD format prior to final acceptance of the work.

D. Maintenance Data: Submit maintenance data and parts lists for water system materials and products. Include this data, shop drawings, product data and record drawings in a maintenance manual to be presented to the Owner at project closeout.

PART 2 – PRODUCTS

2.1 POLYVINYL CHLORIDE PIPE (PVC)

A. PVC pipe of nominal diameter four (4) through twelve (12) inches shall be manufactured in accordance with AWWA Standard C900, latest edition. The PVC pipe shall have a minimum working pressure rating of 150 psi and shall have a dimension ratio (DR) of 18 for all potable water or combination systems. The PVC pipe shall have a minimum working pressure rating of 200 psi and shall have a dimension ratio (DR) of 14 for all fire water systems. Pipe shall have the same O.D. as ductile iron pipe. Pipe shall have a color of blue or white with blue stripes.

B. PVC pipe smaller than three (3) inches shall be Polyethylene (PE) Pressure Pipe and Tubing in accordance to AWWA C-901, latest edition. The pipe shall bear the National Sanitation Foundation (NSF) logo for potable water use. Pipe shall have a color of blue or white with blue stripes.

C. PVC pipe joints shall have integral bell push-on type joints conforming to ASTM D-3139.

D. PVC pipe fittings shall be mechanical joint ductile iron or gray iron conforming to ANSI/AWWA A21.10/C110, 250 psi minimum pressure rating, or ductile iron compact fittings three (3) through twenty-four (24) inches in accordance with ANSI/AWWA A21.53/C153. Pipe fittings shall not contain more than 0.25% lead, and any solder or flux shall not contain more than 0.2% lead. All fittings shall be mechanically restrained.

2.2 DUCTILE IRON PIPE (DIP)

A. Ductile iron pipe shall be cement-mortar lined, Pressure Class 350, mechanical or push-on joint and shall meet all the requirements of the following: AWWA C-104; AWWA C-111 (for rubber gasket joints); AWWA C-150 (for thickness design); and /AWWA C-51 (for D.I.P. molds).

1. Lining: All ductile iron pipe and fittings shall be cement-mortar lined and seal coated in conformance with ANSI A-21.4.
2. Joints: Pipe joints shall be mechanical or push-on joints, except where specifically shown or detailed otherwise.
3. Pipe Fittings: All fittings 4" in diameter and larger shall be mechanical joint ductile iron or gray iron conforming to ANSI/AWWA A21.10/C110, 250 psi minimum pressure rating, or ductile iron compact fittings three (3) through twenty-four (24) inches in accordance with ANSI/AWWA A21.53/C153. Pipe fittings shall not contain more than 0.25% lead, and any solder or flux shall not contain more than 0.2% lead. Mortar lining and seal coat for fittings shall be same thickness specified for pipe. All fittings shall be mechanically restrained.

2.3 GASKET MATERIAL

A. Gaskets: The rubber-ring gaskets shall be suitable for the specified pipe sizes and pressure and shall conform to applicable parts of the latest Federal Specification WW-F-421 and AWWA/ANSI C111/A21.11, and shall be furnished with the pipe.

B. Joint Lubricant: The joint lubricant for push-on joint pipe shall have been tested and approved for potable water service. No lubricant shall be used that will harbor bacteria or damage the gaskets.

2.4 CONTROL VALVES

A. General: Provide valves and flow control devices as indicated. All valves 4" and larger shall be furnished with mechanical joint ends.

1. Minimum working pressure, 200 psi unless otherwise indicated.

B. Gate Valves (4" and larger): Resilient seat type with non-rising stem, except use rising stem valves above ground, cast iron body meeting ASTM A126 and bronze fittings conforming to AWWA C-509. Gate valves located on fire protection mains must be FM approved. All ferrous surfaces inside and outside shall have a fusion-bonded epoxy coating. A 2 inch wrench nut shall be provided for operating the valve in a buried installation.

C. Valve Boxes: Shall be of cast iron three piece boxes with adjustable top. The size shall be large enough for operation of the valve on which it is used with a minimum shaft diameter of 5-1/4". The cover shall have the word "WATER" cast on it.

D. Gate Valves (Smaller than 4"): Shall be non-rising stem, hand-wheel operated, wedge discs, all bronze with flanged ends, conforming to Fed. Spec. WW-V-54, Class B, Type

1. For below ground installation, valves shall be furnished with mechanical joint ends or iron pipe thread and 2" square operating nut.

2.5 THRUST RESTRAINTS

A. General: Provide mechanical pipe joint restraints as necessary to prevent movement of pipe or piping system appurtenances in response to thrust exerted by water under pressure.

1. All mechanical constraints shall be galvanized or otherwise rust-proofed as approved by the Engineer.

2. Concrete thrust block are NOT an acceptable form of mechanical restraint.

2.6 METER ASSEMBLIES

A. General: The Contractor shall furnish and install all water meters and backflow prevention devices. Back flow prevention devices shall be furnished, installed and certified by the Contractor.

1. The Contractor shall coordinate with the Orlando Utilities Commission for the water meters to be furnished and installed by the Contractor.
2. Contractor to paint all above-ground potable water piping and backflow assemblies blue and all fire line piping and backflow assemblies red. **Stainless steel components of the assemblies shall not be painted**.
3. Provide backflow preventers conforming to requirements of the water utility. Checks shall have reversible elastomer discs and shall produce drip tight closure against back-pressure or back-siphonage. If a bypass line is required, it shall include a meter, small diameter reduced pressure zone assembly, and isolation valves. All elements shall be lead free.

    a. Double Check type larger than 2 inches shall consist of two independent check modules within a single housing, with sliding sleeve access port, four test cocks, and two drip-tight shutoff valves. Checks shall be removable and serviceable without the use of special tools. The housing shall be constructed of type 304 (Sch. 40) stainless steel pipe with grooved-end connections.
    b. Reduced Pressure Zone Assembly type larger than 2 inches shall consist of two independent torsion spring check modules, a differential pressure relief valve located between and below the two modules, two drip-tight shutoff valves. Torsion spring check modules and relief valve shall be contained within a sliding sleeve accessible single housing constructed of type 304 (Sch. 40) stainless steel pipe with grooved-end connections.
    c. Reduced Pressure Zone Assembly type 2 inches or smaller shall consist of a lead-free body with polymer check valve seats, stainless relief valve seats, stainless steel springs, and threaded connections. Provide factory air-gap fitting where installed inside building and pipe to nearest floor drain.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install water piping system in compliance with local governing regulations.

B. Water Service Piping: Extend water service piping of size and in locations indicated to water service entrance at buildings. Connections shall be made 5'-0" outside of building lines.

C. Polyvinyl Chloride (PVC) Pipe and Fittings: Install in accordance with Uni-bell Handbook of PVC Pipe and in accordance with AWWA C-900.

D. All PVC pipe 4 inches and larger shall have a #10 GA copper trace wire located directly above the line and terminate on a metal device accessible from the surface without excavation. In addition, plastic marker tape marked "WATER" shall be located no less than 2 feet directly above the water main. Owner's representative shall field verify the tape and locator wire installations prior to backfilling the trench.

E. Control Valves: Install in accordance with manufacturer's instructions.

F. Fire Hydrant Assemblies: Install in accordance with the Orlando Utilities Commission and Orange County Fire Department requirements.

G. Interior Inspection: Inspect conduit to determine whether line placement or other damage has occurred.

1. If the inspection indicates poor alignment, debris, displaced pipe, infiltration or defects, correct such defects to satisfaction of Architect/Engineer.

H. Cleaning Conduit: Clear interior of conduit of dirt and other superfluous material as work progresses. Maintain swab or drag in line and pull past each joint as it is completed.

I. Place plugs in end of uncompleted conduit at end of day or whenever work stops.

J. Disinfection: At completion of water service line installation, flush and disinfect in conformance with AWWA C-651 and local authorities having jurisdiction. Contractor shall provide satisfactory bacteriological test reports at the locations indicated in the Florida Department of Environmental Protection Water Permit and/or as directed by the Engineer of Record. The costs of these tests shall be the responsibility of the Contractor.

K. Utility Crossings: Contractor shall notify the Engineer-of-Record of all utility crossings between potable water lines and sanitary or storm mains. Notification shall be provided in such a manner as to allow the Engineer-of-Record to inspect the crossing prior to backfilling activities.

3.2 TESTING

A. Hydrostatic and Leakage Test: All pipe of whichever size and material installed on the project for the purpose of conveying water or liquid under pressure shall be tested after installation in accordance with the applicable portions of the hydrostatic tests for PVC pipe in AWWA C 605 and for DIP in AWWA C 600. Tests shall be made on sections not exceeding 2,000 feet. Acceptable leakage must be less than the number of gallons per hour as determined by the following formula:

For PVC Pipe:

$$L = \frac{ND(P)^{.5}}{133{,}200}$$

Where:

L = Allowable leakage, in gallons per hour
N = Length of pipe tested, in feet
D = Nominal diameter of pipe, in inches
P = Average test pressure during leakage test, in psig

For Ductile Iron Pipe:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

Where:

L=Allowable leakage, in gallons per hour
S=Length of pipeline tested, in feet
D=Nominal diameter of pipe, in inches
P=Average test pressure during leakage test, in psig

B. All fire lines shall be tested to 200 psi test pressure for two (2) hours duration. Potable water lines shall be tested to 150 psi test pressure for two (2) hours. All gauges and appurtenances necessary shall be furnished by the Contractor. All leaks shall be repaired by removing and replacing defective pipe and joints with pipe and joints free of defects, after which the lines shall be retested. Such repair and retesting shall be done until the lines pass the specified test. The Engineer-of-Record, or their designee, shall be present for the hydrostatic testing.

C. All valves shall be hydrostatically tested with the line in which they are installed.

D. Perform operation testing of hydrants and valves by opening and closing under water pressure to ensure proper operation.

3.3 BACKFILLING

A. Conduct backfilling operations of open-cut trenches closely following laying, jointing and bedding of pipe, and after initial inspection and testing are completed.

3.4 PLACING SYSTEM INTO SERVICE

A. General: The water system shall not be placed into service until all required testing has been completed, approved by the Engineer, and a "Clearance for Use" certification has been issued by the Florida Department of Environmental Protection

B. The Contractor is required to provide the required acceptable hydrostatic and bacteriological test results and a sealed certified as-built drawing of the utility installation to the Engineer -of-Record.

END OF SECTION 33 11 00

SECTION 33 31 00 – SANITARY UTILITY SEWERAGE PIPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

A. This section includes sanitary sewers and structures appurtenant thereto. Excavating, trenching, backfilling, and density tests are specified elsewhere. Sewage collection system work includes, but is not limited to, the following:

Sanitary sewer conduits
Manholes, frames, and covers

B. For sanitary sewer related construction on the project site, refer to the Orange County Utilities Standards and Construction Specification Manual (Revised 2014), if more stringent than herein specified.

C. Refer to Division 02 Sections for excavation and backfilling work related to sewer collection systems.

D. Refer to Division 03 Sections for concrete work related to sewer collection systems.

1.3 QUALITY ASSURANCE

A. Installer: A firm specializing and experienced in sewer work for not less than two years.

B. Code Compliance: Comply with applicable portions of local plumbing codes, Orange County Utilities Standards and Construction Specification Manual (Revised 2014), and the Florida Department of Environmental Protection.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each major component for the sewage collection system materials and products.

B. Record Drawings: At project close-out, submit drawings labeled as "Record Drawings" indicating all installed sewage collection system piping, manholes and products, signed and sealed by a Registered Land Surveyor (State of Florida) containing the following:

1. Location of each manhole. Location of each sewer service at connection. Invert elevations of building services at tie-in. Rim elevations, bottom elevations and invert elevation of all pipes entering manholes. Slope of each segment (mains & services). Length and location of all plugged stub outs. Type of materials used. All horizontal locations required on record drawings shall be located according to the project

coordinate.

C. Maintenance Data: Submit maintenance data and parts lists for sewage collection system materials and products. Include this data, shop drawings, product data and record drawings in a maintenance manual to be presented to the Owner at project close-out.

PART 2 - PRODUCTS

2.1 CONDUIT MATERIALS

A. General: Furnish ells, tees, reducing tees, wyes, couplings, increased superior physical and chemical properties as acceptable to the Architect/Engineer.

B. Polyvinyl Chloride (PVC) Gravity Sanitary Sewer Pipe and Fittings: ASTM D-3034, Type PSM, SDR35.

1. Color: Green.

C. PVC Pipe Joints: Joints for PVC sewer pipe shall be rubber gasketed type complying in all respects to the physical requirements of ASTM D-3212 and ASTM F-477. Lubricant for jointing as approved by the pipe manufacturer shall be used for connecting PVC pipes.

2.2 CONCRETE MANHOLES

A. Precast manhole sections shall be minimum 5" thick and 48" in diameter, conforming to ASTM C-478. Cones shall have same wall thickness and reinforcement as manhole section. Top and bottom of all sections shall be parallel. Joints shall be tongue-and-groove or Keylock type. Joints shall be formed using an approved joint sealer.

1. Prior to the delivery of any size of precast section on the job site, yard tests will be conducted at the point of manufacture. The precast sections to be tested will be selected at random from the stockpiled material which is to be supplied for the job. All test specimens will be mat tested, and shall meet the permeability test requirements of ASTM C-14.

B. Coating System: All sanitary sewer manholes shall be provided with an interior and exterior coal tar epoxy coating. After the concrete has cured for 28 days, minimum, the precast units shall be coated by the manufacturer. The units shall be touched up in the field by the Contractor, if damaged. Interior and exterior surfaces of the manholes shall be coated in accordance with System A, B, or C below.

1. SYSTEM A (TNEMEC)

a. Surface Preparation: SP-C2.
b. Finish: 2 coats of Tnemec 413 Tneme-Tar at 8.3-mil dry thickness, 11.4 wet (140 SFPG) per coat. Thin first coat 10 percent. Apply second coat within 96 hours.
c. Total Thickness (dry): 16.6-mil.

2. SYSTEM B (PORTER)

a. Surface Preparation: SP-C2.
b. Primer: 1 coat of Porter Tarset Concrete Primer at 4.0-mil dry thickness (260 SFPG).
c. Finish: 2 coats of Porter 7013 Tarset C-200 Coal Tar Epoxy Black at 6.0-mil dry

thickness (200 SFPG) per coat.
d. Total Thickness (dry): 16-mil.

3. SYSTEM C (KOPPERS)

a. Surface Preparation: SP-C2.
b. Finish: 2 coats of Koppers Bitumastic 300M Water Epoxy at 8.0-mil dry thickness (200 SFPG) per coat.
c. Total Thickness (dry): 16-mil.

C. Sewer Main Connection to Manholes: Manholes shall be provided with manufacturer installed rubber boots with stainless steel clamps for connection of gravity lines.

D. Manhole Joint Seals: Preformed plastic gaskets shall meet all requirements of Federal Spec. SS-S-00210.

E. Manhole Frames and Covers: Traffic-bearing cast iron of size and shape detailed on the drawings. Covers shall have the word "sewer" in 2" raised letters. Castings shall be tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and all defects. Plane or grind bearing surfaces to ensure flat, true surfaces. Covers shall be true and seat within ring at all points.

F. Base Rock: Clean 3/4" gravel or crushed rock uniformly graded from coarse to fine conforming to requirements of FDOT specifications, 2013.

G. Concrete: All concrete work shall conform to the requirements of Section 03 30 00, Concrete Work.

H. Cleanouts: Provide as indicated, pipe extension to grade with brass ferrule and brass countersunk cleanout plug.

1. Provide a 12-inch by 12-inch concrete collar, 6 inches thick around all exterior cleanouts.

2.3 LOCATION AND IDENTIFICATION

A. General: All PVC pipe 4 inches and larger shall have a #10 GA copper trace wire located directly above the line and terminate on a metal device accessible from the surface without excavation. In addition, plastic marker tape marked “SANITARY” shall be located no less than 2 feet directly above the gravity or force main. Owner’s representative shall field verify the tape and locator wire installations prior to backfilling the trench.

PART 3 - EXECUTION

3.1 INSTALLATION OF CONDUIT

A. General: All PVC sewer shall be installed in accordance with Uni-Bell, UNI-B-5.

B. Pipe Distribution: Distribute material on the job no faster than it can be used to good advantage. Unload pipe that cannot be physically lifted by workers from the trucks, by a forklift, or other approved means. Do not drop pipe of any size from the bed of the truck to the ground.

C. Pipe Preparation and Handling: Inspect all pipe and fittings prior to lowering into the trench to

ensure no cracked, broken, or otherwise defective materials are being used. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.

D. Use proper implements, tools, and facilities for the safe and proper protection of the work. Lower pipe into the trench in such a manner as to avoid any physical damage to the pipe. Remove all damaged pipe from the job site. Do not drop or dump pipe into trenches under any circumstances.

3.2 LINE AND GRADE

A. Gravity Sewer Pipe: All sewer lines between manholes shall be absolutely straight and true. No curvature shall be tolerated. Do not deviate from line or grade, as established by the Engineer, more than 1/2" for line and 1/4" for grade, provided that such variation does not result in a level or reverse sloping invert.

1. Establish line and grade for pipe by the use of lasers or by transferring the cut from offset stakes to batter boards set in the trench at maximum intervals of 25 feet. Maintain a minimum of three sets of batter boards with string line ahead of the pipe laying at all times.

B. Laying and Jointing Pipe: Pipe laying shall proceed upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench, clean the end of the pipe to be joined, the inside of the joint, and the rubber ring immediately before joining the pipe. Make assembly of the joint in accordance with the recommendations of the manufacturer of the type of joint used. Provide all special tools and appliances required for the jointing assembly.

1. After the joint has been made, check pipe for alignment and grade. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints. Apply sufficient pressure in making the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer. To assure proper pipe alignment and joint makeup, place sufficient pipe zone material to secure the pipe from movement before the next joint.
2. When pipe is laid within a movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving the shield ahead.
3. Take the necessary precautions required to prevent excavated or other foreign material from getting into the pipe during the laying operation. At all times, when laying operations are not in progress, at the close of the day's work, or whenever the workers are absent from the job, close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the gasketed joints.
4. Plug or close off pipes that are stubbed off for manhole construction or for construction by others, with temporary plugs.
5. Take all precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.
6. Where non-reinforced pipe is connected to manholes or concrete structures, make connection so that the standard pipe joint is located not more than 3 feet from the outside edge of the structure.
7. When cutting and/or machining the pipe is necessary, use only tools and methods recommended by the pipe manufacturer.

3.3 UNDERGROUND STRUCTURES

A. Rock Base: Prior to setting precast concrete base section, remove water from the excavation.

Place a minimum of 6" of rock base and thoroughly compact with a mechanical vibrating or power tamper.

B. Manhole Joint Seals: Carefully inspect precast manhole sections to be joined. Sections with chips or cracks in the tongue shall not be used. Joint seals shall be installed in strict conformance with the manufacturer's recommendations.

C. Precast Concrete Manholes: Place precast concrete sections as shown on the drawings. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.

1. Install frames and covers on top of manholes to positively prevent all infiltration of surface or groundwater into manholes.
2. Frames shall be set in a bed of mortar with the mortar carried over the flange of the ring as shown in the Manhole Details on the drawings.
3. Provide rubber joint gasket complying with ASTM C-443.
4. Apply bituminous mastic coating at joints of sections.

D. Manhole Invert: Construct manhole inverts in conformance with details shown on the drawings and to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections which tend to obstruct flow. Where a full section of pipe is laid through a manhole, break out the top section and cover exposed edge of pipe completely with mortar. Trowel all mortar surfaces smooth.

3.4 BACKFILLING

A. General: Conduct backfill operations of open-cut trenches closely following laying, jointing and bedding of pipe, and after initial inspection and testing are completed.

1. Place backfill and compact in accordance with provisions of Section 31 20 00, Earth Moving.
2. During backfill operations over pipelines, install the continuous trace wire directly above the pipe at a depth of 6-inches below finish grade.

3.5 CLEANING AND TESTING OF GRAVITY SEWERS

A. Prior to final acceptance, the sewer collection system shall be thoroughly cleaned and visually inspected in the presence of the Engineer and local authorities. Visual inspection shall include closed circuit television inspection.

1. Closed circuit television inspection shall be in conformance with Section V, "Recommended Specifications for Sewer Collection System Rehabilitation" published by the National Association of Sewer Service Companies.

B. Following visual inspection, leakage testing shall be performed on all sewer lines and vacuum testing shall be performed on all sanitary structures.

C. Acceptable methods of testing shall be as follows and the Contractor shall furnish all necessary tools, supplies, labor and equipment for testing.

1. Leakage testing of sewer lines shall be low pressure air exfiltration tests performed in accordance with Uni-Bell, UNI-B-6, and in accordance with the local authority or utility provider requirements.

2. Vacuum testing of sanitary structures shall be in accordance with the local authority or utility provider requirements.

D. Visual inspection and testing shall be performed on the same day. Notify Engineer one week in advance.

E. Deflection Testing: Testing is required no sooner than 30 days after the final backfilling activities are completed on all sections of PVC piping. No section of pipe shall deflect more than 5% using a rigid ball or mandrel for the testing with a diameter not less than 95% of the base inside diameter of the pipe. Testing shall not be performed using mechanical pulling.

F. Contractor shall provide a sealed, certified survey of the as-built conditions including locations, pipe sizing, separation distances from other utilities at pipe crossings, and invert data for the entire sanitary system.

3.6 PLACING SYSTEM INTO SERVICE

A. General: The sewage collection system shall not be placed into service until all required testing has been completed, approved by the Engineer, and a "Clearance for Use" certification (if required) has been issued by the Florida Department of Environmental Protection.

END OF SECTION 33 31 00

SECTION 33 41 00 - STORM UTILITY DRAINAGE PIPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

A. This section includes storm sewers and structures appurtenant thereto. Excavating, trenching, backfilling and density tests are specified elsewhere. Storm sewer system work includes, but is not limited to, the following:

1. Storm sewer conduits
2. Storm sewer structures required by drawings

B. Refer to applicable Division 02 sections for excavation and backfilling work related to storm sewer systems.

C. Refer to applicable Division 03 sections for concrete work related to storm sewer systems.

1.3 QUALITY ASSURANCE

A. Installer: A firm specializing and experienced in storm sewer work for not less than two years.

B. Code Compliance: Comply with applicable portions of local plumbing codes, the requirements of St. Johns River Water Management District and the Florida Department of Environmental Protection.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each major component for the storm sewer system materials and products.

B. Record Drawings: At project closeout, submit record drawings of installed storm sewerage piping and products. All drawings must be labeled as "Record Drawings" and be signed and sealed by a Professional Land Surveyor licensed in the State of Florida. Drawings shall include as a minimum: horizontal locations, tied to project coordinate system, of all structures (area drains, catch basins, manholes, headwalls, etc.) and piping, rim elevations of all structures with invert elevations of all pipes entering structures, diameter and material of all piping, and the slope of each pipe segment. Verify all elements of drainage control structures, including rim elevations, elevation of slots, weirs and orifices, and invert elevation of all pipes entering structures. Refer to "Earth Moving" Section 31 20 00 for record drawing requirements regarding grading, swales, lakes and drainage retention areas.

C. An electronic copy of the Record Drawing shall be provided to the Architect in AutoCADD format prior to final acceptance of the work.

D. Maintenance Data: Submit maintenance data and parts lists for storm sewer system materials and products. Include this data, shop drawings, product data and record drawings in a maintenance manual to be presented to the Owner at project close-out.

PART 2 - PRODUCTS

2.1 GENERAL

A. Except as otherwise provided, all off-site storm sewer materials shall comply with the applicable sections of Orange County Standards which are hereby incorporated into these specifications by reference. All on-site storm sewer materials shall comply with the specifications contained herein.

2.2 CONDUIT MATERIALS

A. Provide materials specified below:

1. Polyvinyl Chloride (PVC), ASTM D-3034, SDR 35 pipe and fittings. Joints and fittings shall have elastomeric gasket joints manufactured in accordance with ASTM D-3212 and ASTM D-477.
2. High Density Polyethylene Pipe (HDPE), 3-inch to 10-inch, in accordance with AASHTO M252 and ASTM D-3350, and shall have a smooth interior lining. Joints shall provide a water tight seal using elastomeric gaskets manufactured in accordance with ASTM D-3212 and ASTM F-477.
3. High Density Polyethylene Pipe (HDPE), larger than 10-inch, in accordance with AASHTO M294, Type S, and ASTM D-3350. Joints shall provide a water tight seal using elastomeric gaskets manufactured in accordance with ASTM D-3212 and ASTM F-477.
4. Round Reinforced Concrete Pipe (RCP) in accordance with ASTM C-76. Joints shall be bell and spigot type. The spigot end shall be grooved to accommodate a rubber O-ring gasket to provide a water tight seal conforming to the requirements of ASTM C-443.

2.3 STORM SEWER STRUCTURES

A. Provide materials and perform all work in accordance with Section 425 of the referenced FDOT Standard Specifications.

B. Manhole Joint Seals: Preformed plastic gaskets shall meet all requirements of Federal Spec. SS-S-00210.

C. Manhole Frames and Covers: Traffic-bearing cast iron of size and shape detailed on the drawings. Covers shall have the word "STORM" in 2" raised letters. Castings shall be tough, close-grained gray iron, sound, smooth, clean, free from blisters, blowholes, shrinkage, cold shuts, and all defects. Plane or grind bearing surfaces to ensure flat, true surfaces. Covers shall be true and seat within ring at all points.

D. Catch Basin Frames and Grates: Use cast iron grates and cast-in angle iron seats on all catch basin structures. Grates in paved areas shall be traffic bearing.

E. Base Rock: Clean 3/4" gravel or crushed rock uniformly graded from coarse to fine conforming to requirements of FDOT specifications, 1996.

F. Concrete: All concrete work shall conform to the requirements of Section 03 30 00, Cast-In-Place Concrete.

G. Cleanouts: Provide as indicated, pipe extension to grade with brass ferrule and brass countersunk cleanout plug.

1. Provide a 12-inch by 12-inch concrete collar, 6 inches thick around all exterior cleanouts.

2.4 SUMP PUMP

A. Sump pump shall be Flygt Model SXV-3 0.75 hp 115 volts/7.0 amp or approved equivalent.

PART 3 - EXECUTION

3.1 GENERAL

A. General: All construction operations shall adhere to the requirements of the referenced FDOT Standard Specifications.

B. Conform to manufacturer's recommendations on the installation of RCP, PVC, and HDPE storm sewers.

C. Pipe Distribution: Distribute material on the job no faster than it can be used to good advantage. Unload pipe which cannot be physically lifted by workers from the trucks, by a forklift, or other approved means. Do not drop pipe of any size from the bed of the truck to the ground.

D. Pipe Preparation and Handling: Inspect all pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after installation.

E. Use proper implements, tools, and facilities for the safe and proper protection of the work. Lower pipe into the trench in such a manner as to avoid any physical damage to the pipe. Remove all damaged pipe from the job site. Do not drop or dump pipe into trenches under any circumstances.

3.2 LINE AND GRADE

A. General: All sewer lines between structures shall be absolutely straight and true. No curvature shall be tolerated. Do not deviate from line or grade more than 1/2" for line and 1/4" for grade, provided that such variation does not result in a level or reverse sloping invert.

1. Establish line and grade for pipe by the use of lasers or by transferring the cut from offset stakes to batter boards set in the trench at maximum intervals of 25 feet. Maintain a minimum of three sets of batter boards with string line ahead of the pipe laying at all times.

B. Laying and Jointing Pipe: Pipe laying shall proceed upgrade with spigot ends pointing in direction of flow. After a section of pipe has been lowered into the prepared trench, clean the end of the pipe to be joined and the inside of the joint immediately before joining the pipe. Make assembly of

the joint in accordance with the recommendations of the manufacturer of the type of joint used. Provide all special tools and appliances required for the jointing assembly.

1. After the joint has been made, check pipe for alignment and grade. The trench bottom shall form a continuous and uniform bearing and support for the pipe at every point between joints. Apply sufficient pressure in making the joint to assure that the joint is "home" as defined in the standard installation instructions provided by the pipe manufacturer. To assure proper pipe alignment and joint makeup, place sufficient pipe zone material to secure the pipe from movement before the next joint is installed.
2. When pipe is laid within a movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving the shield ahead.
3. Take the necessary precautions required to prevent excavated or other foreign material from getting into the pipe during the laying operation. At all times, when laying operations are not in progress, at the close of the day's work, or whenever the workers are absent from the job, close and block the open end of the last laid section of pipe to prevent entry of foreign material or creep of the joints.
4. Plug or close off pipes which are stubbed off for structure construction or for construction by others, with temporary plugs.
5. Take all precautions necessary to prevent the "uplift" or floating of the line prior to the completion of the backfilling operation.
6. Where non-reinforced pipe is connected to manholes or concrete structures, take connection so that the standard pipe joint is located not more than 3 feet from the outside edge of the structure.
7. When cutting and/or machining the pipe is necessary, use only tools and methods recommended by the pipe manufacturer.

3.3 UNDERGROUND STRUCTURES

A. Rock Base: Prior to setting pre-cast concrete base section, remove water from the excavation. Place a minimum of 6" of rock base and thoroughly compact with a mechanical vibrating or power tamper.

B. Structure Joint Seals: Carefully inspect pre-cast structure sections to be joined. Sections with chips or cracks in the tongue shall not be used. Joint seals shall be installed in strict conformance with the manufacturer's recommendations. Only pipe primer furnished by the joint seal manufacturer will be approved.

C. Pre-cast Concrete Structures: Place pre-cast concrete sections as shown on the drawings. Set top elevation of catch basins as indicated on the drawings. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set manhole tops 3 inches above finish surface, unless otherwise indicated.

1. Install frames and covers on top of manholes to positively prevent all infiltration of surface or groundwater into manholes.
2. Frames shall be set in a bed of mortar with the mortar carried over the flange of the ring as shown in the Manhole Details on the drawings.
3. Provide rubber joint gasket complying with ASTM C-443.
4. Apply bituminous mastic coating at joints of sections.

D. Manhole Invert: Construct manhole inverts in conformance with details shown on the drawings and to ensure an unobstructed flow through manhole. Remove sharp edges or rough sections which tend to obstruct flow. Trowel all mortar surfaces smooth.

3.4 BACKFILLING

A. General: Conduct backfill operations of open-cut trenches closely following laying, jointing and bedding of pipe, and after initial inspection and testing are completed. Place backfill and compact in accordance with provisions of Section 31 20 00, Earth Moving.

3.5 CLEANING AND TESTING

A. Prior to final acceptance, the storm sewer system shall be thoroughly cleaned and visually inspected in the presence of the Engineer or his designated representative.

B. Following visual inspection, leakage testing may be required at the discretion of the Engineer and/or local authorities.

C. Acceptable methods of testing shall be water or air exfiltration in accordance with the Florida Building Code requirements. OCPS BCCO will allow the use of laser profile testing as an approved alternative method for the inspection of the site stormwater piping.

1. Laser profiling shall be in accordance with the procedures outlined in FDOT Specification Section 430. A copy of the laser profile DVD inspection and associated reports along with a signed and sealed letter from the Engineer of Record certifying that the storm system is constructed and functioning substantially in accordance with the design must be submitted to BCCO prior to final acceptance.

D. The Contractor shall furnish all necessary tools, supplies, labor and equipment for testing.

E. Visual inspection and testing shall be performed on the same day. Notify the Engineer one week in advance.

F. Contractor shall provide a sealed, certified survey of the as-built layout of the storm system including structure locations, inverts, pipe sizes, locations and inverts and detailed information on the storm water management pond areas.

END OF SECTION 33 41 00

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cleaning of the pool or spa in a way that does not affect the structural integrity of the pool or spa or its associated equipment.

(k) "Residential pool/spa contractor" means a contractor whose scope of work involves, but is not limited to, the construction, repair, and servicing of a residential swimming pool, or hot tub or spa, regardless of use. The scope of work includes the installation, repair, or replacement of existing equipment, any cleaning or equipment sanitizing that requires at least a partial disassembling, excluding filter changes, and the installation of new pool/spa equipment, interior finishes, the installation of package pool heaters, the installation of all perimeter piping and filter piping, and the construction of equipment rooms or housing for pool/spa equipment, and also includes the scope of work of a swimming pool/spa servicing contractor. The scope of such work does not include direct connections to a sanitary sewer system or to potable water lines. The installation, construction, modification, or replacement of equipment permanently attached to and associated with the pool or spa for the purpose of water treatment or cleaning of the pool or spa requires licensure; however, the usage of such equipment for the purposes of water treatment or cleaning does not require licensure unless the usage involves construction, modification, or replacement of such equipment. Water treatment that does not require such equipment does not require a license. In addition, a license is not required for the cleaning of the pool or spa in a way that does not affect the structural integrity of the pool or spa or its associated equipment.

(l) "Swimming pool/spa servicing contractor" means a contractor whose scope of work involves, but is not limited to, the repair and servicing of a swimming pool, or hot tub or spa, whether public or private, or otherwise, regardless of use. The scope of work includes the repair or replacement of existing equipment, any cleaning or equipment sanitizing that requires at least a partial disassembling, excluding filter changes, and the installation of new pool/spa equipment, interior refinishing, the reinstallation or addition of pool heaters, the repair or replacement of all perimeter piping and filter piping, the repair of equipment rooms or housing for pool/spa equipment, and the substantial or complete draining of a swimming pool, or hot tub or spa, for the purpose of repair or renovation. The scope of such work does not include direct connections to a sanitary sewer system or to potable water lines. The installation, construction, modification, substantial or complete disassembly, or replacement of equipment permanently attached to and associated with the pool or spa for the purpose of water treatment or cleaning of the pool or spa requires licensure; however, the usage of such equipment for the purposes of water treatment or cleaning does not require licensure unless the usage involves construction, modification, substantial or complete disassembly, or replacement of such equipment. Water treatment that does not require such equipment does not require a license. In addition, a license is not required for the cleaning of the pool or spa in a way that does not affect the structural integrity of the pool or spa or its associated equipment.

(m) "Plumbing contractor" means a contractor whose services are unlimited in the plumbing trade and includes contracting business consisting of the execution of contracts requiring the experience, financial means, knowledge, and skill to install, maintain, repair, alter, extend, or, if not prohibited by law, design plumbing. A plumbing contractor may install, maintain, repair, alter, extend, or, if not prohibited by law, design the following without obtaining an additional local regulatory license, certificate, or registration: sanitary drainage or storm drainage facilities, water and sewer plants and substations, venting systems, public or private water supply systems, septic tanks, drainage and supply wells, swimming pool piping, irrigation systems, and solar heating water systems and all appurtenances, apparatus, or equipment used in connection therewith, including boilers and pressure process piping and including the installation of water, natural gas, liquefied petroleum gas and related venting, and storm

and sanitary sewer lines. The scope of work of the plumbing contractor also includes the design, if not prohibited by law, and installation, maintenance, repair, alteration, or extension of air-piping, vacuum line piping, oxygen line piping, nitrous oxide piping, and all related medical gas systems; fire line standpipes and fire sprinklers if authorized by law; ink and chemical lines; fuel oil and gasoline piping and tank and pump installation, except bulk storage plants; and pneumatic control piping systems, all in a manner that complies with all plans, specifications, codes, laws, and regulations applicable. The scope of work of the plumbing contractor applies to private property and public property, including any excavation work incidental thereto, and includes the work of the specialty plumbing contractor. Such contractor shall subcontract, with a qualified contractor in the field concerned, all other work incidental to the work but which is specified as being the work of a trade other than that of a plumbing contractor. This definition does not limit the scope of work of any specialty contractor certified pursuant to s. 489.113(6) and does not require certification or registration under this part as a category I liquefied petroleum gas dealer, LP gas installer, or specialty installer who is licensed under chapter 527 or an authorized employee of a public natural gas utility or of a private natural gas utility regulated by the Public Service Commission when disconnecting and reconnecting water lines in the servicing or replacement of an existing water heater. A plumbing contractor may perform drain cleaning and clearing and install or repair rainwater catchment systems; however, a mandatory licensing requirement is not established for the performance of these specific services.

(n) "Underground utility and excavation contractor" means a contractor whose services are limited to the construction, installation, and repair, on public or private property, whether accomplished through open excavations or through other means, including, but not limited to, directional drilling, auger boring, jacking and boring, trenchless technologies, wet and dry taps, grouting, and slip lining, of main sanitary sewer collection systems, main water distribution systems, storm sewer collection systems, and the continuation of utility lines from the main systems to a point of termination up to and including the meter location for the individual occupancy, sewer collection systems at property line on residential or single-occupancy commercial properties, or on multioccupancy properties at manhole or wye lateral extended to an invert elevation as engineered to accommodate future building sewers, water distribution systems, or storm sewer collection systems at storm sewer structures. However, an underground utility and excavation contractor may install empty underground conduits in rights-of-way, easements, platted rights-of-way in new site development, and sleeves for parking lot crossings no smaller than 2 inches in diameter if each conduit system installed is designed by a licensed professional engineer or an authorized employee of a municipality, county, or public utility and the installation of such conduit does not include installation of any conductor wiring or connection to an energized electrical system. An underground utility and excavation contractor may not install piping that is an integral part of a fire protection system as defined in s. 633.102 beginning at the point where the piping is used exclusively for such system.

(o) "Solar contractor" means a contractor whose services consist of the installation, alteration, repair, maintenance, relocation, or replacement of solar panels for potable solar water heating systems, swimming pool solar heating systems, and photovoltaic systems and any appurtenances, apparatus, or equipment used in connection therewith, whether public, private, or otherwise, regardless of use. A contractor, certified or registered pursuant to this chapter, is not required to become a certified or registered solar contractor or to contract with a solar contractor in order to provide services enumerated in this paragraph that are within the scope of the services such contractors may render under this part.

62-604.200 Definitions.

Terms used in this rule shall have the meaning specified below. The meaning of any term not defined below may be taken from definitions in other rules of the Department, unless such meaning would defeat the purposes or intent of Chapter 62-604, F.A.C.

(1) "Alternative collection/transmission systems" means those systems referenced in paragraphs 62-604.300(5)(b), (c), and (j), F.A.C., or other collection/transmission systems not comprised of strictly conventional gravity sewers, pump stations, and force mains.

(2) "Collection/transmission systems" means sewers, pipelines, conduits, pumping stations, force mains, and all other facilities used for collection and transmission of wastewater from individual service connections to facilities intended for the purpose of providing treatment prior to release to the environment.

(3) "Commission" means the Environmental Regulation Commission.

(4) "Delegated local program" means any county, municipality, or combination thereof that has established and administers a pollution control program approved by the Department in compliance with Section 403.182, Florida Statutes, as amended.

(5) "Department" means the State of Florida Department of Environmental Protection, or delegated local program, where applicable.

(6) "District office" means the regional district offices of the Department.

(7) "Domestic wastewater" means wastewater derived principally from dwellings, business buildings, institutions, and the like, commonly referred to as sanitary wastewater or sewage. When industrial wastewater is combined with domestic wastewater for treatment, determination of whether the treatment plant is designated as domestic shall be in accordance with the definition of domestic wastewater provided in Rule 62-600.200, F.A.C.

(8) "Individual service connection" means the sewer which connects the point(s) at which wastewater leaves a building which is its source and the point at which it enters a collection system.

(9) "Modification" means any alteration, expansion, upgrade, extension, replacement of, or addition to an existing wastewater facility or activity.

(10) "Permittee" means the owner, operator or other entity to which a permit for a wastewater facility or activity is issued by the Department. The term "permittee" shall be functionally synonymous with the terms "owner", "contractor", or "licensee", but shall not include licensed individuals, such as State certified operators, unless they are the persons to whom a facility permit is issued by the Department. The term shall extend to a permit "applicant" for purposes of this chapter.

(11) "Pollution" is as defined in Section 403.031, Florida Statutes.

(12) "Pretreatment" means the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to, or in lieu of, introducing such pollutants into the treatment facility. This reduction or alteration can be obtained by physical, chemical, or biological processes; by process changes; or by other means, except by diluting the concentration of the pollutants unless allowed by an applicable pretreatment standard.

(13) "Private drinking water supply well" means a well serving a private or multifamily water system as defined in Rule 62-532.200, F.A.C.

(14) "Public drinking water supply well" means a well serving a public water system as defined in Rule 62-550.200, F.A.C.

(15) "Secretary" means the Secretary of the Department of Environmental Protection.

(16) "Treatment" means any method, technique, or process which changes the physical, chemical, or biological character or composition of wastewater and thereby reduces its potential for polluting waters of the state.

(17) "Treatment plant" means any plant or other works used for the purpose of treating, stabilizing, or holding wastes.

(18) "Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive, or other substances which may pollute or tend to pollute any waters of the State.

(19) "Wastewater" means the combination of liquid and water-carried pollutants from residences, commercial buildings, industrial plants, and institutions together with any groundwater, surface runoff or leachate that may be present.

(20) "Wastewater facility" or "facility" means any facility which discharges wastes into waters of the State or which can reasonably be expected to be a source of water pollution and includes any or all of the following: the collection and transmission system, the wastewater treatment works, the reuse or disposal system, and the residuals management facility.

(21) "Waters" shall be as defined in Section 403.031, Florida Statutes.

Specific Authority 403.061, 403.087 FS. Law Implemented 403.021, 403.061, 403.062, 403.085, 403.086, 403.087, 403.088 FS. History–New 11-27-89, Amended 6-4-92, Formerly 17-604.200, Amended 12-26-96, 11-6-03.

Florida Building Code
Informal Interpretation

Date: Tue Feb 15 2005

Report #: 3512

Code: Plumbing

Section: 701.1

Question:
Is it the intent of the Florida Building Code for Chapter 7 of the Plumbing Code to be applied to a gravity sewer collection system that is required to be permitted under Chapter 62–604 FAC, the FDEP rule for Collection Systems and Transmission Facilities?

Answer:
No. The FBC–Plumbing applies to the building sewer which receives the waste from the building drain and conveys this waste to the public sewer, private sewer, individual sewage disposal system or other point of disposal.

Commentary:
The public sewer, private sewer, individual sewage disposal system or other point of disposal would be governed by their respective laws.

UTILITY NOTES:

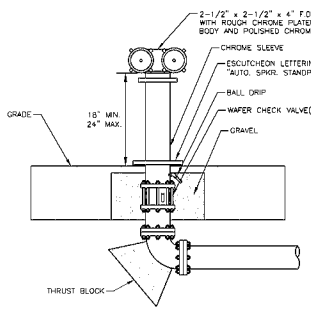
1. ALL SANITARY AND WATER PIPING LOCATED ON OCPS PROPERTY AND NOT IN A DEDICATED EASEMENT, SHALL BE INSTALLED PER THE FLORIDA BUILDING CODE – PLUMBING.
2. THE CONSTRUCTION OF ALL ONSITE PRIVATELY OWNED UTILITIES (WATER AND WASTEWATER), SHALL BE IN CONFORMANCE WITH THE PLANS AND SPECIFICATIONS FOR THE PROJECT. THE CONSTRUCTION OF ALL OFFSITE UTILITIES, OWNED BY THE SUBDIVIDER SHALL BE IN CONFORMANCE THE STANDARDS AND SPECIFICATIONS SET FORTH BY OUC.
3. A. ALL ON SITE UTILITY CONSTRUCTION TO POINT OF SERVICE CONNECTIONS SHALL BE PERFORMED BY AN UNDERGROUND UTILITY CONTRACTOR LICENSED BY THE STATE OF FLORIDA.
   B. ALL ON SITE UTILITY SERVICES FROM THE POINT OF SERVICE CONNECTION & INCLUDING ALL BUILDING PLUMBING, SHALL BE PERFORMED BY A PLUMBER LICENSED BY THE STATE OF FLORIDA.
4. THE LICENSED UNDERGROUND UTILITY CONTRACTOR AND PLUMBING CONTRACTOR SHALL COORDINATE FULLY WITH OUC FOR THE REQUIREMENT OF THEIR WORK, INCLUDING NECESSARY PERMITS, INSPECTIONS AND APPROVALS.
5. ALL NEW AND RELOCATED WATER MAIN PIPE, FITTINGS, VALVES, FIRE HYDRANTS, AND RELATED PRODUCTS THAT WILL COME INTO CONTACT WITH DRINKING WATER SHALL BE IN CONFORMANCE WITH AMERICAN NATIONAL STANDARDS INSTITUTE/NSF INTERNATIONAL STANDARD 61.
6. ALL NEW AND RELOCATED WATER MAIN PIPE, FITTINGS, VALVES, AND FIRE HYDRANTS SHALL BE IN CONFORMANCE WITH APPLICABLE AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARDS. ALL NEW AND RELOCATED WATER MAIN PIPE SHALL CONTAIN NO MORE THAN 0.25 PERCENT LEAD AND ALL PACKING AND JOINTING MATERIALS USED IN THE JOINTS OF NEW OR RELOCATED WATER MAIN PIPE SHALL BE IN CONFORMANCE WITH APPLICABLE AWWA STANDARDS.
7. ROCK AND UNSUITABLE, SIZED STONES (AS DESCRIBED IN APPLICABLE AWWA STANDARDS AND/OR THE PIPE MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES) FOUND IN TRENCHES FOR NEW AND RELOCATED WATER MAIN PIPE SHALL BE REMOVED TO A DEPTH OF AT LEAST SIX INCHES BELOW THE BOTTOM OF THE PIPE, AND CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED IN TRENCHES FOR NEW AND RELOCATED WATER MAIN PIPE. BACKFILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND NEW AND RELOCATED WATER MAIN PIPE TO A SUFFICIENT HEIGHT ABOVE IT TO ADEQUATELY SUPPORT AND PROTECT THE PIPE.
8. ALL TEES, BENDS, PLUGS, AND HYDRANTS IN NEW AND RELOCATED WATER MAINS SHALL BE PROVIDED WITH MECHANICALLY RESTRAINED JOINTS TO PREVENT MOVEMENT OR SEPARATION OF THE PIPE AND ITS APPURTENANCES.
9. ALL NEW AND RELOCATED WATER MAINS SHALL BE PRESSURE AND LEAKAGE TESTED IN ACCORDANCE WITH AWWA STANDARD C600.
10. ALL NEW AND RELOCATED WATER MAINS SHALL BE DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651 AND RULE 62-555.345, F.A.C.
11. ALL NEW AND RELOCATED WATER MAINS SHALL BE LOCATED AT LEAST TEN FEET HORIZONTALLY FROM ALL SANITARY SEWERS, STORM SEWERS, FORCE MAINS, AND RECLAIMED WATER LINES CARRYING RECLAIMED WATER FOR RESTRICTED AREAS, AND AT LEAST THREE FEET HORIZONTALLY FROM ALL RECLAIMED WATER LINES CARRYING RECLAIMED WATER FOR PUBLIC ACCESS AREAS. ALL DISTANCES SHALL BE MEASURED FROM OUTSIDE PIPE EDGE TO OUTSIDE PIPE EDGE.
12. WHERE ANY NEW OR RELOCATED WATER MAINS CROSS ANY SANITARY SEWERS, STORM SEWERS, FORCE MAINS, OR RECLAIMED WATER LINES, THE WATER MAINS CROSS ABOVE SUCH PIPELINES WITH A MINIMUM VERTICAL DISTANCE OF 12 INCHES BETWEEN THE OUTSIDE OF THE WATER MAINS AND THE OUTSIDE OF SUCH PIPELINES, OR SUCH CROSSINGS ARE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE (3) FEET FROM ALL JOINTS IN STORM SEWER AND RECLAIM WATER MAIN CROSSED UNDER PART III OF CHAPTER 62-610, F.A.C. AND AT LEAST SIX (6) FEET FROM ALL JOINTS IN GRAVITY- OR PRESSURE-TYPE SANITARY SEWERS, WASTEWATER FORCE MAIN, OR RECLAIM WATER NOT COVERED UNDER PART III OF CHAPTER 62-610, F.A.C.
13. BACKFLOW-PREVENTION ASSEMBLIES/DEVICES SHALL BE PROVIDED IN ACCORDANCE WITH RULE 62-555.360, F.A.C., AND THE AWWA MANUAL M14, RECOMMENDED PRACTICE FOR BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL.
14. ALL NEW AND RELOCATED WATER SERVICES SHALL BE IN CONFORMANCE WITH THE STATE PLUMBING CODE, AND ALL PIPE AND PIPE FITTINGS FOR NEW AND RELOCATED WATER SERVICES SHALL CONTAIN NO MORE THAN 0.25 PERCENT LEAD, AND ALL SOLDERS AND FLUX FOR NEW AND RELOCATED WATER SERVICES SHALL CONTAIN NO MORE THAN 0.2 PERCENT LEAD.
15. ALL UTILITIES (INCLUDING PUMP STATION IF APPLICABLE) LOCATED OUTSIDE PUBLIC RIGHT-OF-WAYS AND PUBLIC EASEMENTS SHALL BE OWNED AND MAINTAINED BY ORANGE COUNTY PUBLIC SCHOOLS.
16. THE CONTRACTOR SHALL NOTIFY OUC 48 HOURS PRIOR TO ANY UTILITIES CONSTRUCTION.
17. ALL WATER DISTRIBUTION PIPING OWNED BY OUC SHALL BE DUCTILE IRON PIPE. THE EXTENTS OF PIPING TO BE DUCTILE IRON SHALL BE FROM THE WET TAP TO THE UNDERGROUND 90° BEND ON THE DOWNSTREAM SIDE OF THE BACKFLOW PREVENTERS.
18. ALL EXISTING UTILITIES SHALL BE FIELD VERIFIED (VERTICALLY AND HORIZONTALLY) AT ALL POINTS OF CONNECTION AND AT ALL AREAS OF CONFLICT WITH EXISTING INFRASTRUCTURE.
19. ALL UTILITIES LOCATED OUTSIDE PUBLIC RIGHT-OF-WAYS AND PUBLIC EASEMENTS SHALL BE PRIVATELY OWNED AND MAINTAINED.
20. MAINTAIN A MINIMUM OF 3 FEET OF COVER OVER ALL PROPOSED WATER, WASTEWATER, AND RECLAIMED WATER LINES.

WATER:

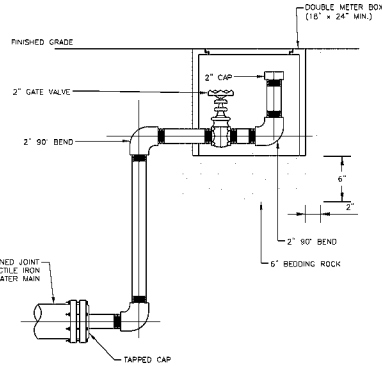
1. ALL WATER DISTRIBUTION SYSTEM PRESSURE PIPE SHALL HAVE A MINIMUM OF THIRTY-SIX (36) INCHES OF COVER
2. ALL PVC WATER DISTRIBUTION SYSTEM PRESSURE PIPE TO BEAR NSF LOGO FOR POTABLE WATER USE. ALL PVC PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH AWWA STANDARD C900 (LATEST EDITION). THE PVC PIPE SHALL HAVE A MINIMUM WORKING PRESSURE RATING OF 150 PSI AND SHALL HAVE A DIMENSION RATIO (DR) OF 14 FOR PIPE OF NOMINAL DIAMETER FOUR (4) INCHES THROUGH TWELVE (12) INCHES. ALL PVC PIPE SMALLER THAN 4" SHALL BEAR THE NSF LOGO AND SHALL HAVE A MINIMUM WORKING PRESSURE RATING OF 200 PSI.
3. THE CONTRACTOR SHALL TAKE ADEQUATE MEASURES TO ENSURE THE PROTECTION OF EXISTING ACTIVE MAINS FROM BACKFLOW CONTAMINATION DURING FILLING, FLUSHING, TESTING AND MAINTAINING A PRESSURE IN THE PIPING UNTIL A LETTER OF CLEARANCE IS OBTAINED FROM THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION.
4. HYDROSTATIC TESTS WILL BE PERFORMED ON THE NEWLY INSTALLED POTABLE WATER DISTRIBUTION SYSTEM PRESSURE PIPE AND APPURTENANCES IN ACCORDANCE WITH ANSI/AWWA C600-93 SECTION 4.
5. WATER DISTRIBUTION LINES AND SERVICES ARE SHOWN SCHEMATICALLY. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT THE SYSTEM WITH THE NECESSARY FITTINGS, JOINTS, AND BENDS TO ALIGN THE SYSTEM IN COMPLIANCE WITH FDEP PERMIT REQUIREMENTS, AND OUC STANDARDS AND ACCEPTANCE.
6. IN THE EVENT THAT THE POTABLE WATER SYSTEM IS CONTAMINATED (I.E. WATER DOES NOT MEET FEDERAL AND STATE REQUIREMENTS) DUE TO CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL BE RESPONSIBLE, UNDER THE DIRECTION OF THE OWNER, OR STATE AND LOCAL REGULATORY AGENCY, FOR CORRECTING ANY SUCH CONTAMINATION PROBLEM INCLUDING DISINFECTION, TESTING, AND OTHER CORRECTIVE ACTION AT CONTRACTOR'S EXPENSE.
7. STABILIZED ROADBEDS AND A SUITABLE WATER SUPPLY SHALL BE PROVIDED ON THE PROJECT WHEN AND IF COMBUSTIBLE MATERIALS ARE BROUGHT ONTO THE CONSTRUCTION SITE IN QUANTITIES DEEMED TO BE HAZARDOUS PER 6D2.6.1 SFPC (94 ED.)

FIRE:

1. HYDRANT COLOR CODING SHALL BE PAINTED IN ACCORDANCE WITH N.F.P.A. 291.
2. FIRE PROTECTION SYSTEM SHALL BE CONSTRUCTED BY A LICENSED FIRE SYSTEM CONTRACTOR, IN COMPLIANCE WITH N.F.P.A. 24 REGULATING THE CONSTRUCTION AND TESTING OF SUCH LINES.
3. PER FS 633, THE FIRE PROTECTION MAIN MUST BE INSTALLED BY A CLASS I, II, OR V CONTRACTOR FROM THE POINT OF SERVICE TO 1 FOOT ABOVE FINISHED FLOOR GRADE.
4. THE BODY OF PUBLIC FIRE HYDRANTS SHALL BE PAINTED YELLOW IN COLOR. THE BODY OF PRIVATE FIRE HYDRANTS SHALL BE PAINTED SAFETY ORANGE IN COLOR. COLOR CODING OF THE HYDRANT BONNET AND CAPS TO ILLUSTRATE AVAILABLE FIRE FLOW AMOUNTS SHALL BE ACCOMPLISHED PER THE GUIDELINES OF NFPA 291, RECOMMENDED PRACTICES FOR FIRE FLOW TESTING AND MARKING OF HYDRANTS.
5. FIRE PROTECTION SYSTEM MAINS ON PRIVATE PROPERTY SHALL MEET THE REQUIREMENTS AND SHALL BE INSTALLED PER NFPA 24, STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES AND/OR NFPA 13, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS AS ADOPTED IN THE FLORIDA FIRE PREVENTION CODE.
6. FIRE HYDRANTS SHALL BE INSTALLED SO THAT THE LARGE 4.5" (STEAMER) PORT IS FACING THE ROADWAY IT IS ACCESSED BY.
7. CLEARANCES AROUND THE PROPOSED FIRE DEPARTMENT CONNECTION MUST BE AT LEAST 7.5 IN FRONT OF AND TO EITHER SIDE OF THE APPLIANCE PER ORANGE COUNTY FIRE RESCUE DEPARTMENT'S NEW CONSTRUCTION CHECKLIST AS ADOPTED IN THE FFPC.
8. ALL PVC PIPING DEDICATED FOR FIRE PROTECTION SHALL HAVE A DIMENSION RATIO OF 14.
9. THE CENTER OF A HOSE OUTLET SHALL BE NOT LESS THAN 18" ABOVE FINAL GRADE OR, WHERE LOCATED IN A HOSE HOUSE, 12" ABOVE THE FLOOR PER 7.3.3, NFPA 24.



NOTE: ALL FDC'S SHALL BE PLACED AT AN ELEVATION ACCESSIBLE TO EMERGENCY FIRE VEHICLES.



NOTES:
1. ALL 2" PIPE AND FITTINGS SHALL BE SCHEDULE 40 GALVANIZED STEEL OR BRASS WITH THREADED (NPT) JOINTS.

FREESTANDING FIRE DEPARTMENT CONNECTION
N.T.S

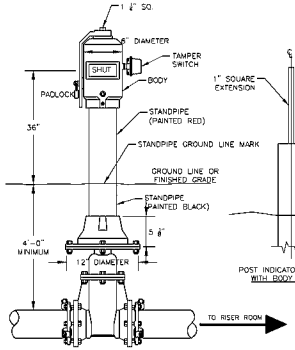
01 — FDC → ENTIRE SCHOOL
SP-1
12"x18"
NOTE: SIGN SHALL HAVE A WHITE BACKGROUND WITH RED LETTERING, ARROW SHALL POINT TOWARDS THE FDC.

02 — PIV → ENTIRE SCHOOL
CUSTOM
12"x18"
NOTE: SIGN SHALL HAVE A WHITE BACKGROUND WITH RED LETTERING, ARROW SHALL POINT TOWARDS THE PIV.

03 — NO PARKING FIRE LANE BY ORDER OF THE FIRE DEPARTMENT
SP-1
12"x18"
NOTE: SIGN SHALL HAVE A WHITE BACKGROUND WITH RED LETTERING.

FIELD ADJUSTMENT INSTRUCTIONS
1. REMOVE THE BODY FROM THE TOP OF THE INDICATOR POST ASSEMBLY.
2. CUT THE REQUIRED LENGTH OFF THE BOTTOM OF THE STANDPIPE FOR THE GROUND LINE TO MATCH UP WITH STANDPIPE GROUND LINE MARK.
3. CUT THE 1" SQ. EXTENSION AT A DISTANCE OF 9" ABOVE THE TOP OF THE STANDPIPE.
4. SET THE "OPEN" AND "SHUT" TARGETS FOR THE APPROPRIATE VALVE SIZE.
5. RE-ATTACH THE BODY TO THE TOP OF THE INDICATOR POST ASSEMBLY.
6. ALL POST INDICATOR VALVES SHALL BE INSTALLED WITH AN ELECTRONIC UL LISTED TAMPER SWITCH.
7. THERE SHALL BE 36" OF UNOBSTRUCTED CLEARANCE AROUND THE PERIMETER OF ALL POST INDICATOR VALVES.
8. POST INDICATOR VALVE SHALL BE LOCATED AT A MINIMUM 5-ft FROM BUILDING.

TYPICAL BLOW OFF VALVE
N.T.S



STANDARD PORT INDICATOR VALVE
N.T.S

MINIMUM HORIZONTAL SEPARATION REQUIREMENTS WATER, WASTEWATER AND RECLAIMED WATER MAINS

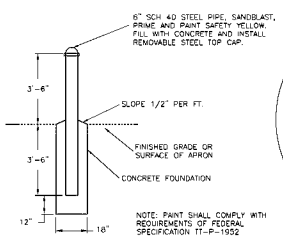
PROPOSED UTILITY	HORIZONTAL & VERTICAL SEPARATION REQUIREMENTS								ACCEPTABLE VARIANCES
	POTABLE WATER PVM		RECLAIMED WATER PVM		SAN SEWER/SSI GRAVITY & PVM		STORM SEWER		
	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	HORIZ	VERT	
POTABLE WATER	-	-	3'	12"	6'	12"	3'	12"	REFER TO GENERAL NOTE #4
RECLAIMED WATER	3'	12"	-	-	3'	12"	-	-	
SANITARY SEWER	6'	12"	3'	12"	-	-	-	-	

GENERAL NOTES
1. THE TABLE MEETS SEPARATION REQUIREMENTS AS DESCRIBED BY FDEP IN THE FLORIDA ADMINISTRATION CODE (FAC). THESE SEPARATION REQUIREMENTS SHALL APPLY BETWEEN NEWLY PROPOSED UTILITY LINES AND EXISTING OR PROPOSED UTILITY LINES.
2. FOR THE PURPOSE OF THIS TABLE, RECLAIMED WATER SHALL MEAN UNRESTRICTED PUBLIC ACCESS REUSE WATER AS DEFINED BY F.A.C. 62-610. OTHER TYPES OF RECLAIMED WATER ARE CONSIDERED RAW SEWAGE AND SEPARATION LISTED FOR SANITARY SEWER SHALL APPLY.
3. ALL SEPARATION DISTANCES ARE FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE.
4. ACCEPTABLE VARIANCES.
   A. WHERE HORIZONTAL SEPARATION IS NOT ATTAINABLE FOR NEW INSTALLATIONS OF PW AND SS, THE PIPES WILL BE INSTALLED IN SEPARATE TRENCHES AND THE BOTTOM OF THE PW MAIN WILL BE 12" HIGHER THAN THE TOP OF THE SS.
   B. WHERE HORIZONTAL SEPARATION IS NOT ATTAINABLE FOR NEW SS AND A NEW OR EXISTING PW MAIN, THE SS WILL BE UPGRADED TO A DR OF 18.
   C. WHERE INSTALLATION OF A NEW PW MAIN IS IN CONFLICT WITH EXISTING SS, THE FOLLOWING SHALL BE MAINTAINED.
      1. VERTICAL CONFLICT: DEFLECT NEW PW MAIN 12" ABOVE THE EXISTING SS WITH SUFFICIENT COVER FOR THE PW OR A SLEEVE FOR ANY PIPE 12" BELOW THE EXISTING SS PER 503.2 FDOP) REQUIREMENT. WHERE DEFLECTION IS NOT POSSIBLE OR MINIMUM COVER NOT MET, THE PW MAIN SHALL BE UPGRADED TO DIP AND CENTERED AT CROSSING.
      2. HORIZONTAL CONFLICT: PW MAIN SHALL BE INSTALLED 18" HIGHER THAN THE EXISTING SS WITH SUFFICIENT COVER OR THE PW WILL BE DIP.
   D. SEPARATION REQUIREMENTS BETWEEN PW AND STORM SEWER ARE THE SAME AS WITH PW AND SS. SPECIAL SUPPORT MAY BE REQUIRED.
   E. WHERE VERTICAL AND HORIZONTAL SEPARATIONS ARE NOT ATTAINABLE FOR PW AND FM, THE FOLLOWING SHALL BE MAINTAINED
      1. FM UPGRADED TO DR 14 (12" DIA AND UNDER) AND DR 18 (14" DIA AND OVER). WHERE FM IS EXISTING, PW SHALL BE UPGRADED TO DIP.
      2. STAGGER THE LOCATION OF JOINTS FOR EACH PIPE.
5. NO WATER PIPE SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SANITARY OR STORM WATER MANHOLE OR STRUCTURE.

RESTRAINED PIPE TABLE
WATER AND RECLAIMED WATER MAINS

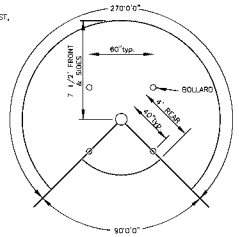
TYPE	MINIMUM LENGTH (FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S)								
	PIPE SIZE								
	4"	6"	8"	10"	12"	16"	20"	24"	30"	36"
90° BEND	20	29	37	44	51	65	77	93	105	120
45° BEND	8	12	15	18	21	27	32	37	44	50
22-1/2° BEND	4	5	7	9	10	13	15	18	21	24
11-1/4° BEND	2	3	4	5	6	7	8	9	10	12
PLUG OR BRANCH OF TEE	42	59	77	93	108	138	166	194	231	265
VALVE	21	30	39	47	54	69	83	97	116	133

NOTES
1. FITTINGS SHALL BE RESTRAINED JOINTS UNLESS OTHERWISE INDICATED.
2. INSTALL FULL LENGTH JOINTS WITH TOTAL LENGTH EQUAL TO OR GREATER THAN SHOWN IN THE TABLE.
3. WHERE TWO OR MORE FITTINGS ARE TOGETHER, USE FITTING WHICH YIELDS GREATEST LENGTH OF RESTRAINED PIPE.
4. ALL LINE VALVES AND THROUGH RUN OF TEES SHALL BE RESTRAINED.
5. LENGTHS SHOWN IN THE TABLE HAVE BEEN CALCULATED IN ACCORDANCE WITH THE PROCEDURE OUTLINED IN "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" AS PUBLISHED BY DIPRA. WITH THE FOLLOWING ASSUMPTIONS.
   WORKING PRESSURE: 150 PSI
   SOIL DESIGNATION: SM (SAND SILT)
   LAYING CONDITIONS: 3
6. FOR HDPE, PVC OR PIPE ENCASED IN POLYETHYLENE, INCREASE THE GIVEN VALUE BY A FACTOR OF 1.25.

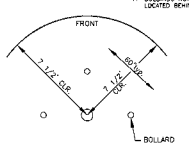


NOTE: PAINT SHALL COMPLY WITH REQUIREMENTS OF FEDERAL SPECIFICATION TT-P-1952

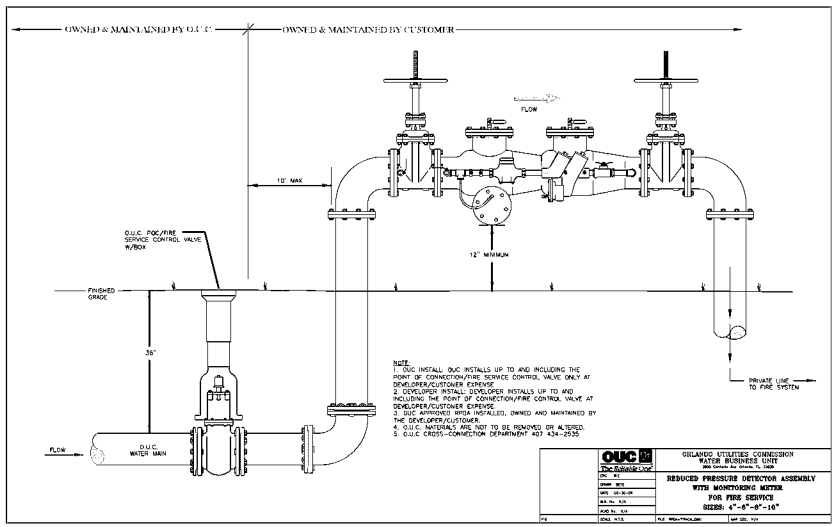
FIXED BOLLARD
N.T.S



FIRE HYDRANT CLEARANCE DETAIL
N.T.S
NOTES:
1. BOLLARDS NOT REQUIRED WHEN HYDRANT IS LOCATED BEHIND CURBING

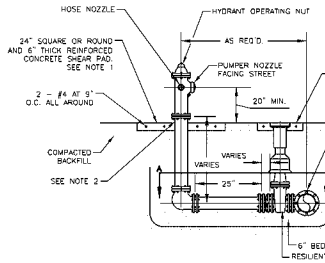


PIV / FDC CLEARANCE DETAIL
N.T.S.
NOTES:
1. BOLLARDS NOT REQUIRED WHEN PIV AND/OR FDC IS LOCATED BEHIND CURBING.



NOTE:
1. OUC INSTALL OUC INSTALLS UP TO AND INCLUDING THE POINT OF CONNECTION/FIRE SERVICE CONTROL VALVE ONLY AT DEVELOPER/CUSTOMER EXPENSE.
2. DEVELOPER INSTALL DEVELOPER INSTALLS UP TO AND INCLUDING THE POINT OF CONNECTION/FIRE CONTROL VALVE AT DEVELOPER/CUSTOMER EXPENSE.
3. OUC APPROVED RPDA INSTALLED, OWNED AND MAINTAINED BY THE DEVELOPER/CUSTOMER.
4. O.U.C. MATERIALS ARE NOT TO BE REMOVED OR ALTERED.
5. O.U.C. CROSS-CONNECTION DEPARTMENT 407 434-2530

ORLANDO UTILITIES COMMISSION
WATER BUSINESS UNIT
REDUCED PRESSURE DETECTOR ASSEMBLY WITH MONITORING METER FOR FIRE SERVICE
SIZES: 4"-6"-8"-10"



STANDARD INSTALLATION
N.T.S
NOTES:
1. THE DEVELOPER MAY INSTALL THE SHEAR PAD RECESSED UP TO 4" BELOW FINISHED GRADE AND SOD THE RECESSED SECTION.
2. CLEARANCE BETWEEN BOTTOM OF BOLTS AND TOP OF SHEAR PAD SHALL BE 6" MINIMUM

PHASE 3R1 SUBMITTAL

REVISIONS	DATE	BY

BRPH
Architects, Engineers, Constructors
Offices in: Melbourne, Atlanta, Orlando, Winter Park, Jacksonville, Seattle, St. Louis, Mexico
BRPH PROJECT NO. C07293.001.00
2420 Lakemont Avenue, Suite 300 Orlando, Florida 32814 407 896-9301 v 407 896-9304 f
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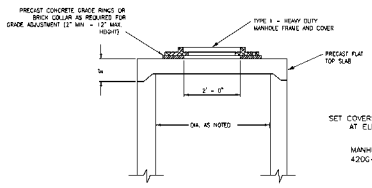
PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094
UTILITY DETAILS

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

DRAWN: SJ
CHECKED: SML
DATE: 3/6/17 PLT SCALE:
OCPS DRAWING FILE NAME: C0094_C800 Utility Details.dwg
SHEET NUMBER: **C800**
OF (Total): 1

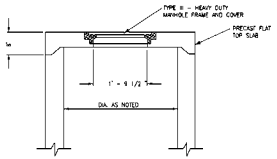
Document Name: C0094_C800 Utility Details.dwg
Document Issue Date: 2/28/2017 3:48 PM

NOTE: THESE DETAILS SHALL APPLY ONLY TO OCPS OWNED AND MAINTAINED ON-SITE UTILITIES SERVING THE PROJECT



TYPE B – FLAT TOP SLAB

N.T.S.

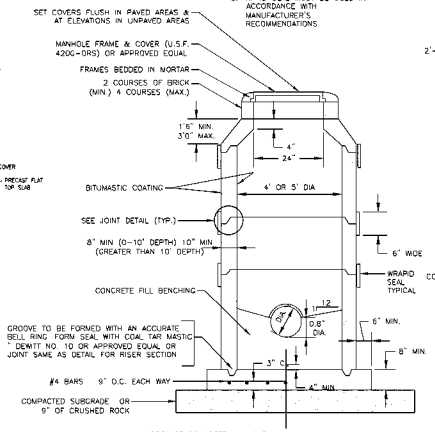


TYPE C – FLAT TOP SLAB

N.T.S.

GENERAL NOTES:

1. MANHOLE COVERS TYPICAL FOR ALL FRAME TYPES.
2. RAPID SEAL MUST BE USED ON ALL JOINTS, CASTINGS AND RISER RINGS; ON ALL JOINTS ON ROUND AIR RELEASE AND ROUND MANHOLE STRUCTURES.
3. RAPID SEAL MUST BE USED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS



PRECAST CONCRETE MANHOLE

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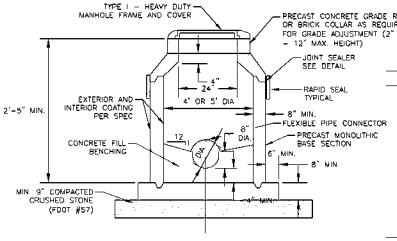
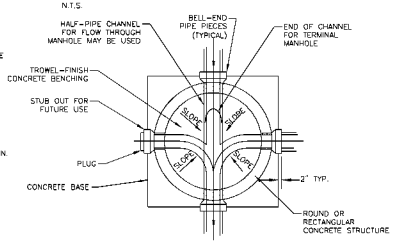
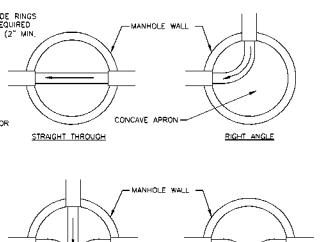


48" DIA SHALLOW PRECAST CONCRETE MANHOLE



TYPICAL MANHOLE PLAN

N.T.S.



JUNCTIONS

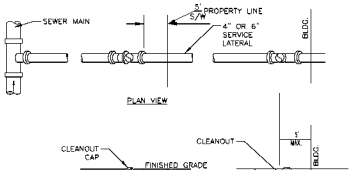
N.T.S.

FLOW CHANNEL DETAIL – SANITARY SEWERS

N.T.S.

NOTES:

1. MAINTAIN DESIGN SLOPE ACROSS MANHOLE UNLESS OTHERWISE INDICATED.
2. DEPTH OF ALL CHANNELS TO BE 80% OF PIPE DIAMETER.
3. FINISH OF ALL CHANNELS TO ALLOW SMOOTH FLOW.
4. CONCRETE BENCH SHALLBE POURED BEFORE SHUTTING DOWN DEWATERING OPERATIONS TO PREVENT FLOTATION.
5. BRICK MAY BE USED TO BUILD UP CONCRETE BENCH.



INSTALLATION OF LATERAL CONNECTIONS

N.T.S.

GENERAL NOTES:

1. LATERAL INSTALLATION SHALL BE CONSTRUCTED BACK TO THE BUILDING AT A SLOPE SUFFICIENT TO YIELD A FLOW VELOCITY OF 2 FEET PER SECOND.
2. BUILDING-SIDE CLEANOUT SHALL BE INSTALLED WITHIN 5 FEET OF THE BUILDING.
3. LATERAL CONNECTIONS OF DISSIMILAR MATERIALS SHALL BE CONNECTED UTILIZING TRANSITION ADAPTERS. TRANSITION GASKETS AND/OR FERNCO ADAPTERS ARE ACCEPTABLE.
4. LATERAL CONNECTION OF LIKE MATERIALS SHALL UTILIZE REDUCERS AND/OR TRANSITION PIECES, ETC.
5. FIELD SOLVENT JOINTS ARE ACCEPTABLE.
6. CLEANOUT CAPS LOCATED IN DRIVEWAYS AND OTHER PAVED AREAS SHALL BE CAST-IN-PLACE RINGS WITH METAL COVERS STAMPED WITH THE WORD "SEWER". ALL OTHERS SHALL BE PVC WITH AN INVERTED HEX-NUT.
7. THERE SHALL BE NO DETECTABLE LEVEL OF INFILTRATION OR EXFILTRATION FROM THE SANITARY SYSTEM AT THE TIME OF INSPECTION. ANY EVIDENCE OF LEAKAGE MUST BE CORRECTED PRIOR TO ACCEPTANCE BY OCPS.
8. USE 4" OR 6" PVC (SDR35) PIPE FOR LATERALS AS NOTED ON DRAWINGS AND IN SPECIFICATIONS.

NOTE: THIS DETAIL SHALL APPLY ONLY TO OUC OWNED AND MAINTAINED ON-SITE UTILITIES SERVING THE PROJECT

OUC Water Engineering Notes (Rev. 10/30/13):

The developer/customer shall accomplish all water main and service work through the point of service/control valve and water meters and deed to OUC. OUC will own and operate up to and including the OUC point of service/control valve and meters only. The required work shall be performed per current OUC guidelines, OUC Water Distribution Standard Specifications and OUC Water Distribution Material Specifications and water detail sheet under OUC's inspection. The developer/customer must contact OUC Inspection at 407-629-1424 to schedule a pre-construction meeting prior to any water construction.

A minimum 9' clearance (including landscaping) must be maintained around meter assembly.

Domestic / fire master meter assembly will be provided by OUC at the developer/customer expense and shall be installed by the developer/customer. After payment, allow 30 days for receipt of the meter by OUC. The developer/customer shall arrange pick-up from the OUC warehouse facility through the OUC inspector.

Contact OUC Inspection department for approved material and construction specifications pertaining to the installation of ductile iron pipe via directional or jack and bore method.

The developer/customer shall field verify the horizontal and vertical location of existing OUC water facilities before commencement of construction.

For water wet taps, use only OUC approved tapping contractors:

Arteen Industries, Inc 352-732-6941 or 800-216-4861
Central Florida Tapping and Construction Services, Inc 407-834-8271
Mac Tapping, Inc 407-656-0557*
Kingsbarr Tapping Services, Inc 800-346-5971
TDW Services, Inc. 407-343-2900
T & R Tapping Service, Inc 407-339-3685
TA Services 407-900-6705

Easements:

All onsite OUC water facilities (mains, services, meters, and fire hydrants) shall be located within a utility easement in accordance with current OUC permit property guidelines. The developer is to furnish all necessary information, including legal description to prepare and document this easement. Water meters and fire services will not be activated until the final easement(s) have been received and approved by OUC. Any questions or comments please contact OUC Property and Rights-of-Way department at 407-434-2158

Connection to Existing valve

Contractor to verify location, condition and pressure rate existing valve prior to connection. If valve does not hold required pressure test additional valve will be required at developer/contractor's expense.

OUC Backflow Prevention Requirements:

Backflow devices will be owned and maintained by customer unless otherwise noted. Any questions contact OUC Backflow Prevention Department at 407-629-1428

Domestic and Irrigation

The Developer/Customer is responsible for the required Reduced Pressure Backflow Preventer. Residential domestic backflow preventers are required in areas where reclaimed or other water supply i.e. well, is provided to the site

Fire Line:

The Developer/Customer is responsible for the required Reduced Pressure Detector Check Assembly w/Monitoring meter for backflow prevention.

As - Built Drawings

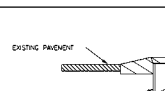
The customer/developer shall provide vertical and horizontal as-built information relative to all constructed utilities and structures. The submittal will include a signed and sealed drawing and a CD with the as built information in Autor AU 2004 format.

State Plane Coordinates, East Florida, NAD 1983(96) is the prefered coordinate system. If a project coordinate system is used, all drawings will be based on this system and existing features i.e. edge of pavement, road intersections, buildings must be referenced to and in the location of permit submittal or in OUC's Geographic Information System. If no existing features are shown at least 2 State Plane Coordinate points must be surveyed and bench marked

As-built information for the water system shall include, but not be limited to, the following:

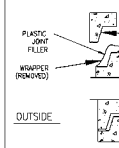
1. Location of all valves, fittings, hydrants, and services.
2. Location of the water main tied horizontally to the back of curb or edge of pavement.
3. Centerline as to the system meeting the minimum cover requirements.
4. Horizontal and vertical data for any construction which deviates from the approved engineering plans

The contractor shall cut "X" in the top curb of each water service and a "V" at all valve locations. Cut W's and V's shall be highlighted with blue paint.



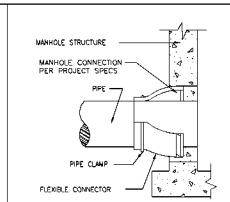
TRAFFIC BEARING CLEANOUT

N.T.S.



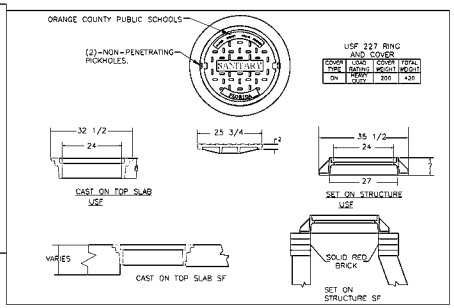
JOINT DETAILS

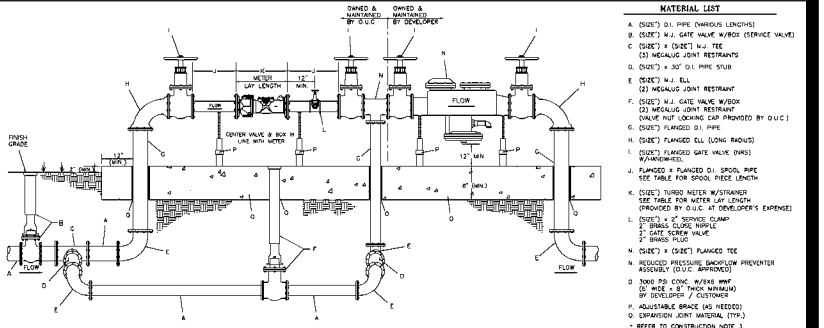
N.T.S.



TYPICAL MANHOLE CONNECTION

N.T.S.





NOTES:

1. THE METER ASSEMBLY TO BE INSTALLED ON PRIVATE PROPERTY EASEMENT REQUIRED.
2. A MINIMUM 9 FT. CLEARANCE ON EACH SIDE OF THE METER ASSEMBLY MUST BE MAINTAINED FOR METER TESTING AND MAINTENANCE.
3. O.U.C. INSTALLED, O.U.C. TO PROVIDE AND INSTALL METER W/STRAINER AND BY-PASS ASSEMBLY (AT DEVELOPERS EXPENSE) ALL OTHER MATERIALS TO BE PROVIDED AND INSTALLED BY THE DEVELOPER /CUSTOMER PER O.U.C. SPECIFICATIONS
4. DEVELOPER INSTALLED, O.U.C. TO PROVIDE METER W/STRAINER (AT DEVELOPERS EXPENSE) ALL OTHER MATERIALS TO BE PROVIDED AND INSTALLED BY THE DEVELOPER/CUSTOMER PER O.U.C. SPECIFICATIONS UNDER O.U.C. INSPECTION.
5. THE BACKFLOW PREVENTION DEVICE (O.U.C. APPROVED) TO BE FURNISHED, INSTALLED, OWNED & MAINTAINED BY THE DEVELOPER/CUSTOMER.
6. FOR CONSTRUCTION AND BACKFLOW PREVENTION REQUIREMENTS CONTACT O.U.C. INSPECTION DEPARTMENT AT 407-434-2535.
7. FOR SENSUS 12 SERIES DOMESTIC METER FLOW DATA & SPECIFICATIONS VISIT WWW.SENSUS.COM

CONSTRUCTION NOTES:

1. SERVICE VALVE, PIPE & FITTINGS TO BE ONE NOMINAL SIZE LARGER THAN METER SIZE.
2. BYPASS ASSEMBLY VALVE, PIPE & FITTINGS SAME SIZE AS METER
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE CURRENT METER & SPOOL PIECE DIMENSIONS THROUGHT O.U.C. OR THE METER MANUFACTURER PRIOR TO CONSTRUCTION.
4. THE OUC OWNED PORTION OF METER ASSEMBLY SHALL NOT BE PAINTED UNLESS APPROVED BY OUC

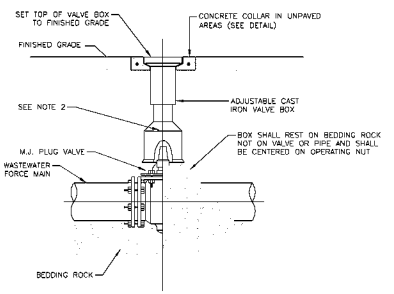
MATERIAL LIST

A. (SIZE") D.I. PIPE (VARIOUS LENGTHS)
B. (SIZE") W.J. GATE VALVE W/BOX (SERVICE VALVE)
C. (SIZE") x (SIZE") M.J. TEE (3) MEGALUG JOINT RESTRAINTS
D. (SIZE") x 30" D.I. PIPE STUB
E. (SIZE") M.J. ELL (2) MEGALUG JOINT RESTRAINT
F. (SIZE") M.J. GATE VALVE W/BOX (2) MEGALUG JOINT RESTRAINT (VALVE NUT LOCKING DEVICE PROVIDED BY O.U.C.)
G. (SIZE") FLANGED D.I. PIPE
H. (SIZE") FLANGED ELL (LONG RADIUS)
I. (SIZE") FLANGED GATE VALVE (NRS) W/HANDWHEEL
J. FLANGED x FLANGED D.I. SPOOL PIPE SEE TABLE FOR SPOOL PIECE LENGTH
K. (SIZE") TURBO METER W/STRAINER SEE TABLE FOR METER LAY LENGTH (PROVIDED BY O.U.C. AT DEVELOPER'S EXPENSE)
L. (SIZE") x 2" SERVICE CLAMP 2" BRASS CLOSE NIPPLE 2" GATE SCREW VALVE 2" BRASS PLUG
M. (SIZE") x (SIZE") FLANGED TEE
N. REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY (O.U.C. APPROVED)
O. 7000 PSI CONC. W/#3@6 WWF (6" WIDE x 8" THICK MINIMUM) BY DEVELOPER / CUSTOMER
P. ADJUSTABLE BRACE (AS NEEDED)
Q. EXPANSION JOINT MATERIAL (AS REQ.)
* REFER TO CONSTRUCTION NOTE 3.

SERV. X METER DIA. (IN)	* (K) METER LAY LENGTH (IN)	* (J) METER SPOOL PIECE (IN)	BYPASS DIA (IN)
4" X 3"	19"	4" FLG. X 2" FLG. X 10"	4"
8" X 4"	23"	8" FLG. X 4" FLG. X 20"	4"
8" X 6"	27"	8" FLG. X 6" FLG. X 30"	6"
10" X 8"	30-1/8"	10" FLG. X 8" FLG. X 40"	8"
12" X 10"	41+1/8"	12" FLG. X 10" FLG. X 50"	10"

ORLANDO UTILITIES COMMISSION
WATER ENGINEERING DIVISION
500 South Orange Ave. Orlando, FL. 32801

DOMESTIC/FIRE METER ASSEMBLY (TYPICAL)
W/O.U.C. APPROVED REDUCED PRESSURE BACKFLOW PREVENTER
STANDARD SIZES: 3" 4" 6" 8" 10"



NOTES:

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.

PLUG VALVE AND BOX DETAIL

PHASE 3R1 SUBMITTAL

REVISIONS	DATE	BY

BRPH

Architects, Engineers, Constructors
Offices in: Melbourne, Atlanta, Orlando, Washington, Philadelphia, Seattle, St. Louis, Mexico

BRPH PROJECT NO. C07293.001.00

2420 Lakemont Avenue, Suite 300 Orlando, Florida 32814 407-896-9301 v 407-896-9304 f

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PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094

UTILITY DETAILS

OCPS
ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

DRAWN: DJ
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DATE: 3/6/17 PLT SCALE:
OCPS DRAWING FILE NAME: C0094_C800 Utility Details.dwg
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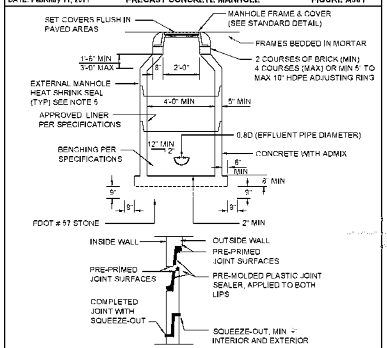
ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: February 11, 2011 | **PRECAST CONCRETE MANHOLE** | FIGURE A301



NOTES:
1. DROP CONNECTIONS ARE REQUIRED WHENEVER INVERT OF INFLUENT SEWER IS 24" OR MORE ABOVE THE INVERT OF THE MANHOLE. SEE MANHOLE CONNECTION DETAIL.
2. ECCENTRIC CONE DESIGN MAY BE USED FOR CONFLICT RESOLUTION WITH OCU APPROVAL.
3. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
4. LIFT HOLES THROUGH STRUCTURE ARE NOT PERMITTED.
5. WRAP TIGHTLY AROUND CASTING JOINTS AND APPLY HIGH INTENSITY PROPANE TORCH TO EFFECTIVELY SEAL THEM FROM GROUND WATER INFILTRATION.
6. HDPE ADJUSTING RINGS MAY BE SUBSTITUTED FOR BRICK RISERS.
7. SECTION HEIGHTS VARY AS REQUIRED, AND AS AVAILABLE, FROM APPROVED MANUFACTURERS LISTED IN APPENDIX D.

ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

APPENDIX A | FIGURE GN
DATE: February 11, 2011

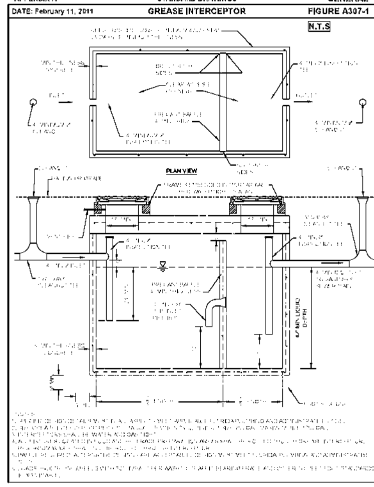
OCU GENERAL NOTES:

1. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING IN PROXIMITY OF WATER MAINS, WASTEWATER FORCE MAINS, GRAVITY MAINS AND RECLAIMED WATER MAINS. MAIN LOCATIONS SHOWN ON PLANS MAY NOT BE EXACT. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING UTILITY LOCATIONS.
2. SHOULD A PIPE EMERGENCY OCCUR, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OCU DISPATCH OPERATOR (407-836-2777) AND THE OCU INSPECTOR.
3. THE CONTRACTOR SHALL NOTIFY THE OCU CONSTRUCTION DIVISION AT LEAST SEVEN DAYS PRIOR TO COMMENCEMENT OF THE CONSTRUCTION PROJECT BY CALLING (407) 254-9798. ALL EXISTING UTILITIES HAVE BEEN FIELD VERIFIED (VERTICALLY AND HORIZONTALLY) AT ALL POINTS OF CONNECTION AND AT ALL AREAS OF CONFLICT WITH OUC INFRASTRUCTURE.
4. THE CONTRACTOR SHALL NOTIFY THE OCU CONSTRUCTION DIVISION AT LEAST 48 HOURS PRIOR TO ANY UTILITIES CONSTRUCTION BY CALLING (407) 254-9798.
5. THE MATERIALS, PRODUCTS, AND CONSTRUCTION OF ALL UTILITIES CONNECTING TO THE OCU SYSTEM SHALL BE IN CONFORMANCE WITH THE ORANGE COUNTY UTILITIES STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL.
6. ALL OCU MAINS AND FACILITIES WITHIN THE LIMITS OF THE PROJECT SHALL BE SUPPORTED AND PROTECTED AGAINST DAMAGE DURING CONSTRUCTION.
7. THE CONTRACTOR, AT THE CONTRACTOR'S EXPENSE, SHALL IMMEDIATELY REPAIR ALL DAMAGES TO OCU MAINS AND FACILITIES. IF THE REPAIR IS NOT MADE IN A TIMELY MANNER, AS DETERMINED BY OCU, OCU MAY PERFORM REQUIRED REPAIRS AND CLEANUP. THE CONTRACTOR WILL BE CHARGED FOR ALL EXPENSES ASSOCIATED WITH THE REPAIR.
8. THE CONTRACTOR SHALL ADJUST ALL EXISTING OCU MAINS AND FACILITIES IN CONFLICT WITH NEW GRADE, NEW OR ALTERED ROADWAYS, SIDEWALKS, DRIVEWAYS, OR STORM WATER IMPROVEMENTS. OCU FACILITIES TO BE ADJUSTED INCLUDE, BUT ARE NOT LIMITED TO PIPELINES, PUMP STATIONS, VALVE BOXES, AIR RELEASE VALVES, FIRE HYDRANTS, MANHOLE COVERS, AND METERS.
9. ONLY OCU SHALL OPERATE OCU WATER, WASTEWATER, AND RECLAIMED WATER VALVES. THE CONTRACTOR SHALL COORDINATE VALVE OPERATION WITH THE OCU INSPECTOR. FOR OPERATION OF MAINS NOT OWNED BY OCU, IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE APPROPRIATE UTILITY REPRESENTATIVE.
10. CONSTRUCTION ACTIVITIES SHALL NOT CAUSE INTERRUPTIONS IN WATER, WASTEWATER, OR RECLAIMED WATER SERVICE. THE CONTRACTOR SHALL COORDINATE PRE-APPROVED INTERRUPTIONS OF SERVICE WITH THE OCU INSPECTOR 7 WORKING DAYS IN ADVANCE.
11. THE CONTRACTOR SHALL PROVIDE FOR BYPASSING AND/OR HAULING WASTEWATER DURING APPROVED INTERRUPTIONS OF WASTEWATER FLOWS AND CONNECTIONS. THE CONTRACTOR SHALL SUBMIT A BYPASS PLAN SIGNED AND SEALED BY A PROFESSIONAL ENGINEER TO OCU DEVELOPMENT ENGINEERING FOR APPROVAL PRIOR TO IMPLEMENTATION BY CONTRACTOR.
12. ALL VALVES INSTALLED AS PART OF THIS CONSTRUCTION PROJECT SHALL REMAIN CLOSED DURING CONSTRUCTION. KEEP VALVES ON ALL WET TAPS CLOSED UNTIL CLEARED BY FDEP. DO NOT CONNECT NEWLY CONSTRUCTED WATER MAINS TO ANY EXISTING WATER MAINS UNLESS CLEARED BY FDEP AND OCU.
13. THE CONTRACTOR SHALL PROVIDE A JUMPER ASSEMBLY WITH A BACKFLOW PREVENTER FOR MAKING TEMPORARY CONNECTIONS TO AN EXISTING POTABLE WATER SOURCE IN ORDER TO CHLORINATE AND FLUSH NEW WATER MAINS WITH POTABLE WATER. ANY TEMPORARY POTABLE WATER CONNECTIONS TO RECLAIMED WATER OR FORCEMAIN SHALL ALSO BE EQUIPPED WITH A BACKFLOW PREVENTER.
14. FOR PVC PIPE THAT WILL BE OWNED AND MAINTAINED BY OCU, NO PIPE BENDING IS ALLOWED. THE MAXIMUM ALLOWABLE TOLERANCE FOR JOINT DEFLECTION IS 0.75 DEGREES (3-INCHES PER JOINT PER 20 FT STICK OF PIPE.) ALIGNMENT CHANGE SHALL BE MADE ONLY WITH SLEEVES AND FITTINGS.
15. FOR NON-PVC PIPE THAT WILL BE OWNED AND MAINTAINED BY OCU, LONG RADIUS CURVES, EITHER HORIZONTAL OR VERTICAL, MAY BE INSTALLED WITH STANDARD PIPE BY DEFLECTIONS AT THE JOINTS. MAXIMUM DEFLECTIONS AT PIPE JOINTS, FITTINGS AND LAYING RADIUS FOR THE VARIOUS PIPE LENGTHS SHALL NOT EXCEED 75 PERCENT OF THE PIPE MANUFACTURER'S RECOMMENDATION.

ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

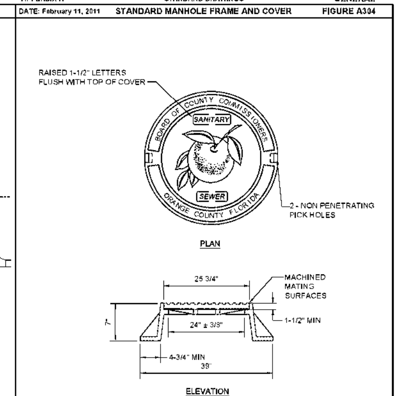
APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: February 11, 2011 | **GREASE INTERCEPTOR** | FIGURE A307-1

N.T.S



ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

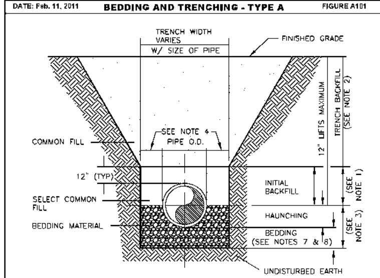
APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: February 11, 2011 | **STANDARD MANHOLE FRAME AND COVER** | FIGURE A304



NOTES:
1. ONLY APPLIES TO UTILITIES OWNED AND MAINTAINED MANHOLES. "ORANGE COUNTY" SHALL NOT APPEAR ON PRIVATE MANHOLES.

ORANGE COUNTY UTILITIES STANDARDS AND
CONSTRUCTION SPECIFICATIONS MANUAL

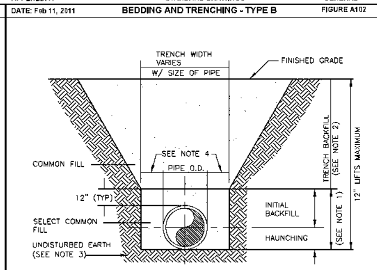
APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: Feb. 11, 2011 | **BEDDING AND TRENCHING - TYPE A** | FIGURE A101



NOTES:
1. INITIAL BACKFILL: SELECT COMMON FILL COMPACTED TO 95% (98% UNDER PAVEMENT) OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
2 TRENCH BACKFILL: COMMON FILL COMPACTED TO 95% (98% UNDER PAVEMENT) OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
3. TYPE A BEDDING MATERIAL SHALL CONFORM TO FDOT NO. 57 AGGREGATE.
4. 15" MAX. (12" MIN.) FOR PIPE DIAMETER LESS THAN 24" AND 24" MAX (12" MIN) FOR PIPE DIAMETER 24" AND LARGER.
5. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION.
6. ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
7. BEDDING DEPTH SHALL BE 4" MINIMUM FOR PIPE DIAMETER UP TO 12" AND 6" MINIMUM FOR PIPE DIAMETER 16" AND LARGER.
8 DEPTH FOR REMOVAL OF UNSUITABLE MATERIAL SHALL GOVERN DEPTH OF BEDDING ROCK BELOW THE PIPE. UTILITIES SHALL DETERMINE IN THE FIELD REQUIRED REMOVAL OF UNSUITABLE MATERIAL TO REACH SUITABLE FOUNDATION.
9. FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS OF GOVERNING AGENCIES. SURFACE RESTORATION WITHIN ORANGE COUNTY RIGHT-OF-WAY SHALL COMPLY WITH REQUIREMENTS OF R/W UTILIZATION REGULATIONS AND ROAD CONSTRUCTION SPECIFICATIONS.

ORANGE COUNTY UTILITIES STANDARDS AND
CONSTRUCTION SPECIFICATIONS MANUAL

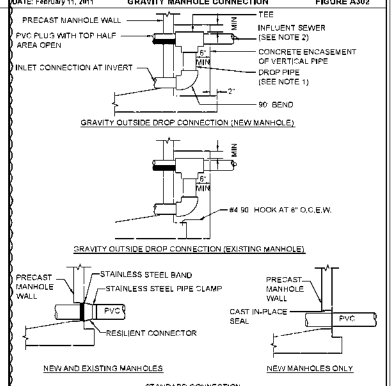
APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: Feb 11, 2011 | **BEDDING AND TRENCHING - TYPE B** | FIGURE A102



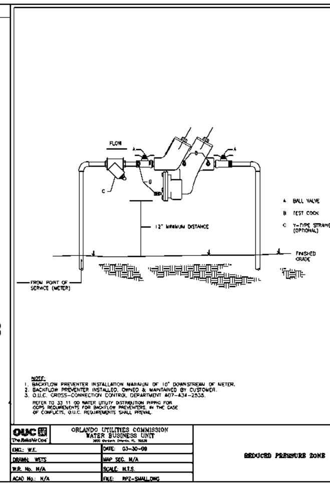
NOTES:
1. INITIAL BACKFILL AND HAUNCHING: SELECT COMMON FILL COMPACTED TO 95% (98% UNDER PAVEMENT) OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
2. TRENCH BACKFILL: COMMON FILL COMPACTED TO 95% (98% UNDER PAVEMENT) OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
3 PIPE BEDDING UTILIZING SELECT COMMON FILL OR BEDDING ROCK IN ACCORDANCE WITH TYPE A BEDDING AND TRENCHING DETAIL MAY BE REQUIRED AS DIRECTED BY UTILITIES.
4. 15" MAX. (12" MIN.) FOR PIPE DIAMETER LESS THAN 24" AND 24" MAX (12" MIN) FOR PIPE DIAMETER 24" AND LARGER.
5. WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION.
6. ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF THE FLOW.
7. FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS OF GOVERNING AGENCIES. SURFACE RESTORATION WITHIN ORANGE COUNTY RIGHT-OF-WAY SHALL COMPLY WITH REQUIREMENTS OF RIGHT-OF-WAY UTILIZATION REGULATIONS AND ROAD CONSTRUCTION SPECIFICATIONS

ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: February 11, 2011 | **GRAVITY MANHOLE CONNECTION** | FIGURE A302

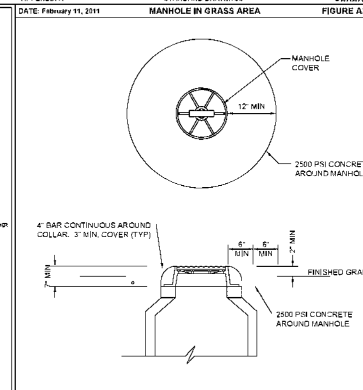


NOTES:
1. DROP PIPE AND FITTINGS SHALL BE OF EQUAL SIZE AND MATERIAL AS THE INFLUENT SEWER.
2. AN OUTSIDE DROP CONNECTION SHALL BE REQUIRED FOR ALL INFLUENT LINES WHICH HAVE AN INVERT 2' OR MORE ABOVE THE MANHOLE INVERT.
3. CONTRACTOR TO COORDINATE THE PRESENCE OF UTILITIES INSPECTOR DURING CORING AND CONNECTIONS TO EXISTING MANHOLES.



ORANGE COUNTY UTILITIES
STANDARDS AND CONSTRUCTION SPECIFICATIONS MANUAL

APPENDIX A | STANDARD DRAWINGS | GENERAL
DATE: February 11, 2011 | **MANHOLE IN GRASS AREA** | FIGURE A303



NOTES
1. CLEARANCE OF 30" FREE FROM OBSTRUCTIONS IN ALL DIRECTIONS.
2. AREAS SUPPORTING CONCRETE COLLAR OR SLAB SHALL BE PROPERLY COMPACTED.
3. TOP OF MANHOLE SHALL BE 2" ABOVE FINISHED GRADE, CROWN OF ADJACENT ROADWAY, OR 100 YEAR FLOOD ELEVATION, WHICHEVER IS GREATER.

NOTE: THIS SHEET OF DETAILS SHALL APPLY TO OCPS OWNED AND MAINTAINED ON-SITE UTILITIES SERVING THE PROJECT AND OCU & OUC OWNED AND MAINTAINED OFF-SITE UTILITES SERVING THE PROJECT. IF THESE DETAILS CONFLICT WITH THE OCU & OUC STANDARDS AND SPECIFICATIONS, USE THE OCU & OUC STANDARDS AND SPECIFICATIONS FOR THE OFF-SITE PORTION OF THE UTILITIES ONLY.

DARIN ALEX LOCKWOOD, P.E.
FL P.E. #60824

PHASE 3R1 SUBMITTAL

REVISIONS	DATE	BY
1 ADDENDUM 1	04/25/17	DAL

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PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094
UTILITY DETAILS

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

OCPS

DRAWN: DJ
CHECKED: DAL
DATE: 3/6/17 | PLT SCALE:
OCPS DRAWING FILE NAME: C0094_C800 Utility Details.dwg
SHEET NUMBER:
C803
OF (Total):

ability to navigate from/to any previously recorded observation or defect instantaneously.

J. The system shall be able to produce data reports to include, at a minimum, all observation points and pertinent data. All data reports shall match the defect severity codes in accordance with PACP naming conventions

K. The data-sorting program shall be capable of sorting all data stored using generic sort key and user defined sort fields.

L. Camera footage, date and manhole numbers shall be maintained in real time and shall be displayed on the video monitor as well as the video character generators illuminated footage display at the control console.

PART 3 - EXECUTION

3.01 LEAKAGE TESTING OF GRAVITY MAINS

A. The CONTRACTOR, with UTILITIES' representation present, shall perform the leakage testing. The CONTRACTOR shall be responsible for furnishing all necessary labor and equipment to conduct such testing.

1. Leakage tests shall be by a low-pressure air test. Each test section shall not exceed 400 feet in length and shall be tested between adjacent manholes. Leakage testing shall be conducted in accordance with the procedure for "Recommended Practice for Low Pressure Air Testing of Installed Sewer Pipe" as established by the Uni-Bell PVC Pipe Association. The pipe shall pass the current most stringent UNI-B-6 Uni-Bell standards for testing gravity sewers and shall have no evidence of leaks in the pipe or connections.

3.02 GRAVITY MAIN REQUIREMENTS BEFORE CCTV INSPECTION

A. All manhole flow channels and benching per specifications shall be constructed and coated (if applicable) prior to CCTV inspection.

B. CCTV inspections shall be received, reviewed and approved by UTILITIES prior to installation of pavement.

C. The CONTRACTOR shall clean gravity mains to remove debris and stains from the pipe prior to televising. Flushing water or debris will not be allowed to enter pump station wet wells. Water will be pumped from the sewer system during flushing to an acceptable discharge location. A visual inspection shall be made and all obstructions removed.

D. Gravity Mains/Pipes that are dirty (dirty walls and/or debris in the inverts) shall be re-flushed and cleaned before rescheduling a CCTV inspection. If necessary, swabbing may be required of specific sections of pipe.

E. The CONTRACTOR shall pass a mandrel through the PVC pipe to confirm ring deflection in excess of five percent (5%). The base inside diameter shall be used to

GENERAL NOTES

1. THE CONTRACTOR AND C/M ARE SYNONYMOUS.
2. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION ACTIVITY FOR DIG PERMITS, ELECTRICAL PERMITS OR OTHER PERMITS AS APPLICABLE. CONTRACTOR IS ALSO TO COORDINATE FULLY WITH UTILITY COMPANIES ON EXACT LOCATION OF UNDERGROUND UTILITIES AND ANY UTILITY ADJUSTMENT REQUIRED. UTILITY COMPANIES SHALL BE NOTIFIED A MINIMUM OF THREE WORKING DAYS PRIOR TO EXCAVATION.
3. THE LOCATION OF EXISTING UTILITIES SHOWN ON THESE PLANS WERE DEPICTED FROM ACTUAL FIELD MEASUREMENTS AND/OR DERIVED FROM RECORD DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM THE LOCATION OF EXISTING UTILITIES TO DETERMINE IF THERE ARE ANY CONFLICTS WITH THE PROPOSED CONSTRUCTION AND TO COORDINATE WITH THE UTILITY OWNERS TO RESOLVE THESE CONFLICTS.
4. THE SUBSURFACE INFORMATION FOR THIS PROJECT WAS OBTAINED FOR DESIGN PURPOSES AND MAY NOT BE AN ADEQUATE REPRESENTATION OF ACTUAL CONDITIONS FOR PROJECT CONSTRUCTION. INFORMATION SHOWN, INCLUDING WATER LEVELS, REPRESENTS EXISTING CONDITIONS AT THE SPECIFIC BORING LOCATIONS AT THE TIME THE BORINGS WERE MADE.
6. ANY DIFFERING SITE CONDITIONS FROM THAT WHICH IS REPRESENTED HEREON, WHETHER ABOVE, ON OR BELOW THE SURFACE OF THE GROUND, SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER, IN WRITING, PER CONTRACT DOCUMENTS. NO CLAIM FOR EXPENSES INCURRED BY THE CONTRACTOR DUE TO SUCH DIFFERING CONDITIONS WILL BE ALLOWED IF HE OR SHE FAILS TO PROVIDE THE WRITTEN NOTIFICATION.
7. ALL MATERIALS, INSTALLATION AND TESTING SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS ALONG WITH ORANGE COUNTY AND FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. WHERE THE SPECIFICATIONS CONFLICT, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
8. THE CONTRACTOR SHALL PROVIDE ALL SHEETING, SHORING AND BRACING REQUIRED TO PROTECT ADJACENT STRUCTURES AND UTILITIES OR MINIMIZE TRENCH WIDTH AS REQUIRED. SHEETING AND SHORING SHALL BE DESIGNED BY A STATE OF FLORIDA PROFESSIONAL ENGINEER RETAINED BY THE CONTRACTOR.
9. THE CONTRACTOR SHALL ENSURE THAT ALL REQUIRED CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING WORK.
10. ALL DEBRIS AND WASTE MATERIALS GENERATED BY DEMOLITION OR SUBSEQUENT CONSTRUCTION ACTIVITIES SHALL BE DISPOSED OFF-SITE IN A LEGAL MANNER AT AN APPROVED DISPOSAL FACILITY.
11. THE CONTRACTOR SHALL OBTAIN ANY AND ALL PERMITS REQUIRED FOR DEMOLITION, CONSTRUCTION WORK AND HAULING WASTE MATERIAL. ALL ASSOCIATED COSTS AND PERMIT FEES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
12. ANY PUBLIC LAND CORNER, WITHIN THE LIMITS OF CONSTRUCTION, IS TO BE PROTECTED. IF A CORNER MONUMENT IS IN DANGER OF BEING ALTERED AND HAS NOT YET BEEN PROPERLY REFERENCED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT WITHOUT DELAY.
13. COORDINATE VALUES ARE BASED ON A LOCAL GRID ESTABLISHED BY THE SURVEY.
14. ALL REFERENCES TO PROPOSED CONSTRUCTION INDICATES CONSTRUCTION INCLUDED IN THIS CONTRACT.
15. ALL PIPING TO HAVE A MINIMUM OF THREE (3) FEET COVER UNLESS OTHERWISE NOTED ON PLANS.
16. EXISTING ROADWAY BASE MATERIALS SUCH AS SHELL OR LIMEROCK MAY BE UTILIZED IN STABILIZATION IF SUITABLE FOR MIXING.
17. THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN ALL NECESSARY STRIPING, TRAFFIC CONTROL AND SAFETY DEVICES IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES," LATEST EDITION, AND THE LATEST FLORIDA DEPARTMENT OF TRANSPORTATION "ROADWAY DESIGN STANDARDS."
18. MAINTENANCE OF TRAFFIC: ACCESS FOR LOCAL TRAFFIC SHALL BE MAINTAINED. IF, DURING CONSTRUCTION, ACCESS FOR LOCAL TRAFFIC IS CHANGED, THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE JURISDICTIONAL AGENCY A MINIMUM OF THREE (3) WORKING DAYS IN ADVANCE. MAINTENANCE OF TRAFFIC SHALL BE IN ACCORDANCE WITH INDEX NO. 600 OF THE FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY AND TRAFFIC DESIGN STANDARDS AND ORANGE COUNTY.
19. REFER TO FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS FOR THE FOLLOWING:
    - TYPE C INLET (INDEX NO. 200 & 232)
    - TYPE E INLET (INDEX NO. 200 & 232)
    - VALLEY GUTTER (INDEX NO. 300)
    - CURB RAMP (INDEX NO. 304)
    - TYPE D CURB (INDEX NO. 300)
    - TYPE F CURB & GUTTER (INDEX NO. 300)
    - CURB TRANSITION (INDEX NO. 300)
    - CROSSWALK, STOP BAR (INDEX NO. 17346)
    - PAVEMENT ARROWS (INDEX NO. 17346)
    - MINIMUM COVER (INDEX NO. 205)
    - SCHOOL SIGNS AND MARKINGS (INDEX NO. 17344)
    - SPECIAL MARKING AREAS (INDEX NO. 17346)
    - TYPE E CURB (INDEX NO. 300)
    - CONCRETE PAVEMENT JOINTS (INDEX NO. 305)
    - CONCRETE SIDEWALK (INDEX NO. 310)
    - SITE DISTANCE (INDEX NO. 546)
    - MAINTENANCE OF TRAFFIC (INDEX NO. 600)
20. THIS PROJECT IS IN FLOOD ZONE 'X" PER FEMA FIRM PANEL # 12095C0240F. MAP PANEL DATE: SEPTEMBER 25, 2009.
21. ALL STORM, SANITARY AND WATER INSTALLATION NOT LOCATED ON PUBLIC R.O.W. OR DEEDED EASEMENTS SHALL COMPLY WITH FLORIDA BUILDING CODES-PLUMBING.
22. CONTRACTOR IS PROHIBITED FROM USE OF VIBRATORY COMPACTION METHOD.
23. INLET PROTECTION FOR STORM STRUCTURE SHALL BE INSTALLED IMMEDIATELY FOLLOWING INSTALLATION OF STRUCTURE AND ADJACENT PIPING.

GRADING AND DRAINAGE NOTES

1. ALL GRADING AND SITE PREPARATION SHALL CONFORM TO SPECIFICATIONS CONTAINED IN THE PROJECT GEOTECHNICAL REPORT BY ARDAMAN & ASSOCIATES DATED NOV. 30 2017 AND SPECIFICATION SECTIONS 31 AND 33, UNLESS INDICATED OTHERWISE. MOST STRINGENT REQUIREMENT SHALL APPLY.
2. CONTRACTOR SHALL VERIFY EXISTING TOPOGRAPHIC DATA, LOCATION OF EXISTING UTILITIES AND ALL OTHER SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
3. ALL CONSTRUCTION WITHIN STREET RIGHT-OF-WAY SHALL CONFORM TO ORANGE COUNTY CODE AND REQUIREMENTS.
4. ALL GRADES SHOWN, WITH THE EXCEPTION OF THOSE INDICATED ON THE SURVEY BASE DRAWING, ARE FINISHED GRADES UNLESS INDICATED OTHERWISE.
5. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE GRADED TO ORIGINAL GROUND LINES AND FINISHED WITH SOD PER PROJECT SPECIFICATIONS UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL MAINTAIN ALL AREAS UNTIL FINAL ACCEPTANCE.
6. STORMWATER COLLECTION SYSTEM TO BE PRIVATELY OWNED AND MAINTAINED.
7. CONTRACTOR SHALL GRADE FROM GRADE POINT TO GRADE POINT IN A UNIFORM MANNER UNLESS OTHERWISE INDICATED ON THE PLANS. ALL AREAS SHALL BE GRADED FOR POSITIVE DRAINAGE.
8. CONTRACTOR IS RESPONSIBLE TO DEVELOP, CONSTRUCT AND MAINTAIN ANY TEMPORARY DEWATERING REQUIRED FOR CONSTRUCTION OF PROJECT IMPROVEMENTS. NO OFFSITE DISCHARGE OF DEWATERING IS ALLOWED, UNLESS ALLOWED BY DEP AND SJRWMD. ANY TEMPORARY IMPROVEMENTS SHALL BE REMOVED AFTER USE AND THE AREA RESTORED TO THE CONDITION SHOWN ON THE PLANS.

DEWATERING NOTES:

1. IF ONSITE DEWATERING MAY OCCUR DURING CONSTRUCTION, THE CONTRACTOR SHALL REFER TO THE DEWATERING REQUIREMENTS IN 62-621.300(4)(a) CONSTRUCTION GENERIC PERMIT OR 62-621.300(2)(a) DEWATERING GENERIC PERMIT AS APPLICABLE. APPROPRIATE BEST MANAGEMENT PRACTICES MUST BE IMPLEMENTED TO ENSURE THAT DISCHARGES DO NOT EXCEED SURFACE WATER QUALITY STANDARDS PER THE CONSTRUCTION GENERIC PERMIT. IF DEWATERING OFFSITE OR INTO THE COUNTY MS4, TURBIDITY MUST BE MONITORED TO ENSURE THAT DISCHARGES DO NOT EXCEED 29 NTU OVER BACKGROUND PER 62-302.530 FAC. THE DISCHARGE OF GROUNDWATER DURING DEWATERING ACTIVITIES TO COUNTY RIGHT-OF-WAY REQUIRES A RIGHT-OF-WAY UTILIZATION PERMIT.
2. ENSURE THE CGP COVERAGE IS OBTAINED, A SWPPP IS PREPARED, AND THAT APPROPRIATE BMPS ARE INSTALLED AND IN EFFECT PRIOR TO THE START OF DEMOLITION ACTIVITIES.

VERTICAL DATUM NOTE:

1. ALL ELEVATIONS SHOWN WITHIN THIS PLAN SET ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
2. BASED ON THE VERTCON SOFTWARE, THE VERTICAL DATUM CONVERSION HAS A FACTOR OF 0.958' FOR THIS PROJECT SITE.
3. DATUM CONVERSION EXAMPLE: 100.00' NGVD 29 – 0.958' = 99.042' NAVD 88.

GEOMETRY NOTES:

1. THREE (3) FOOT CURB TRANSITIONS SHALL BE PROVIDED AT ALL CURB TERMINATIONS AND DROP CURB INTERFACES.
2. DETECTABLE SURFACE ON CURB RAMP WALKING SURFACE (REFER TO DETAIL, SHEET C601).
3. POINTS SHOWN ON THE PLANS HAVE BEEN SET AT FACE OF CURB PC, PT, CURB MIDPOINT AND INTERSECTION LOCATIONS. POINTS SHOWN ON UTILITY STRUCTURES ARE AT THE CENTER OF THE STRUCTURE.

UTILITY NOTES

1. ALL WATER MAIN MATERIALS AND APPURTENANCES SHALL CONFORM TO AND SHALL BE INSTALLED, TESTED AND CLEARED FOR SERVICE IN ACCORDANCE WITH THE STANDARDS OF THE ORLANDO UTILITIES COMMISSION AND THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION.
2. <u>HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY OR STORM SEWER, WASTEWATER OR STORMWATER FORCE MAINS, AND RECLAIMED WATER PIPELINES, AND ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS.</u>
   A. WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE (3) FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED STORM SEWER, STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER, REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
   B. WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN (10) FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER.
   C. WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN (10) FEET, BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED GRAVITY OR PRESSURE TYPE SANITARY SEWER, WASTEWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C. THE MINIMUM HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS AND GRAVITY TYPE SANITARY SEWERS SHALL BE REDUCED TO THREE (3) FEET WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST TWELVE (12) INCHES ABOVE THE TOP OF THE SEWER.
   D. WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN (10) FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND ALL PARTS OF ANY EXISTING OR PROPOSED ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM.
3. <u>VERTICAL SEPARATION BETWEEN WATER MAINS AND SANITARY OR STORM SEWER, WASTEWATER OR STORMWATER FORCE MAINS, AND RECLAIMED WATER PIPELINES.</u>
   A. WATER MAINS CROSSING ANY EXISTING OR PROPOSED GRAVITY OR VACUUM-TYPE SANITARY SEWER OR STORM SEWER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST TWELVE (12) INCHES ABOVE THE OUTSIDE OF THE OTHER PIPELINE.
   B. WATER MAINS CROSSING ANY EXISTING OR PROPOSED PRESSURE TYPE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST TWELVE (12) INCHES ABOVE THE OUTSIDE OF THE OTHER PIPELINE.
   C. AT THE UTILITY CROSSINGS DESCRIBED IN PARAGRAPHS (A) AND (B) ABOVE, ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATIVELY, AT SUCH CROSSINGS, THE PIPES SHALL BE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE (3) FEET FROM ALL JOINTS IN VACUUM-TYPE SANITARY SEWERS, STORM SEWERS, STORMWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER AND AT LEAST SIX (6) FEET FROM ALL JOINTS IN GRAVITY OR PRESSURE-TYPE SANITARY SEWERS, WASTEWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610 F.A.C.
4. ALL ON-SITE UTILITIES SHALL BE PRIVATELY OWNED AND MAINTAINED.
5. BACTERIOLOGICAL SAMPLE POINTS SHALL BE AS DESCRIBED IN THE FDEP PERMIT CONDITIONS.

NPDES PERMIT

CONTRACTOR SHALL PREPARE AND SUBMIT TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION, THE "NOTICE OF INTENT" AND "NOTICE OF TERMINATION" FOR "STORMWATER DISCHARGE FROM CONSTRUCTION ACTIVITIES," PER FLORIDA ADMINISTRATIVE CODE 62-621.300(4). IN ACCORDANCE WITH FDEP REQUIREMENTS, THE CONTRACTOR SHALL PREPARE AND SUBMIT WITH THE APPLICATION, AN APPROVED "STORMWATER POLLUTION PREVENTION PLAN" AND PERFORM/CERTIFY ALL INSPECTIONS AND RETAIN ALL INSPECTION REPORTS AND DOCUMENTATION ON FILE AS REQUIRED FOR DEP REVIEW. ALL FEES SHALL BE PAID BY THE CONTRACTOR, AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY PENALTIES OR FINES DEP MAY LEVY FOR FAILURE TO COMPLY WITH THE PERMITTING REQUIREMENTS.

STORM LEGEND:

M.E.G.	MATCH EXISTING GRADE
12.00	PROPOSED SPOT GRADE
x11.00	EXISTING SPOT GRADE
	PROPOSED DRAINAGE FLOW
	MANHOLE
	INLET
	CLEAN OUT
	PVC
	HDPE
	RCP

WATER / SEWER LEGEND:

WATER LINE
SANITARY LINE
FIRE LINE
FIRE HYDRANT ASSEMBLY
FIRE DEPARTMENT CONNECTION
POST INDICATOR VALVE
GATE VALVE
SANITARY MANHOLE

Klima Weeks
CIVIL ENGINEERING
Certificate of Authorization No.: 9230

PHASE 3R1 SUBMITTAL
Jay A. Klima P.E. No.49845

REVISIONS	DATE	BY
ADDENDUM 1	04/25/17	MAO

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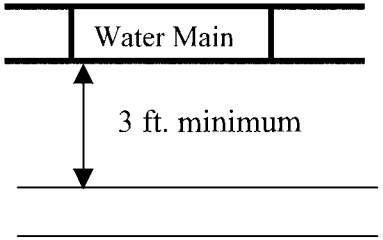
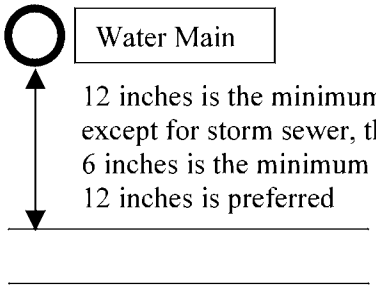
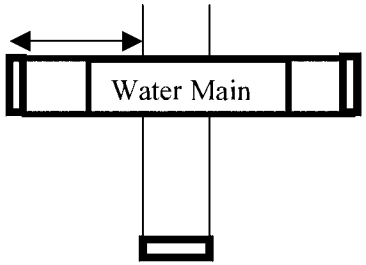
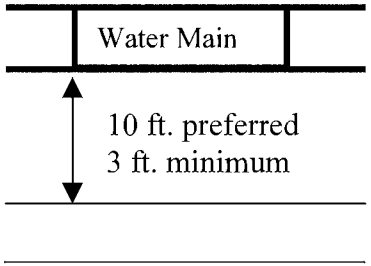
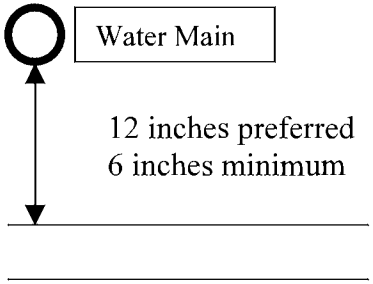
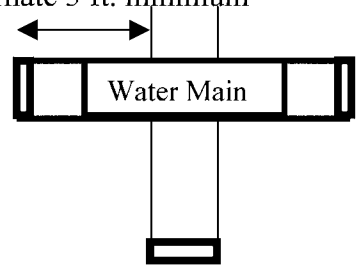
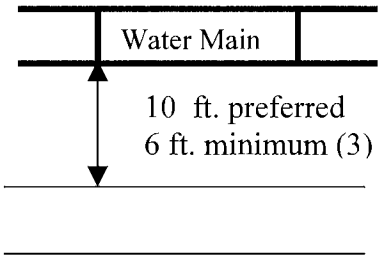
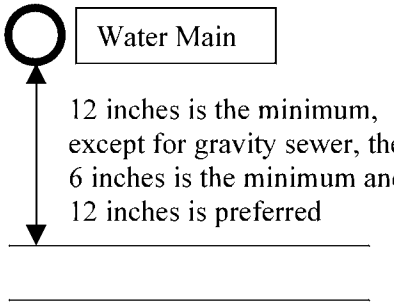
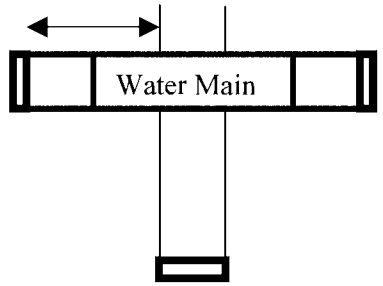
PINE HILLS E.S.
REPLACEMENT SCHOOL
OCPS PROJ. No: C0094
GENERAL NOTES

ORANGE COUNTY PUBLIC SCHOOLS
DESIGN & CONSTRUCTION
FACILITIES SERVICES
BLDG. 200, 6501 MAGIC WAY ORLANDO, FLORIDA 32809

DRAWN:
CHECKED:
DATE: 02/8/17 PLT SCALE:
OCPS DRAWING FILE NAME: C0094_C001.dwg
SHEET NUMBER: C001
OF (Total):

LOCATION OF PUBLIC WATER SYSYEM MAINS IN ACCORDANCE WITH F.A.C. RULE 62-555.314

Other Pipe	Horizontal Separation	Crossings (1)	Joint Spacing @ Crossings (Full Joint Centered)
Storm Sewer, Stormwater Force Main, Reclaimed Water (2)			Alternate 3 ft. minimum 
Vacuum Sanitary Sewer			Alternate 3 ft. minimum 
Gravity or Pressure Sanitary Sewer, Sanitary Sewer Force Main, Reclaimed Water (4)			Alternate 6 ft. minimum 
On-Site Sewage Treatment & Disposal System	10 ft. minimum	---	---

(1) Water main should cross above other pipe. When water main must be below other pipe, the minimum separation is 12 inches.
(2) Reclaimed water regulated under Part III of Chapter 62-610, F.A.C.
(3) 3 ft. for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer.
(4) Reclaimed water not regulated under Part III of Chapter 62-610, F.A.C.

EXCERPTS FROM FLORIDA BUILDING CODE – PLUMBING (2014)

CHAPTER 2, DEFINITIONS: SECTION 202 GENERAL DEFINITIONS

BUILDING DRAIN. That part of the lowest piping of a drainage system that receives the discharge from soil, waste and other drainage pipes inside and that extends 30 inches (762 mm) in developed length of pipe beyond the exterior walls of the building and conveys the drainage to the building sewer.

Combined. A *building drain* that conveys both sewage and storm water or other drainage.
Sanitary. A *building drain* that conveys sewage only
Storm. A *building drain* that conveys storm water or other drainage, but not sewage.

BUILDING SEWER. That part of the drainage system that extends from the end of the building drain and conveys the discharge to a public sewer, private sewer, individual sewage disposal system or other point of disposal.

Combined. A *building sewer* that conveys both sewage and storm water or other drainage.
Sanitary. A *building sewer* that conveys sewage only
Storm. A *building sewer* that conveys storm water or other drainage, but not sewage.

SEWER.
Building sewer. See "Building sewer."
Public sewer. A common *sewer* directly controlled by public authority.
Sanitary sewer. A *sewer* that carries sewage and excludes storm, surface and ground water.
Storm sewer. A *sewer* that conveys rainwater, surface water, subsurface water and similar liquid wastes.

DRAINAGE SYSTEM. Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.
Building gravity. A drainage system that drains by gravity into the *building sewer.*
Sanitary. A drainage system that carries sewage and excludes storm, surface and ground water.
Storm. A drainage system that carries rainwater, surface water, subsurface water and similar liquid wastes.

PLUMBING. The practice, materials and fixtures utilized in the installation, maintenance, extension and alteration of all piping, fixtures, plumbing appliances and plumbing appurtenances, within or adjacent to any structure, in connection with sanitary drainage or storm drainage facilities; venting systems; and public or private water supply systems.

PLUMBING SYSTEM. Includes the water supply and distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and sanitary and storm sewers and building drains; in addition to their respective connections, devices and appurtenances within a structure or premises.

WATER PIPE.
Riser. A water supply pipe that extends one full story or more to convey water to branches or to a group of fixtures.
Water distribution pipe. A pipe within the structure or on the premises that conveys water from the water service pipe, or from the meter when the meter is at the structure, to the points of utilization.
Water service pipe. The pipe from the water main or other source of potable water supply, or from the meter when the meter is at the public right of way, to the water distribution system of the building served.

WATER SUPPLY SYSTEM. The water service pipe, water distribution pipes, and the necessary connecting pipes, fittings, control valves and all appurtenances in or adjacent to the structure or premises.

EXCERPTS FROM FLORIDA BUILDING CODE – PLUMBING (2014)

CHAPTER 3, GENERAL REGULATIONS: SECTION 312 TESTS AND INSPECTIONS

312.1 Required tests. The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.10 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and the permit holder shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. All plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air. After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain whether the pressure has reached all parts of the system.

312.2 Drainage and vent water test. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. This pressure shall be held for not less than 15 minutes. The system shall then be tight at all points.

312.3 Drainage and vent air test. Plastic piping shall not be tested using air. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of not less than15 minutes. Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

312.4 Drainage and vent final test. The final test of the completed drainage and vent systems shall be visual and in sufficient detail to determine compliance with the provisions of this code. Where a smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be held for a test period of not less than 15 minutes.

312.5 Water supply system test. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 107.

312.6 Gravity sewer test. Gravity sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer, filling the building sewer with water, testing with not less than a 10-foot (3048 mm) head of water and maintaining such pressure for 15 minutes.

312.8 Storm drainage system test. Storm drain systems within a building shall be tested by water or air in accordance with Section 312.2 or 312.3.

CHAPTER 7, SANITARY DRAINAGE:

SECTION 701 GENERAL

701.6 Tests. The sanitary drainage system shall be tested in accordance with Section 312.

SECTION 702 MATERIALS

702.2 Underground building sanitary drainage and vent pipe. Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

702.3 Building sewer pipe. Building sewer pipe shall con-form to one of the standards listed in Table 702.3.

TABLE 702.2
UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core, or composite wall	ASTM D 2661; ASTM F 628; ASTM F 1488; CSA B181.1
Asbestos-cement pipe	ASTM C 428
Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 306
Polyolefin pipe	ASTM F 1412; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core, or composite wall	ASTM D 2665; ASTM F 891; ASTM F 1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core, or composite wall	ASTM D 2949, ASTM F 1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F 1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A 112.3.1

TABLE 702.3
BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D 2661; ASTM F 628; ASTM F 1488; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS 35, SDR 35 (PS 45), PS 50, PS 100, PS 140, SDR 23.5 (PS 150) and PS 200; with a solid, cellular core or composite wall	ASTM F 1488; ASTM D 2751
Asbestos-cement pipe	ASTM C 428
Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301
Concrete pipe	ASTM C 14; ASTM C 76; CSA A257.1M; CSA A257.2M
Copper or copper-alloy tubing (Type K or L)	ASTM B 75; ASTM B 88; ASTM B 251
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F 714
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D 2665; ASTM F 891; ASTM F 1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS 140 and PS 200; with a solid, cellular core or composite wall	ASTM F 891; ASTM F 1488; ASTM D 3034; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall.	ASTM D 2949, ASTM F 1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F 1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C 4; ASTM C 700

EXCERPTS FROM FLORIDA BUILDING CODE – PLUMBING (2014)

CHAPTER 11, STORM DRAINAGE

SECTION 1102 MATERIALS

1102.3 Underground building storm drain pipe. Underground building *storm drain* pipe shall conform to one of the standards listed in Table 702.2.

1102.4 Building storm sewer pipe. Building storm *sewer* pipe shall conform to one of the standards listed in Table 1102.4.

TABLE 1102.4 BUILDING STORM SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D 2661; ASTM D 2751; ASTM F 628; CSA B181.1; CSA B182.1
Asbestos-cement pipe	ASTM C 428
Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301
Concrete pipe	ASTM C 14; ASTM C 76; CSA A257.1M; CSA A257.2M
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B 75; ASTM B 88; ASTM B 251; ASTM B 306
Polyethylene (PE) plastic pipe	ASTM F 2306/F 2306M
Polyvinyl chloride (PVC) plastic pipe (Type DWV, SDR26, SDR35, SDR41, PS50 or PS100)	ASTM D 2665; ASTM D 3034; ASTM F 891; CSA B182.4; CSA B181.2; CSA B182.2
Vitrified clay pipe	ASTM C 4; ASTM C 700
Stainless steel drainage systems, Type 316L	ASME A112.3.1

EXCERPTS FROM FLORIDA BUILDING CODE – PLUMBING (2014)

SECTION 1106 SIZE OF CONDUCTORS, LEADERS, AND STORM DRAINS

1106.3 Building storm drains and sewers. The size of the building *storm drain*, building storm *sewer* and their horizontal branches having a slope of one-half unit or less vertical in 12 units horizontal (4-percent slope) shall be based on the maximum projected roof area in accordance with Table 1106.3. The slope of horizontal branches shall be not less than one-eighth unit vertical in 12 units horizontal (1-percent slope) unless otherwise approved.

TABLE 1106.3

SIZE OF HORIZONTAL STORM DRAINGE PIPING

SIZE OF HORIZONTAL PIPING (inches)	HORIZONTALLY PROJECTED ROOF AREA (square feet)					
	Rainfall rate (inches per hour)					
	1	2	3	4	5	6
1/8 unit vertical in 12 units horizontal (1-percent slope)						
3	3,288	1,644	1,096	822	657	548
4	7,520	3,760	2,506	1,800	1,504	1,253
5	13,360	6,680	4,453	3,340	2,672	2,227
6	21,400	10,700	7,133	5,350	4,280	3,566
8	46,000	23,000	15,330	11,500	9,200	7,600
10	82,800	41,400	27,600	20,700	16,580	13,800
12	133,200	66,600	44,400	33,300	26,650	22,200
15	218,000	109,000	72,800	59,500	47,600	39,650
1/4 unit vertical in 12 units horizontal (2-percent slope)						
3	4,640	2,320	1,546	1,160	928	773
4	10,600	5,300	3,533	2,650	2,120	1,766
5	18,880	9,440	6,293	4,720	3,776	3,146
6	30,200	15,100	10,066	7,550	6,040	5,033
8	65,200	32,600	21,733	16,300	13,040	10,866
10	116,800	58,400	38,950	29,200	23,350	19,450
12	188,000	94,000	62,600	47,000	37,600	31,350
15	336,000	168,000	112,000	84,000	67,250	56,000
1/2 unit vertical in 12 units horizontal (4-percent slope)						
3	6,576	3,288	2,295	1,644	1,310	1,096
4	15,040	7,520	5,010	3,760	3,010	2,500
5	26,720	13,360	8,900	6,680	5,320	4,450
6	42,800	21,400	13,700	10,700	8,580	7,140
8	92,000	46,000	30,650	23,000	18,400	15,320
10	171,600	85,800	55,200	41,400	33,150	27,600
12	266,400	133,200	88,800	66,600	53,200	44,400
15	476,000	238,000	158,800	119,000	95,300	79,250

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

D. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

1. Manufacturers:

a. SIGMA Corp.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Section 310000 – Earthwork: For excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, soil, and waste piping within a ceiling cavity shall be the following:

1. PVC pipe, PVC socket fittings, and solvent-cemented joints.

2. Service class, cast iron soil piping with no-hub fittings shall be provided at music classrooms, administration offices, and similar areas where noise is critical.

C. Underground, soil, waste, and vent piping shall be the following:

1. PVC pipe, PVC socket fittings, and solvent-cemented joints.

D. Underground Grease Waste Piping shall be the following

1. Service class, cast-iron soil piping; hub-and-spigot joints.

3.3 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is specified in Division 333100 Section "Sanitary Sewerage."

B. Basic piping installation requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."

C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. Install cleanout fitting with closure plug inside the building in sanitary force-main piping.

E. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Section 220500 – Common Work Results For Plumbing.

C. Backwater Valves: Install backwater valves in piping subject to sewage backflow.

1. Horizontal Piping: Horizontal backwater valves.

2. Floor Drains & Area Drains: Drain outlet backwater valves, unless drain has integral backwater valve.

3. Install backwater valves in accessible locations.

4. Backwater valve are specified in Division 22 Section "Plumbing Specialties."

3.6 HANGER AND SUPPORT INSTALLATION

A. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.

2. Install individual, straight, horizontal piping runs according to the following:

a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

E. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.

3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.

4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 (DN 65) and larger.

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes domestic water piping inside the building.

B. Water meters will be furnished and installed by utility company.

C. Water meters will be furnished by utility company for installation by Contractor.

D. Related Sections include the following:

1. Section 220519 – Meters and Gages: For thermometers, pressure gages, and fittings.
2. Section 221119 – Plumbing Specialties: For water distribution piping specialties.

1.2 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing domestic water piping systems with 125 psig (860 kPa), unless otherwise indicated.

1.3 SUBMITTALS

A. Product Data: For pipe, tube, fittings, and couplings.

B. Water Samples: Specified in Part 3 "Cleaning" Article.

C. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 14 for plastic, potable domestic water piping and components.

C. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

G. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.

3.9 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.

3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 (DN 65) and larger.

3.10 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and floors.

B. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.

2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.

3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish

4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish

5. Bare Piping in Equipment Rooms: One piece, cast brass

6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

C. Escutcheons for Existing Piping:

1. Chrome-Plated Piping: Split casting, cast brass with chrome-plated finish.

2. Insulated Piping: Split plate, stamped steel with concealed hinge and spring clips.

4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

4. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.

6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.15 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.

2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

2.4 SPECIAL PIPE FITTINGS

A. Shielded Nonpressure Pipe Couplings: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

1. Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Mission Rubber Co.

B. Wall-Penetration Fittings: Compound, ductile-iron coupling fitting with sleeve and flexing sections for up to 20-degree deflection, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include AWWA C111, ductile-iron glands, rubber gaskets, and steel bolts.

1. Manufacturers:

a. SIGMA Corp.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Division 32 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

B. Aboveground, Vertical Storm Drainage piping concealed within an enclosed wall cavity shall be the following:

1. SCH 40 PVC pipe, PVC socket fittings, and solvent-cemented joints.

C. Underground Storm Drainage piping shall be the following:

1. SCH 40 PVC pipe, PVC socket fittings, and solvent-cemented joints.

3.3 PIPING INSTALLATION

A. Storm sewer and drainage piping outside the building are specified in Division 334100 Section "Storm Drainage."

B. Basic piping installation requirements are specified in Division 22 Section "Basic Plumbing Materials and Methods."

C. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers. Cleanouts are specified in Division 22 Section "Plumbing Specialties."

D. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping.

a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Feet (30 m), if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.

4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install supports according to Division 22 Section "Hangers and Supports."

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch (10-mm) minimum rods.

E. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

D. Connect force-main piping to the following:

1. Storm Sewer: To exterior force main or storm manhole.
2. Sump Pumps: To sump pump discharge.

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Test Procedure: Test storm drainage piping, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water (30 kPa). From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

5. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

2. Cap and subject piping to static-water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

4. Prepare reports for tests and required corrective action.

3.9 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 22 14 13