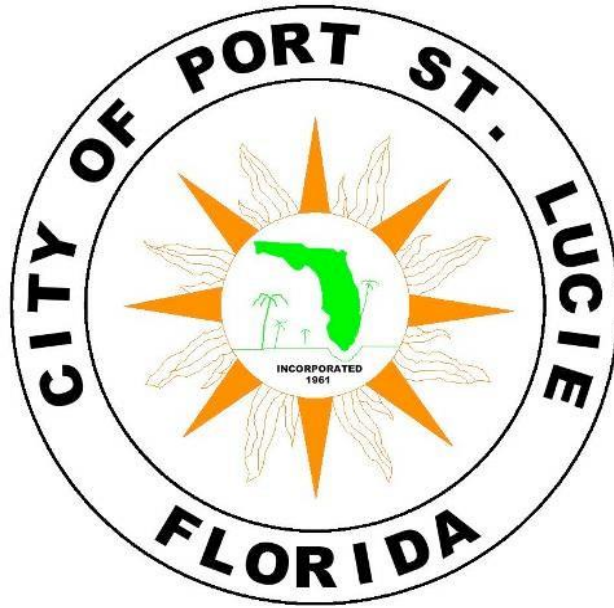


1
2
3
4
5
6



7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

**CITY OF PORT ST. LUCIE
UTILITY SYSTEMS DEPARTMENT**

UTILITY STANDARDS MANUAL

**2019 EDITION
With 2024 Amendment**



FIRST AMENDMENT
TO THE
UTILITY STANDARDS MANUAL

The following serve to update and amend the City of Port St. Lucie Utility Systems Department (PSLUSD) Utility Standards Manual 2019 Edition¹ and the Utility Standard Details 2019 Edition.

The following amendments supersede any previously published standards and/or details.

This Amendment effectively amends the following Sections of the Utility Standards Manual:

Air Release Valves (ARV):	Page 20
Manholes:	Page 23
Lift Station Driveway:	Page 34
Lift Station Operation:	Page 34
Lift Station Elevation:	Page 36
Pump Control System:	Page 90

In the event of a conflict between this Amendment and the Utility Standards Manual, the terms and conditions identified in this Amendment shall control and take precedent.



Adopted by Director Kevin R. Matyjaszek
Date: 8/1/24



Air Release Valves (ARV)

Standards Manual Page 20, Lines 11-16 and Standard Details, W-10, WW-08, 2019 Edition

1. Automatic air valves shall be:
 - 1.1. Placed at all high points on water mains, sewer mains, reclaim mains and any other location as specified by the PSLUSD where elevation changes are greater than 2' in less than 200' horizontal. Locations may be added, removed or require adjustment from design during construction due to field conditions. The Engineer of Record is responsible for ensuring all ARV locations meet requirements during the construction process.
 - 1.2. Combination valves shall be used that allow for the automatic release of large quantities of air and permit air to enter the pipe when the line is being emptied.
 - 1.3. Comprised of a stainless-steel body.
 - 1.4. Sized per the below chart:

MAIN DIAMETER	ARV SIZE
<14"	2"
14" to 24"	3"
>24"	4"

Manholes

Standards Manual Page 23, 13-15 and Standard Detail WW-02, 2019 Edition

2. Manholes shall be fitted with rain guards to prevent inflow of storm water into the wastewater system.

Lift Station Driveway

Standards Manual Page 34, Lines 24-26 and Standard Detail PS-14, 2019 Edition

3. The entirety of the driveway:
 - 3.1. Is to be pitched away from the lift station site with no greater than a 10% slope.
 - 3.2. Must allow for a 40' vacuum truck, with gate clearance.
 - 3.3. Is to be straight, with no curve.
 - 3.3.1. A vehicle turning analysis for the PSLUSD vacuum truck must be provided for all stations.



Lift Station Operation

Standards Manual Page 34, Line 20, 2019 Edition

4. Stations are to be designed with a minimum current available operating range of 3' to allow for future adjustments.

Lift Station Elevation

Standards Manual Page 36, Lines 33-36 and Standard Detail PS-14, 2019 Edition

5. The pump station site shall be well drained and graded to prevent flooding or inflow of surface runoff from a storm event based on the below criteria:
 - 5.1. The top of the wetwell shall be set at or above the finished floor elevation (FFE) of the adjacent building(s) or 18" above the crown of the adjacent roadway(s), whichever is the highest. If more than one building or roadway is adjacent to the station, the highest elevation is to be used.
 - 5.2. Lift Station site plans shall have the following elevations shown:
 - 5.2.1. Wetwell Rim
 - 5.2.2. Collection Manhole Rim
 - 5.2.3. Easement Corners
 - 5.2.4. Driveway at Station and Roadway

Additional elevations may be required as determined by PSLUSD.

- 5.3. The elevation of the lift station easement corners are to be a minimum of 6" lower than the wetwell rim elevation, providing positive drainage away from both the wetwell and collection manhole.
- 5.4. No lift station easement shall be within 10' of the toe of a berm.
- 5.5. Yard drains are not acceptable drainage.

Pump Control System

Standards Manual Page 90, Line 24 Additions and Standard Detail PS-10, 2019 Edition

6. The lift station control panel shall be designed to protect all components from damage due to excessive heat and/or gases. Control panels are to be/have:
 - 6.1. Comprised of 316 stainless steel.
 - 6.2. Powder coated in white.
 - 6.3. Sunshields on the top, front, and sides.
 - 6.4. A side mounted alarm light.



6.5. Intake and exhaust fans.

6.6. A minimum of 5' clear area around the panel.

¹ Resolution 09-R06 dated January 20, 2009 authorizes the Utility Systems Director to revise the Utility Standards Manual as necessary to reflect industry standards and to comply with applicable laws and regulations.

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
<u>PREFACE</u>	6
<u>CHAPTER I - APPLICATION PROCESS</u>	
A. <u>General</u>	8
B. <u>Site Plans</u>	8
C. <u>Construction Plans</u>	9
D. <u>Landscape Plans</u>	12
E. <u>Utility Service Agreement</u>	12
F. <u>Construction Permits</u>	13
<u>CHAPTER II - DESIGN, SPECIFICATIONS & CONSTRUCTION STANDARDS</u>	
A. <u>General</u>	13
B. <u>Easements/Restrictions/Conveyance to PSLUSD</u>	14
C. <u>Setback Requirements</u>	15
D. <u>Separation between PSLUSD Facilities & Other Utilities</u>	15
E. <u>Replacement of Existing Facilities</u>	16
F. <u>Relocation of Existing Facilities</u>	17
G. <u>Wastewater Quality/Pretreatment Requirements</u>	17
H. <u>Design of Water, Wastewater and Reclaimed Facilities</u>	17
1. <u>Design Criteria for Water Mains</u>	18
2. <u>Design Criteria for Gravity Sewers</u>	21
3. <u>Design Criteria for Interceptors</u>	23
4. <u>Design Criteria for Wastewater Pump Stations</u>	31
5. <u>Design Criteria for Force Mains</u>	43
6. <u>Design Criteria for Low Pressure Sewer Systems</u>	44
7. <u>Design Criteria for Reclaimed Water Mains</u>	44
8. <u>Design Criteria for Reclaimed Water Metering Stations</u>	44
I. <u>Qualified Products List (QPL)</u>	45

1	J.	<u>Technical Specifications and Construction Standards</u>	46
2	1.	<u>Earthwork, Excavation, Backfill & Compaction</u>	47
3	2.	<u>Jack & Bore</u>	55
4	3.	<u>Directional Boring</u>	56
5	4.	<u>Pipe & Fittings</u>	58
6	5.	<u>Valves & Appurtenances</u>	67
7	6.	<u>Gravity Sewer</u>	76
8	7.	<u>Grease, Oil, and Sand Interceptors</u>	79
9	8.	<u>Wastewater Pump Stations</u>	80
10	9.	<u>Pipeline Cleaning – Poly Pig Method</u>	101
11	10.	<u>Reclaimed Water Metering Stations</u>	102

12

13 **CHAPTER III - CONSTRUCTION COORDINATION, INSPECTIONS & TESTING**

14

15	A.	<u>General</u>	110
16	B.	<u>Inspections & Testing</u>	111
17	1.	<u>Inspector’s Authority</u>	112
18	2.	<u>Scheduling of Inspections</u>	112
19	3.	<u>Required Inspections</u>	113
20	4.	<u>Required Testing</u>	114
21	C.	<u>Record Drawings</u>	122
22	D.	<u>Completion Inspection Package</u>	126

23

24 **CHAPTER IV - ACCEPTANCE OF SYSTEM FOR OPERATION**

25

26	A.	<u>General</u>	127
27	B.	<u>Utility Acceptance Turnover Package</u>	128
28	1.	<u>Utility Acceptance Turnover Checklist</u>	128
29	2.	<u>Contractor’s Affidavit & Release of Lien with</u>	
30		<u>Sunbiz Detail by Entity Name indicating Auth. of Signatory</u>	128
31	3.	<u>Request to Place Water Distribution and/or</u>	
32		<u>Sewage Collection/Transmission System into Operation</u>	128
33	4.	<u>Owner’s Affidavit with Sunbiz Detail by Entity Name</u>	
34		<u>Indicating Authorization of Signatory</u>	128

35

1	5.	<u>Bill of Sale with Sunbiz Detail by Entity Name</u>	
2		<u>Indicating Authorization of Signatory</u>	128
3	6.	<u>Material and Installation Warranty</u>	129
4	7.	<u>Fees and Charges</u>	129
5	8.	<u>Passing Final Inspection Report</u>	129
6	C.	<u>Approval to Place System into Operation</u>	129

7
8 List of Appendices

9
10 The appendices listed below are referenced, but not included, in this document and can be
11 downloaded from the PSLUSD website at [https://utility.cityofpsl.com/get-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
12 [connected/divisions/utility-engineeringcommercial-development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).
13

- 14 Appendix A – Utility Standard Details
- 15 Appendix B – Qualified Products List
- 16 Appendix C – Fiber Optic Specifications
- 17 Appendix D – ERC Factor Table
- 18 Appendix E – Landscape Policy

19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42

1 **PREFACE**

2
3 The design and construction standards set forth in this manual and all subsequent supplemental
4 standards, herein after referred to as the **Utility Standards**, are the minimum City of Port St.
5 Lucie Utility Systems Department (PSLUSD) requirements. It is the intent that the Utility
6 Standards and Standard Construction Details shall be applicable in all cases where the utilities
7 being constructed will be connected to water, wastewater, and/or reclaimed water facilities
8 owned by PSLUSD. These requirements do not apply to individual single-family dwellings
9 connecting to existing PSLUSD facilities.

10
11 All utility projects, whether privately or publicly owned, shall be constructed in accordance with
12 these Utility Standards. Any supplemental standards adopted by PSLUSD will supersede the
13 standards adopted in this manual. If there is a conflict between the standards included in this
14 manual and any supplemental standards, the requirements of the latest supplemental standards
15 will take precedence.

16
17 All new work, connections, relocations, etc. must be completed with no service interruptions to
18 existing customers. Exceptions are only granted in writing.

19
20 The Engineer of Record (EOR) shall be responsible for assuring that the design details, notes,
21 and requirements presented herein meet all local, state and federal government regulations. If a
22 provision of the Utility Standards is in conflict with the requirements of any state agency or local
23 government having primary jurisdiction, the more stringent requirements shall prevail.

24
25 The minimum requirements of the Utility Standards shall not be modified excepting when
26 unique circumstances exist, the public health and safety is not adversely affected, and written
27 approval has been obtained from the Utility Director or designee. Any proposed modification to
28 the minimum requirements must be substantiated by an engineering report prepared by a
29 Professional Engineer licensed in the State of Florida, which would indicate compliance with the
30 intent of the Utility Standards.

31
32 In case of a disagreement in the interpretation of any provision of this manual, or the
33 supplemental standards, the decision of the Utility Director shall prevail.

34
35 PSLUSD reserves the right to impose additional field requirements not addressed in the Utility
36 Standards, when those requirements will improve the operations, maintenance, or integrity of the
37 utility system.

38
39 The terms “shall” and “must” are used when the requirement is mandatory. Other terms such as
40 “recommended” and “preferred” indicate desirable procedures or methods, with deviations
41 subject to individual consideration.

42
43 The latest revision of regulations, codes, standards and technical publications referenced in the
44 Utility Standards shall be used.

45
46 Copies of the PSLUSD Utility Standards Manual, Supplemental Standards, Standard Details,
47 Applications, Standard Documents and Forms may be downloaded from the PSLUSD website at
48 [https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
49 [development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).

1 All submittals to PSLUSD shall be in electronic formats and include the PSLUSD project name
2 and number. Paper documents are typically reserved for some signed and sealed plans or where
3 original signatures are required. File naming can be found on the City’s website.
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

CHAPTER I
APPLICATION PROCESS

A. GENERAL

1. In order to obtain utility services from the City of Port St. Lucie, the property owner must make an Application for Service to PSLUSD. A completed Application for Service must be submitted with the other items noted on the application form. The application form can be downloaded from the PSLUSD website <https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/>.

2. Applications for services requested by firms, partnerships, associations and corporations shall be tendered only by their duly authorized agents and the official title of the agent shall be shown on the application. Failure to submit all the required information shall result in a rejection of the application, which will then be returned to the owner or designated agent.

3. Within thirty business days of acceptance of the completed Application for Service, including fees, and applicable plans, PSLUSD will provide review comments to the applicant. The applicant shall address the comments and submit construction plans, if applicable, to PSLUSD for review.

4. PSLUSD reserves the right to charge additional fees for services such as subsequent plan review, re-stamped plans, re-inspections, permit modifications, partial certifications, turnovers, administrative fees, etc.

B. SITE PLANS

1. The following information shall be included with the site plan when submitted to PSLUSD for approval:

a. Location and size of existing water, wastewater, and reclaimed water facilities, which are available to serve the proposed project.

b. Approximate location of proposed on-site and off-site water and wastewater mains.

c. Location of any existing or proposed well and septic tank system.

d. Location of nearest fire hydrant within 1,000 feet of property.

e. Location of any public wells within 1,000 feet of property. The City's Wellfield Protection Ordinance restricts certain uses and development within the zone of protection. Confirmation shall be provided that the project is not within the zone of protection, either by a statement on the plan or in a separate document.

f. Right-of-way (ROW), easements and lot lines and pertinent easement information, showing Official Record Book and page number.

g. Project phasing shall be shown. Once approved, re-phasing shall not be permitted.

1 2. Guidance comments for future construction plans may be added to assist the applicant with
2 future submittals.

3
4 **C. CONSTRUCTION PLANS**

5
6 1. All construction plans require review and approval by PSLUSD. A full set of plans shall be
7 submitted digitally until final approval (electronically stamped by PSLUSD) by the applicant
8 together with the completed PSLUSD forms for Water and/or Wastewater Design Information
9 (with first set only), and applicable fees. Include PDF and CAD files with each submittal. After
10 approval, provide one full set of signed and sealed plans on 24" X 36" sheets.

11
12 2. For clarity, utility plans shall be required on separate sheets (not combined with paving and
13 drainage) unless approved in writing by PSLUSD. If approved, paving and grading shall be
14 grayed out. Detailed drawings shall be provided for areas with poor legibility.

15
16 3. The construction plans shall be in compliance with the design, specifications and construction
17 standards included in this document and shall be signed and sealed by a Professional Engineer
18 licensed in the State of Florida. The EOR shall submit the design report, calculations and other
19 pertinent information required in Section H, Chapter II, along with the construction plans. Note:
20 Every project that includes a sewer connection must supply pump station calculations for the
21 station, new or existing, that will be utilized for that project.

22
23 4. Construction plans shall include the following:

24
25 a. Cover sheet with the name of project, developer and EOR; detailed location map with
26 street names and legal description; PSLUSD standards and details utilized (indicate
27 effective date); an index and an issue date.

28
29 b. A revision block on all construction plans.

30
31 c. A north arrow and scale. The following scales shall be used:

32
33 i. 1" = 50' horizontal or larger for water, wastewater and reclaimed water lines

34
35 ii. 1" = 5' vertical or larger for gravity wastewater profile sheets

36
37 iii. 1" = 10' or larger for details, blow-ups and pump station site plans

38
39 d. Phase lines and match lines must be clearly delineated.

40
41 e. Design plans with Record Drawings in mind. Leave room for completed construction
42 data.

43
44 f. Elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD
45 88). The location and elevation of at least one NAVD 88 benchmark shall be indicated.
46 All construction plans to be drawn in State Plane Coordinates, Florida NAD 83 State
47 Plane East Zone, US Foot.

- 1 g. Elevations of conflicting pipes shall be shown to indicate top and bottom pipe
2 elevations.
3
- 4 h. Rights-of-way, all existing and proposed easements, lot lines, and the Official Record
5 Book and page number, if applicable.
6
- 7 i. Lot and block numbers, if applicable.
8
- 9 j. Each lot, bay, and building; type of use and number of floors; each lot/bay shall have a
10 separate water service line with a meter or lockable shut off valve and an individual
11 sanitary sewer service cleanout.
12
- 13 k. The proposed service line, location of the interceptor and area(s) reserved for future
14 potential interceptors for all buildings and each bay.
15
- 16 l. Facilities with interceptors shall be individually identified and metered; the type,
17 capacity and location of interceptors shall be indicated. Leave room for Record Drawing
18 information on the sheet and near each call-out to table. Add boxes, blanks, or table
19 columns to fill in required Record Drawing. A Grease Management Plan is required for
20 all food service related businesses.
21
- 22 m. Driveway locations for all developments, including residential driveways.
23
- 24 n. Existing and proposed water, wastewater and reclaimed water mains and easements;
25 proposed mains shall be in City-owned road rights-of-way or utility easements.
26
- 27 o. Size, length and type of material used to construct all mains and casings.
28
- 29 p. Distance of mains from buildings or structures within 20 feet of the main.
30
- 31 q. Storm sewers including yard drains.
32
- 33 r. All facilities and appurtenances shall be clearly labeled (pipe, valves, fire hydrants, fire
34 sprinkler lines, water meters, fittings, sampling points, manholes, service lines, power
35 lines, fiber, pull boxes, splice boxes, etc.) with associated elevations, sizes, types,
36 composition, and slopes. All manholes, fire hydrants, sample points, and valves shall be
37 numerically identified.
38
- 39 s. The point of service for water, sewer, and reclaimed water, and electrical power for
40 pump stations shall be labeled as Point of Service or “P.O.S.” and shall be as follows:
41
- 42 • Domestic water service – on discharge side of backflow preventer assembly
 - 43 • Fire service – upstream side of the first shut-off valve of the DDCV assembly
 - 44 • Gravity – first cleanout upstream of the gravity main
 - 45 • Grinder with multiple customers – point where 2 services meet at the edge of the
 - 46 lift station easement
 - 47 • Grinder with single customer – point of connection to wet well
 - 48 • Lift station electrical power – within 5’ of lift station easement

1 t. Separation between water mains, gravity sewer, force mains, reclaimed water mains
2 and storm sewers.

3 u. Field verified data (sizes, materials, elevations and locations) for existing utilities
4 including, but not limited to, water mains, force mains, gravity sewers, storm sewers,
5 reclaimed water mains, electric, gas, fiber optic, and telephone.
6

7 v. All paved non-asphalt surfaces (pavers, stamped concrete, etc.) proposed over
8 PSLUSD owned facilities shall be identified on plans. PSLUSD shall not be responsible
9 for the restoration of any landscaping, aesthetic or structural features, and surfaces in the
10 event of damage during maintenance of its water and wastewater facilities.
11

12 w. The plan view and profile of gravity sewer indicating the length and slope of pipe
13 between the manholes; elevation of each manhole rim and inverts; location and elevation
14 of connection to existing sewage collection system or proposed pump station; finished
15 grade elevation; and elevation of water, storm sewer and reclaimed water lines crossing
16 the sanitary sewer.
17

18 x. The details indicated hereunder shall be provided if a wastewater pump station is
19 proposed. Keep all lift station details on the same sheet.
20

21 i. A plan and section view of the pump station with dimensions and size of the wet
22 well, showing the placement of all components and clearances; elevation of wet-well
23 bottom, top and at ground adjacent to wet-well; elevation of all influent inverts;
24 elevation of emergency off (back-up), pump off, lead pump on, lag pump on and
25 high-water alarm levels; pump information including model, impeller diameter, horse
26 power, motor speed, operating point, operating voltage, and control panel.
27

28 ii. A detailed site plan drawn to scale for the pump station including all applicable
29 structures, components and appurtenances such as wet-well, valve vault, telemetry,
30 generator, fuel tank, odor control equipment; water service and reduced pressure
31 principle backflow prevention assembly; gravity sewer, manhole and pressure main;
32 landscaping and irrigation system; control panel, auxiliary electrical enclosure, and all
33 buried electrical conduit including electrical service to control panel, as applicable;
34 concrete and gravel areas; easements; fence; and access driveway. Proposed grade
35 elevations shall be indicated on the site plan in the proximity of the pump station.
36

37 y. PSLUSD Standard Details located at [https://utility.cityofpsl.com/get-
38 connected/divisions/utility-engineeringcommercial-development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)) shall
39 be utilized, but do not have to be included in the construction plans submitted for review.
40 If the standard details are included in the construction plans, the detail sheets shall not be
41 reduced in scale. If the standard details are not included in the construction plans, the
42 contractor and EOR shall ensure that a copy of the Utility Standards Manual, including
43 Standard Details, is available at the project at all times.
44

45 z. After the initial PSLUSD plan submittal, all revisions shall be noted in revision block
46 on cover sheet and clouded on corresponding plan sheets.
47

48 aa. Landscaping plans shall be submitted for the project as indicated below in Section D.
49

1 bb. Conflicts shall be called out with sequential numbers, beginning with 1, on the utility
2 sheet.
3

4 5. PSLUSD will notify the applicant when the construction and landscape plans are in
5 compliance with the Utility Standards, however, the plans will not be approved until the Utility
6 Service Agreement has been executed, all fees are paid, and a Construction Permit/Approval to
7 Connect is issued by PSLUSD or FDEP.
8

9 6. No changes shall be made to the approved plans after a Construction Permit/Approval has
10 been issued without specific written concurrence of PSLUSD. Revisions which directly or
11 indirectly impact utility design void the plan approval. Such revisions include, but are not
12 limited to, changes in use from retail to restaurant, adding or deleting bays in buildings, site plan
13 changes, and changes from single-family homes to multiple-family homes. Revised plans are
14 required for approval and are subject to new plan review fees.
15

16 **D. LANDSCAPE PLANS** 17

18 1. Landscape plans shall be submitted for the project indicating the location of landscape areas,
19 perimeter walls, foundations, berms, tree wells, fences, gates, signs, decorative rocks, sculpture,
20 fountains, and any other features that may influence the location of water/wastewater/reclaimed
21 water facilities; also, existing and proposed water/wastewater/reclaimed facilities, and right-of-
22 way, lot lines and all easement information, showing Official Record Book and page number,
23 shall be included. The plans shall include and confirm to the following standard notes:
24

25 a. All landscaping within PSLUSD utility easements and within 10' of PSLUSD
26 infrastructure shall comply with Chapter 154 of the City's Code of Ordinances and PSLUSD
27 Utility Standards.
28

29 b. No landscaping shall be planted in such a manner as to adversely affect utility installation,
30 operation, or maintenance.
31

32 c. No landscaping other than sod grasses may be planted within a 5' radius maintenance area
33 of any PSLUSD appurtenance such as water meters, backflow devices, fire hydrants, sanitary
34 sewer cleanouts, manholes, air release valves, etc. Trees shall not be planted within 10' of
35 any PSLUSD infrastructure. All measurements are from outside to outside, not centerline to
36 centerline. Example: outside of pipe to nearest point on tree trunk.
37

38 **E. UTILITY SERVICE AGREEMENT** 39

40 1. When the Application for Service and construction plans have been completed satisfactorily,
41 the applicant/property owner is required to enter into a Utility Service Agreement with PSLUSD.
42 The agreement shall be binding on the applicant/property owner, successors and assigns.
43

44 2. The Utility Service Agreement shall detail the terms, conditions and responsibilities of the
45 applicant/property owner, including, but not limited to, warranty of all work and equipment for
46 the project.
47

48 3. If utility construction has not been initiated within one year of execution of the Utility Service
49 Agreement or inspections by PSLUSD indicate that utility construction activity has not occurred

1 for a period of 12 months, a re-approval of the project is required. For re-approval of project by
2 PSLUSD, construction plans shall be revised to meet the current standards and submitted with
3 the appropriate charges/fees; an amendment to the Utility Service Agreement may be required.
4 4. The applicant shall pay all required charges and fees prior to execution of the Utility Service
5 Agreement by PSLUSD. The Guideline for Estimating Project Fees can be obtained on our
6 website at [https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-
7 development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).
8

9 **F. CONSTRUCTION PERMITS**

10
11 1. If required, a permit must be obtained from PSLUSD prior to construction of water and
12 wastewater facilities, except utility facilities mentioned below. A completed Application for
13 Permit to Construct a Water Main/Distribution System (PSLUSD Doc No 61) and/or Application
14 for Permit to Construct a Domestic Wastewater Collection/Transmission System (PSLUSD Doc
15 No 60) must be submitted prior to the pre-construction meeting being scheduled.
16

17 2. PSLUSD is authorized by the Florida Department of Environmental Protection (FDEP) to
18 independently regulate the construction of water distribution mains of 12” or less in diameter,
19 gravity wastewater collection systems of 12” or less in diameter, wastewater force mains of 12”
20 or less in diameter, and pump stations appurtenant to such force mains. Construction of these
21 projects is exempt from FDEP permit requirements.
22

23 3. Applications for FDEP permits for construction of mains larger than 12” and pump stations
24 appurtenant to such mains can be submitted concurrently with the construction plans; however,
25 PSLUSD will not sign the FDEP application form until PSLUSD has executed a Utility Service
26 Agreement and approved the construction plans.
27

28 **CHAPTER II**

29 **DESIGN, SPECIFICATIONS AND CONSTRUCTION STANDARDS**

30 31 **A. GENERAL**

32
33 1. The standards set forth in this manual are intended to provide a basis for design and
34 construction. Applicable federal, state and local laws and regulations should be considered
35 concurrently with this text. Any variation from these standards shall be specifically requested by
36 the EOR and requires written approval from PSLUSD prior to construction plan submittal.
37 Approval of construction plans by PSLUSD does not constitute written approval of deviations
38 from the Utility Standards.
39

40 2. All references to stainless steel shall refer to grade 316 unless otherwise noted.
41

42 3. Water, wastewater and reclaimed water lines shall not be constructed without first obtaining
43 an approval or permit, as applicable, from PSLUSD.
44

45 4. All construction shall be in accordance with this manual, the City of Port St. Lucie Code of
46 Ordinances, and with all applicable FDEP rules and regulations. If any conflict exists between
47 the standards, the more stringent governs, as determined by the PSLUSD. Copies of City Code of
48 Ordinances are available with the City Clerk’s office and can also be accessed online at

1 https://library.municode.com/fl/port_st_lucie/codes/code_of_ordinances. FDEP rules are
2 available online at www.dep.state.fl.us.

3
4 5. Construction shall be in accordance with the Utility Standards in effect at the time the project
5 was approved by PSLUSD and will not be subject to changes in the standards during the life of
6 the project. However, if utility construction has not been initiated within one year of execution of
7 the Utility Service Agreement or inspections by PSLUSD indicate that utility construction
8 activity has not occurred for a period of 12 months, a re-approval of the project is required.

9
10 6. Wastewater discharge shall be subject to PSLUSD wastewater system user rules in accordance
11 with the City of Port St. Lucie Code of Ordinances - Title VI.

12
13 7. All abandoned mains and service lines shall be removed or filled with cement grout at the
14 discretion of PSLUSD. Asbestos cement pipe (ACP) must be removed and handled in
15 compliance with applicable federal, state and local regulations. All cutting, removal, and disposal
16 of ACP shall be performed by a Florida licensed Asbestos Abatement Contractor.

17
18 8. The design and construction of privately-owned fire lines shall conform to the St. Lucie
19 County Fire District standards (www.slcfcd.com) pertaining to dedicated fire sprinkler systems.
20 The District has final jurisdiction on all hydrant and fire sprinkler line requirements. A plan
21 approved by the District is required to be submitted at the pre-construction meeting with any
22 revision that relocates a hydrant or a fire line connection.

23
24 9. Cross connection control shall be provided in compliance with City of Port St. Lucie Code of
25 Ordinances – Title VI and FDEP regulations.

26
27 10. Permits shall be obtained for subaqueous and aerial pipe crossings canals and other surface
28 waters from jurisdictional agencies and construction shall be in accordance with the permitted
29 plans and conditions.

30
31 11. All new/replaced facilities shall be restored with a minimum of one full row (1' wide) of sod.

32 **B. EASEMENTS/RESTRICTIONS/CONVEYANCE TO PSLUSD**

33
34
35 1. Water, wastewater, and reclaimed water facilities shall be placed in a city-owned ROW or
36 utility easement. Placement of facilities on or adjacent to interior property lines or between
37 structures is discouraged but may be considered by PSLUSD on a case-by-case basis.

38
39 2. A minimum 10' wide easement is required adjacent to any non-city-owned ROW for future
40 PSLUSD facilities.

41
42 3. All other utility easements must be a minimum of 20' wide. For gravity sewer, transmission
43 mains, and mains deeper than 12', the easement shall be calculated using the equation: Easement
44 = $1 + 1.5D$, where D is the depth from the finished grade to pipe invert.

45
46 4. Utility easements shall extend a minimum of 10' beyond a manhole and 7.5' beyond a
47 hydrant.

1 5. Structural landscape features such as rock, sculpture and tree wells, berms, signs, walls,
2 foundations, fences and gates are not allowed in a utility easement but may be considered by
3 PSLUSD on a case-by-case basis. PSLUSD shall not be responsible for the restoration of any
4 landscaping, aesthetic or structural features and surfaces in the event of damage during
5 maintenance of its water and wastewater facilities.
6

7 6. No landscaping shall be planted in a manner that would adversely affect utility installation,
8 operation and maintenance. Landscaping shall be in compliance with Chapter 154 of the City of
9 Port St. Lucie Code of Ordinances. Approved shrubs and ground cover listed in Chapter 154 may
10 be planted in the easement.
11

12 7. Minimum easements shall be provided for pump systems as follows:
13

- 14 • Grinder System – 20' x 20'
- 15
- 16 • Duplex/Triplex Lift Station – 30' x 45'
- 17

18 Larger easements may be required based on the site plan prepared by the EOR for the pump
19 station.
20

21 8. The developer/property owner shall convey easements and/or property essential to operation
22 of the utility at no cost to the city by fee simple deed. Conveyance may be needed for the
23 construction of water wells, mains, pump stations, storage tanks, etc.
24

25 9. Easements shall be submitted to PSLUSD prior to any scheduling of leak testing. The
26 submittal shall be in PDF format. Once approved by PSLUSD, the Applicant shall record the
27 easement in St. Lucie County and provide the recording book and page on the Record Drawings.
28 A copy of the recorded easement shall be provided to PSLUSD.
29

30 **C. SETBACK REQUIREMENTS** 31

32 1. All water, wastewater, and reclaimed water facilities which require an excavation with a
33 depth of 6' or less, as measured from the bottom of the excavation to finished grade, shall be
34 installed at a minimum of 10' horizontally from any structures. This setback requirement also
35 applies to new structures being constructed in the vicinity of existing PSLUSD facilities. The
36 10' horizontal setback shall be measured from the outside edge of the utility facilities to the
37 nearest part of the structure, including underground (e.g. footers) or above-ground (e.g. roof
38 overhangs) features. In addition, the 10' setback applies only to mains skirting a single structure.
39 Where utility facilities deeper than 6' are installed adjacent to or between structures, setback
40 shall be calculated using the equation: $\text{Setback} = 1 + 1.5D$, where D is the depth from the
41 finished grade to bottom of the excavation.
42

43 **D. SEPARATION BETWEEN PSLUSD MAINS AND OTHER UTILITIES** 44

45 1. The minimum separation between PSLUSD mains and other utilities, as measured from the
46 outside of each pipe, shall be as follows:
47

1 a. Water mains shall be located a minimum of 10' from a storm sewer, a gravity sewer, a
2 force main and a reclaimed water main. The vertical separation shall be at least 18" with
3 the water main crossing over the other pipes.
4

5 b. All PSLUSD pipes shall have a minimum horizontal separation of 5' from all other
6 underground utilities including light poles and a vertical separation of at least 18"
7 including footers.
8

9 c. When gravity sewer, force main, or reclaimed water main is to be installed parallel to a
10 drainage pipe, a minimum horizontal separation of 10' is desired. A greater separation
11 may be required for drainage pipes larger than 48" in diameter.
12

13 **E. REPLACEMENT AND UPGRADING OF EXISTING FACILITIES**

14
15 1. Upon development or improvement of a property, the owner shall be required to replace any
16 existing onsite PSLUSD water and wastewater facilities constructed of ACP or 'transite' pipe,
17 cast iron pipe (CIP), vitrified clay pipe (VCP) or any facilities that do not meet the specifications
18 of this manual with currently approved materials at no cost to PSLUSD. Replacement easements
19 shall be shown on construction plans and conveyed to the City in proper form.
20

21 2. When development or improvement of a property causes offsite drainage and/or road
22 improvements to be constructed, the property owner shall be required to replace any existing
23 ACP, CIP, and VCP pipes or any pipe located within the road/drainage ROW or easements that
24 does not meet the Utility Standards. All such installations, whether planned or unplanned, shall
25 be subject to review by PSLUSD prior to actual commencement of any site/road work.
26

27 3. When a proposed project causes existing PSLUSD facilities to be hydraulically overloaded or
28 at risk of damage or contamination, the developer shall be required to upgrade and/or relocate the
29 facilities in compliance with the current Utility Standards.
30

31 4. In case of road surfacing and other improvements, adjustments shall be made to manholes,
32 valves, fire hydrants and other appurtenances to meet the current Utility Standards at no
33 additional cost to PSLUSD. All work shall be inspected by PSLUSD for compliance.
34

35 5. Developments with privately-maintained water and wastewater utility systems may request
36 PSLUSD to accept ownership of the systems subject to the following conditions:
37

38 a. The property owner submits information regarding the system to the PSLUSD, including:
39

40 i. Record Drawing of the system prepared by a Professional Engineer licensed in the
41 State of Florida.
42

43 ii. An engineering report with details on the condition of the system. The report shall be
44 prepared by a Professional Engineer, licensed in the State of Florida and shall contain
45 results of inspection and testing of the mains, appurtenances, structures, and equipment.
46

47 b. The system is repaired or replaced to meet current Utility Standards by the property owner.
48

49 c. Utility easements are conveyed to PSLUSD.

1 d. PSLUSD is given access to perform inspections and testing to determine the condition of
2 the system and conformity to current Utility Standards.
3

4 **F. RELOCATION OF EXISTING FACILITIES**
5

6 1. Relocation of existing facilities shall conform to the design and construction standards of this
7 manual. All materials used in construction shall be on the PSLUSD Qualified Products List
8 (QPL). Design for relocation of existing facilities must provide for continuity of service to
9 existing customers as well as verification that the relocated facilities will not cause additional
10 operation and maintenance expense to PSLUSD.
11

12 **G. WASTEWATER QUALITY/PRETREATMENT REQUIREMENTS**
13

14 1. City of Port St. Lucie Code of Ordinances – Title VI, prohibits the discharge of commercial
15 and industrial wastewater into the city’s wastewater collection system if the wastewater contains
16 pollutants and contaminants that are:
17

- 18 a. Harmful to the operation of wastewater facilities.
- 19
- 20 b. Untreatable and will result in violation of city, state, and federal standards.
- 21
- 22 c. Hazardous or harmful to the health and safety of city personnel and the general public.
- 23

24 2. Any wastewater that has the potential of causing the above adverse effects will require
25 treatment and/or disposal in compliance with the city, state and federal regulations.
26

27 3. Discharge of wastewater from commercial and industrial establishments may be allowed in
28 some cases if pretreatment is approved by FDEP and PSLUSD.
29

30 4. Interceptors are required for certain establishments specified in Section F of this Chapter.
31

32 5. All waste streams, other than domestic wastewater, shall be identified by the applicant. The
33 information regarding the quantity and quality shall be submitted to PSLUSD with the
34 application for wastewater service.
35

36 **H. DESIGN OF WATER, WASTEWATER, AND RECLAIMED WATER FACILITIES**
37

38 1. Water, wastewater, and reclaimed water facilities shall be designed by a Professional
39 Engineer licensed in the State of Florida. It is recommended the developer and EOR meet with
40 PSLUSD staff to determine feasibility, conformance with the PSLUSD Master Plan, and any
41 other special project requirements prior to beginning of any design work on a project. In areas
42 where Master Plan facilities have not been constructed, the design of such facilities shall be
43 incorporated in the overall design of the project. A Master Plan for the development shall be
44 required prior to the submittal of construction plans. Construction plans prepared without regard
45 to PSLUSD requirements shall not be accepted for review.
46

47 2. The design criteria specified herein is applicable to PSLUSD facilities, including, potable
48 water mains, gravity sewer, wastewater pump stations, force mains, reclaimed water mains and
49 appurtenances which fall within the PSLUSD service area. The criteria shall be used in

1 conjunction with the design guidelines and technical references required in FDEP regulations.
2 Deviations shall not be made without first receiving written approval from PSLUSD. If special
3 circumstances or conditions necessitate deviation from the criteria, the EOR shall submit
4 documentation to show that the deviation is based on good engineering practice and provide
5 reasonable assurance that public health and safety will not be compromised.
6

7 **H1. DESIGN CRITERIA FOR WATER MAINS**

8

9 1. Water mains shall be designed in accordance with Chapter 62-555 of the Florida
10 Administrative Code (F.A.C.), St. Lucie County Fire Department standards, and provisions of
11 this manual.
12

13 **a. Sizing**

14
15 i. The EOR shall submit a report including the design and calculations for sizing of the
16 water main on the basis of following considerations:
17

18 1. The PSLUSD Master Plan.

19
20 2. The specific development Master Plan.

21
22 3. The mains shall be sized to provide at least maximum day domestic requirements
23 plus fire flow at residual pressures of not less than 35 psi at all points in the system.
24

25 4. Domestic flows shall be based on 250 gallons per single-family dwelling unit,
26 which equates to one Equivalent Residential Connection (ERC); the ERC factors for
27 residential, commercial, and institutional establishments.
28

29 5. The velocity shall be less than 6 feet per second (fps) at peak hour.
30

31 6. Distribution mains shall be at least 6" in residential areas. A 4" water main may be
32 proposed for non-hydrant lines serving cul-de-sacs where additional development will
33 not occur. In non-residential areas, distribution mains shall be a minimum of 8".
34

35 Material type for all pipe 24" and above must be approved, in writing, by PSLUSD.
36

37 **b. Layout**

38 i. All developments shall be required to extend water mains across existing or proposed
39 streets, whether public or private, for future extension of other developments. In order to
40 facilitate potable water service for all properties within the service area, the
41 developer/owner shall extend the water main along the full length of all fronting
42 boundaries of the property and may be required to extend it through the property.
43

44 ii. Water mains shall be looped at all locations. A looped line shall have two separate
45 branches at least 500' apart with an isolation valve in between. Grid spacing shall not
46 exceed approximately 100 feet per inch of pipe diameter. Multiple feed lines may be
47 required at the discretion of PSLUSD.
48

1 iii. Written approval must be obtained from PSLUSD for dead-end water mains. Dead-
2 end water mains shall be planned and located such that new or existing pavement will not
3 have to be cut in the future when the main is extended. In such instances, mains less than
4 16" shall end with a valve, a plug, and a blow-off assembly. Water mains 16" and larger
5 shall end with a teed-off fire hydrant, an inline valve, and a plug. Permanent dead-end
6 water mains shall be equipped with an automatic flushing valve, that may be metered,
7 with water billed to the developer.
8

9 iv. Water mains shall be located to maintain the minimum separation required in Section
10 D of this Chapter and the standard detail unless a deviation is approved in writing by
11 PSLUSD. Separation less than the minimum required in Chapter 62-555, FAC shall not
12 be permitted.
13

14 v. Water mains shall not be placed in ditches, landscape buffers, wetlands, storm water
15 management areas or under sidewalks, concrete slabs and paved areas, unless specifically
16 noted on the plans and approved by PSLUSD.
17

18 **c. Design Working Pressure**

19
20 i. Water main systems shall be designed for a minimum working pressure of 150 psi. The
21 system pressure is typically 60-80 psi and not less than 35 psi.
22

23 ii. Where system water main pressures meet the minimum requirements but additional
24 pressure is desired by individual customers (such as for high-rise buildings), individual,
25 privately-owned booster pumps may be installed subject to approval by PSLUSD. The
26 EOR shall submit design information to PSLUSD to assure that the booster pump
27 facilities will not adversely affect the pressures in the utility mains and/or result in cross-
28 connection. Appropriate features shall be incorporated in the design to prevent a drop in
29 pressure in the utility mains below 40 psi.
30

31 **d. Cover**

32
33 i. Water mains shall have a minimum cover of 36" and a maximum of 60", unless
34 otherwise approved in writing by PSLUSD.
35

36 **e. Valves**

37
38 i. Valves shall be designed to facilitate the isolation of each section of pipeline between
39 intersections of the grid system. The number and location of valves shall provide for
40 flexibility of operation and maintenance, while minimizing the number of customers out
41 of service. In all instances, effectiveness of placement shall be primary criteria in
42 determining valve location.
43

44 ii. Valves shall not be placed in curbs, gutters, sidewalks, parking spaces, and handicap
45 ramps.
46

47 iii. Generally, the number of valves at an intersection shall be one less than the number of
48 pipes forming the intersection. Wet taps may require a valve installed on the main being
49 tapped.

1 iv. Inline valves shall be installed for mains near each side of a canal crossing and/or
2 major road crossing.

3
4 v. Valves shall be located at not more than 500' intervals in multi-family residential,
5 industrial and commercial districts and at not more than 800' intervals in single-family
6 residential districts. On transmission water mains less than or equal to 16" in diameter,
7 valves shall be installed at a maximum of 1000' intervals and at distribution branches. On
8 transmission mains greater 16" in diameter, valves shall be located at a maximum of 2500'
9 intervals and at distribution branches.

10
11 vi. Air release valves shall be placed at all canal crossings, high points and at other
12 locations specified by PSLUSD. The EOR shall consult with PSLUSD regarding the type
13 of valve to be used and its location. The valve shall be located inside a maintenance access
14 structure as shown in the PSLUSD standard details. Automatic valves shall not be used in
15 situations where flooding of the maintenance access structure may occur. Valves shall be
16 sized per the manufacturer's recommendations¹.

17
18 **f. Fire Hydrants and Fire Sprinkler Systems**

19
20 i. The St. Lucie County Fire District has final jurisdiction on all fire hydrants and fire
21 sprinkler line requirements. Written approval must be obtained from the Fire Chief and
22 submitted to PSLUSD.

23
24 ii. Unless specifically provided in the Utility Service Agreement, all new fire hydrants
25 shall be owned and maintained by PSLUSD and painted safety red. Private hydrants are
26 allowed only with specific written approval and project-specific conditions. Approved
27 plans do not constitute approval. If approved, privately-owned fire hydrants shall be
28 painted safety yellow.

29
30 iii. Hydrants shall be located so as to provide complete accessibility and minimize the
31 possibility of damage from vehicle or injury to pedestrians. The following setbacks and
32 clearance shall be observed for fire hydrants:

- 33
34 1. On or near side lot line.
35
36 2. No more than 15' from edge of pavement.
37
38 3. Clearance of 7.5' in front and sides and 4' to the rear, including landscaping.
39
40 4. No less than 2' from curb/edge of pavement/sidewalk.
41
42 5. No less than 3' from storm sewers/structures.
43
44 6. No less than 6' from a gravity sewer, reclaimed water main or force main.
45
46 7. No less than 10' from wastewater pump stations and onsite sewage treatment and disposal
systems.

¹ See Amendment 1

1 **g. Water Meters and Service Lines**

2
3 i. Water meters and service lines shall be sized by the EOR in accordance with AWWA
4 Manual of Water Supply Practices - M22. The size of the service line shall be a minimum
5 of 2” except single-family residential. The location of meters and service lines shall be
6 shown on the plans per the standard details and as follows:
7

- 8 1. Water service lines to each lot, parcel, or building.
9
10 2. All services lines after the meter shall be located on the property, outside of any
11 easements.
12
13 3. Water meters shall be located in accessible areas, outside of landscaping and
14 pavement, a minimum of 5’ from buildings and electric transformers, adjacent to
15 parking areas or roadways and a minimum of 3’ from the edge of pavement.
16
17 4. Water meters shall not be located within 10’ of wastewater and reclaimed water
18 service lines.
19
20 5. Each lot/bay shall have a separate water service line with a meter or lockable shut
21 off valve. A separate water meter shall be provided for businesses required to have an
22 interceptor.
23
24 6. Temporary and permanent water meters shall only be installed on City-owned
25 water mains.
26

27 **h. Cross Connection Control/Backflow Prevention**

28
29 i. Cross connection control/backflow prevention shall be incorporated in the design of
30 facilities in compliance with the City of Port St. Lucie Code of Ordinances – Title VI.
31 Specifications are included in this Chapter and the approved backflow prevention
32 assemblies are on the QPL.
33

34 **i. Sampling Points**

35
36 i. Bacteriological sampling points shall be located at the point of connection to existing
37 water main, at all dead ends, on the far side of all loops and no more than 1200’ apart. A
38 sample point location map shall be submitted on the overall utility plan prior to
39 disinfection.
40

41 **H2. DESIGN CRITERIA FOR GRAVITY SEWERS**

42
43 1. The property owner of existing and proposed developments shall provide a gravity wastewater
44 collection system. A pump station will be used when connection to the PSLUSD wastewater
45 collection system is not possible due to the elevation or other constraints of the receiving gravity
46 sewer, as determined by PSLUSD. PSLUSD may require submittal of an economic analysis by
47 the EOR to compare the cost of gravity sewer versus a pump station over a period of 30 years,
48 including capital and maintenance costs.
49

1 2. Gravity sewers shall be designed in accordance with Chapter 62-604, FAC and provisions of
2 this manual.

3
4 3. Pump stations are to be designed to serve neighboring parcels to maximize the benefit to the
5 system and minimize maintenance costs.

6
7 **a. Sizing**

8
9 i. The size shall conform to the approved Master Plan for the development.

10
11 ii. The minimum allowable size for a gravity sewer, other than a service connection, shall
12 be 8”.

13
14 iii. Lateral sewers shall be designed with capacities of not less than four times the average
15 flow. Trunk lines shall have capacities of not less than 2.5 times the average flow.

16
17 iv. The minimum service pipe size shall be 6” in diameter.

18
19 v. Material type for all pipe 24” and above must be approved, in writing, by PSLUSD.

20
21 **b. Layout**

22
23 i. In order to facilitate wastewater service for all properties within the PSLUSD service
24 area, wastewater gravity sewers shall be extended by the developer/owner along the full
25 length of all fronting boundaries of a property and through the property.

26
27 ii. All wastewater mains shall terminate with a manhole. In “phased” projects, pavement
28 must be in place over stub-out runs a minimum of 5’ past the end manhole.

29
30 **c. Slope**

31
32 i. All gravity wastewater lines shall be designed with hydraulic slopes sufficient to give
33 mean velocities, when flowing full or half full, of not less than 2 fps and not more than 5
34 fps, based on Manning’s formula using an “n” value of 0.013. The upsizing of sewers to
35 reduce slopes will not be permitted unless justified by calculated flows.

36
37 ii. The following minimum slopes will be used:

- 38
39 • 8” – 0.40%
40
41 • 10” – 0.28%
42
43 • 12” – 0.22%

44
45 **d. Cover**

46
47 i. The minimum cover over gravity sewers shall be 4’.

1 **e. Manholes**

2
3 i. Manholes shall be installed at the end of each sewer, at every change in grade, size, or
4 alignment, at all sewer intersections, and at distances not greater than 400' apart.

5
6 ii. Manholes shall be placed in accessible locations, preferably in pavement flush to the
7 surface. Manholes shall not be located in low areas and wheel paths (i.e. structures shall
8 be located centered in the travel lane, crown of the road, paved shoulder or off the
9 pavement). Manholes located in unpaved areas shall have a rim elevation 2" higher than
10 the surrounding ground and a concrete collar shall be placed around the manhole; the
11 concrete shall be sloped from the rim and taper out to the existing ground.

12
13 iii. Manholes shall not be placed in low-lying areas where storm water inflow may occur.
14 The manhole cover and frame shall prevent inflow of storm water and shall be on the
15 QPL².

16
17 iv. The design depth of the manhole from rim elevation to invert elevation shall be no
18 more than 20', unless specifically approved in writing by PSLUSD.

19
20 v. Standard manholes shall be provided with a minimum 0.1' drop in the invert.

21
22 vi. Where the drop in invert exceeds 0.1' but is less than 2', a channel shall be
23 constructed to prevent solids deposition in the manhole.

24
25 vii. An outside drop connection shall be provided when a sewer enters a manhole 2' or
26 higher than the main invert channel as shown in the standard detail.

27
28 viii. A sewer service connection shall not be directed into a manhole.

29
30 **H3. DESIGN CRITERIA FOR INTERCEPTORS**

31
32 1. Interceptors shall be provided when, in the opinion of the Utility Systems Director, they are
33 necessary to prevent the discharge of liquid wastes containing grease, fats, oils, hair, lint, sand
34 and other substances or materials that may be harmful to the operation and maintenance of the
35 City's wastewater facilities.

36
37 2. Interceptors are specifically required for establishments with food service, laundry, car wash,
38 services for repair or maintenance of vehicles/mechanical equipment, barber shops, beauty
39 salons, and animal care facilities. Interceptor may be required for institutional facilities and other
40 establishments based on the characteristics of the wastewater, past experience, field inspections,
41 maintenance records and operational issues. Separate plumbing shall be provided for the
42 wastewater to be treated through an interceptor (see example on exhibit in this chapter).

43
44 3. An interceptor shall be provided in compliance with these requirements when an existing
45 establishment, listed in 2. above, is expanded or remodeled.

46
47 4. Interceptors are not required for single-family homes and private dwelling units.

48

2 See Amendment 1
2019 Edition

1 5. Interceptors shall not be shared. Each business required to have an interceptor shall have its
2 own separate plumbing, interceptor and water meter (see example on exhibit in this chapter).
3 When the same establishment has multiple uses requiring an interceptor, such as an institutional
4 facility with a kitchen and laundry, each use shall be provided with separate plumbing and
5 interceptor.
6

7 6. Wastewater from toilets, urinals, showers, and other similar plumbing fixtures for human
8 waste shall not discharge into an interceptor for kitchen, laundry, animal care or facilities for
9 servicing vehicles/mechanical equipment (see example on exhibit in this chapter).
10

11 7. Wastewater required to be treated in an interceptor shall enter the interceptor through an inlet
12 pipe only.
13

14 8. All equipment and plumbing fixtures in a food service facility that may introduce fats, oil or
15 grease into the PSLUSD wastewater facilities must be connected through the grease interceptor,
16 including but not limited to:

17
18 i. Scullery sinks (two or three compartment).
19

20 ii. Pots and pan sinks.
21

22 iii. Floor drains in kitchen, walk-in coolers and washing areas (not including public
23 restrooms).
24

25 iv. Pre-wash sinks.
26

27 v. Dishwashers and other washing machines.
28

29 vi. Automatic hood wash units.
30

31 vii. Indoor garbage can wash units.
32

33 9. Establishments with facilities for servicing of vehicles/mechanical equipment shall connect all
34 plumbing (other than the restroom) from the area where repairs and maintenance is being
35 performed into a sand/oil interceptor. Engine oil, transmission oil, coolant, solvents, additives,
36 brake fluid and any other fluid collected in the process of servicing vehicles/mechanical
37 equipment shall not be discharged into the interceptor or other plumbing. The handling and
38 disposal of these fluids shall be in compliance with FDEP and PSLUSD rules and regulations.
39

40 10. Concrete interceptors shall be designed in accordance with ASTM C 890-91 (Reapproved
41 1999), Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional
42 Precast Concrete Water and Wastewater Structures, for the appropriate loading.
43

44 11. Grease, oil, and sand interceptors shall be provided with an access manhole over the inlet and
45 outlet ends. Traffic rated lids shall be installed with manhole covers to finished grade.
46

47 12. The wastewater collection system for commercial projects shall be designed to accommodate
48 the installation of interceptors for future uses and phases of the project (see example on exhibit in
49 this chapter). Construction plans submitted to PSLUSD shall indicate areas reserved for the

1 placement of future interceptors. Physical property restrictions or lack of sewer gradient shall not
2 be a defense for failure to provide adequate interceptors.

3
4 13. A sampling and inspection manhole may be required downstream of grease, oil, and sand
5 interceptors.

6 7 **a. DESIGN CONSIDERATIONS**

8
9 1. Interceptors shall be designed by a Professional Engineer licensed in the State of Florida, in
10 accordance with applicable building codes, state regulations and provisions of this manual. The
11 design shall be based on the characteristics of the wastewater and the peak flow rate. The EOR
12 shall take into consideration the specifications for interceptors in this Chapter, the PSLUSD
13 standard details and the criteria indicated below.

14 15 **a. Location (Not Applicable to Interceptors for Barber Shops & Beauty Salons)**

16
17 i. The site plan shall provide for area(s) conducive to the installation of an exterior, in-
18 ground interceptor for all spaces, bays, or suites. Proper planning of areas for
19 interceptors is particularly essential when designing a new strip center, strip mall, plaza,
20 shopping center, or any other commercial project where the type of tenancy is uncertain.
21 The location shall be based on the following criteria:

22
23 1. Interceptors shall be located in proximity of the building and the sewer lateral to
24 allow gravity flow.

25
26 2. Interceptors shall be located outside building structures and shall not be placed in
27 any type of enclosure.

28
29 3. Interceptors shall be located in grass/non-traffic areas, unless approved in writing
30 by PSLUSD.

31
32 4. Interceptors shall not be located in low areas subject to flooding. The site shall be
33 sloped to drain storm water away from the interceptor.

34
35 5. Interceptors shall be located as to be easily accessible at all times for routine
36 inspection, cleaning and maintenance, and to pose no hazard to public health or
37 safety. Interceptors shall not be placed in parking spaces or sidewalks.

38 39 **b. Sizing**

40
41 i. PSLUSD will confirm the minimum capacity and the type of interceptor that will be
42 required based on the information submitted by the applicant and the EOR. The EOR
43 may specify a larger capacity.

44 45 **c. Minimum Design Criteria**

46
47 i. The design criteria shall include, but not be limited to, the following depending on the
48 type of facility:

1 **1. Food Service Facilities** – PSLUSD will specify size and type of interceptor based
2 on the following category of food service establishments:

3
4 a. Mobile food vendors – An under-the-sink grease trap may be used.

5
6 b. Limited food facilities – Food preparation on the premises is limited to hot
7 dogs, popcorn, coffee and soft drinks, food is served only with disposable
8 utensils, plumbing fixtures do not include floor drains or a garbage grinder or
9 dishwashing machine, and the amount of grease is expected to be minimal.
10 Examples: ice cream and frozen yogurt shops, concession stands, and
11 convenience stores. An automatic grease removal unit may be used.

12
13 c. Full service facilities – Food preparation is not limited as in paragraph above.
14 Examples: restaurants, cafeterias, butcher shops, institutional kitchen facilities,
15 meat and seafood markets. A grease interceptor shall be provided in accordance
16 with the standard detail and as specified below:

17
18 i. A baffle is required, as shown in the detail, unless multiple tanks are used.

19 ii. When the size specified by PSLUSD is greater than 1250 gallons, the
20 installation of multiple tanks in series may be required.

21
22 iii. When food wastes containing grease or oil are processed through a
23 garbage disposal, the waste from the garbage disposal shall be directed to a
24 solids separator for separating the solids before discharging into the grease
25 interceptor (see example at the end of this Section). A combination solids and
26 grease interceptor may be installed if the effective capacity of the interceptor
27 is increased to accommodate the waste from the garbage disposal.

28
29 **2. Laundry Interceptor** - Interceptors for commercial laundries shall be equipped
30 with a wire basket or similar device removable for cleaning that prevents passage of
31 solids ½” or larger in size, strings, rags, buttons or other materials detrimental to the
32 wastewater facilities.

33
34 **3. Interceptor for car washes and facilities servicing vehicles/mechanical
35 equipment** - All such facilities shall install a combination sand and oil interceptor.

36
37 **4. Interceptor for barber shops and beauty salons** – A hair interceptor shall be
38 installed under the sinks used for shampoo.

39
40 **5. Interceptor for institutional facilities that include uses such as schools, child
41 care, adult congregate, assisted living, nursing homes, hospitals, labor camps,
42 juvenile detention, prisons, etc.** – When required by PSLUSD, an interceptor for
43 such facilities shall be designed to remove rags, clothes, diapers, toys or other objects
44 that would cause overflow of sewage or damage to PSLUSD wastewater facilities.
45 Separate plumbing and interceptors shall be provided for the human, kitchen, and
46 laundry wastes.

47
48 **6. Interceptor for animal care facilities for housing, holding, hygiene or medical
49 treatment of animals, i.e. kennel, pet grooming, pet shop, shelter, hospital, etc.-**

1 Such facilities shall, as a minimum, install an interceptor for retention of hair. A
2 combination hair and solids interceptor may be needed depending upon the
3 characteristics of the wastewater.
4

5 **d. Submittal**
6

7 i. The following information shall be submitted by the EOR to PSLUSD:

8 1. A site plan showing the proposed service line, location of the interceptor and
9 area(s) reserved for future interceptors. This is not required in the case of interceptors
10 for barber shops and beauty salons.
11

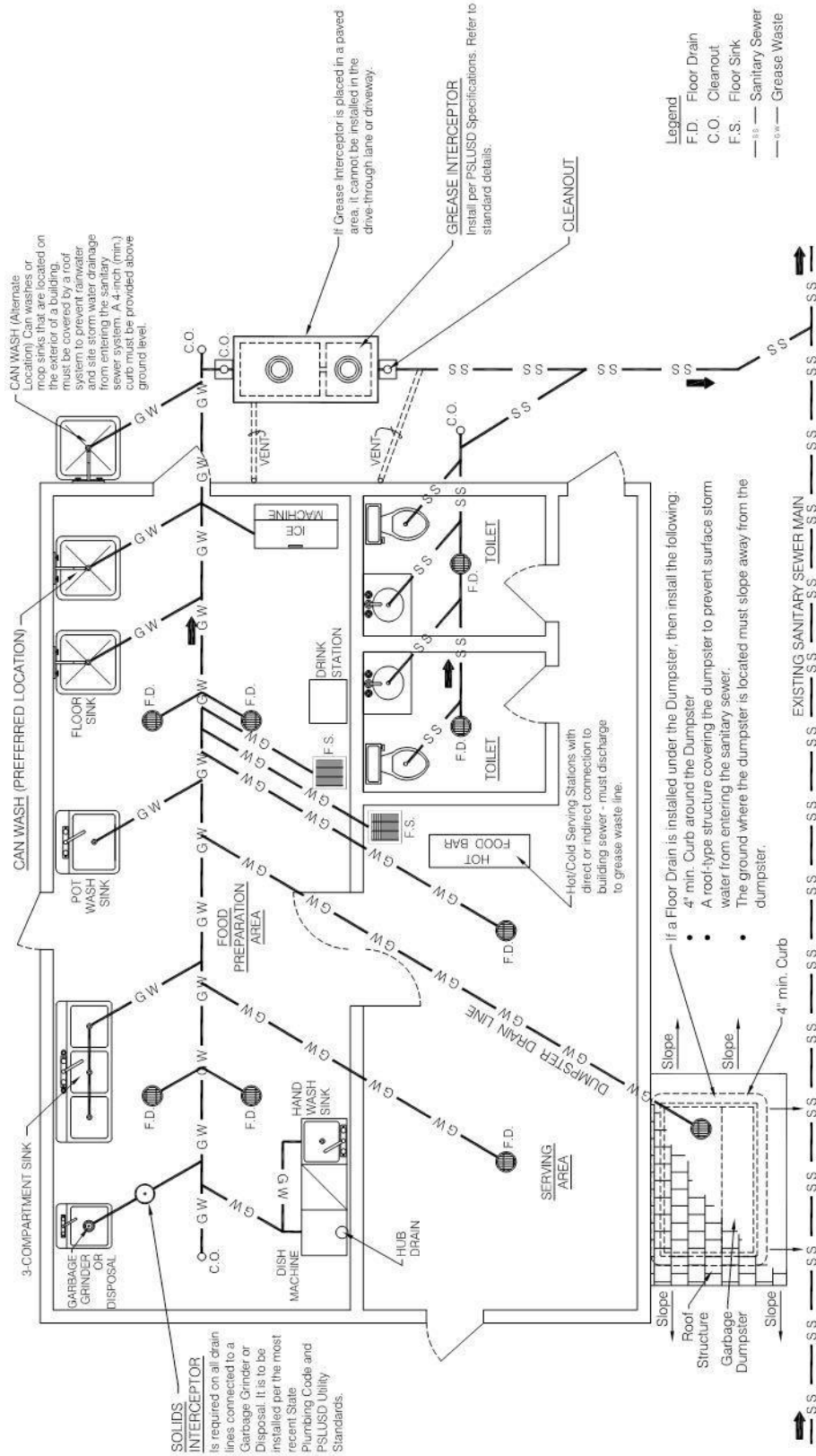
12 2. A Grease Management Plan for food service establishments.
13

14 3. Detailed calculations for the peak flow rate of commercial/industrial wastewater.
15

16 4. Characteristics of all commercial/industrial wastewater from proposed and
17 potential uses of the project.
18

19 5. A copy of the floor plan, plumbing plan and configuration as shown in the
20 examples on the following pages.
21

22 6. The capacity of the interceptor, manufacturer and model number shall be specified
23 prior to the preconstruction meeting. The interceptor shall be on the QPL or shop
24 drawings shall be submitted to PSLUSD.
25



Notes

- This is a Typical Site Plan Grease Interceptor & Piping Layout drawing, and is for informational purposes only.
- Each owner must submit a detailed Site Plan, Piping Layout and any additional information required by PSLUSD.
- Once the owner's submittal is complete, PSLUSD will issue a Grease Interceptor sizing and approval form.
- The Grease Interceptor must be accessible for inspection and cleaning at all times.

EXAMPLE GREASE INTERCEPTOR SITE PLAN & PIPING LAYOUT

- Legend**
- F.D. Floor Drain
 - C.O. Cleanout
 - F.S. Floor Sink
 - SS — Sanitary Sewer
 - GW — Grease Waste

CAN WASH (Alternate Location) Can washes or mop sinks that are located on the exterior of a building, must be covered by a roof system to prevent rainwater from entering the sanitary sewer system. A 4-inch (min.) curb must be provided above ground level.

If Grease Interceptor is placed in a paved area, it cannot be installed in the drive-through lane or driveway.

GREASE INTERCEPTOR
Install per PSLUSD Specifications. Refer to standard details.

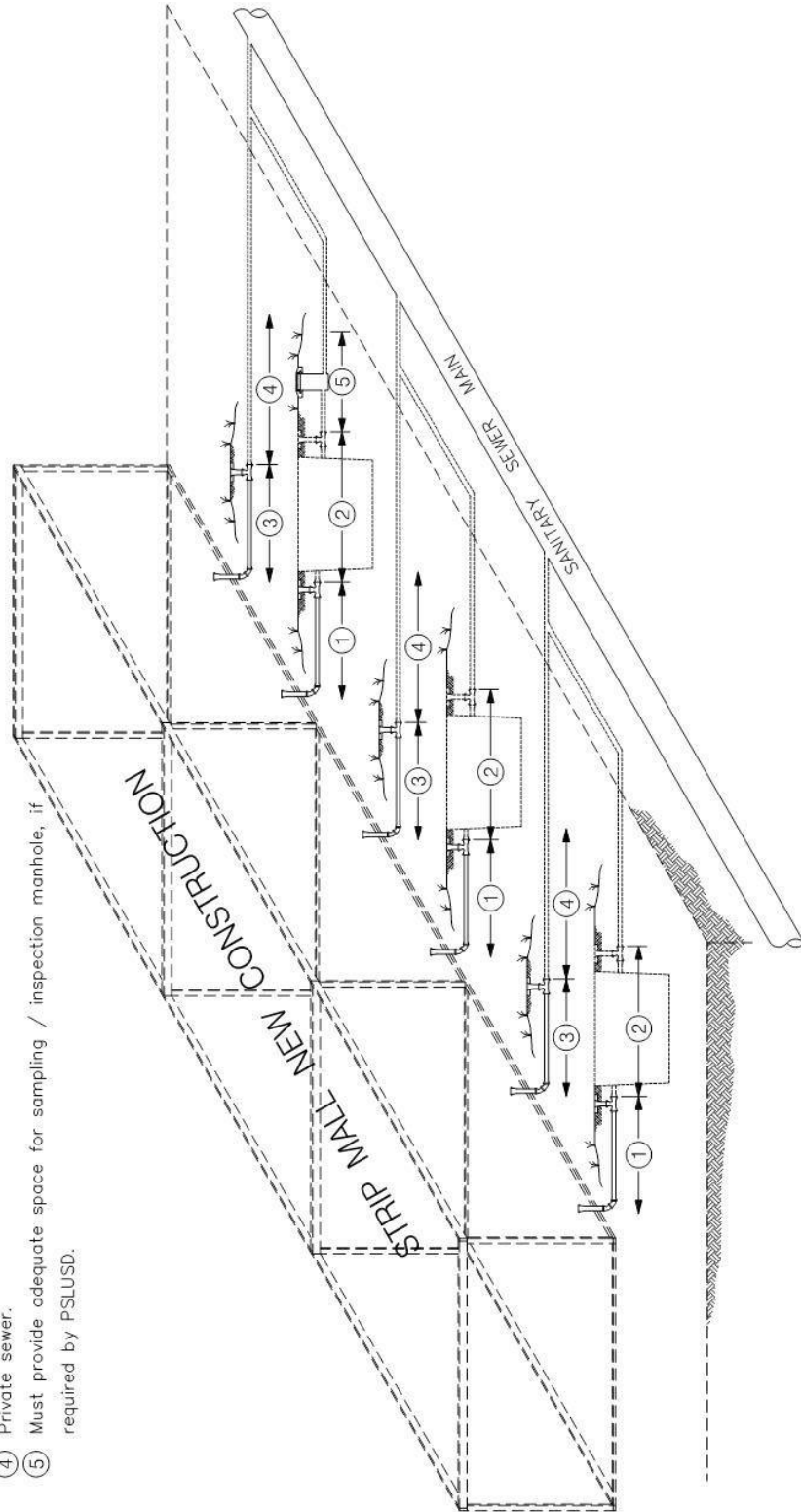
If a Floor Drain is installed under the Dumpster, then install the following:
 • 4" min. Curb around the Dumpster
 • A roof-type structure covering the dumpster to prevent surface storm water from entering the sanitary sewer.
 • The ground where the dumpster is located must slope away from the dumpster.

Hot/Cold Serving Stations with direct or indirect connection to building sewer - must discharge to grease waste line.

SOLIDS INTERCEPTOR
is required on all drain lines connected to a Garbage Grinder or Disposal. It is to be installed per the most recent State Plumbing Code and PSLUSD Utility Standards.

1
2
3
4

- ① REQUIRED: Stub-out must be provided for future line to interceptor.
- ② REQUIRED: Must provide adequate space to install future interceptor.
- ③ Sanitary sewer stub-out.
- ④ Private sewer.
- ⑤ Must provide adequate space for sampling / inspection manhole, if required by PSLUSD.

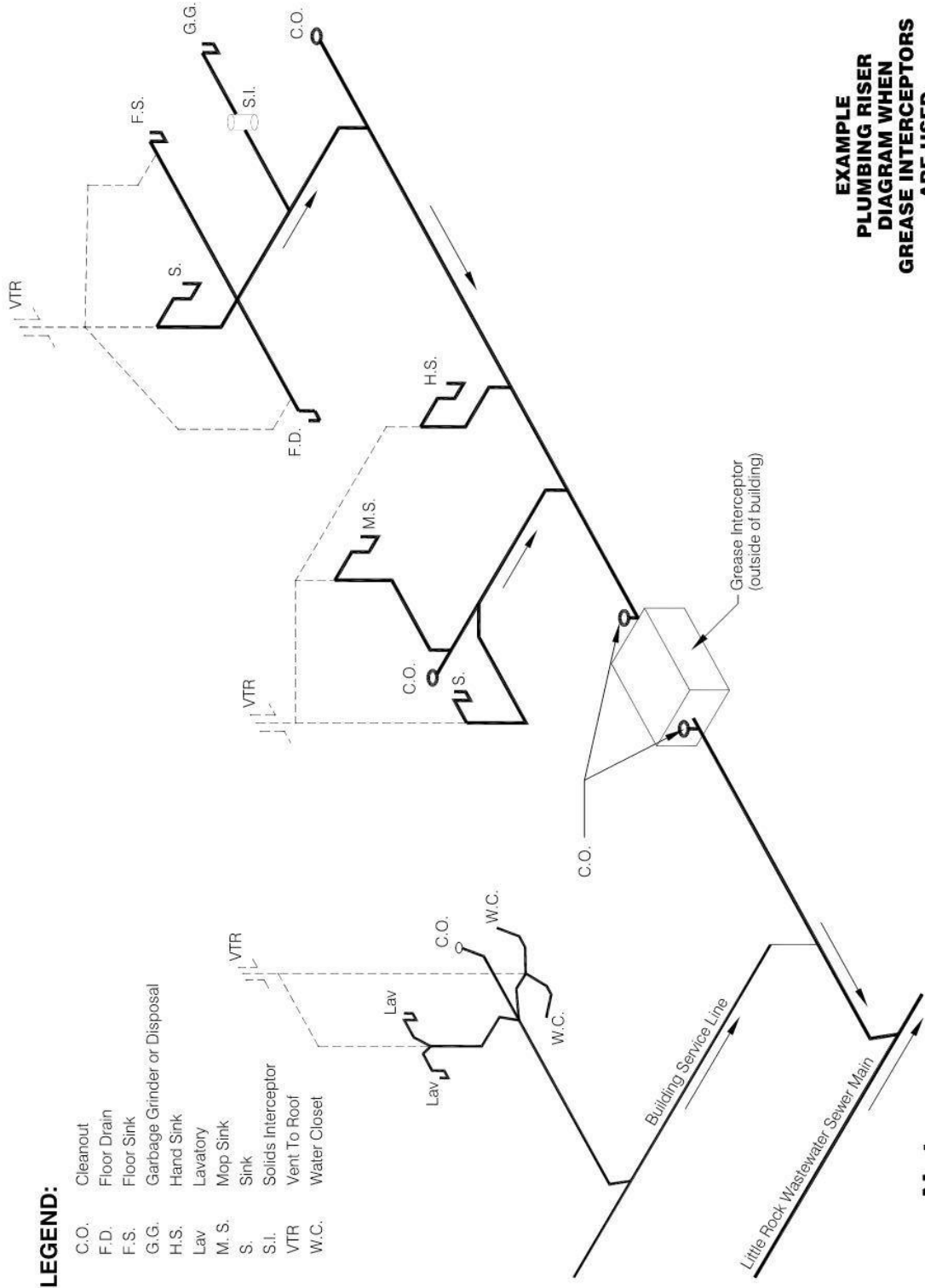


EXAMPLE
NEW CONSTRUCTION
- FLEX SPACE/STRIP MALL -
PLUMBING CONFIGURATION

Notes

- If ② is an oil / grease / sand interceptor refer to Standard Detail for installation.

1
2
3
4
5
6



**EXAMPLE
PLUMBING RISER
DIAGRAM WHEN
GREASE INTERCEPTORS
ARE USED**

LEGEND:

- C.O. Cleanout
- F.D. Floor Drain
- F.S. Floor Sink
- G.G. Garbage Grinder or Disposal
- H.S. Hand Sink
- Lav. Lavatory
- M. S. Mop Sink
- S. Sink
- S.I. Solids Interceptor
- VTR Vent To Roof
- W.C. Water Closet

Notes

- This EXAMPLE PLUMBING RISER DIAGRAM is intended for informational purposes only. It does not match the Example Grease Interceptor Site Plan

1 **H4. DESIGN CRITERIA FOR WASTEWATER PUMP STATIONS**
2

3 1. The property owner of existing and proposed developments shall provide a gravity wastewater
4 collection system. A pump station will be used only when connection to the PSLUSD
5 wastewater facilities is not possible due to elevation of the receiving gravity sewer. PSLUSD
6 may require submittal of an economic analysis by the EOR to compare the cost of gravity sewer
7 versus a pump station over a period of 30 years, including capital and maintenance costs.
8

9 2. Pump stations shall be designed in accordance with Chapter 62-604, F.A.C. and provisions of
10 this manual. The specifications for the various components are provided in this Chapter and the
11 PSLUSD standard details shall be used in conjunction with the design criteria specified herein.
12

13 3. All wastewater pump stations shall be owned, operated, and maintained by PSLUSD. An
14 exclusive utility easement shall be provided as required under Section B of this Chapter.
15

16 4. Pump stations shall be designed for a 30-year useful life and shall conform to the PSLUSD
17 Master Plan. PSLUSD shall have the right to require the design and construction of the pump
18 station to allow other properties to connect to the system.
19

20 5. The developers/owners of adjoining properties shall coordinate to provide a common pump
21 station.
22

23 6. Pump stations shall be designed and located so as to minimize the adverse effects resulting
24 from odor, noise and lighting. The installation of an odor control system such as a mulch bed,
25 chemical feed, etc. will be required if cycling time is more than 30 minutes.
26

27 7. Pumps shall be designed, at a minimum, with capacity to handle the anticipated peak hourly
28 flow with one pump out of service.
29

30 8. Electric power shall meet the 3-phase and voltage requirements of the pump station, which
31 shall be made available to the pump station site. All solids-handling pumps shall be either 240 or
32 480 volts. Grinder pumps shall be 208 or 240 volts.
33

34 9. Pump stations shall be protected from lightning and transient voltage surges. As a minimum,
35 stations shall be equipped with lightning arrestors, surge capacitors or similar protection devices
36 and phase protection.
37

38 10. The potential for damage or interruption of operation because of flooding shall be considered
39 in the location of new pump stations. Pump stations shall be designed to stay fully operational
40 and accessible during a 25-year flood. The electrical and mechanical equipment shall be
41 protected from physical damage by a 100-year flood. Design shall include measures to withstand
42 floatation forces when empty.
43

44 11. Pump stations shall be equipped with submersible pumps.
45

46 12. Pump stations shall be equipped with an audible and visible high-water level alarm.
47

48 13. Water service shall be provided to the pump station site and protected with an approved
49 backflow prevention assembly.

1 14. A fall through prevention system is required for the wet well access opening. Safety grates
2 shall be used for concrete wet wells and safety nets shall be used for fiberglass wet wells. The
3 system shall be installed by the manufacturer or by a contractor approved by the manufacturer.
4

5 15. Explosion proof motors, lights, cables, conduits, switch boxes, and other electrical equipment
6 shall be used in areas where fire or explosion hazards may exist due to flammable gases, vapors,
7 or liquids, combustible dust or ignitable fibers or flyings. The electrical components shall
8 comply with the National Electrical Code requirements for Class I, Division I, Group D
9 locations.
10

11 **a. Submittal**
12

13 1. Design report prepared by the EOR must be submitted with the following information:
14

15 a. Construction plans as required under Section C, Chapter I.
16

17 b. Calculations including, but not limited to:
18

19 i. Average Daily Flow (ADF) and Peak Hourly Flow (PHF) - ADF shall be based
20 on the type of use and the number of hours of operation. Engineering references,
21 historical flows or other acceptable methods may be used to determine ADF. The
22 method used shall be specified. The ADF for facilities subject to seasonal high
23 use (e.g., recreational areas, resorts, campuses, industrial facilities) shall be based
24 on the daily average flow during the seasonal period.
25

26 ii. A maximum storage retention time of 30 minutes.
27

28 iii. ADF/PHF cycle/run times and starts per hour - cycle time calculations for
29 pump starts between 2 and 10 per hour, not to exceed the manufacturer's
30 recommendation.
31

32 iv. Total Dynamic Head.
33

34 v. Analysis of system pressure for current and future (30-year projection)
35 conditions, including highest and lowest, actual or projected, system pressures.
36

37 vi. Protection against floatation with a minimum safety factor of 1.1. Assume
38 station is empty, ground water is at the rim elevations, and no soil weight.
39

40 vii. The size of the emergency power equipment based on capacity to start and
41 maintain the total rated operating capacity of the pump station. Electrical sizing
42 calculations shall assume loading based on the starting and full operation of
43 pumps and all electrical equipment associated with the pump station.
44

45 c. The information listed on the Pumping Station Data Table, including but not
46 limited to, the dimensions of wet well and valve vault, size of piping, pump
47 specifications, operating levels, and elevations intended to provide a basis for design
48 and construction. The EOR shall modify the information, as necessary, and provide
49 additional details not shown as may be required by applicable codes and standards.

1 All changes shall be clearly identified. The Pumping Station Data Table and
2 accompanying details can be downloaded from the PSLUSD website at
3 [https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-
4 development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).
5

6 d. Pump data including the performance curve, capacities and efficiency based on the
7 manufacturer's shop testing of like units. Curves shall be submitted at as large a scale
8 as practical. Curves shall be plotted from zero flow at the pump's shut off head to the
9 pump's capacity. The EOR shall plot the specific system design on the
10 manufacturer's original curve, plotting from zero flow at the designed static head, to
11 and through the selected pump performance curve. Pump duty point shall be within
12 75% and 115% range of pump flow at Best Efficiency Point (BEP). Pump family
13 curve tables are not acceptable.

14
15 e. The availability of electric power compatible with the pump voltage and phase
16 requirements. The EOR shall address whether existing electrical service is adequate
17 or will need to be extended to the site. The details for extension of service shall be
18 included.

19
20 f. The electric power service from the ground transformer or pole hand hole/pull box
21 shall be minimized. No greater than 50' of conduit.

22
23 g. Communication shall be by extension and connection to the City's fiber optic
24 system unless approved in writing to use radio communication.
25

26 **b. Type of Pump Stations and Related Design Considerations**

27
28 i. The type of pump station required depends on the size of the project and whether the
29 connection is into a low-pressure sewer system or a force main. Table 1 and the details
30 provided herein shall be used as design criteria.

31
32 1. **Grinder Station** – A grinder pump system is typically used for small projects with
33 7500 gallons per day (GPD) flow or less. The requirements for single-phase and 3-
34 phase grinder systems are detailed below:

35
36 a. **Single-Phase Duplex Grinder Station** consists of a dual pump system that
37 operates on 230-volt, single-phase electrical power, with a 2 horsepower (HP)
38 motor. The single-phase duplex system may be approved on a case-by-case basis
39 by PSLUSD if the wastewater generated by the project is limited to 1000 GPD
40 and an interceptor is not required for the proposed use. Written approval must be
41 obtained from PSLUSD.

42
43 b. **Three-Phase Duplex Grinder Station** consists of a dual pump system that
44 operates on 208-volt or 230-volt, three-phase electrical power with a 2, 3 or a 5
45 HP motor. The three-phase duplex system may be used in commercial
46 applications in accordance with Table 1.
47
48
49

1 **c. Minimum Design Requirements**

2
3 a. The wet well shall be 4' diameter fiberglass basin. Depth shall be site specific and a
4 minimum of 6' deep.

5
6 b. The wet well shall have only one influent pipe.

7
8 c. A swing check valve and gate valve are required on the discharge line of each pump.

9
10 d. An emergency pump-out connection with a gate valve is required on the discharge
11 piping.

12
13 e. A separate valve vault is required for grinder stations.

14
15 f. An approved generator receptacle shall be provided for connecting to a portable
16 generator during extended power failure.

17
18 g. Pumps and motors completely submerged at all times.

19
20 h. Minimum operating range shall be 1'³.

21
22 i. Minimum float spacing is 6".

23
24 j. A 10'x 45' unobstructed area for a vacuum truck within 10' of the wet well. The slope
25 of unobstructed area for the truck and access driveway shall not exceed 10%. **NOTE: See**
26 **Sample Location for Maintenance Truck**⁴

27
28 **3. Lift Stations (other than grinder stations)** – A lift station shall be designed for
29 208/230/460 volt, 3-phase, and 60-cycle electric service. Each pump shall have a horsepower
30 rating between 10 HP and 47 HP and a speed rating between 1700 and 1800 rpm. A lift
31 station shall be provided in accordance with Table 1 when the project does not meet the
32 requirements of a grinder system or the constraints of the PSLUSD wastewater collection
33 system.

34
35 **4. Minimum Design Requirements**

36
37 a. A duplex lift station shall be provided for projects with a flow of up to 250,000 GPD.
38 A triplex lift station shall be provided for projects over 250,000 GPD or peak flows over
39 700 gallons per minute (GPM).

40
41 b. In projects constructed in phases and/or where future conditions change significantly,
42 lift stations shall be equipped with temporary impellers, pumps, and/or electrical
43 equipment with reduced capacity at PSLUSD discretion. A second set of impellers,
44 pumps, and/or electrical equipment for full flow conditions shall be required to be
45 furnished at lift station start-up. The selected pumps and electrical system must allow for
46 a minimum of one impeller upgrade or downgrade in the future.

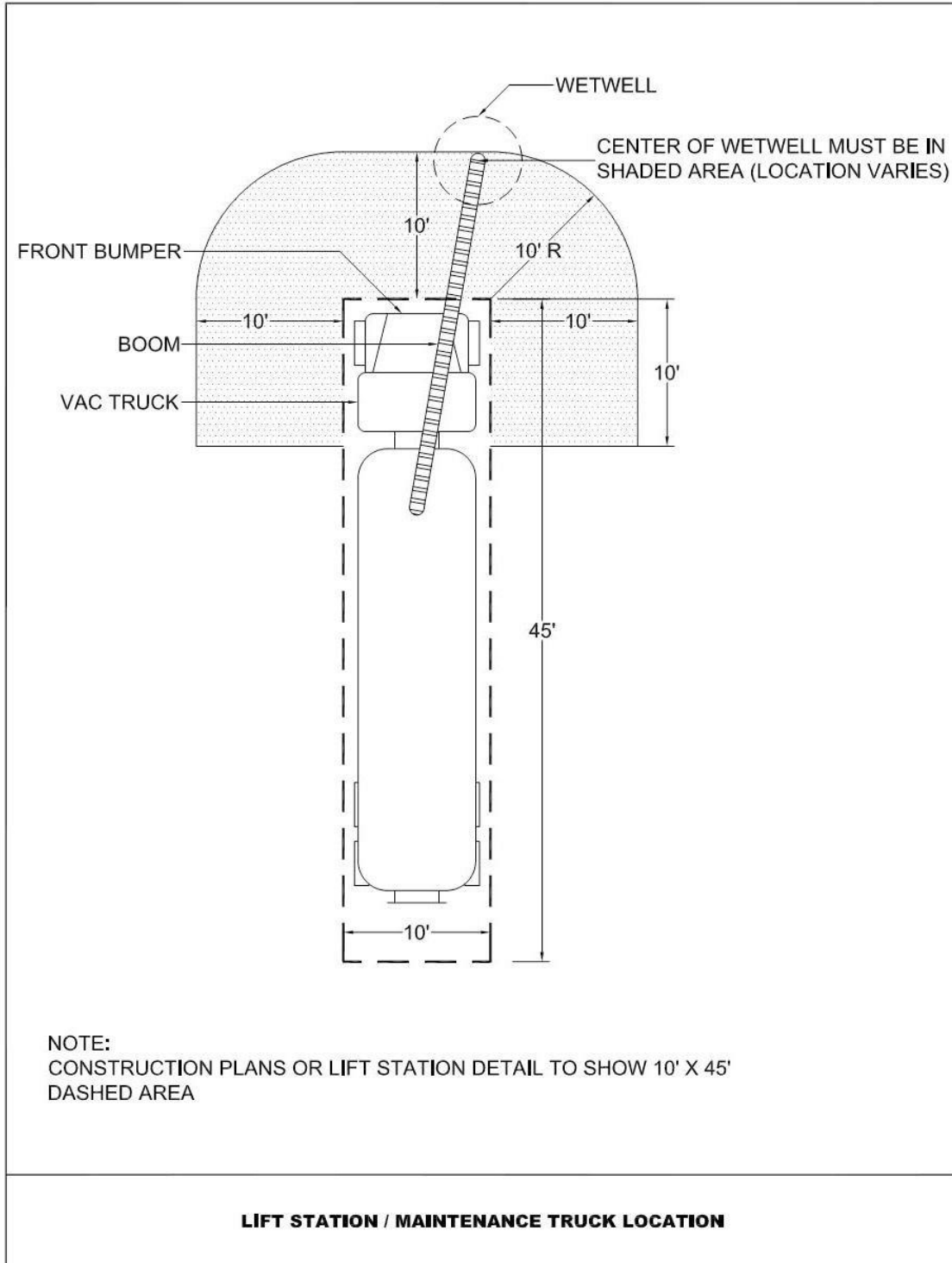
47

³ See Amendment 1

⁴ See Amendment 1

1
2
3
4

c. The station shall include a wet well, control valves, generator pad, telemetry system, a 6' chain link fence with a lockable gate and a 10' x 45' unobstructed area for a vacuum truck within 10' of the wet well. **NOTE: See Sample Location for Maintenance Truck**



5
6

1 d. The minimum diameter of the wet well shall be 8'. The depth of wet wells shall not
2 exceed 25' unless approved in advance by PSLUSD. The wet well and access cover shall
3 be as per the specifications included in this Chapter.
4

5 e. A wet well elevation control system shall be provided. The system shall be composed
6 of a five-float system used in conjunction with various monitoring, indicator and logic
7 control devices. The floats shall have the capability to control several pumps and alarms,
8 as well as indicate levels using discrete set points. The float installation shall allow for
9 multiple operating ranges over a period of 30 years, as noted within the PSLUSD Master
10 Plan Model.
11

12 f. The wet well's operating water levels shall be arranged to ensure pump operation
13 without cavitation and ensure the gravity sewer system is not surcharged. The operating
14 levels for Pumps Off, Lead Pump On, Lag Pump On, High Water Level Alarm, and
15 Backup Relay System shall be established in increments as explained below.
16

17 g. The depth of the wet well shall be adequate to provide for the necessary incremental
18 set points of the floats without surcharging the influent line. The High-Water Alarm
19 elevation shall be set at a minimum of 6" below the lowest influent pipe invert elevation.
20 The Pumps Off elevation shall be set so that the pumps are completely submerged at all
21 times. The highest float shall be used to control the Backup Relay System.
22

23 h. Minimum float spacing is 6". Additional float spacing may be required as determined
24 by PSLUSD.
25

26 i. The valve assembly shall be designed per the PSLUSD standard detail. A plug valve is
27 required on the discharge line of each pump with a pressure gauge on the discharge side
28 of the plug valve. A check valve is required between the pump and plug valve. An
29 emergency pump connection device shall be provided and shall be a male aluminum or
30 bronze "Cam-loc" fitting with a dust cap and an isolation plug valve. A stainless-steel
31 ball valve shall be provided on the dust cap.
32

33 j. The pump station site shall be well drained and graded to prevent flooding or inflow of
34 surface runoff after a storm event. The exterior top of the wet well shall be designed at or
35 above the 100-year/1-day flood elevation below the finished floor elevation by at least 6"
36 and shall not be below the crown elevation of an adjacent roadway⁵.
37

38 k. Emergency pumping capability shall be provided for all lift stations. Stations that
39 receive flow from one or more pump stations through a force main, triplex stations and
40 pump stations discharging through pipes 12" or larger, shall provide for uninterrupted
41 pumping capabilities, including an in-place emergency generator or emergency pumping
42 system. For other stations, emergency pumping capability may be accomplished by
43 connection of the station to at least two independent utility substations or by providing an
44 approved generator receptacle and a portable generator or approved emergency pumping
45 system. Such emergency standby system shall have sufficient capacity to maintain the
46 total rated running capacity of the station. In-place generators shall be equipped with an
47 automatic transfer switch. The lift station site shall include extension of the concrete
48 driveway such that the emergency system can be operational on the driveway inside the

⁵ See Amendment 1

1 fence and still allow access for operation and maintenance of the wet well, control valves,
 2 and control panel.

3
 4 l. A telemetry and communication system shall be provided in accordance with the
 5 specifications in this Chapter. Connection to and extension of fiber optic cable is required
 6 unless PSLUSD approves the use, in writing, of radio communication.

7
 8 m. Odor control may be required as directed by PSLUSD.

9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27

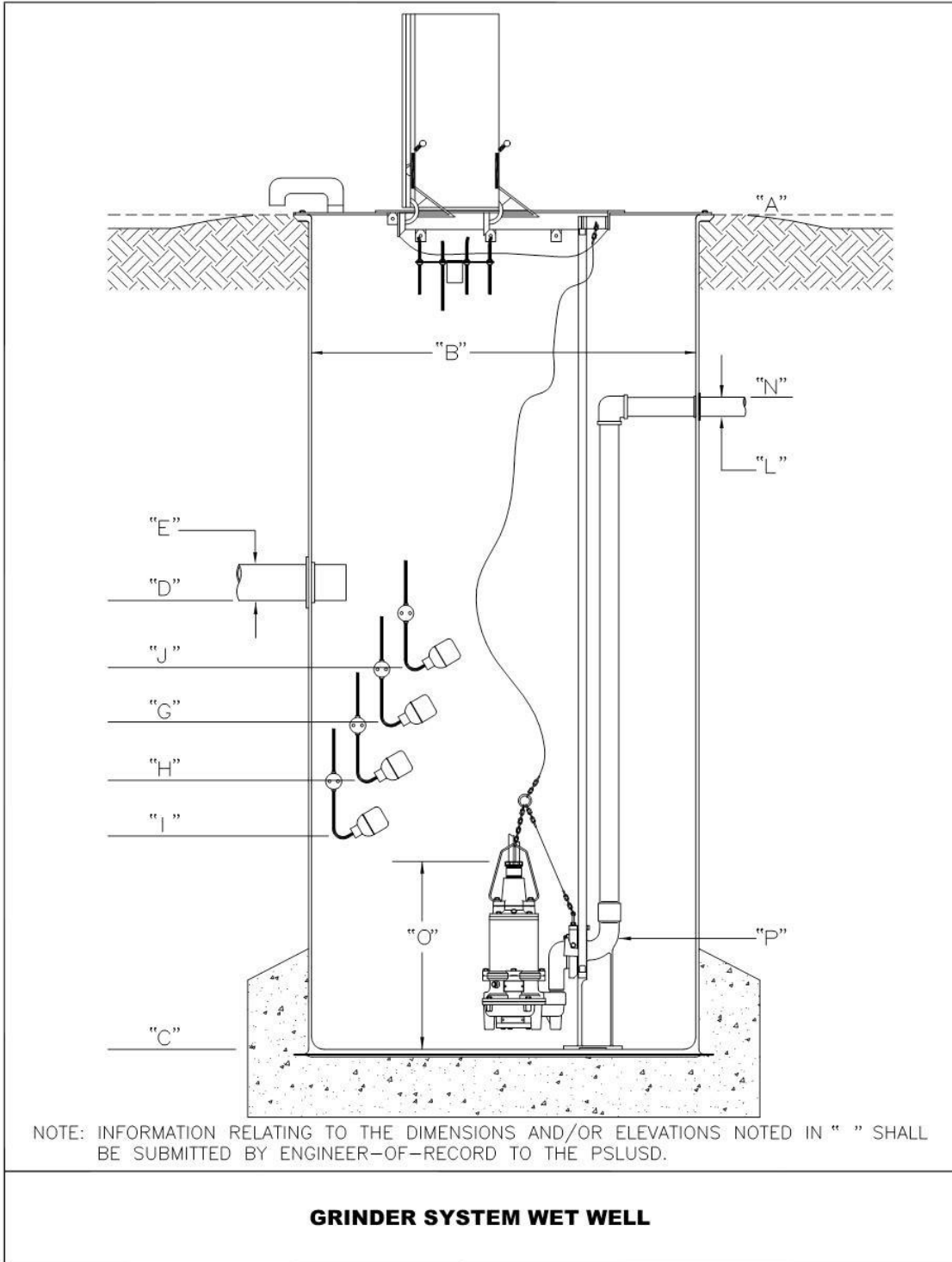
28 **Table 1 - PUMP STATION DESIGN CRITERIA**

Design Basis	Low Pressure System		Force Main	
	7500 Max.**	7500 Max.**	7500 Max.	<= 250000 (Duplex) >250000 (Triplex)
ADF (gallons/day)				
Type	Grinder	Grinder	Grinder	Lift Station
Size (HP)	2	3	5	10-47
Voltage	208/240	208/240	208/240	240/480
Phase	Three	Three	Three	Three
Wetwell Diameter	4*	4'	4'	8'-12'
Wetwell Depth	6'-10'	Varies	Varies	Varies
Wetwell Material	Fiberglass	Fiberglass	Fiberglass	Concrete
Valve Vault	Inside Vault	Inside Vault	Inside Vault	Above Ground No Vault
Easement (Min.)	20'x20'	20'x20'	20'x20'	Duplex -30'x45'

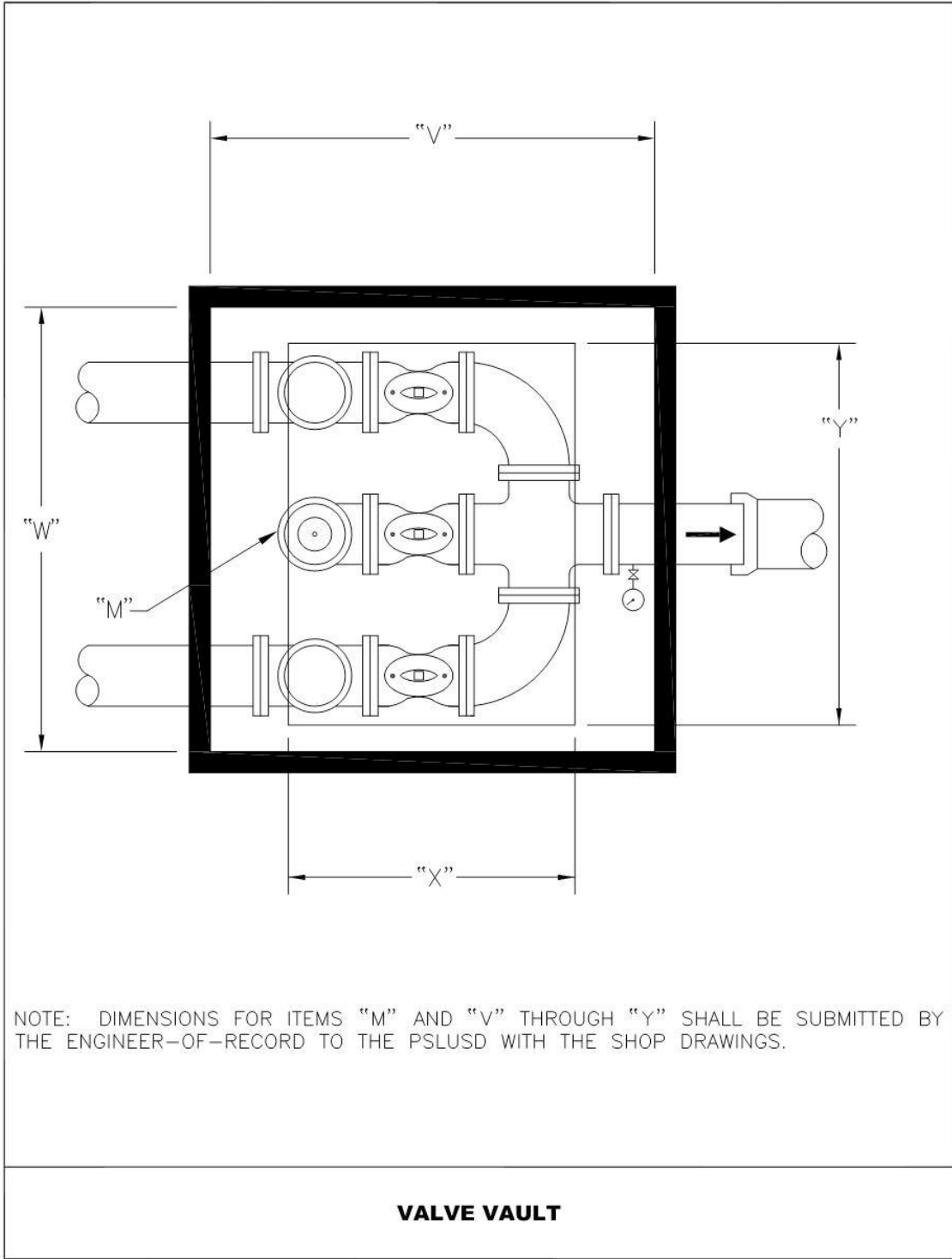
29
 30 *anything greater than 10' deep and no more than 12' deep will be 5' diameter
 31
 32 **Limited by capacity of the Low Pressure Sewer System

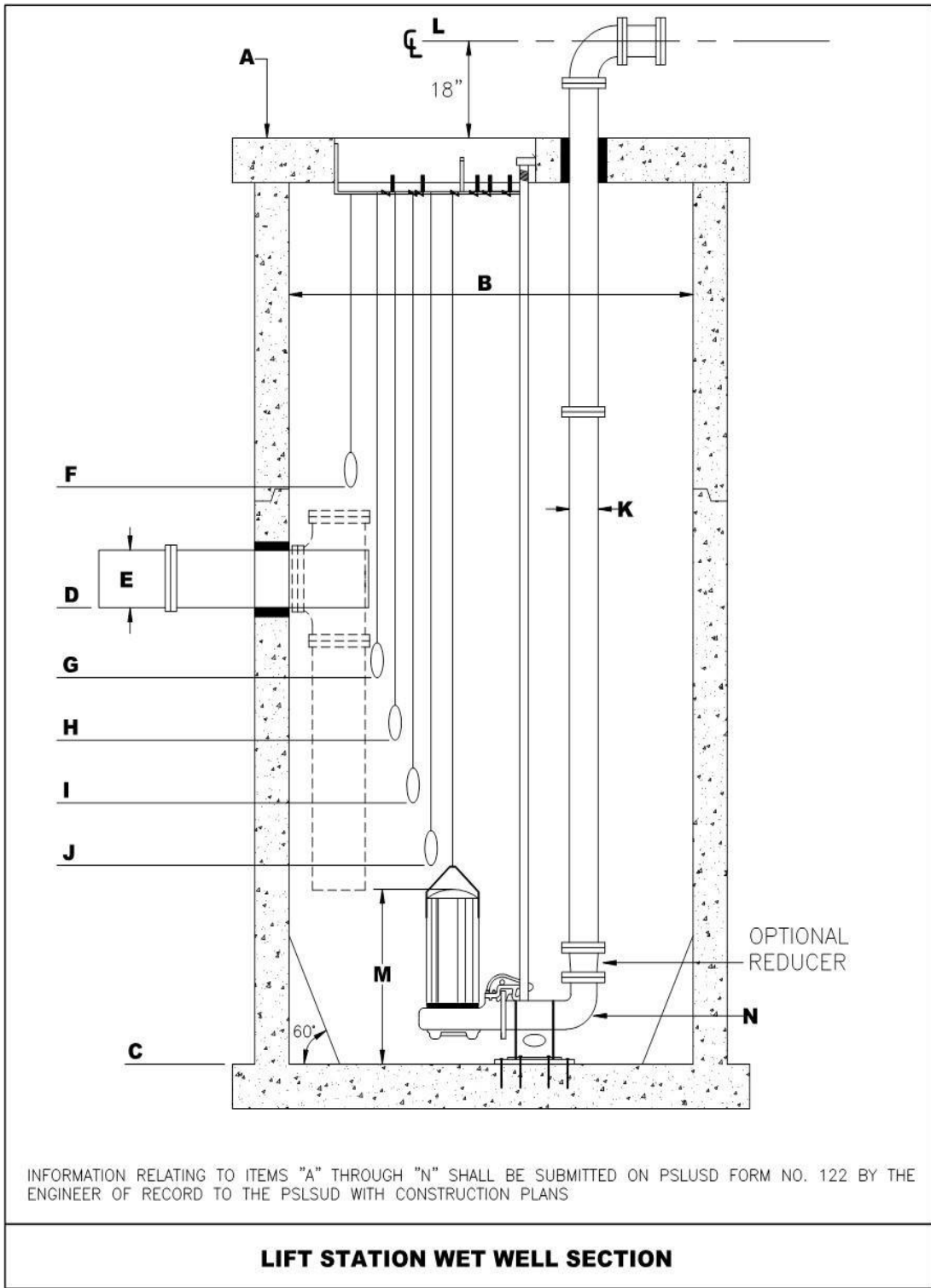
PUMPING STATION DATA TABLE												PSLUSD Lift Station ID #					
Pump Model Number	WG120 Myers Grinder	WG330H Myers Grinder	WG50H Myers Grinder	Flyqvt		Flyqvt		Flyqvt		Soft Start							
				Non-Clog	10	10	15	20	30	47	47						
Pump Manufacturer																	
Pump Type																	
Horse Power	2	3	5														
Impeller	5.5"	5.25"	5.5"														
Phase	3	3	3														
Voltage	230	230	230														
Cycles (Hz)	60	60	60														
RPM	3450	3450	3450														
Shut Off Head (ft)	105	105	120														
Best Efficiency Point Flow (gpm)	N/A	N/A	N/A														
Best Efficiency Point Head (ft)	N/A	N/A	N/A														
Pump Efficiency @ BEP Point (%)	N/A	N/A	N/A														
Run Out Flow (gpm)	40	97	95														
Run Out Head (ft)	20	28	60														
"A" Wet Well Rim Elevation (NAVD)																	
"B" Wet Well Diameter (ft)	4	4	4	8	8	8	8	8	12	12	12	12					
"C" Wet Well Bottom Elevation (NAVD)																	
"D" Inflow Pipe Invert Elevation (NAVD)																	
"E" Inflow Pipe Diameter (in)																	
"F" Lag Pump 2 On Elevation (Tri-plex only)																	
"G" Lag Pump On Elevation (NAVD)																	
"H" Lead Pump On Elevation (NAVD)																	
"I" Pumps Off Elevation (NAVD)																	
"J" Alarm Elevation (NAVD)																	
"K" Emergency Off Elevation (NAVD)																	
"L" Discharge Pipe Diameter (in)	2	3	3	6	6	6	6	6	8	8	8	8					
"M" Pump Out Diameter (in)	3	3	3	4	4	4	4	4	6	6	6	6					
"N" Discharge Pipe Elevation (NAVD)																	
"O" Pump Submergence (in)	23	34	34														
"P" Pump Discharge Diameter (in)	2	3	3														
"Q" C/L of wetwell to C/L of pump (in)	N/A	N/A	N/A														
"R" C/L of wetwell to C/L of pump bolts (in)	N/A	N/A	N/A														
"S" C/L of pump to C/L of pump (in)	20	22.75	22.75														
"T" Wet Well Hatch (in)	24	24	24														
"U" Wet Well Hatch (in)	36	36	36														
"V" Exterior Valve Vault (in)	N/A	40	40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
"W" Exterior Valve Vault (in)	N/A	50	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
"X" Valve Vault Hatch (in)	N/A	30	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
"Y" Valve Vault Hatch (in)	N/A	36	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
"Z" C/L of Wet Well to Inside Edge of Hatch	N/A	N/A	N/A						0	0	0	0					

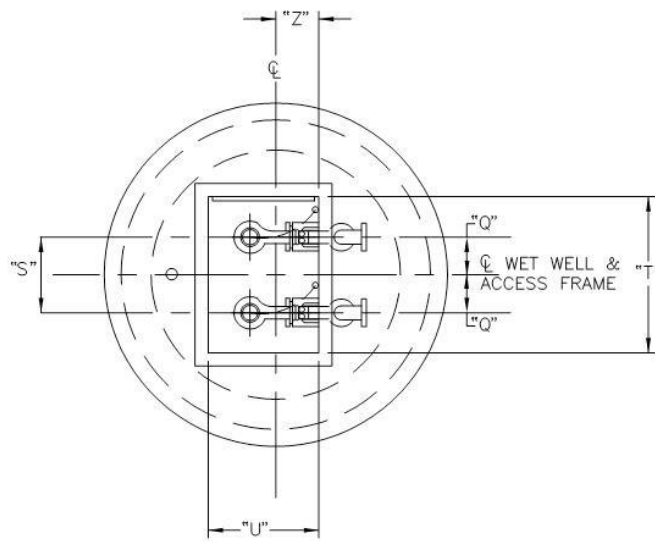
Pumping Station Data Table Notes
 1. The Engineer of Record (EOR) shall verify all dimensions shown and add or revise the specific pump information in the appropriate column as necessary, and provide additional details not shown as may be required by applicable codes and standards. All changes to these pages shall be clearly identified when submitting for approval.
 2. The EOR shall submit the information on this table to the PSLUSD for review and approval with all items filled in or revised for the specific pump model chosen.



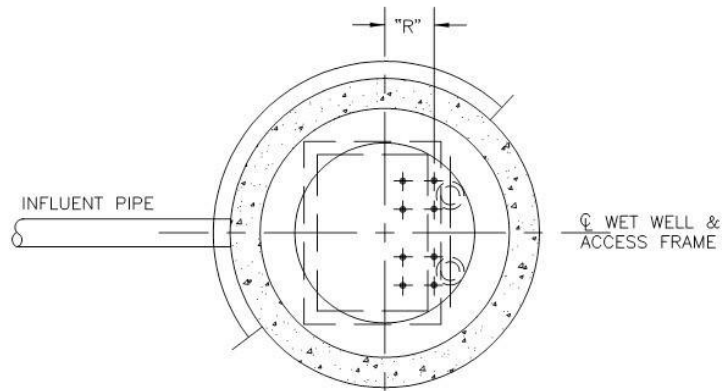
1
2
3
4







PLAN VIEW GRADE ELEVATION



PLAN VIEW BASE ELEVATION

NOTE: THE DIMENSIONS SHOWN SHALL BE SUBMITTED BY THE ENGINEER-OF-RECORD TO THE PSLUSD WITH THE SHOP DRAWINGS.

PUMP STATION WET WELL

- 1
- 2
- 3
- 4
- 5

1 **H5. DESIGN CRITERIA FOR FORCE MAINS**

2
3 1. Force mains shall be designed in accordance with Chapter 62-604, F.A.C. and the criteria
4 specified herein.

5
6 **a. Sizing**

7
8 i. The EOR shall clearly state the basis for design, which shall include:

9
10 1. The PSLUSD Master Plan.

11
12 2. The specific development Master Plan.

13
14 3. Force mains shall generally not be less than 4” ID and with an ultimate design flow
15 velocity of no less than 2.0 fps nor greater than 5.0 fps. Force mains less than 4” in
16 diameter or velocity less than 2.0 fps may be approved by PSLUSD on a case-by-case
17 basis if proper justification is submitted in writing by the EOR.

18
19 3. Material type for all pipe 24” and above must be approved, in writing, by PSLUSD.

20
21 **b. Layout**

22
23 i. In order to facilitate wastewater service for all properties within the service area, force
24 mains shall generally be extended along the full length of all fronting boundaries of a
25 property by the developer/owner.

26
27 ii. Force mains shall not be placed in ditches, landscape buffers, wetlands, and storm
28 water management areas.

29
30 iii. Separation from other mains, structures, and utilities shall be as in Section D of this
31 Chapter.

32
33 **c. Cover**

34
35 i. The minimum cover shall be 36” and a maximum of 72”.

36
37 **d. Valves**

38
39 i. Valves shall be designed to facilitate the isolation of each section of pipeline between
40 intersections of the grid system. The number and location of valves shall provide for
41 flexibility of operation and maintenance, while minimizing the number of customers out
42 of service. In all instances, effectiveness of placement shall be primary criteria in
43 determining valve location.

44
45 ii. Valves shall not be placed in curbs, gutters, parking spaces, and handicap ramps.

46
47 iii. Generally, the number of valves at an intersection shall be one less than the number of
48 pipes forming the intersection. Wet taps may require a valve in the main being tapped as
49 well.

1 iv. Valves shall be installed for mains near each side of a canal crossing and/or major
2 road crossing.

3
4 v. On force mains less than or equal to 16” in diameter, resilient seat gate valves shall be
5 installed at a maximum of 1000’ intervals and branches of intersecting force mains on
6 tees and wyes and at force main stubs. On force mains greater than 16”, valves shall be
7 located at a maximum of 2500’ intervals.

8
9 vi. Air release valves shall be placed at all canal crossings, high points, and at other
10 locations specified by PSLUSD. The EOR shall consult with PSLUSD regarding the type
11 of valve to be used and its location. For below ground installation, the air release valve
12 shall be located inside an above-ground access structure as shown in the standard details.
13 Valves shall be sized as per the manufacturer’s recommendation.

14 15 **H6. DESIGN CRITERIA FOR LOW PRESSURE SEWER SYSTEMS**

16
17 1. Low Pressure Sewer Systems (LPSS) shall be designed in accordance with the “Design and
18 Specification Guidelines for Low Pressure Sewer Systems”, prepared by a Technical Advisory
19 Committee for FDEP and the PSLUSD Utility Standards.

20
21 2. Separation to other mains and utilities shall be as in Section D of this Chapter.

22
23 3. The minimum cover shall be 36” and a maximum of 72”.

24 25 **H7. DESIGN CRITERIA FOR RECLAIMED WATER MAINS**

26
27 1. Reclaimed water mains shall be designed in accordance with Chapter 62-610, F.A.C. and this
28 manual.

29
30 2. In order to facilitate service for all properties within the service area, reclaimed water mains
31 shall generally be extended along the full length of all fronting boundaries of a property by the
32 developer/owner.

33
34 3. Separation to other mains and utilities shall be as in Section D of this Chapter.

35
36 4. The pipes shall be PVC and meet the specification outlined in Section N of this Chapter.

37
38 5. The minimum cover shall be 36” and a maximum of 72”.

39
40 6. Extension of the City’s fiber optic system is usually required.

41 42 **H8. DESIGN CRITERIA FOR RECLAIMED WATER METERING STATIONS**

43
44 1. An engineering report and construction plans prepared by the EOR shall be submitted to
45 PSLUSD for review and approval.

46
47 2. Design shall incorporate the requirements included in Section N of this Chapter.

1 3. All communication and control panels will require extension of and connection to the City's
2 fiber optic system.

3
4 4. The City will own the reclaimed water main meter, control valve and fittings up to the point of
5 service as well as the control panel, level control, and related electrical components.

6 7 **I. QUALIFIED PRODUCT LIST**

8
9 1. Products listed on the QPL have been approved by PSLUSD for use in the construction of
10 water, wastewater, and reclaimed water facilities. Prior to the pre-construction meeting, the
11 contractor shall submit to PSLUSD a list of products and equipment to be installed selected on
12 the QPL. Any materials not listed on the QPL shall require submittal of shop drawings approved
13 by the EOR, and review by PSLUSD prior to ordering the materials. Use of products on the QPL
14 will expedite the review and approval process and is, therefore, encouraged. If the applicant
15 prefers to use other products, it is strongly suggested that a request be submitted to include such
16 products on the QPL.

17
18 2. PSLUSD reviews new products through the Product Evaluation Committee (PEC). The PEC
19 provides technical information to the Utility Director regarding the inclusion or exclusion of
20 products on the QPL. The goals of the PEC are to:

21
22 a. Review and evaluate new and existing technologies and products for potential application
23 in the rehabilitation and expansion of the PSLUSD utility system.

24
25 b. Encourage standardization and interchangeability of parts/products. Remove obsolete,
26 inferior equipment or discourage having too many options.

27
28 c. Provide the Utility Director with technically sound information regarding new and existing
29 products.

30
31 3. The PEC consists of PSLUSD staff members and usually meets during the months of May and
32 October each year.

33
34 4. The Product Review Application Form contains instructions on how to complete the
35 application form and lists the necessary documentation required supporting the application. A
36 total of seven (7) copies of the completed application form, together with all the supporting
37 documentation or samples, shall be submitted to the PEC Chairperson by April 1st for the May
38 meeting and September 1st for the October meeting. The Product Review Application Form can
39 be downloaded from the city website at

40 [https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
41 [development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).

42
43 5. The product representative will be notified, by e-mail, that the Product Review Application
44 Form has been received and whether it is administratively complete. If items are found to be
45 incomplete, the application will not be reviewed by the PEC until all sections of the application
46 are complete. Applications that are not properly completed and are not returned to the PEC
47 within 60 days of the notice of an incomplete application shall be considered void and the
48 process must be started over.

1 6. An administratively complete application will be reviewed at the next scheduled meeting of
2 the PEC. The PEC shall present to the Utility Director all pertinent information related to the
3 product including performance, costs for labor and materials, comparison with currently
4 approved products, references from other users, spare parts availability, standardization, financial
5 stability of the manufacturer, etc.
6

7 7. The PEC may also review a previously approved product on the QPL and provide the Utility
8 Director with technically sound information for decision-making purposes. Prior to the PEC
9 meeting, the product representative will be notified of PSLUSD's concern with the product and
10 will be offered an opportunity to meet with the PEC. The Utility Director may then approve or
11 disapprove the inclusion/exclusion of a product on the QPL.
12

13 8. The Utility Director may approve use of products for trial periods of up to five (5) years prior
14 to inclusion in the QPL. Products acquired for such trial periods may be provided free of charge
15 by the vendor or may be purchased sole source with the concurrence of the Utility Director. The
16 Utility Director may require that in order for a product to be used on a trial basis, a performance
17 bond be posted in the amount equal to all-inclusive cost associated with the product's removal
18 and replacement. The Utility Director may also cancel the use of the product at any time during
19 the trial period.
20

21 **J. MINIMUM TECHNICAL SPECIFICATIONS AND CONSTRUCTION STANDARDS** 22

23 1. This section includes the specification of materials, construction standards, and contractor
24 responsibilities associated with the installation of water, wastewater, and reclaimed water
25 facilities. These specifications relate to construction and installation work associated with the
26 following:
27

- 28 1. Earthwork, excavation, backfill and compaction
- 29
- 30 2. Jack and bore
- 31
- 32 3. Directional boring
- 33
- 34 4. Pipe and fittings
- 35
- 36 5. Valves and appurtenances
- 37
- 38 6. Gravity sewer
- 39
- 40 7. Interceptors
- 41
- 42 8. Wastewater pump stations
- 43
- 44 9. Pipeline cleaning – poly pig method
- 45
- 46 10. Reclaimed water metering station
- 47

1
2 **J1. EARTHWORK, EXCAVATION, BACKFILL, AND COMPACTION**
3

4 1. The provisions set forth in this section shall be applicable to all underground water,
5 wastewater, and reclaimed water main installations unless deviations are approved in writing by
6 the EOR and PSLUSD.
7

8 2. The contractor shall be responsible for furnishing of all labor, materials, equipment, and
9 incidentals required to properly perform clearing, grubbing, filling of undeveloped ROWs or
10 corridors, excavation, backfill and compaction for all water, wastewater, and reclaimed water
11 facilities, as shown on the approved plans and as specified herein. Imported material, provided
12 by the contractor, shall be at no additional expense to PSLUSD unless specifically stated.
13

14 3. All excavations shall be properly shored, sheeted and braced or cut back at the proper slope to
15 provide safe working conditions, to prevent shifting of material, to prevent damage to structures
16 or other work, and to avoid delay to the work, all in compliance with the Occupational Safety
17 and Health Act (OSHA), the State of Florida Trench Safety Act, and under Section 107 of the
18 Contract Work Hours and Safety Standards Act. In all cases where a conflict exists in the
19 requirements of OSHA, the Florida Trench Safety Act, and these specifications, the requirements
20 that are more stringent shall prevail.
21

22 4. The EOR or their representative shall inspect the work as needed in order to comply with the
23 permit requirements, certify the project, and ensure a quality constructed project. This may
24 include additional inspections other than scheduled inspections with PSLUSD. The contractor
25 shall provide appropriate notice to the EOR to allow time for scheduling. No work shall be
26 covered up, nor test results accepted unless witnessed by the EOR or their representative.
27 Inspections by the EOR shall not be performed in lieu of inspections required by the City,
28 County, or Federal requirements.
29

30 **a. Submittals**
31

32 i. Contractor shall obtain necessary permits for any required dewatering activity in
33 accordance with the applicable governmental agencies. These permits must be submitted
34 to PSLUSD and the EOR prior to construction.
35

36 **b. Materials**
37

38 i. Fill and backfill material shall be clean, fine earth, granular shell, or sand, free of
39 vegetation or organic material. Material may be from onsite excavation or may be
40 imported. The contractor shall supply load tickets on every truck of fill, which identify
41 and confirm the source of fill.
42

43 ii. Suitable materials for fills shall be classified as A-1, A-3 or A-2-4 in accordance with
44 American Association of State Highway and Transportation Officials (AASHTO)
45 Designation M-145 and shall be free from vegetation and organic material. Not more than
46 12 % by weight of fill material shall pass the No. 200 sieve, and no particle shall be
47 larger than 1” in diameter. The Contractor shall furnish all additional fill material
48 required.
49

1 iii. Suitable material for fills to be placed in water shall be classified as A-1 or A-3 in
2 accordance with AASHTO Designation M-145.

3
4 iv. Unsuitable materials are classified as A-2-5, A-2-6, A-2-7, A-4, A-5, A-7 and A-8 in
5 accordance with AASHTO Designation M 145 or soils, which cannot be compacted to
6 specified percentage of maximum density.

7
8 v. All fill shall be placed with moisture content within 2% of the optimum moisture
9 content.

10
11 **c. Clearing, Grubbing, and Stripping**

12
13 i. All clearing work shall be done for the full width of the corridor area or ROW shown
14 on the approved plans.

15
16 ii. Existing vegetation including trees, roots, and stumps shall be removed from the
17 corridor areas. Damage to trees or other items outside of the corridor area shall be
18 prevented. If damage occurs, the contractor shall be responsible for repairs or
19 replacement. The contractor shall dispose of all vegetation material and trash removed
20 from the site to a permitted disposal facility

21
22 **d. Filling and Grading**

23
24 i. Future roadway elevations are shown on the drawings when available from
25 construction plans on file with the owner or proposed by others. These elevations shall be
26 used as guides for the filling and grading of the corridor.

27
28 ii. All filling and grading work shall be done to provide corridor access and suitable
29 conditions in preparation for utility pipeline construction.

30
31 **e. Excavation**

32
33 i. Unsuitable material shall be removed from the corridor area only as necessary for
34 access and pipeline construction.

35
36 ii. The maximum amount of open excavation/trench permitted in any one location shall
37 be the length necessary to accommodate the amount of pipe installed in a single day. All
38 excavation/trenches shall be fully backfilled at the end of each day. Barricades and
39 warning lights meeting OSHA requirements shall be provided and maintained.

40
41 **1. Trench Dimensions:** The minimum width of the excavation/trench shall be equal
42 to the outside diameter of the pipe, plus the minimum necessary to obtain proper
43 utility facility excavation backfill and compaction requirements. The maximum width
44 of trench, measured at the top of the pipe, shall not exceed the outside pipe diameter
45 plus 2', unless otherwise shown on the drawing details or approved by the EOR.

46
47 **2. Trench Grade:** Standard trench grade shall be defined as the point of contact
48 between the utility facility and the soil. Excavation/trench grade for utilities in rock or
49 other non-cushioning material shall be defined as 6" below the outside of the bottom

1 of the utility, which 6" shall be backfilled with extra utility bedding material.
2 Excavation below trench grade shall be backfilled to trench grade with granular
3 material placed in appropriate lift thicknesses, compacted, and meet density
4 requirements stated herein.
5

6 **3. Utility Bedding:** The bottom of the trench shall be shaped to provide firm bedding
7 for the utility facility/pipe. The utility shall be firmly bedded in firm soil, or hand-
8 shaped unyielding material. The bedding shall be shaped so that the pipe will be in
9 continuous contact therewith for its full length and shall provide a minimum bottom
10 segment support for the pipe equal to spring line of the pipe or one-half of the outside
11 diameter of the barrel. Special bedding may be required due to depth of cover, impact
12 loadings, or other conditions.
13

14 **4. Unsuitable Material Below Trench Grade:** Soil unsuitable for a proper
15 foundation encountered at or below trench grade, such as muck or other deleterious
16 material, shall be removed for the full width of the trench and to the depth required to
17 reach suitable foundation material, unless special design considerations receive prior
18 approval from PSLUSD and the EOR. Backfilling below trench grade shall be in
19 compliance with the applicable provisions of "Backfilling", with material as specified
20 in Section g. - BACKFILL.
21

22 **5. Extra Utility-Bedding Material:** When rock or other non-cushioning material is
23 encountered at trench grade, excavation shall be extended to six inches below the
24 outside of the bottom of the utility, and a cushion of granular material shall be
25 provided. Utility-bedding material shall be installed as specified in Section g. -
26 BACKFILL.
27

28 **6. Sheeting and Bracing:** In order to prevent damage to property, injury to persons,
29 erosion, cave-ins, or excessive trench widths, adequate sheeting and bracing shall be
30 provided, as required within these specifications, in accordance with accepted
31 standard practice. When the situation arises, sheeting and bracing shall be used as
32 necessary to protect the integrity of the road shoulder. Sheeting shall be removed
33 when the trench has been backfilled to at least one-half its depth, or when removal
34 would not endanger the construction of adjacent structures. Upon written approval
35 from the EOR and PSLUSD, to eliminate excessive trench width or other damage,
36 sheeting, bracing, or shoring shall be left in place and the top cut off at an elevation of
37 5.0 feet below finished grade or 1.0' above top pipe whichever is less, unless
38 otherwise directed. All sheeting and bracing will be in accordance with OSHA and
39 the Florida Trench Safety Act.
40

41 **7. Excavated Material:** Suitable material to be used for backfill shall be neatly and
42 safely deposited at the sides of the excavations/trenches where space is available. The
43 contractor will make every effort to segregate any and all unsuitable material and
44 isolate it from the clean fill intended for backfilling. Whenever possible, excavated
45 material near a roadway should be deposited on the ROW side of the trench away
46 from the travel-way. Where temporary stockpiling of excavated material is required,
47 the contractor shall be responsible for transporting the material to and from the
48 stockpile site. No excavated material shall be placed within roadside swales for
49 longer than that day's work.

1 **8. Excess Fill Material:** Clean excess fill shall be the property of the City. The
2 contractor shall deliver and stockpile this material to areas designated by the City,
3 within the City limits. Resale of excavated material on the project site will not be
4 permitted.
5

6 **9. Material Disposal:** Unsuitable fill material or cleared and grubbed material
7 resulting from the utility installation shall be removed from the work site and
8 disposed of at location(s) secured by the contractor, and in accordance with the
9 agency having jurisdiction.
10

11 **10. Borrow:** Should there be insufficient satisfactory material from the excavations to
12 meet the requirements for fill material, borrow shall be obtained from pits secured by
13 the contractor. All borrow shall meet the provisions of these specifications.
14

15 **11. Dewatering**

16
17 a. Utilities shall be laid "in the dry", unless otherwise approved in writing by
18 PSLUSD and the EOR. The contractor, at no direct cost to PSLUSD, shall
19 perform all dewatering activity required for facilities to meet PSLUSD Standards.
20 Dewatering systems shall be utilized in accordance with good standard practice
21 and must be efficient enough to lower the water level in advance of the excavation
22 and maintain it continuously to keep the trench bottom and sides firm and dry.
23

24 b. Trench excavations shall be dewatered by using the well point system, sumps
25 with pumps or other method(s), as approved by the EOR. If the material
26 encountered at trench grade is suitable for the passage of water without destroying
27 the sides or utility foundation of the trench, sumps with pumps may be provided.
28

29 c. Discharge from dewatering shall be disposed of in such a manner that it will not
30 interfere with normal drainage of the area in which the work is being performed,
31 create a public nuisance, or cause flooding. All discharge shall be in accordance
32 with South Florida Water Management District issued permits. The operations
33 shall not cause damage to any portion of the work completed or in progress, to the
34 surface of streets, or to private property. Prior to construction, the EOR and
35 applicable regulatory agencies shall approve the proposed dewatering method(s)
36 and schedule. Additionally, where private property will be involved, the
37 contractor shall obtain advance permission from the property owner.
38

39 **12. Obstructions:** It shall be the contractor's responsibility to become acquainted
40 with existing conditions and to locate structures and utilities along the proposed
41 utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable,
42 work shall be coordinated with the facility owner and performed so as to minimize
43 any adverse impact on the use of affected property. All affected utilities shall be
44 notified prior to excavation in their vicinity.
45
46
47
48
49

1 **a. BACKFILL**

2
3 1. Backfill of all excavations shall be conducted as promptly as the work permits, but not until
4 completion of the following:

- 5
6 • Completion of construction below finish grade.
7
8 • Inspection, testing, approval and recording locations of underground utilities.
9
10 • Removal of shoring, and bracing, and backfilling of voids with satisfactory materials.
11
12 • Removal of trash and debris.
13
14 • Permanent or temporary horizontal bracing which is in place on horizontally supported
15 walls.

16
17 2. Backfilling shall be divided into two specified areas:

- 18
19 a. Trench grade to a point 12” above the top of the utility, shall be referred to as initial
20 backfill.
21
22 b. From the top of the pipe to the bottom of the sub-grade if under pavement, or profile grade
23 if the pipe is not under pavement shall be referred to as final backfill.
24
25 c. Where encasements or other below grade concrete work have been installed, backfilling
26 shall not proceed until the concrete has obtained sufficient strength to support the backfill
27 load.
28
29 d. All fittings, restraints, and conflicts shall not be backfilled until approved by PSLUSD.

30
31 **3. Initial Pipe Backfill**

32
33 1. No pipe backfill shall be placed until density testing approved in writing by PSLUSD. Backfill
34 material shall be carefully placed and tamped around the lower half (spring line) of the utility.
35 Backfilling shall be carefully continued until the fill is 12” above the top of the utility in layers
36 not exceeding 12” (un-compacted thickness), using the best available material from the
37 excavation, if approved. The material shall be lowered to within 2’ above the top of the
38 previously compacted lift before it is allowed to fall. Initial backfill shall exclude organic matter
39 and or deleterious material, stones, or rock fragments larger than 1” for PVC pipe. Compaction
40 of each lift shall be equal to 98 % of maximum density as determined by AASHTO T-180.

41
42 **4. Final Pipe Backfill**

43
44 1. The remainder of the trench above initial backfill shall be backfilled and compacted in layers
45 not exceeding 12” (un-compacted thickness) per lift. Compaction of each lift shall be equal to
46 98% of maximum density as determined by AASHTO T-180.
47
48

1 **5. Structure Backfill**

2
3 1. Prior to backfill, all structures shall have one-foot increments marked in spray paint on a
4 minimum of one side and lines and footage must be visible from outside of the excavation.
5 Backfill material shall be carefully placed and tamped around the structure with the first lift of
6 material starting at the bottom of the structure. Backfilling shall be continued in layers not
7 exceeding 12” (un-compacted thickness). Backfilling shall be continued until the fill is at plan
8 grade. The material shall be lowered to within 2’ above the top of the previously compacted lift
9 before it is allowed to fall. Backfill shall exclude organic matter and or deleterious material,
10 stones, or rock fragments larger than 1”. Compaction of each lift shall be equal to 98% of
11 maximum density as determined by AASHTO T-180.
12

13 **6. Shoulder Restoration**

14
15 1. All shoulder restoration shall be in accordance with the applicable permit requirements of the
16 agency having jurisdiction. In excavated locations outside a 2(horizontal) to 1(vertical) slope
17 downward from the shoulder line or the back of the curb, backfill (initial and final) shall be
18 compacted to a density equal to 98% of maximum density, as determined by AASHTO T-180.
19

20 **7. Non-Structural Backfill**

21
22 1. When approved in writing by the EOR and PSLUSD, non-structural backfill can be used and
23 compacted to a density of 95% of maximum density as determined by AASHTO T-180.
24

25 **c. COMPACTION**

26
27 **1. Compaction Methods**

28
29 a. Specified compaction shall be accomplished using accepted standard methods (powered
30 tampers, vibrators, etc.), with the exception that the initial backfill below 12” over top of pipe
31 shall be compacted by hand-operated tamping devices. Flooding with water to consolidate
32 backfill is not acceptable.
33

34 **2. Density Tests**

35
36 a. Density tests for determination of the above-specified compaction shall be made by a
37 testing laboratory selected by PSLUSD and the EOR. If any test results are unsatisfactory to
38 PSLUSD or the EOR, the contractor shall re-excavate, re-compact the backfill, and retest, at
39 his expense, until the desired compaction is obtained. Additional compaction tests shall be
40 made to each side of an unsatisfactory test, as directed, to determine the extent of re-
41 excavation and re-compaction necessary. All costs associated with additional testing required
42 to verify that all specifications have been met shall be the responsibility of the contractor.
43

44 b. Acceptance Density Testing for Pipe: The first lift of testing shall start with the bedding
45 material under the utility pipe for all utility mains and structures. All bedding material shall
46 have passing density tests prior to installation of utilities. All density testing shall be
47 completed with a Nuclear Density Gauge or Drive Cylinder Method per ASTM D-2397.
48 The second lift of testing shall be along the sides of the pipe, after the first lift of backfill is
49 placed. A lift of backfill shall be considered passing when the criteria of the lift being firm,

1 unyielding, and passing a density test using the appropriate proctor is met as determined by
2 the Geotechnical Engineering Firm. No backfill for the subsequent lift shall be placed until
3 such time as the underlying lift has met acceptance criteria. “Stepping, Sloping, or digging
4 down” to take density tests on an underlying lift of backfill is prohibited. Each lift of backfill
5 is to be placed and meet acceptance criteria prior to any portion of the subsequent lift of
6 backfill material being placed in the excavation/trench.
7

8 c. Acceptance Density Testing for Structures: (interceptors, manholes, wet wells, valve
9 vaults, etc.): The first lift of testing shall start below the bottom center of the structure, prior
10 to placement. All density testing shall be completed with a Nuclear Density Gauge or Drive
11 Cylinder Method per ASTM D-2397. The Drive Cylinder Method (ASTM D-2937) may be
12 used if approved in writing by the EOR and PSLUSD in certain cases. A lift of backfill shall
13 be considered passing when the criteria of the lift being firm, unyielding, and passing a
14 density test using the appropriate proctor is met. No backfill for the subsequent lift shall be
15 placed until such time as the underlying lift has met acceptance criteria. “Stepping, sloping,
16 or digging down” to take density tests on an underlying lift of backfill is prohibited. Each lift
17 of backfill is to be placed and meet acceptance criteria prior to any portion of the subsequent
18 lift of backfill material being placed in the excavation/trench.
19

20 i. NOTE: If the question of accuracy of moisture levels arises due to any given lift being
21 yielding or “pumping”, a Calcium Carbonate Moisture Test (Speedy) shall be performed
22 to determine if actual moisture levels are within the acceptable limits established by the
23 proctor test. Any soils that appear soft, pumping or otherwise yielding as determined by
24 the EOR, PSLUSD or testing laboratory personnel will not be considered to have met the
25 compaction specifications stated herein.
26

27 ii. For large projects (see 5.e. below), a density log book with all densities graphed, equal
28 to that accepted by the Florida Department of Transportation (FDOT), shall be submitted
29 to PSLUSD with the Record Drawings seven days prior to leak testing. See Section 5
30 below for submittal requirements.
31

32 iii. No more than 2 tests over 100% will be accepted on any given section of testing. If
33 results over 100% continue, a new proctor shall be taken.
34

35 **3. Location of Density Tests for Pipe** 36

37 a. Density tests shall be made on each individual section of trench backfilled and compacted
38 during each work day’s production or every 200’, whichever is less. At least three density
39 tests shall be taken under each roadway cut, per lift of backfill. Test locations shall be
40 staggered and random as determined by the testing lab. Additional test locations may be
41 requested by the EOR or PSLUSD.
42

43 **4. Location of Density Tests for Structures** 44

45 a. Density tests shall be made on each individual lift of backfill, with the first test at the
46 center of the structure, prior to setting of structure. There shall be two tests per lift, randomly
47 chosen around the structure. One test shall be within 2’ of structure walls, and the second test
48 shall cover the remaining excavation backfill for the structure. A lift of backfill shall be
49 considered passing when the criteria of the lift being firm, unyielding, and passing a density

1 test using the appropriate proctor is met. No backfill for the subsequent lift shall be placed
2 until such time as the underlying lift has met acceptance criteria.
3

4 **5. Submittal of Density Test Results**

5

6 a. Determination will be made during the initial plan review if a log book is required and
7 comments will be provided by the reviewer.
8

9 b. Small projects, which are defined as a single structure, such as a convenience store or a
10 pharmacy, will not require a log book. They will require an Earthwork Density Report
11 located on the PSLUSD website located at [https://utility.cityofpsl.com/get-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
12 [connected/divisions/utility-engineeringcommercial-development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/) along
13 with the signed and sealed test.
14

15 c. Large projects, which are defined as a residential subdivision or a shopping plaza, shall
16 require a log book. It is not a requirement to provide signed and sealed tests, but a signed
17 and sealed letter, on the Geotech firm’s letterhead, certifying the densities will be required as
18 part of the closeout/turnover process. In addition, the Geotech firm shall provide a marked-
19 up utility plan or clear description of test locations. The body of the letter shall contain, at a
20 minimum, the following verbiage:
21

22 “Our company has completed final field density testing at the above-referenced project
23 for the utilities indicated on the attached utility plan and/or as described in this letter. I
24 certify that all testing was done per the City of Port St. Lucie Utility Systems Department
25 Standards and meets all specified requirements for locations, quantities, and minimum
26 compaction.”
27

28 d. The firm performing the densities for large projects shall create all log book forms and
29 present them to the PSLUSD project manager during the pre-construction meeting.
30

31 e. Density test results shall be submitted to PSLUSD on the 1st and the 15th of the month by
32 the EOR. The PSLUSD project manager may ask for them at shorter intervals if they deem
33 necessary.
34

35 f. The inspections required for items noted below shall not be scheduled until such time as
36 the density test results have been approved by PSLUSD:
37

- 38 • Installation of lift station/grinder structures/valve vaults
- 39 • Installation of manholes
- 40 • Installation of manholes
- 41 • Installation of manholes
- 42 • Pressure/leak testing
- 43 • Pressure/leak testing
- 44 • Infiltration/Exfiltration test
- 45 • Infiltration/Exfiltration test
- 46 • Concrete pad formwork/rebar placement
- 47 • Concrete pad formwork/rebar placement

1 **J2. JACK AND BORE**

2
3 1. The contractor shall be responsible for furnishing of all labor, materials, equipment, and
4 incidentals required to complete the jack and bore installations as shown on the approved plans
5 and as specified herein.

6
7 2. The provision of this section shall be the minimum standards for the installation of casing pipe
8 by the jack and bore method. Other types of trenchless methods may be acceptable and
9 encouraged if the specific method is at least equal to the performance of typical jack and bores.

10
11 **3. Casing Pipe Materials**

12
13 a. Casings shall be steel pipe conforming to the requirements of ASTM Designation A-139.
14 The minimum casing pipe size and wall thickness shall be as shown on the approved plans.
15 For sizes not included therein, or for special design considerations, approval shall be
16 obtained from the EOR and PSLUSD.

17
18 b. For crossing of state roads, casing materials and installation shall conform to FDOT
19 Standards, latest edition.

20
21 **4. Carrier Pipes**

22
23 a. Water, wastewater, and reclaimed water carrier pipes to be installed within the specified
24 casings shall be equipped with restrained joint connections.

25
26 b. Pipe and fittings shall comply with the applicable provisions of these standards.

27
28 **5. Casing Insulators**

29
30 a. Non-corrosive casing insulators shall be used.

31
32 b. The casing runner height shall be large enough so that it does not interfere with the pipe-
33 restrained joints.

34
35 c. Stainless steel nuts and bolts shall be used.

36
37 d. Installation and spacing of casing insulators shall be as required by the manufacturer.

38
39 **6. Installation**

40
41 a. Casing pipes crossing under roadways/railroads shall be located at suitable approved
42 alignments in order to eliminate possible conflict with existing or future utilities and
43 structures, with a minimum 36" depth of cover between the top of the casing pipe and the
44 surface of the roadway. For casing pipe crossings under roadways/railroads, the contractor
45 shall comply with the regulations of jurisdictional authority in regard to design,
46 specifications, and construction. Casing installations shall be as specified in the FDOT Utility
47 Accommodation Manual and the American Railway Engineering Association for railroads.

1 b. The jack and bore operations shall be conducted simultaneously with continuous
2 installation, until the casing pipe is in final position. Correct line and grade shall be carefully
3 maintained. Add-on sections of casing pipe shall be full-ring welded to the preceding length,
4 developing watertight total pipe strength joints. The casing installation shall produce no
5 upheaval, settlement, cracking, movement, or distortion of the existing roadbed or other
6 facilities. Following placement of the carrier pipe within the steel casing, end link seals are to
7 be installed at each open end. Said end link seals shall be suitable for restraining the external
8 earth load, while allowing internal drainage.

9
10 c. Casing pipe holes shall be mechanically bored through the soil by a cutting head on a
11 continuous auger mounted inside the pipe. The distance between the leading end of the first
12 auger section and the leading end of the casing shall be as necessary to maintain a solid plug
13 of spoil material inside the forward portion of the casing.

14
15 d. The casing pipe shall be adequately protected to prevent crushing or other damage under
16 jacking pressures. Backstops shall be provided for adequately distributing the jack thrust
17 without causing deformation of the soil or other damage. Should the casing pipe be damaged,
18 such damaged portion not in the hole shall be replaced; however, if installed, the encasement
19 pipe shall be abandoned in place, grouted full, and suitably plugged, and an alternate
20 installation made. An alternate installation will also be required if the casing alignment or
21 elevation substantially deviates from the plan locations, and results in the installation being
22 unusable, as determined by PSLUSD and the EOR.

23
24 e. Required jack and bore pits or shafts shall be excavated and maintained to the minimum
25 dimensions necessary to perform the operation. Said excavations shall be adequately
26 barricaded, sheeted, braced and dewatered, as required, in accordance with the applicable
27 portions of Section N of this Chapter - "Earthwork, Excavation, Backfill and Compaction"
28 and applicable regulations/specifications. The pits will normally be no closer than 5' from the
29 edge of pavement, with the permitting agency having final determination of the required
30 setback distance.

31 32 **J3. DIRECTIONAL BORING**

33
34 1. Portions of pressure mains shall be installed by the directional boring method within the limits
35 indicated on the approved plans and as specified herein. Generally, as a minimum, the pressure
36 main is to be located within the road ROW or easement and shall be installed by directional
37 boring. Piping not designated for installation by a specific method may be installed by open
38 trench or directional boring, as approved by the EOR and PSLUSD.

39
40 2. The contractor shall be responsible for furnishing of all labor, materials, equipment and
41 incidentals required to perform trenchless installation of pressure mains, as shown on the
42 approved plans and as specified herein.

43
44 3. The contractor is required to bring to the attention of the EOR any known design discrepancies
45 with actual tunneling methods that the contractor will be performing no later than the
46 pre-construction meeting.

1 **4. Contractor's Experience**

2
3 a. The contractor must demonstrate expertise in trenchless methods by providing a list of ten
4 utility references for which similar work has been performed in the last two years. The name
5 and telephone number of the references shall be included so contact can be made to verify the
6 contractor's capability. Also, the contractor must provide documentation showing successful
7 completion of the projects used for reference. Conventional trenching experience is not
8 sufficient to demonstrate expertise in trenchless methods.

9
10 b. All supervisory personnel must be adequately trained and will have at least four years'
11 experience in directional boring. The contractor shall submit the names and resumes of all
12 supervisory field personnel prior to construction. In order to save time, the contractor may
13 wish to provide multiple experienced directional boring crews.

14
15 **5. Submittals**

16
17 a. Technical data must be submitted for equipment including clay slurry material, method of
18 installation with working drawings, and proposed sequence of construction for approval by
19 the EOR and PSLUSD.

20
21 b. Prior to approval for directional boring, the contractor shall submit the names of
22 supervisory field personnel and historical information of directional boring experience. In
23 addition, the contractor must submit for approval nameplate data for the drilling equipment,
24 mobile spoils removal unit, and Safety Data Sheets (SDS) information for the drilling slurry
25 compounds.

26
27 **6. Installation**

28
29 a. Installation shall be in accordance with American Public Works Association (APWA)
30 publication "Trenchless Technology Applications in Public Works" and in a trenchless
31 manner producing continuous bores.

32
33 b. The tunneling system shall be remotely steerable and permit electronic monitoring of
34 tunnel depth and location. Accurate placement of pipe within a ± 2 " window is required both
35 horizontally and vertically. Turning capability of 90° is required. Continuous monitoring of
36 the boring head is required, including across open water if necessary.

37
38 c. The directional boring contractor shall be required to submit a bore log to the EOR, who
39 will verify that the directional boring has been performed in accordance with the approved
40 construction plans and the EOR will provide signed and sealed Record Drawing drawings of
41 the installation.

42
43 c. Tunneling must be performed by a fluid-cutting process (high pressure-low volume)
44 utilizing a liquid clay, i.e. bentonite. Liquid clay type colloidal drilling fluid shall consist of
45 at least 10% high-grade, carefully processed bentonite to consolidate cuttings of the soil, to
46 seal the walls of the hole, and to furnish lubrication for subsequent removal of cuttings. In
47 addition, the clay fluid must be totally inert and contain no environmental risk.

1 e. The contractor must have a mobile vacuum spoils recovery vehicle on-site to remove the
2 drilling spoils from the access pits. The spoils must then be transported from the job site for
3 proper disposal. Under no circumstances will the drilling spoils be permitted to be disposed
4 of into sanitary or storm sewers, public or private drainage systems, and surface waters.
5

6 f. Mechanical, pneumatic, or water-jetting methods will be considered unacceptable. After an
7 initial bore has been completed, a reamer will be installed at the termination pit and the pipe
8 will be pulled back to the starting pit. The reamer must also be capable of discharging liquid
9 clay to facilitate the installation of the pipe into a stabilized and lubricated tunnel. Upon
10 completion of boring and pipe installation, the contractor will remove all spoils from the
11 starting and termination pits. All pits will be restored to their original condition.
12

13 **7. Restoration of Paved, Improved and Unimproved Areas**

14
15 a. The shoulders, ditches, banks and slopes of roads and railroads crossed and paralleled shall
16 be restored to their former condition and properly sodded to prevent erosion. Restoration
17 shall be as required by the jurisdictional authority and as specified within the contract
18 documents. Road and railroad crossings and parallel installations are to be continuously
19 maintained until completion of the work.
20

21 **J4. PIPE AND FITTINGS**

22
23 1. The contractor shall be responsible for furnishing of all labor, materials, equipment and
24 incidentals required to install and complete, all pipeline and fittings as shown on the approved
25 plans and in accordance with the design, specifications and construction standards incorporated
26 in this manual.
27

28 2. All pipe and fittings shall be clearly marked with the name or trademark of the manufacturer,
29 the batch number, the location of the plant, strength designation, and standards as applicable.
30

31 3. All pipe, fittings, valves appurtenances and linings for potable water facilities shall be in
32 conformance with ANSI/NSF Standard 61-Drinking Water System Components – Health
33 Effects.
34

35 **4. Related Sections (Section N of this Chapter)**

- 36 • Earthwork, Excavation, Backfill and Compaction
- 37
- 38 • Jack and Bore
- 39
- 40
- 41 • Directional Boring
- 42
- 43 • Valves and Appurtenances
- 44
- 45
- 46
- 47
- 48
- 49

1 **5. Pipe and Fittings** (Material type for all pipe 24” and above must be approved, in writing, by
2 PSLUSD.)
3

4 **a. Ductile Iron**
5

6 i. Use of Ductile Iron Pipe (DIP) is not permitted for underground pipe excepting in
7 limited special circumstances where PVC and HDPE do not meet the design
8 requirements. The EOR shall submit justification for the use of DIP to PSLUSD for
9 review and approval.
10

11 **1. Pipe**
12

13 a. DIP shall conform to ANSI/AWWA C151/A21.51.
14

15 b. All above-ground pipe shall be flanged and shall conform to ANSI/AWWA
16 C115/A21.15. Flanges shall be threaded unless otherwise noted. Flanges shall be
17 flat faced unless they are mating up to existing raised flanges.
18

19 c. The EOR shall specify the pressure class rating and special thickness class
20 rating of the pipe for the prevalent conditions.
21

22 **2. Fittings**
23

24 a. DIP fittings for buried pipe shall conform to ANSI /AWWA C153/A21.53.
25

26 b. All above ground fittings for flanged pipe must conform to ANSI/AWWA
27 C110/A21.10 or C153/A21.53, with a minimum pressure rating of 150. Gaskets
28 shall be full face, 1/8” thick, cloth-inserted rubber and furnished in Buna-N rubber
29 suitable for sewage and water service, rated for pressure class 150. Bolts and nuts
30 for flanges shall be Type 316 stainless steel conforming to ASTM A-193, Grade
31 B&M for bolts, and ASTM A-194, Grade M for nuts. Washers shall be provided
32 for each nut and shall be of same material as the nuts.
33

34 **3. Joints**
35

36 a. All buried joints at fittings must be restrained with mechanical joints.
37

38 b. "Push on" and mechanical joints shall be in accordance with ANSI/AWWA
39 C111/A21.11.
40

41 c. Restrained joint assemblies with mechanical joint pipe shall be approved
42 restraining devices on the QPL.
43

44 **4. Coatings and Linings**
45

46 a. Buried ductile iron pipe and fittings for water facilities shall receive an exterior
47 asphaltic coating as specified in ANSI/AWWA C151/A21.51. The pipe shall be
48 cement mortar lined and sealed with a coat of asphaltic material, in accordance
49 ANSI/AWWA C104/A21.4.

1 b. For wastewater and reclaimed water facilities, ductile iron pipe and fittings
2 shall be cement mortar and epoxy lined and a bituminous coating applied on the
3 exterior, in accordance with the manufacturer's recommendations.
4

5 c. Machined surfaces shall be cleaned and coated with a suitable rust-preventive
6 coating at the shop immediately after being machined.
7

8 d. Ductile iron pipe exposed to the atmosphere and all above ground applications
9 shall be cleaned and given a new inhibitive primer coat at the place of
10 manufacturer. The prime coat shall be compatible with the finish coat of alkyd
11 enamel. Minimum primer dry-film thickness shall be 3 mils. A field prime coat
12 shall be applied in areas where the initial prime coat is damaged in the field. After
13 installation, all above ground ductile iron piping shall receive two or more coats
14 of a high grade, gloss or semi-gloss alkyd enamel coating. Each coat shall have a
15 minimum dry thickness of 3 mils. All related piping shall be the same color.
16

17 **5. Special Exterior Protection for Corrosion**

18
19 a. When specifically required, extra protection shall be provided for underground
20 cast or ductile iron pipe and fittings within areas of severe corrosive conditions.
21 This shall be accomplished by the installation of polyethylene encasement as per
22 AWWA C105, through the area of concern. Soil-test evaluation to determine the
23 necessity for extra protection in suspect areas shall be as set forth in ANSI Stan-
24 dard A21.5.
25

26 b. If a ductile iron pipe crosses another pipe with cathode protection, it shall be
27 protected for a distance of 20' on each side of the crossing; also, protection shall
28 be provided when the ductile iron pipe is laid parallel to and within 10'.
29

30 **b. Polyvinyl Chloride (PVC): Water, Wastewater, and Reclaimed Water Pressure** 31 **Mains**

32 **1. Pipe**

33
34
35 a. PVC pipe must meet requirements as set forth in AWWA C900 and C905 and
36 potable water pipe must bear the National Sanitation Foundation seal. Provisions
37 must be made for contraction and expansion at each joint with a rubber ring and
38 integral thickened bell as part of each joint. Pipe and fitting must be assembled
39 with nontoxic lubricant.
40

41 b. Water mains shall be blue, wastewater mains shall be green and reclaimed
42 water mains shall be purple.
43

44 c. The Dimension Ration (DR) and Pressure Rating shall be C900, DR-18
45 (Pressure class 235) for 4" to 12" pipe and C905, DR-18 (Pressure rating 235) for
46 14" and above pipe.
47
48
49

1 **2. Joints**

2
3 a. Connections for pipe 2” or greater in diameter shall be rubber compression
4 ring-type. Pipe shall be extruded with integral thickened wall bells without
5 increase in the DR. Rubber ring gaskets shall consist of synthetic compounds
6 meeting the requirements of ASTM Designation D869 and suitable for the
7 designated service.
8

9 **3. Fittings**

10
11 a. Ductile iron fittings shall be used on all PVC C900 & C905 mains. Fittings
12 shall conform to AWWA/ANSI C153/A21.53.06 with a minimum pressure rating
13 of 350 psi. Fittings shall be coated as specified under c. (1) (d) Coating & Linings
14 for DIP.
15

16 **c. PVC: Gravity Sewer**

17
18 1. PVC pipe and fittings for gravity sewer as well as service lines shall, as a minimum,
19 conform to ASTM D-3034, Standard Dimension Ratio (SDR)-26 and meet requirements
20 of ASTM D-3212 on joints for sewer pipe using flexible elastomeric seals. For depths
21 greater than 15’, the pipe, joints and fittings shall meet the specifications for pressure
22 mains.
23

24 **d. PVC: Low Pressure Mains**

25 **1. Pipe**

- 26
27 a. PVC pipe for low-pressure mains, as a minimum, must meet requirements set
28 forth in ASTM D2241 with an SDR-21 and pressure rating of 200 psi. Fittings
29 shall be of the same type of material used for the pipeline.
30
31 b. Pressure mains installed along side lot lines shall be HDPE and sleeved the full
32 length of the lot line.
33
34

35 **2. Fittings**

36
37 a. Fittings shall be manufactured in one piece of injection-molded PVC meeting
38 ASTM D-1784, class 200.
39

40 **3 Joints**

41
42 a. Pipe shall have push-on type joints with integral wall bell. Bell shall be a gasket
43 joint conforming to ASTM D-3139 with gaskets conforming to ASTM F477. Push
44 joint or mechanical joint ductile iron fittings meeting AWWA C153 may be allowed
45 as an alternative when PVC sizes are not available, as approved by PSLSUD.
46
47
48
49

1 **e. Polyethylene Tubing up to 3” diameter**

2
3 **1. Pipe**

4
5 a. Polyethylene tubing shall conform to AWWA C901, Standard Code Designation
6 PE 4710; Pressure Class 200 DR-9 for water use and blue in color and Pressure Class
7 160, DR-11 for sanitary use and green in color.
8

9 **2. Joints**

10
11 a. Joints for polyethylene tubing shall be of the compression type utilizing a totally
12 confined grip seal and coupling nut. Stainless steel tube stiffener inserts shall also be
13 used for tubing services.
14

15 **3. Fittings**

16
17 a. All fittings and stops to be high quality water works brass. No PVC fittings or
18 adapters will be permitted. Fittings shall be brass or bronze, equipped with
19 compression-type connectors.
20

21 **f. High Density Polyethylene (HDPE) Pressure Pipe over 3” outside diameter (OD)**

22
23 **1. Pipe and Fittings**

24
25 a. Pipe supplied under this specification shall have a nominal DIP size OD unless
26 otherwise specified. The pipe and fittings shall conform to AWWA C906, Standard
27 Code Designation PE 4710. The SDR and the pressure rating of the pipe and fittings
28 materials shall be as specified by the EOR. As a minimum, the materials shall be
29 Pressure Class 200 DR-11 for water use and Pressure Class 160, DR-11 for sanitary
30 use.
31

32 **2. Joining**

33
34 a. Sections of polyethylene pipe should be joined into continuous lengths on the job
35 site above ground. The joining method shall be the butt fusion method and shall be
36 performed in strict accordance with the pipe manufacturer's recommendations. The
37 butt fusion equipment used in the joining procedures should be capable of meeting all
38 conditions recommended by the pipe manufacturer, including but not limited to,
39 temperature requirements of 500° F, alignment, and 150 psi interfacial fusion
40 pressure.
41

42 b. Butt fusion joining shall be 100% efficient offering a joint weld strength equal to or
43 greater than the tensile strength of the pipe. Socket fusion shall not be used. Extrusion
44 welding or hot gas welding of HDPE shall not be used for pressure pipe applications
45 or in fabrications where shear or structural strength is important. Flanges, unions,
46 grooved-couplers, transition fittings, and some mechanical couplers may be used to
47 mechanically connect HDPE pipe without butt fusion.
48
49

1 **6. Installation (Pressure Pipe)**
2

3 a. The installation standards detailed below apply only to pressure pipe - water mains, force
4 mains, low-pressure sewer mains, and reclaimed water mains. **The installation of gravity**
5 **sewers is covered in Section N of this Chapter.**
6

7 **i. Existing PSLUSD Facilities and Other Utilities**
8

9 1. The contractor is required to verify location, depth, and size of existing PSLUSD
10 facilities, service lines and other utilities (telephone, gas, electric, cable, etc.) prior to
11 beginning of construction, whether shown in the construction drawings or not. Any
12 discrepancies between the construction drawings and field conditions shall be brought
13 to the attention of the EOR prior to construction. Construction shall not be initiated if
14 the discrepancy may result in non-compliance with Utility Standards; the EOR shall
15 obtain prior written approval from PSLUSD.
16

17 2. Any damage to existing utilities or services shall be repaired immediately in
18 coordination with the utility, with all repair costs being incurred by the contractor.
19

20 b. Piping and fittings shall be installed in accordance with these standards and in general with
21 the manufacturer's recommendations for the applicable service.
22

23 c. Piping shall be installed along straight line and grade between fittings, or other defined
24 points, unless other definite lines of alignment deflection or grade change have been
25 established. Modification to approved alignment or grade during construction shall not be
26 made without prior approval from the EOR and PSLUSD.
27

28 d. The standard minimum cover for utility mains shall be 36” and a maximum of 72”.
29

30 e. Utility crossing signs may be required along the pipe alignment at each side of the canal,
31 waterway, storm water retention area, etc. and shall be approved by PSLUSD and agency
32 having jurisdiction over the water body.
33

34 f. All piping shall be laid in a clean dry trench on line and grade. All valves and vertical
35 appurtenances shall be plumb. Large gate valves may be rotated horizontally with vertical
36 gear operators upon written approval of PSLUSD.
37

38 g. Materials shall be cleaned and maintained clean, with all coatings protected from damage.
39 The interior of the pipe shall be free of dirt and debris, and when work is not in progress, all
40 open ends shall be plugged with an approved device.
41

42 h. Pipe, fittings, and other items shall be inspected prior to installation and any items showing
43 a fracture or any other defect shall be rejected. Additionally, any pipe or fitting which has
44 received a severe blow that may have caused an incipient fracture may be salvaged by cutting
45 off the impacted section 12” past the damage, providing the remaining pipe is sound.
46 Discoloration of PVC due to exposure to the sun may result in pipe rejection.
47

1 i. Underground piping shall not be driven to grade by striking it. After the pipe has been
2 properly bedded, enough compacted backfill shall be placed to hold the utility in correct
3 alignment. Precautions shall be taken to prevent flotation when necessary.
4

5 j. Joining shall be by the manufacturer's approved method and shall not require undue force
6 to accomplish full satisfactory seating and assembly. Connections at structures shall be cut
7 accurately and worked into place without forcing and shall align with the connecting point.
8 Flanged joints shall be made tight, but with care taken to prevent undue strain upon
9 equipment or other items. Suitable flange filler rings shall be installed where required to
10 provide suitable joints. The installation shall be permanently watertight with no visible
11 leakage at joints, connections and other locations, under operational or testing conditions.
12 Material that in jointing does not remain completely seated and/or watertight shall be
13 rejected.
14

15 **k. Pipe Restraints**
16

17 i. Underground pressure piping systems shall be securely anchored by acceptable means
18 at all tees, plugs, caps, bends and valves, and at all other fittings or locations where
19 unbalanced forces exist or as directed by PSLUSD, the EOR, and as specified herein.
20

21 1. All pressure pipes at fittings shall be restrained by appropriate restraint devices
22 meeting requirements of UNI-B-13 for PVC pipe and the Ductile Iron Pipe Research
23 Association for DIP, and be UL listed. The criteria for establishing required pipe
24 restraint lengths are specified in the standard details.

25 2. Approved pipe restraint devices that are on the QPL shall be used. Shop drawings
26 shall specify the particular system to be utilized and no substitutions will be allowed
27 after approval without re-submittal of shop drawings to PSLUSD for written
28 approval.
29

30 3. All bends, tees, crosses, reducers, valves, and dead ends shall be restrained through
31 an approved means of mechanical joint restraint. Any line terminated as a
32 construction phase that is a known future extension, shall have a plugged valve placed
33 at the end and restrained with approved mechanical joint restraint.
34

35 4. Restrained joints shall be installed in accordance with manufacturer's
36 recommendations and PSLUSD Standards. Every pipe joint that is required to be
37 restrained shall be inspected by PSLUSD and the EOR prior to the contractor
38 backfilling the restrained joint.
39

40 ii. Exposed systems shall be supported as necessary to hold the piping and appurtenances
41 in a firm, substantial manner to the required alignment and grade, with no undue piping
42 stresses transmitted to equipment or other items. Above-ground pipe outside of buildings
43 shall be supported on concrete supports or pre-manufactured adjustable pipe supports.
44

45 iii. In case of conflict between various installation requirements, the more stringent one
46 shall apply.
47

48 iv. Installation of pipe and testing shall be performed in the presence of PSLUSD and the
49 EOR.

1 v. Pipeline joint deflections shall not exceed what is recommended in the Uni-Bell
2 Handbook of PVC Pipe or 75% of the manufacturer's maximum allowable deflection,
3 whichever is more stringent.
4

5 **l. Ductile Iron Pipe:**
6

7 i. Installation shall be performed in accordance with the applicable provisions of AWWA
8 Standard C600 and the manufacturer's recommendations.
9

10 **m. Polyvinyl Chloride Pipe**
11

12 **i. Water, Sewer, and Reclaimed Water Mains (C900 & C905)**
13

14 1. Installation shall be performed in accordance with the applicable provisions of
15 AWWA 605, ASTM D-2774, AWWA Manual M23 and the manufacturer's
16 recommendations. Lubrication used for pipe and fitting joints shall be nontoxic.
17

18 **ii. Low Pressure Mains (SDR-21)**
19

20 1. Installation shall be performed in accordance with the applicable provisions of
21 ASTM D-2774, Uni-Bell B-3 for PVC pressure sewer pipe and with the
22 manufacturer's recommendations. If there are conflicts in installation methods, the
23 more stringent installation criteria shall apply.
24

25 2. Pressure mains installed along side lot lines shall be HDPE and sleeved the full
26 length of the lot line.
27

28 **n. HDPE**
29

30 i. Construction and installation shall be performed in compliance with the Poly Pipe
31 Institute and manufacturer's guidelines and the standards included in this document.
32

33 **o. Service Connections**
34

35 **i. Residential Water Service Connections (Water Main):** Connections to water mains
36 shall be made by installing service saddles or tees. A corporation stop shall be placed at
37 the saddle or fitting, with the service line extended to the ROW/easement/property line
38 perpendicular to said line and terminating with a curb stop pending meter installation.
39 Corporation stops shall not be placed under sidewalks, driveways, or pavement.
40

41 **ii. Non-Residential Water Service Connections (Water Main):** Connections to water
42 mains shall be made by installing service saddles. A gate valve shall be placed at the
43 saddle or fitting, with the service line extended to the ROW/easement/property line
44 perpendicular to said line and terminating with a riser and an angle valve, above ground
45 in grass areas, pending meter installation.
46

47 **iii. Residential Wastewater Service Connections (Low-Pressure Main):** Connection to
48 low-pressure mains will be made by use of a tapping sleeve, valve, and check valve with

1 the service line extended to the ROW/easement/property line perpendicular to said line,
2 terminating with a cap.
3

4 **iv. Non-Residential Wastewater Service Connections (Low-Pressure Main):**

5 Connection to low-pressure mains will be made by use of a tapping sleeve, valve, gate
6 valve, and check valve, with the service line extended to the ROW/easement/property
7 line, perpendicular to said line, and terminating with a cap.
8

9 **v. Services Crossing under Roadways:** Shall be pushed, moled, or installed by the jack
10 and bore method. Jetting shall not be used. No open cutting of roads for service lines will
11 be allowed. The service line shall have a minimum cover of 30” with slight grade sloping
12 away from the water main or low-pressure main. The service shall be enclosed within a
13 casing pipe. Casing pipe shall be at least schedule 40 PVC or HDPE.
14

15 **p. Locating Devices**

16
17 **i. Locator Wire**

18
19 1. Locator wire is required to be installed on all PSLUSD facilities except gravity
20 sewers. All pressure mains and pressure service lines shall be marked by use of an
21 approved solid copper locator wire per the QPL. The wire shall be installed on the top
22 of the pipe and attached or looped at each pipe bell. The wire shall be inserted into a
23 curb stop box at each valve and blow-off pad. The wire shall be looped into the valve
24 box where the pump out is located on all grinders. The loops shall be a minimum of
25 24” long.
26

27 **ii. Marking Tape**

28
29 1. Marking tape shall be placed in the trench above all PSLUSD pressure mains 12”-
30 18” below grade.
31

32 a. Marking tape shall be minimum 6” wide.
33

34 b. Marking tape shall be per the QPL, as specified, with "CAUTION PSLUSD
35 MAIN CALL BEFORE DIGGING (772) 873-6400" printed every 3’ in black
36 letters.
37

38 c. The tape shall be a dielectric, polyolefin film tape that is tear resistant, and
39 corrosion resistant. The tape shall be constructed using material and ink colors
40 which will not change when exposed to acids and other destructive substances
41 commonly found in the soil.
42

43 **iii. Marker Balls**

44
45 1. Service connections for water mains, gravity sewer and low-pressure mains shall
46 be provided with an electronic marker ball, placed directly above the end of the pipe
47 at the ROW/easement/property line. Marker balls with tie down straps shall be placed
48 on fittings at service termination points, service connection points on all pressure
49 mains, stub outs for future construction, buried abandon valves, and all vertical and

1 horizontal deflections. The marker balls shall be installed in accordance with the
2 manufacturers requirements and be capable of operating at a depth of 6' below the
3 ground surface. The marker balls shall have separate and unique frequencies for
4 water, wastewater, and reclaimed water service connections. Any marker ball that is
5 deeper than 6' shall have additional marker balls placed vertically at 4' spacing and
6 connected by locate wire. (Example: main 13' deep, ball at 13' deep, 9' deep, and 5'
7 deep).
8

9 **J5. VALVES AND APPURTENANCES**

10
11 1. The contractor shall be responsible for the proper location and installation of valves and
12 appurtenances for utility pipeline construction, as shown on the approved plans and as specified
13 herein.

14
15 2. Materials shall include, but not be limited to, the following:

- 16
- 17 • Gate valves
- 18 • Butterfly valves
- 19 • Ball valves
- 20 • Plug valves
- 21 • Valve boxes
- 22 • Extension stem for valve operator
- 23 • Check valves
- 24 • Air release valves
- 25 • Corporation stops and curb stops
- 26 • Service saddles
- 27 • Water meters
- 28 • Water meter boxes
- 29 • Tapping valves and sleeves
- 30 • Backflow prevention assemblies
- 31 • Fire hydrant assemblies
- 32

33 3. All equipment and appurtenances shall be of the size shown on the approved plans and all
34 equipment of the same type shall be from one manufacturer.

35
36 4. All equipment and appurtenances shall have the name of the manufacturer, the size and the
37 design working pressure either cast in raised letters or on a stainless steel plate.

38
39 a. Coating conforming to ANSI/AWWA C550 shall be applied to the interior surfaces of
40 valves and appurtenances that will be in contact with water.

41
42 b. One 5' (min) valve key (wrench) shall be provided per project.
43

44 **5. Installation**

- 45
- 46 a. Valves and appurtenances shall be installed in accordance with the manufacturer's
47 recommendations for the applicable service. Approved restraint devices shall be used as
48 detailed in Section N of this Chapter.

1 **6. Reflective Pavement Markers (RPM)**
2

3 a. RPM, marking locations of valves, blow offs, etc., shall be placed 6” from edge of
4 pavement in the event the plans do not call for roadway striping, and 8” from edge of
5 pavement in the event the plans call for roadway striping to be placed.
6

7 b. All fire hydrants shall be marked with a blue RPM placed in the center of the travel lane
8 closest to the hydrant, outside of the crosswalk.
9

10 c. RPMs shall NOT be placed in crosswalks. If RPM placement falls within the crosswalk, it
11 shall be placed outside of crosswalk as close to valve or hydrant location as possible.
12

13 **7. Inline Valves**
14

15 a. Valves shall be carefully inspected, opened wide, and then tightly closed then placed in the
16 normal operating position. All the various nuts and bolts thereon shall be tested for tightness.
17 Special care shall be taken to prevent joint materials, stones or other substances from
18 becoming lodged in the valve seat. Valves, unless otherwise required, shall be set with their
19 stems vertically above the centerline of the pipe. Any valve that does not operate correctly
20 shall be adjusted to operate properly or removed and replaced.
21

22 b. Buried valves shall be installed vertically where depth of cover permits. Where depth of
23 cover does not permit vertical installation, side operators shall be used if approved in writing
24 by PSLUSD. The operating nut shall be between 24”- 30” below final grade. Extension stems
25 shall be provided on all buried valves when the operating nut is deeper than 30” below the
26 final grade.
27

28 c. Valves shall open left (counterclockwise).
29

30 **d. Gate Valves**
31

32 i. Gate valves 2” and larger shall be gray or ductile iron body, conforming to AWWA
33 C509 or C515, with mechanical joints or flanged ends, and shall be equipped with a 2”
34 square gray or ductile iron wrench nut.
35

36 ii. The stem shall be non-rising type for underground and outside stem-and-yoke rising
37 type for above-ground installation.
38

39 iii. Gate valves shall be resilient wedge type and meet the following provisions:
40

41 1. The wedge shall be of ductile or gray iron, fully encapsulated with EPDM rubber,
42 including the glide path.
43

44 2. The gland flange shall be ductile iron for maximum strength.
45

46 3. The stem material shall be 316 stainless steel with yield strength of 40,000 psi.
47

48 4. Valve body, bonnet, and gland flange shall have an electrostatic applied, fusion-
49 bonded epoxy coating internally and externally, a minimum of 8 mils thick. The

1 coating shall meet or exceed the requirements of the AWWA C550. Coating shall be
2 applied at the valve manufacturer's facilities.

3
4 5. All bolts, nuts, and washers shall be stainless steel to limit exterior corrosion and
5 maintain fastener strength. Manufacturer shall use a lubricant listed on the QPL
6 during assembly of bolt and nut sets to prevent galling of similar metals.

7 6. Valves shall be rated for 250 psi working pressure. All valves shall have pressure
8 tests performed to the requirements of AWWA C509 or C515 specifications, as
9 applicable, prior to shipment from the manufacturer.

10
11 7. Valves shall be covered by a Manufacturer's 10-year Limited Warranty from date
12 of purchase by the end user.

13
14 **e. Butterfly Valves**

15
16 i. Butterfly valves shall be used only at the discretion of PSLUSD. Butterfly valves shall
17 be cast or ductile iron body, alloy cast iron or ductile iron disc, one-piece stainless steel
18 shaft, or short or long body-type with the valve class, shaft size, and other special
19 requirements selected in accordance with the specific design and shall comply with the
20 provisions of AWWA C504, "Rubber-Seated Butterfly Valves".

21
22 ii. The valve disc shall be gray iron or ductile iron. The valve disc or valve body shall be
23 fitted with a resilient seat of synthetic rubber.

24
25 iii. Valves shall open counterclockwise. Actuators shall comply with AWWA C504 with
26 2" square operating nut. Actuators shall be capable of developing torques listed in
27 AWWA C504 for Class 150B valves. Valve actuators shall be traveling nut or worm gear
28 type, fully field adjustable stops so the actuator does not have to be disassembled for
29 valve seat adjustment.

30
31 **f. Ball Valves**

32
33 i. Ball valves shall be limited to 3/4" through 2" in size and shall have cast bronze or
34 stainless-steel body, bronze tee head, stem with check, full round way opening and
35 provisions for locking in a closed position.

36
37 ii. Ball valves shall be used on all water and low-pressure service lines 3/4"-2" in size.

38
39 iii. Ball valves shall be designed to be fully open by a 90° turn of the operating handle
40 and shall be full port design with bi-directional sealing rated for 150 psi minimum
41 working pressure.

42
43 iv. Valve ends may be threaded if Schedule 80 PVC is used and push-on restrained or
44 solvent welded ends may be used for other PVC.

45
46 **g. Plug Valves**

47
48 i. Plug valves may be used if approved in advance by PSLUSD in writing.

1 ii. All valves shall be cast or ductile iron or steel body, non-lubricated, eccentric-type
2 with resilient faced plugs and capable of drip-tight shutoff at the rated pressure when
3 applied at either port. Valve surfaces in contact with the plug face shall be 90% pure
4 nickel. Operation of all valves 10” and larger and smaller sizes in exposed locations
5 which require hand wheels or chain wheels, shall be by approved gear actuators,
6 equipped with position indicator and stop, and shall be furnished by the valve
7 manufacturer. Gear actuators for buried or submerged installations shall be furnished
8 with sealed enclosures. Valves shall be equipped with 2"actuating nuts, cast iron hand
9 wheels, or chain operators, with galvanized steel chains, as appropriate for the installation
10 and type of operator.

11
12 iii. Port areas of valves sized 3” through 24” shall be at least 100% and 30” and larger at
13 least 75% of full pipe area.

14
15 iv. Valves shall be non-lubricated and rated for 150 psi pressure differential acting in
16 either direction. At this differential, the valve shall provide drip tight shutoff.

17
18 v. The valves shall have a balanced plug to assure low torque and drip tight shutoff.
19 Valves shall be equipped with resilient plug facings to provide drip tight shutoff without
20 use of sealing lubrications. Even if small solids are trapped between the plug and seat, the
21 resilient facing shall provide tight shutoff and prevent seat damage.

22
23 vi. Plug valves shall have heavy-duty upper and lower guide bearings capable of resisting
24 corrosion and preventing binding. Bearings shall be stainless steel or bronze bushing.

25
26 **h. Valve Boxes**

27
28 i. Units shall be adjustable, cast iron, two-piece screw-type with minimum interior
29 diameter of 5” with covers cast with the applicable inscription in legible lettering on the
30 top -"SEWER", "RECLAIM" or "WATER". Boxes shall be of heavy-duty construction
31 for traffic loading. Extension pieces, if required, shall be the manufacturer's standard
32 screw-type for use with the valve box. Bolt down covers shall be provided when
33 requested by PSLUSD.

34
35 ii. The top side of valve box cover and the inside of the top section of the valve box shall
36 be painted blue for water mains, green for sewer mains and purple for reclaimed water
37 mains. The paint used shall be on the QPL.

38
39 iii. Valve boxes shall be provided with concrete base and valve nameplate with suitable
40 anchors for casting flush into concrete. Nameplate shall be 3” diameter bronze disk
41 according to PSLUSD Standard Detail G-07. Information on disk shall be of specific
42 valve type, size, direction and number of turns, and schematic of facilities. The brass disc
43 shall be set into wet concrete to be flush with the pad. Discs that have been drilled in and
44 set with epoxy will not be accepted. All water valve locations are to be marked by a blue
45 RPM, wastewater valves by a green RPM, and reclaimed water are to be marked by a
46 purple RPM.

47
48 iv. A valve box alignment device shall be used to eliminate the shifting of the valve box
49 against the operating nut.

1 v. The tops of valve boxes shall be set to the required grade. Any valve box that becomes
2 out of alignment or is not to grade shall be dug out and adjusted.
3

4 vi. The valve box shall not transmit surface loads directly to either the pipe or valve. Care
5 shall be taken to prevent earth and other material from entering the valve boxes.
6

7 **i. Extension Stem for Valve Operators**
8

9 i. Where the depth of the operating nut is more than 30", operating extensions shall be
10 provided to bring the operating nut to a point 24"-30" below finished grade. The
11 extension shall be high strength steel construction and permanently attached to the
12 operating nut or handle on the valve. Where extension stems are required within valve
13 boxes, approved insert stem guides shall be provided and a steel centering plate welded to
14 the extension shall be provided.
15

16 **j. Check Valves**
17

18 i. Check valves less than 2" (Water) shall be bronze body and disc, swing check-type
19 with removable inspection covers and rated for 150 psi minimum working pressure.
20

21 ii. Check valves (Low-Pressure Mains) shall be a brass or stainless-steel check valve
22 rated for 150 psi. The check valve will provide a full-ported passageway when open. A
23 non-metallic hinge shall be an integral part of the flapper assembly providing a maximum
24 degree of freedom to assure seating, even at a very low back pressure.
25

26 iii. Check valves 2" and larger shall conform to ANSI/AWWA C508, Standard for Swing
27 Check Valves and shall meet the following additional provisions:
28

29 1. Valves shall be of the flanged type and shall be supplied with or without external
30 lever and weight or lever and stainless-steel spring. A priming actuator may be
31 supplied for installations that require manual backflow to prime pumps, drain the line,
32 and/or back flush.
33

34 2. Valve bodies and bonnets shall be of ductile or gray iron meeting the requirements
35 of ASTM A536. The check valve shall be a clear waterway design as defined by
36 AWWA C508. The minimum working pressure rating shall be 250 psi.
37

38 3. Flanges shall be in compliance with ANSI/ASME B16.1 Class 125. Laying lengths
39 shall comply with ANSI/ASME B16.10.
40

41 4. All internal uncoated ferrous components and bolting shall be stainless steel. The
42 hinge and hinge pin shall be constructed of AISI 316 stainless steel. O-rings shall be
43 used to seal the hinge pin. Exterior bushing material shall be bronze.
44

45 5. All exterior bolting shall be stainless steel.
46

47 6. All valves shall be covered by a Manufacturer's 10-year Limited Warranty from
48 date of purchase by the end user, which shall include repair parts and reasonable labor
49 costs.

1 **k. Air Valves**

2
3 i. Air valves for water facilities shall conform to AWWA C512 and be of single body
4 configuration. Valves shall be of stainless steel, gray cast iron or ductile iron body and
5 cover, with stainless steel float and trim, and rated for a minimum 150 psi working
6 pressure. Combination valves shall be used unless a different type of air valve is
7 approved by PSLUSD based on recommendation of the EOR. Air valves shall be
8 equipped with an inflow prevention device when required by PSLUSD.

9
10 ii. Air valves for wastewater facilities shall be of single body configuration and shall be
11 constructed with stainless body and cover with stainless steel trim and float for a
12 minimum working pressure of 150 psi. Combination valves shall be used unless a
13 different type of air valve is required by PSLUSD based on recommendation of the EOR.

14
15 **l. Ball Corporation Stops and Curb Stops**

16
17 i. Ball corporation and curb stops shall be required on all water services. The units shall
18 be manufactured from cast bronze or brass with machined fitting surfaces and, for sizes
19 $\frac{3}{4}$ "-2" in accordance with AWWA C800.

20
21 ii. Units shall be equipped with connections compatible with the connecting service pipe-
22 type; must have pack-joint type connections for polyethylene tubing with locking collars
23 and stainless-steel inserts.

24
25 **m. Service Saddles**

26
27 i. Service saddles for PVC, HDPE, or DIP shall conform to AWWA C800. Saddles shall
28 be double strap, stainless steel full circle type with a bronze body and epoxy lined.
29 Sealing gaskets shall be suitable for the applicable service.

30
31 **n. Water Meters**

32
33 i. All water meters shall be owned and maintained by PSLUSD. Water meters up to 2" in
34 size shall be furnished and installed by PSLUSD. The property owner shall be
35 responsible for furnishing and installing the meter above 2" and shall obtain a written
36 approval from PSLUSD prior to installation. Meters 2" and above shall be compound
37 meters unless specifically approved in writing by PSLUSD. Shop drawings shall be
38 submitted for the proposed meter along with a certification of calibration. Ownership of
39 meters provided by the owner/developer shall be transferred by Bill of Sale. The meter
40 shall meet the following specifications:

41
42 1. Turbine - The meter to be furnished shall be Class II, horizontal shaft, and shall
43 meet the requirements of AWWA C701, with particular reference to flow capacity,
44 pressure loss, accuracy, physical dimension, and material construction.

45
46 2. Compound – The meter shall comply with the requirements of AWWA C702 with
47 particular reference to flow capacity, pressure loss, accuracy, physical dimension, and
48 material construction.

1 3. The main case shall be of high-grade bronze containing not less than 75% copper
2 and with operating pressure test of 200 psi without leakage at gasket. The name of the
3 manufacturer shall be marked permanently on the lid of the register box. The serial
4 number of the meter shall be imprinted on the lid and on meter main case.
5

6 4. The meter must be able to use a strainer without the additional piping upstream and
7 downstream to control accuracy of the meter; strainer will come with meter only upon
8 request.
9

10 5. The register shall be permanently hermetically sealed, magnetic drive, low torque
11 registration, straight reading, large numerals, and no fogging type lens.
12

13 6. The connection shall be flanged and shall come with companion flanges, gaskets,
14 bolts and nuts.
15

16 7. Meters shall have an Encoder-Receiver-Transmitter device for automatic meter
17 reading compatible with existing PSLUSD system.
18

19 8. Meters shall be NSF approved for potable water use.
20

21 **o. Meter Boxes**
22

23 i. Meter boxes shall be high-density polyethylene body with a solid cover.
24

25 ii. Meter boxes shall be the same type throughout the project.
26

27 **p. Tapping Valves and Sleeves**
28

29 i. Tapping valves shall have a ductile iron body that accommodates a full-size shell
30 cutter.
31

32 ii. Tapping valves shall conform to the specifications set forth previously for the
33 applicable service conditions. Additionally, units shall be comparative with the
34 connecting sleeve or saddle and specially designed for wet tapping installation
35 operations.
36

37 iii. When specified, tapping valves 4" through 12" shall have a ring cast with the body on
38 its flanged end to ensure proper alignment with suitable tapping sleeves. All other end
39 configurations shall be specified as mechanical joint (MJ).
40

41 iv. Tapping sleeves shall be split-type stainless steel or MJDI with flanged outlet for
42 connection to tapping valve. Carbon steel flanges are not allowed without written
43 approval by the EOR and PSLUSD.
44

45 **q. Backflow Prevention Assemblies**
46

47 i. Domestic water backflow prevention assemblies shall be owned and maintained by
48 PSLUSD. Fire backflow assemblies shall be privately owned and maintained. Backflow

1 prevention assemblies shall be manufactured and installed in full conformance with the
2 following standards:

- 3
- 4 1. AWWA C510 – Standard for Double Check Valve Backflow Prevention
5 Assembly.
- 6
- 7 2. AWWA C511 – Standard for Reduced Pressure Principle Backflow Prevention.
8
- 9 3. AWWA M14 – Recommended Practice for Backflow Prevention and Cross
10 Connection Control.
- 11
- 12 4. Laboratory and Field Performance Specifications of the Foundations for Cross
13 Connection Control and Hydraulic Research, University of Southern California.
14

15 ii. Domestic backflow prevention assemblies shall be tested by PSLUSD. Final approval
16 for fire line backflow preventers shall be based on a “Certificate of Approval” issued by
17 an approved testing laboratory certifying full compliance with above standards. Backflow
18 prevention assemblies which have been fully tested and have been granted a certificate of
19 approval by an approved testing laboratory, may be used if listed on the QPL.
20

21 **r. Fire Hydrant Assembly**
22

23 i. Fire hydrant assemblies shall include fire hydrant, spool pieces, gate valve, hydrant
24 extensions, valve extensions, valve box, concrete collars around valve box and hydrant,
25 tee at the main, necessary bends and fittings, restraining devices, and bedding material.
26

27 ii. All fire hydrants shall be of the size and type specified and all hydrants shall be from
28 one manufacturer.
29

30 iii. Fire hydrant extensions shall not be used unless specifically approved in writing by
31 PSLUSD.
32

33 iv. Fire hydrant adjustments and relocations include all materials and labor that may be
34 required to complete adjustment and/or relocation to PSLUSD specifications.
35

36 v. Fire hydrants shall be connected to the main with a minimum 6” branch controlled by
37 an independent 6” gate valve. All pipe, valve, and joints from the hydrant to the main
38 shall be restrained. Hydrants shall stand plumb and true and shall have nozzles parallel
39 with or at right angles to the curb or edge of pavement with the pumper nozzle facing the
40 curb or edge of pavement. Hydrants shall be set to the established grade with nozzles at
41 least 18” above the ground.
42

43 vi. Fire hydrants shall be free of corrosion and all working parts shall be properly
44 lubricated. Hydrants shall be painted with an approved paint on the QPL. Hydrants
45 owned and maintained by PSLUSD shall be painted red. Private fire hydrants shall be
46 painted yellow.
47

1 vii. Fire hydrants shall have a minimum of 10-year warranty from the manufacturer
2 covering 100% of all parts and labor for repairs/replacement. The warranty shall become
3 effective on date of acceptance by PSLUSD.
4

5 viii. One operating wrench for every ten fire hydrants shall be provided to PSLUSD.
6

7 **ix. Specifications** 8

9 1. Hydrants shall be dry barrel type and shall meet the following provisions:
10

11 a. Shall conform to ANSI/AWWA C502.
12

13 b. Shall be listed by Underwriters Laboratory (UL) and approved by Factory
14 Mutual (FM) for fire line service. UL and FM trademarks shall be cast on the
15 hydrant nozzle section.
16

17 c. A weather shield shall be provided to prevent dirt and corrosion from affecting
18 the operating mechanism. It will be marked with an arrow indicating the direction
19 of opening (counterclockwise). Weather shields and nozzle cap nuts shall be 1½”
20 pentagon shape.
21

22 d. Hydrant bonnet, nozzle, standpipe, shoe sections, and flanges shall be made of
23 ductile or gray iron. All caps and weather shields may be manufactured of cast or
24 ductile iron. Caps shall be provided with gaskets and cap threads shall be
25 lubricated before delivery with an anti-seize lubricant listed in the QPL.
26

27 e. Hydrant sections shall have an electrostatic applied, fusion bonded, epoxy
28 coating internally and externally. The coating shall meet or exceed the
29 requirements of AWWA C550. Coating shall be applied only at the valve
30 manufacturer’s facilities. New hydrants shall be painted at the manufacturer’s
31 facility; field painting will not be accepted.
32

33 f. The standpipe shall be Bitumen coated internally and externally with a bury line
34 present below the break flange to indicate proper installation depth. Bury depth
35 will be clearly stenciled or cast on the standpipe section.
36

37 g. Rated working pressure shall be 250 psi and test pressure shall be 500 psi in
38 both the open and closed position. Independent testing shall certify fire hydrants
39 have a maximum head loss of 2.5 psi when flowing at 1000 gpm through the 4½”
40 nozzles. Tests will be performed as described in AWWA C502.
41

42 h. The hydrant main valve shall be 5¼” and true compression type, opening
43 against and closing with the pressure. All working parts shall be removable
44 without excavation.
45

46 i. The hydrant’s upper and lower stem, as well as its break coupling, internal pins
47 and clips, shall be manufactured of stainless steel or epoxy coated steel. External
48 bolting shall be manufactured of stainless steel. Manufacturer shall use a lubricant
49 during assembly of bolt and nut sets to prevent galling of similar metals.

1 j. All hydrants shall be of the traffic breakaway type and allow a 360° rotation to
2 position the pumper nozzle in the desired direction after installation. Undercut or
3 breakaway bolts will not be permitted.
4

5 k. Hydrants will consist of one 4½” NST pumper nozzle and two 2½” NST hose
6 nozzles. Each nozzle will be bronze and secured with a stainless-steel set screw
7 for easy maintenance and replacement, should damage occur. Nozzles threaded
8 into the nozzle section shall be lubricated with a lubricant before delivery.
9

10 **J6. GRAVITY SEWER**

11
12 1. The contractor shall be responsible for furnishing of all labor, materials, equipment, and
13 incidentals required for construction of gravity sewers and appurtenances as shown on the
14 approved plans and as specified herein.

15
16 2. The contractor shall be responsible to ensure that all safety requirements are met.
17

18 3. Materials shall include, but not limited to, the following:
19

- 20 • Gravity wastewater main
- 21 • Wastewater manholes
- 22 • Service laterals and cleanouts

23 **4. Sewer Pipe**

24 **a. Materials**

25
26 i. The pipe material, joints, and fittings shall be as specified in Section N of this Chapter
27 and on the QPL.
28

29 **b. Installation**

30
31 i. All sewer pipes shall be true to line and grade with bells facing upstream. The sections
32 of the pipe shall be so laid and fitted together that when complete, the sewer shall have a
33 smooth and uniform invert. All pipes shall be free from defects. Trenches shall be kept
34 dry while the pipe is being laid. Visible leakage, deflections, horizontal misalignment,
35 non-constant slopes between manholes, and sagging joints shall each be grounds for
36 rejection of lines.
37

38
39 ii. Where navigable waterways are crossed, approved utility crossing signs shall be
40 placed on the pipe alignment at each side of the waterway.
41

42 iii. Special care shall be exercised in design and installation to provide adequate bedding
43 for the type of pipe used, taking into consideration trench width and depth, superimposed
44 loadings above grade, and the material below trench grade. Pipe loading capabilities shall
45 be computed in accordance with established design criteria and special supporting
46 bedding or facilities shall be provided as required by the EOR. The pipe barrel shall be
47 uniformly supported along its entire length on undisturbed soil or bedding material.
48

49 iv. A sewer service connection shall not be directed into a manhole.

1 v. No service connection shall be made within 5' of any manhole. The allowable length
2 of PSLUSD-owned service laterals shall be no more than 150'.
3

4 vi. Cleanouts shall be spaced a maximum of 75' apart. Cleanouts shall be shown on the
5 plans at the property/ROW line or other required locations to limit PSLUSD maintenance
6 and ownership responsibility. Cleanouts ending PSLUSD maintenance responsibility
7 shall be installed at a minimum of 3' from back of curb, edge of driveway/pavement. For
8 cleanout installations within a non-exclusive utility easement paralleling a road ROW, the
9 cleanout shall be located a maximum of 1½' from the ROW line.
10

11 vii. The service pipe lateral and required fittings shall extend to the property line,
12 perpendicular to said line, terminating with stoppered ends or fittings, as indicated. The
13 exact location for each installed service shall be marked by marker balls.
14

15 **5. Manholes**

16 **a. Materials**

17
18
19 i. Manhole interior shall be lined as detailed and specified by the manufacturer. The
20 minimum inside diameter of manholes shall be 48". Non-penetrating lift pin inserts shall
21 be installed by pre-cast fabricator. Pre-cast reinforced manholes shall be in accordance
22 with ASTM C478, Class II, made with Type II acid resistant cement, shall attain a
23 minimum compressive strength of 4000 psi in 28 days. The liner system shall be cast
24 integrally into the manhole, pre-cast concrete surrounding it, with alignment/grade of
25 channels/openings for connecting pipes matching drawing requirements. Liner integrally
26 formed bell gaskets shall comply with ASTM F 477 Standard Specification for
27 Elastomeric Seal (Gaskets) for Joining Plastic Pipe. Installation of pre-cast manholes
28 shall comply with the details shown in the Construction Standards and in accordance with
29 the manufacturer's recommendations.
30

31 ii. Manhole frames and covers shall be ductile iron or gray cast iron traffic rated heavy
32 duty conforming to ASTM Designation A48, Class 30 and on the QPL. Covers shall be
33 marked with the word "SANITARY SEWER" in 2" raised letters. Frames and covers
34 shall be set to the correct finish grade elevation and have a rubber O-ring seal.
35

36 iii. The base slab and first ring of the pre-cast manhole shall be cast monolithically.
37

38 iv. Lift holes shall be grouted once the manhole is in place.
39

40 **b. Marking and Identification**

41
42 i. Each manhole shall be marked on the inside and outside with the following
43 information:
44

- 45 • Manufacturer's name or trademark
- 46
- 47 • Manufacturer's factory location
- 48

- 1 • Manufacturer's serial number
- 2
- 3 • Total manhole depth
- 4

5 **c. Installation**

6

7 i. Manholes shall be installed at the end of each sewer, at every change in grade, size, or

8 alignment, at all sewer intersections, and at distances not greater than 400' apart.

9

10 ii. Manholes shall be placed in accessible locations, preferably in pavement flush to the

11 surface. In unpaved areas, a concrete collar shall be poured around the top of the manhole

12 flush with the cover and 2" above finished grade.

13 iii. Manholes shall be set according to approved construction plans and shall be pre-cast

14 in accordance with approved shop drawings, specifications, and construction standards.

15 d. Manholes shall not be placed in low-lying areas where storm water inflow may occur.

16 The manhole cover and frame shall be water tight to prevent inflow of storm water and

17 shall be on the QPL.

18

19 iv. Certification from manufacturer stating that manufacturer has provided factory

20 training to the pre-cast fabricator, and that the pre-cast fabricator is approved by the liner

21 manufacturer for incorporation of manufacturer's liner into fabricator's pre-cast manhole

22 product, shall be required.

23

24 v. All joints, including manhole sections and risers, shall be sealed using a bonding

25 compound that meets ASTM C-990-96, latest revision. Also, an approved external joint

26 sealing system may be applied on the outside of all joints. The application of sealants

27 shall be in accordance with standard detail WW-04.

28

29 vi. Fabricator shall provide on-site guidance during manhole pipe connection and joint

30 sealant installation of first manhole. Upon completion of construction, contractor shall

31 provide certification from the fabricator stating that such field guidance was provided to

32 the contractor.

33

34 vii. Concrete manhole exterior shall receive three (3) applications, 3-5 mils each, of a

35 100% solids water base epoxy. The first coat is a primer followed by two (2) finish coats.

36 Application shall be by an approved applicator.

37

38 viii. All manholes shall require backfill compaction as specified in compaction

39 specifications.

40

41 **d. Tools**

42

43 i. One manhole lid removal hook/bar shall be provided per project.

44

45

46

47

1 **J7. GREASE, OIL, AND SAND INTERCEPTORS**
2

3 1. The contractor shall be responsible for furnishing all labor, materials, equipment, and
4 incidentals required for installation of a grease, oil or sand interceptor as shown on the approved
5 plans. The installation shall comply with the standard detail and as specified herein.
6

7 2. Installation of the interceptor and its components shall be performed by a licensed plumber or
8 septic tank contractor registered with the Florida Department of Health.

9 3. Materials shall include the tank, baffle, lid, manhole covers, valve boxes, pipe, tees, elbows
10 and miscellaneous fittings and hardware.
11

12 **4. Tank**
13

14 a. The tank shall be built of pre-cast concrete with a minimum of 4” thick walls and pre-cast
15 holes for the inlet/outlet pipes. The lid shall be at least 8” thick. Traffic lids shall meet the
16 specifications of ASTM C890-91, latest revision.
17

18 b. The inlet and outlet holes shall have a prefabricated pipe boot with stainless steel-clamp or
19 gasket.
20

21 c. The inlet invert level shall be a minimum of 2½” above the water level.
22

23 d. The liquid depth shall be at least 42”.
24

25 e. A baffle shall be installed such that the first chamber shall have a minimum effective
26 capacity of ½ (one-half) to 2/3 (two-thirds) the total required effective capacity. The flow
27 between the two compartments shall be through an 8” diameter hole in the baffle. The hole
28 shall be located 12” from the tank bottom for a grease interceptor and 16” to 20” for a
29 sand/oil interceptor. A baffle is not required if multiple interceptors are installed in series.
30

31 f. A manhole shall be provided over each compartment for access to the inlet and outlet tees.
32

33 **5. Installation**
34

35 a. All piping shall be a minimum of 4” PVC.
36

37 b. The inlet and outlet tees shall be located no more than 4” from the end of the tank and
38 shall be in accordance with ASTM C923-98, latest revision, Standard Specification for
39 Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
40 The inlet tee shall extend no more than 24” below the water level for a grease interceptor. An
41 inlet tee is not required for sand/oil interceptors. However, if used, it shall not extend more
42 than 12” below the water level. The outlet tee shall extend to within 8” of the bottom of the
43 tank.
44

45 c. The inlet and outlet tee shall be attached to the tank wall as per detail submitted by the
46 EOR and approved by PSLUSD.
47

48 d. Inspection ports (two-way clean-outs) shall be installed on each end of the interceptor,
49 which are easily accessible for inspection/sampling.

1 e. When the required effective capacity of the interceptor is greater than 1250 gallons,
2 PSLUSD may require installation of multiple tanks in series. When multiple tanks are used
3 there shall be a minimum 4' separation between tanks with the required inspection port
4 installed in the center.

5
6 f. The manholes shall be brought to grade and fitted with covers.

7
8 g. All joints, including mid-seams, risers and lids shall be sealed using a bonding compound
9 that meets ASTM C-990-96, latest revision.

10
11 h. An approved external joint sealing system on the QPL shall be applied to on the outside of
12 all joints.

13
14 **J8. WASTEWATER PUMP STATIONS**

15
16 1. These specifications are the minimum requirements for pump stations, including factory
17 testing of all materials, equipment and appurtenances, delivery and installation. The
18 manufacturer's recommendations, approved plans and standard details may contain additional
19 requirements pertinent to the installation including accessory and auxiliary equipment and
20 material types, which may not be specified herein.

21
22 2. The specifications for "Grinder Pump Station" and "Lift Station" shall be used in conjunction
23 with Section H of this Chapter - Design Criteria for Wastewater Pump Station.

24
25 3. The pumps and appurtenances furnished shall be installed in accordance with the industry
26 standards and methods, as specified herein. All pumps shall be manufactured in accordance with
27 the Hydraulic Institute standards.

28
29 4. In the event that it is impossible to conform to certain details of the specifications due to
30 different manufacturing techniques, a written justification shall be submitted for all non-
31 conforming aspects.

32
33 5. Only components on the QPL shall be utilized.

34
35 6. All equipment and materials furnished shall be new and the standard product of the
36 manufacturer.

37
38 7. The use of stainless steel nuts and bolts, minimum grade 316, is required on all parts.

39
40 8. When pump stations are located in areas where fire or explosion hazards may exist, the
41 electrical components (e.g. motors, lights, cables, conduits, switch boxes, control circuits, etc.)
42 shall comply with the National Electrical Code requirements for Class I, Division I, Group D
43 locations. The pumps and electrical components shall be certified as explosion proof by Factory
44 Mutual Approvals.

1 **9. Shop Testing**
2

3 a. Each pump shall be tested in the manufacturer's shop to demonstrate the proper operation
4 of all components. Testing shall also be conducted to determine overheating of bearings,
5 motors or other components.
6

7 **10. Submittals**
8

9 a. Contractor shall provide to PSLUSD factory test results and shop drawings in PDF format
10 for review and approval.
11

12 **i. Grinder Pump System** - The following information shall be provided as a minimum:
13

- 14 1. Dimensions and anchor bolt locations.
- 15
- 16 2. Descriptive literature, bulletins, and/or catalogs of the equipment.
- 17
- 18 3. A list of the manufacturer's recommended spare parts to be supplied in addition to
19 those specified herein under Section X - Spare Parts in this Chapter i.e. gaskets,
20 packing, etc. shall be included and bearings shall be listed by the manufacturer's item
21 numbers only.
22
- 23 4. Complete motor data.
- 24
- 25 5. Copies of all factory test results.
- 26
- 27 6. A certified Hydraulic Institute test curve from an identical pump including head,
28 capacity, brake horsepower, and pump efficiency for each pump type supplied.
29

30 **ii. Lift Station** – The submitted drawings and data shall be provided by the manufacturer,
31 including but not limited to the following:
32

33 1. Information on wet well, pumps, discharge piping, valves, guide rail systems,
34 pressure gauges, access covers, control panel, electrical schematics and any other
35 requirements necessary to complete the lift station installation, including:
36

- 37 • Assembly drawings, nomenclature, and materials list
- 38 • Outline dimensions and weights
- 39 • Drawings, method of anchoring equipment, and piping connection details
- 40 • Electric motors
- 41 • Name of manufacturer
- 42 • Type, model and frame size
- 43 • Motor horsepower
- 44 • Full load speed
- 45 • Construction
- 46 • Temperature rise and class of insulation
- 47 • Service factor.
- 48 • Voltage, frequency, number of phases

- 1 • Full load current
- 2 • Locked rotor current
- 3 • Motor efficiencies at 1/2, 3/4, and full load
- 4 • Controls and Wiring Diagram
- 5 • Pump curves at listed RPM ("Family" curves are not acceptable)

6
7 b. Drawings and descriptive information in sufficient detail to show the kind, size,
8 arrangement, and operation of component materials and devices, the external connections,
9 anchorages, and support required, and the dimensions needed for installation and correlation
10 with other materials and equipment. All part numbers and catalog data required for ordering
11 spares and replacements shall be provided.

12
13 c. The acceptance of drawings returned marked "REVIEWED" or "REVIEWED AS
14 NOTED" will not constitute a blanket approval of dimensions, quantities, and details of the
15 materials, equipment, device or items shown and does not relieve the contractor of
16 responsibility for errors or deviations from the requirements.

17
18 **d. Manufacturer's Qualifications**

- 19
20 i. Equipment and materials shall be furnished by a manufacturer fully experienced,
21 reputable and qualified in the manufacture of items to be installed.

22
23 **e. Product Handling**

24
25 i. All equipment and parts shall be properly protected so that no damage or deterioration
26 will occur during a prolonged delay from the time of shipment until installation is
27 completed and ready for operation.

28
29 ii. Factory assembled parts and components shall not be dismantled for shipment unless
30 permission is received in writing from the EOR.

31
32 iii. Finished surfaces of all exposed pump openings shall be protected by wooden planks,
33 strongly built and securely bolted thereto. Finished iron or steel surfaces not painted shall
34 be properly protected to prevent rust and corrosion.

35
36 iv. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment,
37 and proper care shall be taken to protect parts from entry of water during shipment,
38 storage and handling.

39
40 v. Each box or package shall be properly marked to show its net weight in addition to its
41 contents.

42
43 **f. Warranty**

44
45 i. Pumps shall have a minimum of 5-year warranty from the manufacturer, covering
46 100% of all parts and labor for repair/replacement. The warranty period shall commence
47 at the time of pump station acceptance by PSLUSD.

1
2 **g. Spare Parts**
3

4 i. Spare parts to be furnished to PSLUSD shall include:

- 5
6 • 1 full set of fuses for entire panel.
7
8 • 1 full set of fuses for disconnect (if fused).
9
10 • 1 set of motor starters for a grinder pump station or 1 set of starter contacts for the
11 lift station, as applicable.
12

13 ii. These items shall be turned over to PSLUSD at the start-up inspection.
14

15 **h. Field Quality Control**
16

17 i. The services of a qualified factory-trained manufacturer’s representative shall be
18 provided to assist the contractor in installation and start-up of the equipment specified
19 under this section. The manufacturer’s representative shall provide technical direction
20 and assistance to the contractor in general assembly of the equipment, connections,
21 adjustments and testing. The following work shall be performed by the contractor, as a
22 minimum, under the technical direction of the manufacturer’s service representative:
23

- 24 • Inspections and final adjustments.
25
26 • Operational and functional checks of controllers/starters and spare parts.
27

28 **i. Pump Station Specifications and Installation**
29

30 **i. Grinder Pump Station** - A single manufacturer shall be responsible for supplying
31 the entire grinder pump station including, but not limited to, pumps, motors, wet well,
32 valve vault, rail assembly, electrical controls and appurtenances. PSLUSD will make
33 available to developer/contractor for purchase the major components of the single-
34 phase grinder system. All appurtenances and labor required to complete the
35 installation will be the responsibility of the developer/contractor.
36

37 **1. Pumps**
38

- 39 a. The pumps shall be totally submersible grinder type, designed to pump raw
40 sewage. The pumps shall be standard dimensions such that parts will be
41 interchangeable between like units. The same manufacturer shall supply all
42 units.
43
44 b. The pumps shall be equipped with a rail and discharge connection assembly
45 which will allow the removal of the pumps without the need for personnel to
46 enter the wet well.
47
48

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20

2. Valves & Piping

a. Pipes, fitting, valves, and appurtenances shall meet the specifications included in this Chapter and must be approved by PSLUSD or on the QPL.

b. A heavy-duty brass or stainless-steel check valve, rated for 150 psi, shall be installed in the discharge line at the point of connection to the main, as shown on the approved plans and standard details.

c. Discharge piping shall be schedule 80 PVC.

d. For grinder pump stations, a valve vault made of fiberglass shall be provided as required in the design criteria and shown on the standard details. The valve vault shall include a check and plug valve for the discharge line for each pump and an emergency pump out connection with a 3" Camlock. The lid and cover shall be made of aluminum, capable of bearing a live load of 300 pounds per square foot.

21
22
23
24
25
26
27
28
29
30
31
32
33
34

3. Wet Well and Access Cover

a. The wet well shall be sized as specified in the approved plans and made of molded reinforced polyester resin and fiberglass construction. The wet well shall have a minimum wall thickness of 1/4". An inlet hub of the O-ring seal type shall be provided for field installation of the lateral. Other wall penetrations for electrical conduits and venting shall be provided.

b. The wet well manufacturer shall furnish wet well access covers and frames as shown on the approved plans and PSLUSD standard details for the wet well. The cover shall be made of aluminum, gasket sealed, with 316 stainless steel bolts used to secure the cover to the wet well and shall be capable of bearing 300 pounds per square foot live load.

c. An approved QPL safety net or grate shall be provided for fall prevention.

35
36
37
38
39
40
41
42
43
44
45
46
47
48
49

4. Pump Control System

a. A pump controller shall be provided for each grinder pump unit. The controller shall automatically start and stop the pump and switch the lead and lag pump on each start-up.

b. The pump controller shall be the standard system of the manufacturer, as modified for the proposed application.

c. The control panel shall consist of a lightning arrestor, a disconnect switch, a circuit breaker and NEMA rated magnetic starter for each pump motor. A high-level alarm and pump shut-off shall be activated by a float type, low voltage liquid level control system. Control switches shall provide means to operate each pump manually or automatically.

1 d. The electrical control equipment shall be mounted within a NEMA control
2 panel with all stainless-steel hardware. The enclosure shall be UL listed as an
3 assembly and shall incorporate a removable back panel on which control
4 components shall be mounted. Back panel shall be secured to enclosure with
5 collar studs. A high level and seal failure alarm light shall be mounted on top
6 of the control cabinet. The light shall be enclosed in a red polycarbonate
7 enclosure. The high-level alarm float installed in the wet well shall activate an
8 exterior light and audible alarm. Seal failure alarm circuitry shall only be
9 provided if required to obtain manufacturer's warranty.

10
11 e. The enclosure shall be installed with stainless steel anchors imbedded a
12 minimum of 2" into concrete.

13 14 **5. Installation**

15
16 a. Installation shall be strictly in accordance with the manufacturer's
17 instructions, PSLUSD standard details, and in the location shown on the
18 approved plans. If the equipment requires an arrangement or dimensions
19 different from those shown on the approved plans or the standard details, the
20 EOR shall submit shop drawings, showing all necessary changes, to PSLUSD
21 for review and approval.

22 23 **ii. Lift Station**

24 25 **1. Wet Well**

26
27 a. The base slab and the first ring of the pre-cast wet well shall be cast
28 monolithically.

29
30 b. The holes for influent pipe and discharge pipes shall be pre-cast and have
31 pre-fabricated boots installed by the manufacturer of the wet well.

32
33 c. A liner shall be provided as a corrosion barrier by an approved
34 manufacturer on the QPL.

35
36 d. Installation of the lift station risers shall be in accordance with the
37 manufacturer's specifications.

38
39 e. The exterior of the wet well shall receive three (3) applications 3-5 mils
40 each of a 100% solid water-based epoxy on the QPL. The first coat is a primer
41 followed by two (2) finish coats. The coatings shall be applied at the
42 manufacturer's facility. Field application is not acceptable excepting for
43 repairs and shall be conducted by a factory representative.

44
45 f. Holes to accommodate pipe shall be pre-cast into the section at the
46 manufacturer's plant.

47
48 g. Any visible reinforcing wire, steel or honeycombs on pre-cast structures
49 shall be cause for rejection.

1 h. Interior of wet well shall be fitted with 316 stainless steel upper guide bar
2 brackets, cable holder, guide rails, and grip eyelift cable.
3

4 i. The wet well shall have a concrete top and a pad lockable aluminum hatch
5 cover and frame with stainless steel hardware. The cover shall be sized and
6 located to allow for unobstructed vertical removal of all pumps and mixed
7 flush valves and shall be capable of supporting a 300 pounds per square foot
8 static load. The cover shall have a pull-up handle to open and have a locking
9 safety handle to retain the covers in an open position.
10

11 j. All access openings shall be fitted with a permanently installed fall through
12 prevention system that is easily retractable for access to the opening below.
13 The fall through prevention system shall consist of the following components:
14

15 i. A safety grate

16 ii. All 316 stainless steel hardware

17 iii. A permanently attached metal tag with the following information:
18

- 19 • Name of the grate manufacturer
- 20 • Identification of the grate material
- 21 • Date of manufacture
- 22 • Date of prototype test
- 23 • Name of testing agency
- 24 • Serial number
25

26 k. Installation shall be in accordance with the manufacturer's instructions.
27

28 **2. Discharge Piping**

29

30 a. Discharge piping from the pumps shall be installed in accordance with
31 PSLUSD standard details. Piping inside the wet well shall be flanged 316
32 stainless steel or HDPE pipe. HDPE shall be DR-9 and stainless steel shall be
33 Schedule 40 gauge. Submerged fittings can be ductile iron.
34

35 b. Each base elbow shall be secured to the concrete floor with stainless steel
36 expansion bolts and a stainless-steel plate per PSLUSD standard details.
37

38 c. The pipes, valves, and fittings shall be coated as specified for exterior of
39 wet well.
40

41 d. Check valves shall include external spring and lever.
42

43 e. Shutoff valves shall be resilient plug valves.
44

45 f. An emergency pump connection device shall be provided and shall be a
46 male aluminum or bronze Camlock fitting with dust cap and an isolation plug
47 valve. A stainless steel ball valve shall be provided on the dust cap.
48

49 g. All fittings to have flange ends.

- 1 h. All hardware shall be grade 316 stainless steel.
- 2
- 3 i. An air release valve shall be provided with a vent into the wet well.
- 4
- 5 j. An oil-filled pressure gauge and a pressure transducer shall be provided in
- 6 the discharge pipe after the check valves. The gauge shall read in pounds per
- 7 square inch, with a range suitable for the required service. Gauge shall be
- 8 equipped with diaphragms (neoprene or stainless steel), or other suitable
- 9 separating device, to preclude wastewater from entering the mechanism.

10

11 **3. Pumps**

12

- 13 a. Pumps shall be non-clog and mechanical seal submersible pumps.
- 14
- 15 b. The pump electrical conductor shall be continuous multi-conductor, copper
- 16 cable (no splices), in compliance with industry standard for load and
- 17 resistance against sewage. The conductor shall enter the pump through a
- 18 heavy-duty entry assembly that shall be provided with an internal grommet
- 19 assembly to protect against leakage once secured and must have a strain relief
- 20 assembly as part of standard construction. The pump conductor shall be the
- 21 length required to properly connect the pump and panel, but in no case shall
- 22 be less than 40'.
- 23
- 24 c. Each pump shall be provided with a guide rail assembly designed so that
- 25 each pump automatically connects to the discharge piping when the pump is
- 26 lowered into place. The pump to guide rail assembly connection shall be non-
- 27 sparking. The pumps shall be easily removable for inspection and/or service.
- 28 d. Pumps shall have a tandem mechanical shaft seal system. Mechanical seals
- 29 shall be made of tungsten carbide or silicon carbide with a stainless-steel case.
- 30 Wearing rings shall be abrasion resistant and shall be installed at the inlet side
- 31 of the pump to provide protection against wear to the impeller.
- 32
- 33 e. The lifting handle shall be stainless steel and be large enough to hook the
- 34 pump with a standard assembly from a height of 20' and be equipped with a
- 35 grip eye lifting cable and tool.
- 36
- 37 f. The pumps with a size of 15 HP or greater shall be equipped with a
- 38 moisture sensor to detect seal failures. A visual signal with a manual override
- 39 shall be used at the control panel.
- 40
- 41 g. One pump shall be equipped with a utility approved mix flush system per
- 42 the pump manufacturer.
- 43
- 44 h. Pump motor shall be housed in an air-filled watertight casing and shall have
- 45 Class F insulated windings which shall be moisture resistant. The motor shall
- 46 be Nema Design B rated 155° C maximum and have a minimum 1.15 service-
- 47 factor. Pump motors shall have cooling characteristics suitable to permit
- 48 continuous operation in a totally, partially, or non-submerged condition. The
- 49 pump shall be capable of running dry continuously in a totally dry condition.

1 Cable junction box and motor shall be separated by a stator-lead sealing gland
2 or terminal board which shall isolate motor from any water or solids gaining
3 access through pump cable.
4

5 **4. Motor Starter/Controller** 6

7 a. To extend the useful life of the pump station components including the
8 pump and motors and comply with the rules and regulations for electrical
9 service and maximum allowable voltage fluctuations, one of the following
10 starter/controllers is required for each pump/motor based upon the motor
11 horsepower. The warranty shall include materials or workmanship, which do
12 not conform to these specifications.
13

14 **i. Type “one” (MCC I):** 10 HP 230 VAC started across the line shall be
15 protected at 300% of nameplate Full Load Amperage (FLA), using NEMA
16 motor starters.
17

18 **ii. Type “two” (MCC II):** 11 HP – 30 HP 480 VAC requires soft start
19 device with internal bypass protected at 200% of nameplate FLA.
20

21 **iii. Type “three” (MCC III):** 31 HP and above 480 VAC requires a soft
22 start device with internal bypass or a variable frequency drive protected at
23 200% of motor nameplate FLA.
24

25 **iv. NEMA Motor Starters (MCC – I Only):** NEMA Magnetic Motor
26 Starter with solid state overload relay with life time coil warranty.
27 Overload relay includes phase loss and phase unbalance. Device must be
28 manufactured to ensure full voltage is applied to coil even at 85% of
29 nominal eliminating contact chatter and premature contact failure. When
30 lower than acceptable voltages are applied, the motor starter will not start
31 or will break the circuit to prevent contact chatter.
32

33 **v. Soft Start Motor Starters (MCC – II Only):** 34

35 1. Reduced Voltage Solid State Motor Starters shall be severe duty
36 rated with overload protection, adjustable ramp times, and adjustable
37 torque control and shall be ordered with edge control option of
38 automatic reset if desired. The starter shall offer adjustable kick start
39 control, soft stop control feature, which reduces water hammer through
40 soft stop control. The starter shall shut down at 110° C and have jam
41 and stall detection and protection features. Kick Start feature shall
42 provide 0 to 550% full load current for a duration of 0-2 seconds.
43 Ramp up start, current limit start features are also required. Device
44 shall incorporate an internal by pass, shunting Silicon Controlled
45 Rectifier (SCR) after reaching full load.
46

47 **vi. Solid-State Reduced Voltage Motor Control:** 48

1 1. The solid-state reduced voltage starter (soft starts) shall be UL and
2 CSA listed and bear the CE mark for compliance with applicable IEC
3 and Eruo Norm standards for solid state reduced voltage starters. The
4 solid-state reduced voltage starter shall be an integrated unit with
5 power SCR's heat sink, logic board, paralleling bypass contactor, and
6 electronic overload relay enclosed in a shingle molded housing. The
7 SCR based power section shall consist of six (6) back-to-back SCRs
8 and shall be rated for a minimum peak inverse voltage (PIV) rating of
9 1600 volts. The starter shall be three-phase, 60 Hz, and rated for the
10 HP, current, and voltage as shown on the QPL. The following control
11 function adjustments on the device keypad are required:
12

- 13 • Selectable Torque Ramp Start on Current Limit Start
- 14 • Adjustable Kick Start Time, 0-2 seconds
- 15 • Adjustable Kick Start torque, 0-85%
- 16 • Adjustable Ramp Start Time, 0.5-180 seconds
- 17 • Adjustable Initial Starting Ramp Torque, 0-85%
- 18 • Adjustable Smooth Stop Ramp Time, 0-6 seconds

19
20 2. Enclosed units shall include a thermal magnetic circuit breaker or
21 Motor Circuit Protector (HMCP) for short circuit protection and quick
22 disconnect means. Starters with breakers/HMCPs are to be rated per
23 UL508D with a withstand rating of 65 kAIC rms. Control power shall
24 be 24V DC as standard for safety and reliability. Separate control
25 terminals shall be provided for 24V DC power, logic levels signals for
26 permissive, start, jog forward, ramp start overload override and electric
27 reset. Control terminals shall be pull-apart for easy access and wiring.
28 Optional external interface circuitry shall include 120-volt relay logic
29 interface capability. A removable Customer Interface Module (CIM)
30 shall be provided that allows for full adjustment of control and
31 protection functions through the use of potentiometers and DIP (Dual
32 in-line package) switches. Enclosure shall not be less than 16-gauge
33 steel. Type 12 enclosures shall be of welded construction with
34 gasketed heat sink and doors.
35

36 **vii. Variable Frequency Drive (VFD) Controllers (MCC III Only)**
37

38 1. The VFD shall be rated for input voltage. The VFD shall be
39 microprocessor-based control for three phase induction motors. The
40 VFDs shall be Pulse Width Modulated (PWM) design. Adjustable
41 current source VFDs are not acceptable. Insulated Gate Bipolar
42 Transistor shall be used in inverter section. Bipolar Junction
43 Transistor, Gate Turn-Offs (GTO) or SCRs are not acceptable. The
44 VFDs shall have efficiency at full load speed that exceeds 97% for
45 motors over 40 HP.
46

47 2. The system containing the VFDs shall comply with the 5% level of
48 total harmonic distortion of line voltage and the line current limits as

1 defined in IEEE 519-1992. If the system cannot meet the harmonic
2 levels with the VFD provided with standard input line reactor or
3 optional input isolation transformer, the VFD manufacturer shall
4 supply a multiple bridge rectifier AC to DC conversion section with
5 phase shifting transformer for all drives above 100 HP. Harmonic
6 filters are not acceptable above 100 HP. The device shall be capable
7 of communicating with PSLUSD approved programmable logic
8 controller with optional Modbus communication capability.
9

10 **iii. Controls**
11

12 **1. Control Panel Builder**
13

- 14 a. The panel builder shall be experienced in the construction of lift station control
15 Panels, shall have a UL approved shop, and shall be able to provide both a UL
16 508 label for the panel, and a UL label for service rated.
17
18 b. The panel builder shall warrant the panel for one (1) full year minimum from
19 the date of start-up.
20
21 c. The panel builder or qualified technical representative shall checkout and test
22 the panel as part of the lift station start-up with PSLUSD and the EOR.
23

24 **2. Panel Components⁶**
25

- 26 a. The panel and panel components are specified in the PSLUSD standard details.
27 Omission of any component on the standard details does not relieve the contractor
28 from furnishing such components that would normally be required for wastewater
29 pumping stations.
30

31 **i. Enclosure**
32

- 33 1. The EOR shall ensure the panel sizing is in accordance with the pump
34 size of the lift station.
35
36 2. The panel shall be of a NEMA, 3R construction as listed on the QPL
37 with a drip lip.
38
39 3. The panel shall be constructed of grade 316 stainless steel, 14 gauge
40 with a #3 polish on the exterior.
41
42 4. All external hardware shall be stainless steel with piano hinge, three-
43 point latch with roller fitting top and bottom and single handle with
44 padlock fitting and stainless steel external parts.
45
46 5. Drip shield to deflect water from the door, closed cell neoprene gasket
47 on the door.

⁶ See Amendment 1
2019 Edition

6. Blank outer door with dead front inner door of 1/8" thick aluminum hinged on the left with the operator's controls mounted on or projecting through it.
7. Painted steel back mounting plate for heavy components.
8. Aluminum enclosure 1/8" thick around the surge arrester and surge capacitor with a 1/8" minimum, Lexan cover for the ends of the arrester and capacitor and the incoming line terminals to isolate the lightning arrester and surge capacitor in case of failure and to provide protection for the operator from the live terminals if the breaker is open.
9. The outer door is to have 9" x 11" painted steel or aluminum pocket for the log book tack welded to the inside of door.
10. Arms and latches shall hold both outer door and inner door in an open position; these must be sufficiently rigid and secure to hold doors open under windy weather conditions.
11. Sliding locking bar to allow only main or emergency breaker to be closed. Bar shall be aluminum with stainless steel hardware.
12. All hardware shall be grade 316 stainless steel.

3. Telemetry

- a. The contractor shall furnish and install the new radio telemetry equipment and programming as specified in the approved plans and in accordance with the PSLUSD Standard Details. Extension of fiber optic cable may be required when deemed necessary by the Utility Director. A single subcontractor shall be responsible for all hardware, software, system integration, programming, testing, and startup.

i. Components

1. Remote Telemetry System

- a. The Remote Telemetry shall be a microprocessor based Programmable Logic Controller (PLC) and shall serve as an interface to accumulate, process, transmit, and receive discrete and analog status and control messages between the RTU base station and the remote RTU sites. Remote sites shall be 452.100 MHZ or 151.565 MHZ or fiber optic PLC depending on location.
- b. The PLC shall be designed to operate in an industrial environment, be capable of operation in an ambient temperature range of 0-60° C and a relative humidity of 5%-95%, non-condensing. The PLC shall operate on supply voltages of 24 volts DC.
- c. LED-type indicating lights shall be shall be provided as follows:

1 i. READY; RUN; BATTERY LOW; MODBUS; ETH, Serial.

2
3 ii. Controller and accessory equipment shall be Modicon M340
4 PLC.

5 iii. All IEDs shall be powered with 24 vdc through a power supply
6 capable of float charging sealed Gel-Cell batteries and shall
7 include AC Power monitor with alarm output to the RTU loss of
8 AC power. Batteries shall be sized to provide 60 minutes of full
9 load back up in the event of AC power loss.

10 iv. Input/output modules shall be wired to terminal strips.

11 12 **2. RTU Communication Interface**

13
14 a. The radio transceiver shall be complete Calamp Vipier SC series
15 radio with serial and ethernet interface. The radio transceiver shall
16 include automatic frequency, control, loop back, and SMART
17 diagnostics. Radio enclosure shall include RF shield. Radio transceiver
18 shall be 5 watts at a frequency of 452.100 MHz or 151.565 MHz
19 depending on location. Cisco IE 3000-4TC Ethernet switch on
20 required for locations with fiber optic communication.

21
22 b. The complete communications subsystem including interconnecting
23 cables shall contain lightning, surge, and transient protection.

24
25 c. Control panels shall be sized to accommodate the PLC, radio
26 transceiver or fiber optic switch, power supply, backup battery, and
27 other ancillary equipment related to the remote telemetry system, as
28 well as all starters, soft starts, relays, over current protection and
29 Modicon TeSys T motor management system.

30 31 **3. Antenna and Tower Assembly**

32
33 a. Antenna and tower assembly shall be installed in accordance with
34 standard details.

35
36 b. Antenna cable shall be ½” Heliax with LMR connectors and
37 protected in panel with a Polyphaser surge protector.

38 39 **4. Surge Protection**

40
41 a. Surge protection shall protect the 120 volts AC system, the ½” helix
42 cable and antenna subsystem.

43 44 **5. Electrical Transient Protection**

45
46 a. All electrical and electronic elements shall be protected against
47 damage due to electrical transient induced in interconnecting lines
48 from lightning discharges and nearby electrical systems.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50

6. Manufacturer's Qualifications

a. The company shall have at least five years' experience in the design, development, and manufacture of surge suppressors.

7. Surge Suppressor

a. Surge suppressors shall be located at:

i. Any connections between AC power and electrical and electronic equipment, including panels, assemblies, and field mounted analog transmitters.

ii. The field, panel, or assembly connections of all analog signal circuits that have any portion of the circuit extending outside of a protecting building.

b. Surge suppressor assemblies for 120-volt AC power supply connectors shall be:

i. Provided with two 3-terminal barrier terminal strips capable of accepting a No.12 - AWWC solid or stranded copper wire. One terminal strip shall be located on each end of the suppressor unit.

ii. Epoxy encapsulated within a nonflammable phenolic enclosure with provision for mounting to interior or equipment racks, cabinets, or to the exterior of freestanding equipment. Epoxy encapsulation shall be flame retardant.

iii. Constructed as multistage devices. The first stage shall be a high-energy metal oxide variator element. The second stage shall consist of fast-acting high power bipolar silicon avalanche devices. First and second stages shall be interconnected through a series air core inductor of sufficient current-carrying capacity to permit a continuous operating current of 15 amperes. Inductors having ferrous or other high permeability core materials are not acceptable. Suppressor assemblies shall be the automatic recovery type.

c. Surge suppressors shall meet or exceed the following performance criteria based on a test surge wave shape with an 8-microsecond rise time and a 20- microsecond exponential delay time:

- Minimum Operating Voltage: 120 volts AC
- Maximum Breakdown Voltage: 150 volts AC
- Maximum Operating Current: 15 amps
- Peak First Stage Surge Current: 20,000 amps
- Maximum Second Stage Clamping Voltage: 350 volts
- Minimum Second Stage Clamping Voltage: 210 volts
- Ambient Temperature Range: -20° C to +85° C

1 d. Surge suppressors for analog signal connections shall:
2

3 i. Have four lead devices with a threaded mounting/grounding
4 stud.

5
6 ii. Have a circuit consisting of a 3-electrode gas tube and silicone
7 avalanche devices to clamp each line to the ground. High-energy
8 gas tube and silicone avalanche devices shall be separated by
9 series impedance.

10
11 iii. Be epoxy encapsulated with a nonflammable phenolic
12 enclosure. Epoxy encapsulation shall be flame retardant.

13
14 iv. Limit line-to-ground and line-to-line voltage to 30 volts on 24
15 volts DC circuits.

16
17 v. Meet or exceed the following performance criteria based on a
18 test surge wave with 8-microsecond rise time and 20-microsecond
19 exponential decay time:

- 20
- 21 • Recovery - Automatic
- 22 • Peak Source Current - 10,000 amps
- 23 • Pulse Lift Before Failure - 100 occurrences
- 24 • Minimum Voltage Clamp Rating - 30 volts
- 25 • Series Impedance - 24 ohms total
- 26 • Temperature Range - -20° C to +85° C
- 27 • Operating Voltage - Less than 30 volts DC
- 28 • Operating Current - 4 to 20 mA DC
- 29 ○ (ix) Resistance Line-to-Ground - Greater than 1 megaohm
- 30

31 **8. Corrosion Protection**

32
33 a. All indoor and outdoor panels shall be fitted with vapor phase
34 corrosion inhibitor capsules. Capsules shall be labeled with the date of
35 activation.

36 **9. Workstation Displays/Database**

37
38
39 a. The graphics screens shall match existing plant standard screens.
40 The database shall be configured for complete functionality including
41 I/O driver, tag names, alarm points, and printouts.

42 **10. Fabrication**

43
44
45 a. Cabinets and panel shall provide mounting for power supplies,
46 control equipment, input-output subsystems, panel mounted equipment
47 and appurtenances. Ample space shall be provided between equipment
48 to facilitate servicing and cooling.

1 b. The rack framework shall be stainless steel construction, 1-5/8" x 1-
2 5/8", using Powerstrut, Unistrut, or equal and/or angle to provide a
3 rigid assembly. Racks shall be of open, box-like framework with all
4 frame supports welded and ground smooth. Stainless steel straps shall
5 be used for locating terminal blocks. The terminal blocks shall be
6 factory assembled on a miniature mounting channel and the channel
7 bolted to the stainless-steel strap. Terminals shall be miniature screw
8 type unless otherwise required and shall be rated at least 300 volts, 20
9 amps, per the QPL.

10
11 c. The terminals shall be marked vertically with a permanent,
12 continuous marking strip from top to bottom. One side of each
13 terminal strip shall be reserved exclusively for field incoming
14 conductors. Common connections and jumpers required for internal
15 wiring shall not be made on the field side of the terminal subject to the
16 approval of PSLUSD. A vendor's pre-engineered and prefabricated
17 wiring termination system will be acceptable.

18
19 d. Wiring shall comply with accepted standard instrumentation and
20 electrical practices and codes. For each pair of parallel terminal blocks,
21 the field wiring shall be between the blocks. Solder-less horseshoe
22 (spade) connectors, with insulating sleeves shall be used for
23 connecting wires to terminal blocks.

24
25 e. All wiring shall be bundled and run open or enclosed in vented
26 plastic wire way, as required. All conductors run open shall be bundled
27 and bound at regular intervals, not exceeding 12", with nylon cable
28 ties. Care shall be taken to separate electronic signal, discrete signal,
29 and power wiring. A copper ground bus shall be installed the full
30 length of each panel. Interior panel wiring and field wiring shall be
31 tagged at all terminations with machine printed plastic sleeves. The
32 wire number shall be the ID number listed in the input/output
33 schedules.

34
35 f. Wires shall be color coded as follows:

- 36 • Neutral – White
- 37 • Ground – Green
- 38 • Power – Red
- 39 • Signal – Black and White
- 40 • Control – Violet
- 41 • Special – Blue

42
43
44 g. Panels shall be provided with a main circuit breaker and a circuit
45 breaker on each individual branch circuit distributed from the panel.
46 Main breaker and branch breaker sizes shall be coordinated such that a
47 fault in a branch circuit will trip only the branch breaker, but not the
48 main breaker.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

h. Panels shall be provided with an exterior, weatherproof 120-volt duplex receptacles for service equipment, and an internal LED panel light with separate switch located on dead front.

i. Provide separate 120-volt feeder circuit complete with circuit breaker and on/off switch.

j. Panels shall be furnished with red laminated plastic warning signs in each section. The sign shall be inscribed “WARNING - This Device is Connected to Multiple Sources of Power”. Letters shall be 1” high, white.

k. Panels shall have equipment racks mounted on a removable back plate (sub panel) to permit withdrawal of the equipment for maintenance or adjustment. Panels shall be designed to permit front access for all service and removal of equipment. Front access panels shall be hinged, removable with common keyed locking hardware. The interconnection between equipment and panel shall be by means of flexible cables provided to permit withdrawal of the equipment from the cabinet without disconnecting the plugs.

l. Panels shall be provided with separate 120-volt circuit and switch for area flood light.

11. Supplier’s Qualifications:

a. The system supplier shall be ISO 9000 certified, and regularly engaged in design, construction, installation, and startup of SCADA RTU systems.

4. Wiring

a. All wiring shall be copper, AWG 14 minimum. Wires shall be color coded as follows:

<u>Controls</u>		<u>Color</u>	
• Ground		Green	
• Grounded Neutral		White	
• 120-Volt Power		Black	
• Control		Red	
• 24-Volt Control		Blue	
<u>Power</u>		<u>240Y/120</u>	<u>480Y/277</u>
• Phase A	Black	Brown	
• Phase B	Red	Orange	
• Phase C	Blue	Yellow	
• Neutral	White	Gray	
• Ground	Green	Green	

- 1 b. Different control wiring colors are acceptable if clearly identified. Power
 2 wiring shall be kept separate from control wiring and shall be identified by phase.
 3 The high leg shall be the center terminal on the main breaker.
 4
 5 c. All wires shall be numbered with machine made plastic wrap around labels at
 6 both ends.
 7
 8 d. All external connection and internal connections, where shown on the
 9 drawings, shall be brought to the numbered terminals.
 10
 11 e. Wiring shall be enclosed in panduct or equivalent wire ways and wiring
 12 between the doors and the panel shall be enclosed in a spiral wrap or approved
 13 equal with sufficient slack to allow full opening of the door.
 14
 15 f. Wiring shall be secured with screw-on tabs. Tabs with adhesives shall not be
 16 used.
 17
 18 g. All wiring shall be front accessible.
 19
 20 h. All conduits to be ultra-violet resistant PVC, Schedule 80 or stainless steel for
 21 electrical use, as indicated in the PLSUD standard details for control panels and
 22 shall be of 2" minimum size.
 23

24 **5. Component Mounting**

- 25
 26 a. All components shall be securely mounted with stainless steel hardware. Self-
 27 tapping screws are not acceptable.
 28
 29 b. All relay bases shall be front-mounted with screw terminals. No soldered
 30 connections shall be used. All base terminals shall be numbered to correspond to
 31 relay numbers. Where plug-in components are not firmly secured in bases, hold
 32 down clamps shall be provided.
 33

34 **6. Identification**

- 35
 36 a. All components shall be identified in accordance with the schematic diagram,
 37 using permanent nametags on the panel of laminated micarta or approved equal.
 38 The permanent nametags shall be securely attached and in a position where they
 39 are clearly visible.
 40
 41 b. All operators' controls shall be provided with laminated micarta nametags
 42 attached with stainless steel screws, with minimum lettering height of 1/8".
 43
 44 c. A laminated schematic drawing shall be attached to the inside of the outer door,
 45 minimum size 11" x 17".
 46
 47 d. Attach a separate laminated label showing the following details:
 48

Pump	Motor
• Brand	Horsepower
• Catalog Number	Speed
• Impeller Number and Size	Voltage

- Design Head Full Load Amps
- GPM Catalog Number
- Serial Numbers Serial Numbers

7. Component Features

a. Main and Emergency Breaker: The panel shall include circuit breaker sized as required for main power and emergency power disconnect. Breakers shall be mounted on the sub panel with handles through inner door and shall include a mechanical interlock on the handles to ensure that only one breaker can be in the "ON" position at any one time. Circuit breaker Ampacity Voltage and Interrupting Capacity shall be listed on the construction drawings. Panel shall also include an externally mounted generator power receptacle pre-wired to the emergency breaker.

b. High Level Alarm System: The panel shall include a vapor-proof red light mounted on the top of the enclosure for high-level alarm visual indication and a weatherproof horn mounted on the underside of the panel box. The alarm light and horn shall be pre-wired to terminals to operate on a high-level control signal. An alarm silence push button labeled "Alarm Silence" shall be mounted on the outside of the enclosure and pre-wired to a relay which will silence the horn under all conditions, and automatically reset when high level condition is corrected. The high-level light shall have a flasher to pulse the red external visual indicator light during a high-level condition. The alarm light is to be designed and positioned to provide an unobstructed access for changing light bulb.

c. Elapsed Time Meters: The panel shall include a non-resettable type elapsed time meter for each starter mounted on the inner door to record the accumulated running time of each pump. A totalizer to record running time of all pumps shall also be provided.

d. Convenience Receptacle: The panel shall have a Ground Fault Interrupter (GFI) type convenience receptacle mounted on the inner door to provide plug-in 120-volt power with ground fault protection.

e. Phase and Voltage Monitor Relay:

i. The panel shall have a line voltage rated phase sequence and loss monitor relay. The monitor relay shall be the adjustable type to be field set for nominal available incoming voltage. The monitor relay will be pre-wired to take the control circuit out of service if a phase is reversed, one or more phases are lost, or drops below nominal voltage or if all three phases drop below nominal voltage.

ii. The unit will automatically restore when normal conditions are restored.

iii. Relay shall be the socket-mounted type.

1 **f. Seal Failure Indicator:** The panel shall have a seal failure (leak detector)
2 indicator pilot light for each pump, if applicable. These pilot lights shall be
3 operated by moisture sensing monitors that are signaled by probes supplied in
4 each pump.

5
6 **g. Lightning Arrester/Surge Suppressor:** The panel shall have three-phase
7 transient voltage lightning arrester/surge suppressor protection. The suppressors
8 shall be pre-wired to the point of incoming line service.

9
10 **h. Float Control System:**

11
12 i. The panel shall have a five-float control system, to activate the appropriate
13 controls. The floats shall have the capability to control several pumps and
14 alarms, as well as indicate levels, using discrete set points. Floats shall be used
15 in conjunction with various monitoring, indicating, and logic control devices.
16 The highest float shall operate a relay-controlled backup system.

17
18 ii. Each motor shall have a separate circuit breaker.

19
20 iii. Each control cable from the wet well into the control panel shall be
21 protected by a suppressor.

22
23 iv. Each alarm shall have a spare contact. The contacts shall be terminated on
24 a terminal strip for future use.

25
26 **i. Telemetry System:** The components shall include, but not be limited to,
27 terminal strip, relays, float switches, power supply (24 volt and 120 volt) and pilot
28 lights.

29
30 **j. Main Power Disconnect:** A service rated fused type circuit breaker shall be
31 included, sized as required for disconnecting main power to panel box and shall
32 be housed in separate stainless-steel enclosure mounted behind main panel box as
33 indicated on the PSLUSD standard detail. Where required by the power company,
34 an additional disconnect will be provided prior to the meter.

35
36 **8. Installation**

37
38 a. Installation of piping and valves shall be in accordance with specifications in
39 Section N of this Chapter.

40
41 b. All installations shall be performed in such a manner so that components are
42 plumb and true and aligned in such a manner that the station is fully operable and
43 functional and no additional maintenance or restorative action is required. All
44 electrical installations shall be performed by a licensed electrical contractor in
45 accordance with prevailing codes and licensing requirements and shall result in a
46 fully functioning station meeting the full intent of these specifications and the
47 drawings.

1 c. The contractor shall install the required fence in a true and straight manner,
2 construct the required water service with a reduced pressure principle backflow
3 prevention assembly, construct the concrete driveway access, construct all
4 necessary conduit and electrical connections and all other appurtenances shown
5 on the approved plans or reflected within these specifications and PSLUSD
6 Standard Details, to provide for a fully functional installation.

7 d. The contractor should give particular attention to the following items during
8 installation of the lift station:
9

10 i. All guide rails shall be attached to access lid frame with approved bracket
11 assemblies. Intermediate guide rail supports shall be provided per
12 manufacturer's recommendations and at least every 10'. Guide rails shall be
13 316 stainless steel piping.
14

15 ii. Lifting rings for the wet well or valve vault shall be removed below the
16 surface and grouted flush to avoid tripping hazards. Exterior lifting holes shall
17 be grouted flush.
18

19 iii. Concrete work is to be of a professional quality with nonskid finish.
20

21 iv. All discharge elbows shall be level and plumb to ensure all guide rails will
22 work properly and that pumps can be removed easily and seat properly.
23

24 v. All adapter flanges shall be installed according to drawings to allow easy
25 removal of valves. All bolts shall be torqued according to the manufacturer's
26 recommendations.
27

28 vi. The pedestal, control panel, and related components shall not be painted.
29

30 vii. The lift station site, within the fenced area, shall be covered with # 57
31 stone, a minimum of 6" and a maximum of 8" deep, over 2-ply 4mil visqueen.
32 The site shall be graded for proper drainage to prevent inflow of storm water
33 into the wet well.
34

35 viii. Modifications to an existing pumping station shall be completed in
36 accordance with these specifications and the details shown on the approved
37 plans. This includes all work, materials, and cleaning to provide a fully
38 operational station in a "like-new" condition.
39

40 **9. Generator**

41
42 a. Where portable emergency power equipment is utilized, the generator shall be
43 diesel fuel powered, trailer mounted, and with sufficient capacity to run the
44 pumps and all electrical equipment at the pump station during a power failure.
45

46 b. The developer shall pay for the cost of the generator and related equipment, as
47 required in the Utility Service Agreement.
48

1 **J9. PIPELINE CLEANING (Poly Pig Method)**
2

3 1. The contractor shall provide supervision, labor, tools, material and equipment necessary to
4 clean all newly constructed mains, using an approved poly pig procedure. The contractor shall
5 provide and install all items required, including poly pigs, launching and retrieval devices and
6 test equipment, in accordance with the specifications incorporated herein and PSLUSD standard
7 details.
8

9 2. The materials specified shall be constructed and installed in accordance with the best practice
10 and methods.
11

12 **3. Contractor Qualifications**
13

14 a. The materials and work specified herein shall be furnished and performed by firms fully
15 experienced, reputable, and qualified in pipeline cleaning with the poly pig method.
16

17 b. Equipment shall be installed in accordance with manufacturer's recommendations by
18 personnel thoroughly trained, knowledgeable and experienced in the technology and
19 procedures required for the proper and safe "pigging" of the system.
20

21 **4. Contractor Responsibilities**
22

23 **a. Supervision**
24

25 i. There shall be on-site at all times during the work, one supervisor with experience in the
26 cleaning of utility mains utilizing the procedure outlined herein.
27

28 **b. Proposed Method**
29

30 i. The method of cleaning shall be by use of bare swab type poly pigs with light-density
31 open-cell urethane foam body, base coated with urethane elastomer. The pigs shall have
32 the characteristics detailed below in section 5.-Poly Pigs. A minimum of two pigs of a size
33 2" larger than the diameter of the pipe shall be used for each main that is cleaned.
34

35 **c. Cleaning & Testing**
36

37 i. Cleaning shall remove soil, debris, suspended or floating matter and other foreign
38 material from the pipe, without over abrading or over cleaning the interior walls of the
39 pipe. PSLUSD shall consider a pipe to be clean when a sample of approximately two
40 gallons of water is swirled and allowed to settle in a clean white five-gallon bucket and
41 there is no visible soil, debris, suspended or floating matter or any other foreign material.
42 This test shall be performed when the water leaving the pipe appears to be clean for a
43 minimum of two minutes.
44

45 ii. The pigging procedure will be repeated until the above-mentioned test shows that the
46 cleaning is satisfactory.
47
48
49

1 **5. Poly Pigs**

2
3 a. Poly pigs shall be constructed of blown elastomer polyurethane with an open cell
4 construction and a density equal to or suitable for use in the piping system being cleaned.
5 Poly pig configuration shall consist of a parabolic nose and a concave base. The pig shall be
6 coated with a resilient surface material that will maintain a peripheral seal and effectively
7 clean the pipe without over abrading or causing any damage to the interior wall.
8

9 b. Poly pig characteristics shall include the ability to navigate through 90° and one hundred
10 and 180° turns, bi-directional fittings, full port valves and comparable in-line appurtenances,
11 reduce its cross-sectional area and restore itself to its original design configuration, be
12 propelled by applications of hydraulic and pneumatic pressure while maintaining its primary
13 function as an internal cleaning device of conduits. When in use, the pig must be able to
14 undergo a reduction to a minimum of 65% of the original cross-sectional area and return to
15 shape while maintaining the sliding seal and ability to clean. Pigs shall be bi-directional and
16 have the ability to negotiate fittings, valves and other appurtenances.
17

18 **6. Performance**

19
20 a. Contractor will prepare, with assistance from the EOR, the design of the cleaning
21 procedure including the provision of:

- 22
23 • Selection of starting and ending points for the cleaning process.
- 24
25 • Evaluation of total volume of fluids to be used and the disposal and the source(s) of
26 fluids.
- 27
28 • Mechanical or piping adaptation to the existing piping configuration.
- 29
30 • Coordination and scheduling of the cleaning process to include selection of the distances
31 and sizes of the piping to be cleaned as one procedure.
- 32
33 • Immediately available alternative procedures to be applied if the cleaning of the system
34 requires such remedial action.
35

36 b. PSLUSD will not accept any utility mains that do not pass the cleanliness test required in
37 Section c. above.
38

39 **J10. RECLAIMED WATER METERING STATIONS**

40
41 1. The contractor shall be responsible for furnishing of all labor, materials, equipment and
42 incidentals required to install a complete and operational reclaimed water metering station with
43 fiber optic communication as shown on the approved plans, the PSLUSD standard details and as
44 specified herein.
45

46 2. These specifications are the minimum requirements regarding the equipment application,
47 furnishings, installation, delivery, shop and field-testing of all materials, equipment and
48 appurtenances for reclaimed water metering stations. The manufacturer's recommendations and

1 approved plans may contain additional requirements pertinent to the installation of equipment,
2 including accessory and auxiliary equipment and material types, which may not be specified
3 herein.
4

5 3. Installation shall be completed in a manner that all components are plumb, true, properly
6 aligned, fully operable and functional, and no additional maintenance or restorative action is
7 required. Electrical work shall be performed by a licensed Electrical Contractor in accordance
8 with prevailing codes and licensing requirements. The fence, driveway and other features shall
9 be constructed in accordance with the approved plans and the PSLUSD Standard Details.
10

11 4. The specifications shall not be construed as requiring the contractor to utilize personnel
12 supplied by his assigned instrument manufacturer's organization, or any division thereof, to
13 accomplish the physical installation of any elements, instruments, accessories or assemblies
14 specified herein. However, the contractor shall employ installers who are skilled and experienced
15 in the installation and connection of all elements, instruments, accessories and assemblies.
16

17 5. PSLUSD shall be provided with an exclusive easement around the metering station, consistent
18 with PSLUSD detail RW-01. Dedicated easements for ingress and egress shall also be provided
19 where necessary.
20

21 6. Developer/Contractor shall pay for all costs associated with having electrical power designed
22 and installed to the metering facility. This shall include any and all fees or charges which may be
23 required and payable to Florida Power and Light Company (FPL).
24

25 7. The operation of the metering station shall allow PSLUSD to control flow to a customer based
26 upon the following options of operational control:
27

- 28 • Flow
 - 29 • Upstream pressure
 - 30 • Downstream pressure
 - 31 • Daily volume and storage levels
- 32

33 The EOR shall obtain written approval from PSLUSD as to the specific type of operational
34 controls required.
35

36 **8. Related Sections**

- 37 a. Design Criteria for Reclaimed Water Mains
- 38
- 39 b. Pipe and Fittings
- 40
- 41 c. Valves and Appurtenances
- 42
- 43

44 **9. Contractor's Qualifications**

- 45 a. A contractor who is experienced, reputable and qualified in the installation of underground
46 and above ground utility lines and related appurtenances, as determined by PSLUSD.
47
- 48

1 b. A manufacturer who is experienced, reputable and qualified in the manufacture of items to
2 be installed /constructed shall furnish all equipment and materials, as determined by
3 PSLUSD.

4
5 c. All materials, fittings and appurtenances intended for use in pressure pipe systems shall be
6 designed and constructed for a minimum working pressure of 150 psi unless otherwise
7 specified.

8
9 **10. Submittals**

10
11 a. The EOR must submit signed and sealed flow meter sizing calculations for review and
12 approval by PSLUSD.

13
14 b. When selecting the electronic/hydraulic control valve, the EOR shall provide PSLUSD
15 with a copy of the cavitation analysis performed by the manufacturer, and any anti-cavitation
16 device recommendations, if necessary. PSLUSD retains the authority to request additional
17 cavitation analysis for varying scenarios. Additionally, should the use of an orifice plate be
18 required by the manufacturer, or if PSLUSD opts to use one instead of other anti-cavitation
19 options recommended by the manufacturer, the EOR must submit signed and sealed
20 calculations to PSLUSD for review to verify proper sizing and adjustment of hydraulic grade.

21
22 c. Shop drawings shall be submitted to PSLUSD and the EOR for review and/or approval.
23 Shop drawings shall be submitted as a complete bound color PDF package. Stamps and
24 signatures on each of the individual components for each sheet shall be required from both
25 the contractor as well as the EOR. Each shop drawing submittal, whether it is the first
26 submittal to PSLUSD or subsequent revised submittal, must be accompanied with the “Shop
27 Drawing Review Form”, which is available on PSLUSD’s website at
28 [https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
29 [development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/).

30
31 d. Shop drawings shall include information on all above ground piping, piping
32 primer/intermediate/finished coats, above ground fittings, above ground valves, flow meter,
33 all telemetry hardware, interface between instruments, control panel, level detection
34 components, electronic/hydraulic control valves, pipe supports, pressure gauges, electrical
35 schematics and any other requirements necessary to complete the reclaimed water metering
36 installation.

37
38 e. Data shall include drawings and descriptive information in sufficient detail to show the
39 kind, size, arrangement, and operation of component materials and devices, the external
40 connections, anchorages, and support required, and dimensions needed for installation and
41 correlation with other materials and equipment. All part numbers and catalog data required
42 for ordering spares and replacements shall be provided.

43
44 f. Data sheets for each component must be submitted together with a technical product
45 brochure or bulletin. This includes electronic indicator, manual set-point station, ultrasonic
46 level controller, RTU, panel enclosure and all other devices or equipment which will be used.

47
48 g. The Instrumentation Systems Integrator (ISI) shall be per the QPL and shall be submitted
49 to PSLUSD, through the EOR, detailed procedures to physically test each Input/Output (I/O)

1 that provides control and/or warnings such as alarms, level controls and pressure and flow
2 set-points. PSLUSD reserves the right to modify the testing procedures provided by the ISI.
3 Any modifications to the procedures by PSLUSD will be provided in writing to the EOR.
4

5 h. Drawings showing definite diagrams are required for every instrumentation loop system.
6 Drawings shall include electrical schematics, layout, wiring diagrams, and a parts list for all
7 control circuits and within the control panel.
8

9 i. The acceptance of drawings returned marked "REVIEWED" or "REVIEWED AS
10 NOTED" will not constitute a blanket approval of dimensions, quantities, and details of the
11 materials, equipment, device or items shown and does not relieve the contractor of any
12 responsibility for errors or deviations from the requirements.
13

14 j. The EOR must submit to PSLUSD start-up documentation, initialized by the contractor, ISI
15 and the valve manufacturer, indicating that the hydraulic control valve and all associated
16 equipment have been installed correctly and operating per the manufacturer's specifications.
17

18 k. The ISI shall submit to PSLUSD (through the EOR) any independent instrumentation
19 programs outside the PLC in hard copy format (i.e., storage level sensor, etc.).
20

21 **11. Meters**

22
23 a. The flow meter shall be per the QPL and have a sealed indicator having a range
24 determined by the EOR and approved by PSLUSD, or an approved equal.
25

26 b. The flow meter shall also be equipped with a transmitter per the QPL. The transmitter
27 signal output shall be in direct proportion to the flow through the meter and shall be
28 converted to a two-wire 4 to 20 mA DC current output transmitted to a local display and the
29 PLC.
30

31 c. Meter shall be a velocity propeller type, magnetic drive, sealed housing, flanged tube
32 meter for 150 psi working pressure. It shall comply with the applicable provisions of
33 AWWA, except for the higher standard required in this specification. In the event of conflict,
34 the specification herein shall prevail. Meter shall be equipped with a six-digit totalizer
35 reading in units of gallons and shall be accurate within $\pm 2\%$ of true flow within the
36 manufacturer's specifications for flow range, or an approved equal.
37

38 d. Meter tube shall be fabricated steel pipe and use 150 lb AWWA Class "D" flat face steel
39 flanges. The internal and external of the meter tube and meter head shall be blasted to near
40 white metal and coated with 12-15 mils of fusion epoxy coating, applied by the fluidized bed
41 method. Meter tubes shall have a constant nominal inside diameter to offer minimum
42 obstruction to the flow and shall be furnished with four straightening vanes.
43

44 e. Meter head shall be connected to the tube by means of a flanged, O-ring sealed connection
45 with stainless steel bolts. The meter head shall be designed for easy removal of water wetted
46 parts from the tube for inspection or repair without having to remove the complete tube.
47 Water wetted meter components that are permanently attached to the tube will not be
48 accepted.
49

1 f. Gear box shall be bronze, sealed and filled with a high-grade lubricant. The drive
2 mechanism shall be magnetically driven from the propeller, through a magnetic coupling and
3 be isolated from the water flow by means of an O-ring sealed housing. A rigid stainless steel
4 vertical shaft is required from the miter gear frame to the totalizer drive magnet. Flexible
5 cables will not be accepted.
6

7 g. Propeller shall utilize a water lubricated ceramic sleeve and spindle bearing system. The
8 stainless steel/ceramic spindle on which the propeller is mounted shall be parallel to the
9 direction of the water flow in the pipe. Dual ceramic thrust bearings shall be standard on the
10 meter. Ball bearings or other types of sleeve bearings will not be accepted. The propeller
11 shall be a conical shaped, three bladed, injection molded of thermoplastic material, resistant
12 to normal water corrosion and deformity due to high flow velocities. Propellers, which have
13 been trimmed, shaved or require varying change gears for the same size meters, will not be
14 accepted.
15

16 h. Transmitter shall be encased in a sealed housing conforming to NEMA standards for
17 weatherproof enclosures. It shall provide a solid state, optically coupled pulse output and a
18 loop powered current output to drive the associated instrument(s). The unit shall be per the
19 QPL. The standard 4-20 mA DC sourcing type current output gives 4 mA output at zero
20 flow and 20 mA output at the maximum scale range selected by the EOR and approved by
21 PSLUSD. The pulse output (open collector transistor output) will be a minimum of 150
22 pulses per minute at the maximum flow range of the instrument that the transmitter is
23 controlling. The transmitter enclosure shall be made from injection molded 20% glass filled
24 engineered grade thermoplastic. Transmitter shall attach directly to the propeller meter head
25 with screws having holes for seal wires and be protected with an O-ring seal.
26

27 i. Transmitter output shall be in direct proportion to the flow through the meter at the above
28 pulse rate and current output. The unit shall be powered by an external 12-30 volts DC power
29 supply wired in a loop with the current output. The 4-20 mA DC output shall not change or
30 require any field adjustments with the varying voltage of the power supply.
31

32 j. Indicator-totalizer shall be equipped with a digital transmitter and six-digit, straight reading
33 type totalizer. The totalizer shall read in units of gallons and be able to check the accuracy of
34 the indicator. The indicator drive mechanism shall be temperature compensated, so the
35 indicator hand shall be accurate and linear within +/- 1% at all points when the unit is
36 operated within the temperature range of 32° to 140° F. The indicator-totalizer shall be
37 protected by an O-ring sealed bonnet made from injection molded 20% glass filled
38 engineering grade thermoplastic. The bonnet shall be attached to the meter head by screws
39 located under the hinged lid, which has a padlock hasp.
40

41 k. Volumetric testing of all meters must be performed and approved prior to shipment. The
42 complete meter head assembly must be accuracy tested in the same pipe size and same type
43 tube that the meter will be mounted in. The test shall be at near minimum, intermediate, and
44 maximum manufacturers specified flow ranges of the meter. The amount of water used to
45 conduct the test must be left on the totalizer. Prior to shipping, a tag shall be attached to the
46 meter showing the totalizer reading after the test. The test facility must be certified annually
47 to an accuracy of $\pm 0.2\%$ and be traceable to the National Institute of Standards and
48 Technology. If desired, the test shall be witnessed by the customer or their selected agent and

1 a copy of the certified accuracy test record must be furnished at no charge to the customer, if
2 requested.
3

4 **12. Electronic/Hydraulic Control Valves** 5

6 a. The electronic/hydraulic control valve shall be a dual solenoid control which shall close
7 valve upon power loss or PLC failure. The valve shall also have the ability to be operated
8 manually, via the pilot system, upon power or PLC loss and/or during normal operation. The
9 valve shall be per the QPL. The valve to be manufactured as followed, ductile iron body,
10 globe, 150-pound class flanged, 304 stainless steel trim (disc guide, seat and cover bearing),
11 304 stainless steel cover hardware, brass ASTM B283 solenoid body and pilot tubing, 304
12 stainless steel disc retainer and diaphragm washer, Buna-N rubber, isolation valves, and flow
13 clean strainers. Valve should be sized in accordance with manufacturer's recommendation.
14 The valve may require an anti-cavitation option or an orifice plate, as determined by the
15 manufacturer and with approval by PSLUSD, based upon the cavitation analysis submitted to
16 PSLUSD. The valve shall have the ability to modulate flow, via a set-point signal from a
17 remote computer, based upon varying feedback signals such as flow rate, upstream and/or
18 downstream pressures, daily volumes delivered and storage levels.
19

20 b. A valve positioning transmitter shall also be provided. The valve positioning transmitter
21 shall be per the QPL. The transmitter shall be installed and interfaced with applicable
22 electronic components to provide remote monitoring of valve position. The signal from the
23 position sensing mechanism shall be converted to a two-wire 4 to 20 mA current output
24 transmitted to a local display and the PLC. The output signal shall range from 4 mA to
25 represent valve fully closed to 20 mA for valve fully open.
26

27 c. The brass solenoid body, brass pilot tubing, name plate data and all instrumentation
28 connections to the valve shall not be painted.
29

30 **13. Storage Requirements** 31

32 a. Storage shall be provided by the developer/customer for the purposes of retention during
33 wet weather conditions, maintenance of irrigation equipment, or other conditions which
34 preclude the use of reclaimed water. Type of storage may include a pond, reservoir, tank, or
35 an above/below ground structure and shall be addressed in the design engineering report
36 required in this Chapter. As a minimum, storage capacity shall be three times the average
37 daily volume of reclaimed water used. Construction shall be in compliance with applicable
38 state and local agencies.
39

40 **14. Storage Level Sensor** 41

42 a. The level monitoring system shall be ultrasonic type, continuous level measuring system
43 consisting of, at the minimum, an ultrasonic level element/transducer, local display of storage
44 elevation and cable for connection from level element to local display and PLC. Level
45 element system shall have the ability to monitor storage levels both locally and through a
46 remote telemetry system.
47

48 b. Level element shall be ultrasonic type transducer. Transducer shall be of waterproof
49 construction with minimum operating range of -20° to +50° C (larger range preferred) at one

1 (1) atmosphere, unless otherwise noted. The instrument supplier will coordinate with the
2 transducer manufacturer for proper mounting of the transducer within the storage stilling
3 well, as shown in the standard detail.
4

5 c. The storage level monitoring system shall provide a 4 to 20 mA DC output signal to the
6 PLC in linear proportion to the level being sensed. The level range/readouts shall be based
7 upon the maximum storage elevation allowed (high level), which is to be provided by the
8 EOR and approved by PSLUSD. The local display component for the storage level shall be
9 provided in the control panel, along with the any necessary functions for level
10 calibration/controls, for use by the PSLUSD operator.
11

12 d. The system shall have an overall accuracy of plus or minus 0.25% of full scale and shall
13 operate on 120 volts, 50/60-HZ power.
14

15 e. All necessary interconnecting cables shall be furnished with the equipment provided in
16 sufficient length.
17

18 f. All equipment shall be provided transient surge protection for the incoming 120 volts AC
19 and DC signals.
20

21 g. The sensors shall be accessible for calibration, maintenance, and replacement.
22

23 **15. Control Panel and Telemetry System**

24

25 a. Fiber optic communication shall be used in lieu of radio telemetry in all instances.
26 Extension of and connection to the existing fiber optic system is required.
27

28 b. The system supplier shall be per the ISI on the QPL and will be responsible for furnishing
29 and installing the new Telemetry equipment and programming as specified. ISI shall be
30 responsible for all hardware, software system integration, programming, testing and startup.
31 HMI graphical screen development and required database configuration of the existing data
32 acquisition software shall be provided consistent with the monitoring facility (Glades or
33 Westport WWTP).
34

35 c. Local control of the reclaimed water metering station shall be through a portable laptop
36 computer.
37

38 d. The panel builder shall be experienced in the construction of lift station control panels,
39 shall have a UL approved shop, and shall be able to provide both a UL 508 label for the
40 panel, and a UL label for service rated.
41

42 e. The Remote Telemetry shall be microprocessor based, user programmable PLC, and shall
43 serve as an interface to accumulate, process, transmit, and receive discrete and analog status
44 and control messages between the RTU base station and the remote RTU sites located.
45

46 f. The panel builder shall warrant the panel for one (1) full year minimum from the date of
47 start-up.
48

1 g. The panel builder or qualified technical representative shall checkout and test the panel as
2 part of the station start-up with PSLUSD and the EOR.
3

4 h. The panel shall be 316 stainless steel modified NEMA-12 control panel with a drip shield
5 along the complete top of panel. Padlocking handles shall be provided with accessories and
6 doorstop kit. Provide two extra bolted clips on front edge of door panel with all stainless-
7 steel hardware. An aluminum inner hinged door shall contain all operators' controls and the
8 dead front panel outside door shall be blank. Provide duct seal putty on all outgoing conduits.
9 Provide corrosion inhibitor per the QPL.
10

11 i. Control panel shall be mounted to two (2) 3" diameter aluminum pipe supports (6061-T6-
12 Sch40). Length of the pipe supports shall be sized so as to provide for 36" of burial (in 3000
13 psi concrete) and extend to 3" above the top of the supports. The panel shall be mounted to
14 the pipe supports with one (1) 5/8" x 5/8" 12-gauge stainless steel Unistrut at a height
15 consistent with FPL requirements for mounting their meter. Paint below ground portion of
16 supports with asphalt-based paint to 3" above grade. All hardware shall be stainless steel.
17

18 j. A back-mounting panel for heavy components including RTU shall be provided.
19

20 k. Panel shall be surface wired with numbered terminals. Terminal strip shall be located at
21 least 4" from the bottom of the enclosure for accessibility.
22

23 l. All wiring shall be copper THWN. Shielded cable shall be Belden 8760 or approved equal.
24

25 m. Panel shall be built by UL approved shop and adhere to UL label 508.
26

27 n. A circuit breaker disconnecting NEMA-4X stainless steel enclosure shall be provided
28 outside the control panel. Disconnect shall be service entrance rated.
29

30 o. Panel components shall be as listed. No substitutions shall be made without prior approval
31 in writing from PSLUSD.
32

33 p. Telemetry hardware and conduit will conform as specified in control panel requirements.
34 Telemetry systems shall be compatible with PSLUSD's central control receiving station.
35

36 q. RTU antenna requirement shall be as shown on the standard detail.
37

38 r. Local and remote readouts shall be provided per the standard detail for I/O Schematic and,
39 at a minimum, as listed below in the units shown:
40

- 41 • Upstream pressure (psi)
- 42 • Downstream pressure (psi)
- 43 • Flow (gpm/gpd) (two readouts/modes):
 - 44 ○ Instantaneous flow rate
 - 45 ○ Daily volume delivered
- 46 • iv. Storage Level (two readouts/modes):
 - 47 ○ Storage Elevation (NGVD)
 - 48 ○ Feet above or below storage high water elevation

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48

- v. Valve position (% open)
- vi. FPL power (light)

- s. Breakers shall be per the QPL.
- t. Pilot lights, selector switches and push buttons shall be per the QPL.
- u. Surge Arrestor for power and lighting shall be per the QPL.

v. The PLC shall be per the QPL and shall have:

- One (1) digital output card 8-channel
- One (1) digital input card 8-channel
- One (1) CPU
- One (1) Ethernet Module or Ethernet/Modbus converter
- One (1) fiber optic/Ethernet switch
- One (1) 8-channel analog input card
- One (1) 4-channel analog output card

a. General I/O schedule is as follows, unless otherwise modified by PSLUSD:

- | | |
|--|-------------------------------|
| • Upstream Pressure | Analog Input |
| • Downstream Pressure | Analog Input |
| • Instantaneous Flow rate | Analog Input |
| • Daily Volume Pumped | Totalizer Programmed into PLC |
| • Daily Volume Delivered | Totalizer Programmed into PLC |
| • Valve Position (Feedback) | Analog Input |
| • Valve Position (Flow rate Set Point) | Analog Output |
| • Storage Level | Analog Input |
| • FPL Power | Analog Input |
| • Storage Flow Rate | Analog Input |
| • Local/Remote Indication | Discrete Input |

CHAPTER III
CONSTRUCTION COORDINATION, INSPECTIONS AND TESTING

A. GENERAL

1. The EOR shall have a pre-construction meeting with PSLUSD and the contractor prior to starting construction. The meeting shall be held at the Utility Department’s Office.
2. The EOR shall coordinate all construction and inspections on the project and shall be the point of contact with PSLUSD. Testing shall be conducted by or at the direction of the EOR in the presence of a PSLUSD inspector.
3. The contractor shall contact the EOR, the appropriate governmental jurisdictional agency, and all utility companies at least 48 hours prior to commencement of construction for coordination of any utilities.

1 4. There shall be no field changes or deviations from design without prior written approval of
2 PSLUSD and the EOR.

3
4 5. All materials, construction methods, testing, and disinfection shall conform to the
5 requirements of the PSLUSD, FDEP, and AWWA current standards.

6
7 6. It is the EOR's responsibility to coordinate the installation of other public utilities near
8 PSLUSD facilities.

9
10 7. The contractor shall strictly adhere to the horizontal and vertical separation requirements
11 specified in the PSLUSD Utility Standards and applicable standard detail. All crossings between
12 PSLUSD facilities as well as with other utilities shall be left exposed until observed by a
13 PSLUSD inspector.

14
15 8. Contractor shall adhere to the approved Temporary Traffic Control Plan at all times where
16 work is in progress. Traffic control, barricades, etc. shall be in accordance with applicable
17 permits, local regulations and FDOT and OSHA standards.

18
19 9. Contractor shall repair any damage caused to existing utilities by construction activity in
20 accordance with applicable standards.

21
22 10. No pollution or erosion caused by this project will be allowed off site or in the stormwater
23 drainage system. The contractor shall install any devices necessary to prevent pollution or
24 erosion and comply with the City's code for erosion and sediment control standards. The cost of
25 pollution and erosion control shall be incidental to the cost of construction.

26 **B. INSPECTIONS & TESTING**

27
28
29 1. The EOR shall perform inspections, observations, and tests necessary to assure compliance
30 with Utility Standards, complete the required PSLUSD forms for inspections and testing, and
31 certify completion of the utility facilities.

32
33 2. The contractor shall not cover newly constructed facilities prior to a required inspection being
34 conducted by the EOR and PSLUSD. If any construction is covered before an inspection by
35 PSLUSD, the contractor shall be required to uncover it at his expense. If work is being
36 performed on days that are non-PSLUSD working days, i.e. weekends and holidays, pictures of
37 conflicts, etc. shall be taken and e-mailed to PSLUSD within 48 hours.

38
39 3. All work that has been rejected or condemned shall be repaired, or if it cannot be satisfactorily
40 repaired, shall be removed and replaced at the contractor/developer's expense.

41
42 4. Materials not conforming to the requirements of the specifications shall be removed
43 immediately from the site of work and replaced with satisfactory material by the
44 contractor/developer.

45
46 5. PSLUSD shall have the right to require additional inspections, certifications and/or testing to
47 confirm that the deficient work has been corrected.

1 **B1. PSLUSD INSPECTOR’S AUTHORITY**

2
3 1. The PSLUSD inspections are intended to make observations for verification of compliance
4 and do not relieve the EOR or contractor from fulfilling their responsibilities. Any items found to
5 be deficient after PSLUSD has approved an inspection will still require correction at the
6 contractor/developer’s expense.
7

8 2. The PSLUSD inspector is not authorized to revoke, alter or waive any requirements of the
9 specifications, but is authorized and expected to call to the attention of the EOR and/or
10 contractor any failure of work or materials to conform to the plans or specifications. The
11 PSLUSD inspector does NOT have the authority to make changes to the approved plans. The
12 inspector shall have the authority to reject materials or suspend the work until questions of issue
13 can be referred to and decided upon by the Utility Director or his designated representative.
14

15 4. The inspector shall in no case either act as foreman or perform other duties for the EOR and/or
16 contractor nor interfere with the management of the work. Advice that the inspector may give
17 shall in no way be construed as binding to the City of Port St. Lucie or releasing the developer,
18 his engineer or contractor from performing according to the intent of the plans and minimum
19 PSLUSD Standards.
20

21 **B2. SCHEDULING OF INSPECTIONS**

22
23 1. It shall be the responsibility of the EOR to schedule inspections via e-mail and their qualified
24 representative shall be present at all scheduled tests and inspections. Pre-testing is encouraged to
25 be completed prior to scheduled inspections, to minimize failures. A scheduled inspection will be
26 canceled and a re-inspection fee assessed if one of the three following situations occurs:
27

- 28 • A failing test result.
- 29
- 30 • Cancellation of the inspection with less than 24 hours’ notice.
- 31
- 32 • Failure to show for inspection by the EOR or contractor.
- 33

34 2. Re-inspection fees shall be assessed per scheduled hour of the inspection. The exception is for
35 TV inspection of gravity sewer, for which the re-inspection fee will be assessed on the hours
36 scheduled for the repairs and the TV inspection. The EOR will be notified or given a Failed
37 Inspection Notice at the time of the failed inspection. All re-inspection fees shall be paid to
38 PSLUSD prior to any subsequent scheduling of further inspections.
39

40 3. PSLUSD shall be provided with at least two (2) full working days’ notice for scheduled
41 inspections. Inspectors will make unscheduled visits as needed to observe such items as ongoing
42 work on site, restraints and clearances between conflicting lines.
43

44 4. Scheduled inspections will be conducted during normal business hours 7:30 am – 3:30 pm,
45 Monday through Friday, except when service disruptions are anticipated. When progress of a
46 project requires, for the convenience of the contractor, the periodic presence of a PSLUSD
47 representative during after hours, weekends and/or city holidays, the contractor/developer shall
48 accept the financial responsibility for the overtime hours (at overtime rates) with a possible
49 minimum of four (4) hours, including travel time.

1 **B3. REQUIRED INSPECTIONS**

2
3 1. The following are the required inspections:

- 4
5 • Materials inspection
- 6 • Installation of lift station/grinder structures/valve vault/grease interceptor
- 7 • Installation of the first manhole of the lift station and the first manhole to be installed
- 8 • Jack & bores and installation of the carrier pipes, directional drilling, directional boring
- 9 (and any other type of bore)*
- 10 • Connection to existing mains, tie-ins, wet taps, etc., witness installation of pigs and
- 11 temporary jumper assembly
- 12 • Flushing (pigging)*
- 13 • Restraints and conflicts*
- 14 • TV inspection (gravity sewer)*
- 15 • Infiltration/ex-filtration test report (leak test on gravity sewer, manholes, and pump
- 16 stations)*
- 17 • Pressure/leak testing*
- 18 • Chlorination/disinfection test*
- 19 • Chlorination flush
- 20 • Concrete pad formwork/rebar placement
- 21 • Liner welding and spark testing
- 22 • Wire trace continuity and electronic marker verification*
- 23 • Any reconstruction repairs and field changes (including lines that have not been turned
- 24 over to PSLUSD)
- 25 • Removal and plugging of sample points – Removal is at your risk unless the water main
- 26 has been certified
- 27 • Fire hydrant flow test*
- 28 • Electrical components of pump station
- 29 • Pump station start-up*
- 30 • Deflection test*
- 31 • Removal of temporary jumper assembly
- 32 • Final inspection/work completion
- 33

34 Some of the above inspections, such as Materials Inspections, Restraints and Conflicts, etc., may

35 be required on multiple occasions. The above inspections are performed typically in this order

36 unless otherwise agreed to and adjusted in the Pre-Construction Meeting.

37

38 *As a courtesy, PSLUSD Inspection/Test Reports can be completed on-site electronically by the

39 PSLUSD inspector or EOR’s representative. Tests and inspections are typically determined to

40 pass or fail at the time of the test or inspection. No separate paperwork is required for a passing

41 test or inspection. All test reports must be completed and can be downloaded from the city’s

42 website at [http://www.cityofpsl.com/utility/commercial-development/utility-commercial-](http://www.cityofpsl.com/utility/commercial-development/utility-commercial-development.html)

43 [development.html](http://www.cityofpsl.com/utility/commercial-development/utility-commercial-development.html).

44

45 2. EOR’s representative shall e-mail PSLUSD results of tests that are not marked with an

46 asterisk.

47

1 3. All pipe restraints and crossings shall be left exposed until inspected and approved by
2 PSLUSD. Such inspections may be combined with scheduled inspections or will be conducted at
3 a separate scheduled time.

4 5 **B4. REQUIRED TESTING** 6

7 1. The testing for various components of the water, wastewater and reclaimed water system
8 components shall be performed as detailed below. The EOR shall provide PSLUSD with written
9 test results on PSLUSD forms noted above for each required test. During construction, the
10 individual test reports shall be prepared and signed in the field immediately following the test.

11 12 **a. Performance testing of pressure pipe** 13

14 **i. Type of Testing** 15

16 1. The following performance testing must be conducted:
17

- 18 • Water Main: Hydrostatic, Leakage, and Bacteriological Testing
- 19 • Force Main: Hydrostatic, and Leakage Testing
- 20 • Low Pressure Main: Hydrostatic and Leakage Testing
21

22 **ii. References** - Testing shall be performed in accordance with the following references:
23

- 24 • ANSI/AWWA C600 – Ductile Iron Pipe Installation and Testing
- 25 • ANSI/AWWA C605 – Polyvinyl Chloride (PVC) Pipe Installation/Testing
- 26 • ANSI/AWWA C651 – Disinfecting Water Mains
- 27 • ANSI/AWWA C900 – PVC Pipe, 4"-12" for Water Distribution
- 28 • ANSI/AWWA C905 – PVC Pipe 14"& above for Water Distribution
29

30 **iii. Regulations** – No leak testing shall be performed until easements, Record Drawings,
31 and density tests have been submitted to the City. Incomplete easements, Record
32 Drawings, and density tests will prevent passing of leak testing, and no further testing can
33 be scheduled. Re-review fees may apply. Testing shall conform to PSLUSD
34 requirements and FDEP regulations.
35

36 37 **b. Temporary Connection to PSLUSD Water Main** 38

39 i. A temporary jumper connection is required between an existing active water main and
40 a newly constructed main until a clearance is obtained from PSLUSD. The temporary
41 connection shall be used at point(s) of filling in accordance with the standard details for
42 potable and non-potable water jumper connection.
43
44
45
46

1 ii. The EOR shall contact PSLUSD via e-mail at (inspectors@cityofpsl.com) regarding
2 scheduling of required inspections listed in this Chapter or any other inspections deemed
3 necessary by PSLUSD and shall strictly follow all procedures detailed in this Chapter.
4

5 iii. The temporary jumper assembly (flange to flange) will be supplied, installed and
6 tested by PSLUSD, in coordination with the EOR and the contractor. Other materials and
7 installation required for the connection shall be responsibility of the contractor. The
8 contractor shall disinfect the tapping sleeve and exterior of the main to be tapped by
9 spraying and swabbing with chlorine in the presence of a PSLUSD inspector. The
10 underground fittings shall be restrained mechanical joint type. All materials shall be per
11 the PSLUSD approved QPL.
12

13 iv. The jumper connection shall be maintained by the contractor until filling, flushing,
14 hydrostatic pressure/leakage testing, disinfection and bacteriological sampling have been
15 satisfactorily completed by the contractor and the test results are in compliance with the
16 PSLUSD and FDEP standards. Disinfection and bacteriological sampling is not required
17 for newly constructed force mains and reclaimed water mains.
18

19 v. A physical separation shall be maintained between an existing water main and the
20 newly constructed water main, except as noted herein. If approved in writing, PSLUSD
21 may allow a physical connection under controlled conditions as follows:
22

23 1. The procedure will be conducted by the contractor in the presence of a PSLUSD
24 inspector and the EOR or representative.
25

26 2. The new valve(s) shown in this detail shall be pressure/leakage tested and
27 replaced if leakage is observed. The valves will be kept closed by PSLUSD and
28 shall not be operated by anyone other than PSLUSD personnel.
29

30 3. The jumper connection shall be used to fill the new main.
31

32 4. The contractor shall disinfect the pipe and fittings used to make the connection by
33 spraying and swabbing with chlorine.
34

35 5. All valves in the new system downstream of the jumper shall be opened by the
36 contractor prior to flushing. The valves shown in the standard detail shall be opened
37 by PSLUSD personnel only.
38

39 6. The pigging and flushing shall be performed by the contractor in the presence of a
40 PSLUSD inspector. The valves will be closed by PSLUSD personnel after the main
41 has been flushed.
42

43 7. The main shall be pressure tested after flushing and prior to disinfection. All valves
44 shall be kept closed during the pressure test and will be opened by PSLUSD
45 personnel if the test results are satisfactory.
46

47 8. Disinfection shall be conducted in accordance with AWWA C651. A minimum
48 pressure of 20 psi shall be maintained in the new water main after disinfection.
49

1 vi. Bacteriological sampling and testing of the new water main shall be conducted per
2 Section B of this Chapter and a clearance obtained from PSLUSD or FDEP, as
3 applicable. The sampling points shall be removed and plugged, and the permanent
4 connection made by the contractor. The contractor shall disinfect the pipe and fittings
5 used to make the connection by spraying and swabbing with chlorine.
6

7 vii. At the request of the EOR only, PSLUSD will remove the jumper assembly (flange to
8 flange) after the corporation stop valves to the jumper have been closed, the valves shall
9 be plugged by the contractor after removal of the assembly.

10 viii. The contractor shall pay PSLUSD for all the water used, based on the initial and
11 final reading of the water meter.
12

13 **c. Cleaning/Flushing**

14 i. Flushing shall be conducted to clean the mains and remove all foreign matter.
15
16

17 ii. For water mains, flushing shall be conducted prior to disinfection. Hoses, fittings and
18 temporary pipes in ditches shall be provided as required to dispose flushing water without
19 damage to adjacent properties. Flushing velocities shall be at least 2.5 fps.
20

21 iii. All mains shall be cleaned using a poly-pig cleaning system as detailed in Chapter II,
22 Section N. All equipment and piping shall be provided by the contractor. Testing shall be
23 conducted to ensure proper cleanliness of the pipe as detailed in this section. PSLUSD
24 will not accept any utility mains that do not pass the cleanliness test.
25

26 iv. Prior to the actual line flushing operation, the contractor shall properly notify
27 PSLUSD and the EOR of such intended water use a minimum of 48 hours prior to
28 flushing of mains up to 8" diameter, and at least 1 week prior to flushing of mains larger
29 than 8". All flushing times will be limited to off peak times of water system demand and
30 consumption. No flushing shall take place without the PSLUSD inspector and EOR being
31 present.
32

33 v. The contractor shall pay PSLUSD for all water used.
34

35 vi. The flushing report shall be submitted by the EOR on the PSLUSD form prior to
36 disinfection.
37

38 **d. Hydrostatic and Leakage Testing**

39 i. Hydrostatic and leakage tests shall be made between valves and/or connectors for each
40 section tested using the procedure outlined in ANSI/AWWA C600 for DIP and C605 for
41 PVC.
42

43 ii. The contractor shall provide all necessary equipment such as pumps, gauges and water
44 measuring tanks and shall perform all work required for pipe pressure and leakage test.
45 The gauge shall read in 2-pound increments and shall be a maximum of 250 psi.
46
47

48 iii. Hydrostatic testing shall be performed for a period of not less than 2 hours at 150 psi
49 pressure for water/force/reclaimed water mains and at 100 psi for low-pressure mains.

1 The allowable rate of leakage shall be less than the number of gallons per hour
2 determined by the following formula:
3

$$L = \frac{SD \sqrt{P}}{148,000}$$

L = Allowable leakage in gallons per hour.

S = Length of pipe tested in feet.

D = Nominal diameter of the pipe in inches.

P = Average test pressure maintained during the test
in pounds per square inch gauge.

4
5 iv. The testing procedure shall include the continued application of the specified pressure
6 to the test system for the two-hour period using a suitable pump connected to the
7 pipeline. The pipeline shall be allowed to stabilize at the test pressure before conducting
8 the hydrostatic test. The pressure shall not vary by more than ± 5 psi from the required
9 pressure for the duration of the test. Test pressure shall be maintained with this tolerance
10 by adding makeup water through the pump into the pipeline. The amount of makeup
11 water shall be accurately measured and shall not exceed the allowable leakage rate as
12 determined using the above formula. If at any point during the test the pressure loss
13 exceeds 5 psi, the test is considered failed. Should the test fail, the contractor shall make
14 necessary repairs and the test shall be repeated until satisfactory results are obtained.
15

16 v. Any exposed pipe, fittings, valves, hydrants, and joints shall be examined during the
17 test to ensure there are no visible leaks. Any damaged or defective pipe fittings, valves, or
18 hydrants that are discovered following the pressure test shall be repaired or replaced with
19 sound material, and the test shall be repeated.
20

21 vi. The pressure test report shall be submitted by the EOR on PSLUSD form prior to
22 disinfection.
23

24 **e. Disinfection (Water Facilities Only)**

25
26 i. Disinfection of mains shall comply with AWWA C651. Each unit of completed water
27 main and distribution system shall be thoroughly flushed and then disinfected with
28 chlorine.
29

30 ii. Chemicals:

31
32 1. Sodium or calcium hypochlorite conforming to ANSI/AWWA B300 shall be used.

33
34 2. Calcium hypochlorite intended for use in swimming pools shall not be used.

35
36 3. Chlorine tablets shall not be used unless specifically approved in writing by
37 PSLUSD.
38

39 4. Pure chlorine gas or liquid shall not be used.

1 iii. The disinfection test report shall be submitted by the EOR on PSLUSD form prior to
2 final inspection.
3

4 **f. Bacteriological Sampling & Testing (Water Facilities Only)**
5

6 i. The contractor shall verify that piping system has been cleaned and properly isolated.
7 The maximum length of line to be tested as one section will be equal to or less than
8 2500’.
9

10 ii. Bacteriological testing shall not begin until after the pressure test has been passed.
11

12 iii. The contractor shall install sampling points required to take all necessary water
13 samples at locations designated in the approved plans and submit a single-sheet PDF map
14 of all sample points for review and approval prior to sampling.
15

16 iv. The contractor shall coordinate with a Florida Department of Health certified testing
17 laboratory to take all water samples required for bacteriological tests and shall maintain
18 continuous running bacteriological sample taps. Water mains being tested must remain
19 under line pressure until release of system into service by PSLUSD and FDEP.
20

21 v. The test report shall include the following information:
22

- 23 • Date issued, project name, and testing laboratory name, address, telephone
24 number and State Certification Number.
- 25 • Time and date of water sample collection.
- 26 • Name of person collecting samples.
- 27 • Test locations.
- 28 • Coliform bacteria test results for each outlet tested.
- 29 • Certification that water conforms to bacterial standards.
- 30 • Bacteriologist's signature and authority.
- 31
- 32
- 33
- 34
- 35
- 36
- 37

38 vi. The bacteriological test results shall be submitted to PSLUSD with the Final
39 Inspection Package.
40

41 **g. Fire Hydrant Flow Testing**
42

43 i. A flow test to verify the fire flow rates shall be performed by the EOR on all new fire
44 hydrants prior to the project’s final inspection. The gauges for the test will be provided by
45 PSLUSD. The flow tests shall be witnessed by the PSLUSD and contractor. The
46 contractor shall make provisions for minimizing interruptions to traffic and for adequate
47 drainage of water.
48

1 ii. Each hydrant shall be capable of delivering a minimum flow of 600 gpm for residential
2 areas and 1250 gpm for non-residential areas (or a higher flow as required by the Fire
3 Marshal), with a residual pressure of not less than 20 psi.
4

5 iii. The contractor shall provide one hydrant wrench, fire hydrant repair kits and
6 maintenance manuals to PSLUSD at the time of flow testing. One fire hydrant repair kit
7 shall be provided per every five fire hydrants. If there are less than five hydrants, one kit
8 will be required. These kits shall be turned over to PSLUSD at or before hydrant testing.
9 Each kit shall include a sufficient quantity of parts and lubricant to facilitate quick
10 repairs, and a copy of the maintenance manual. The repair kit items required for each
11 approved manufacturer are mentioned on the QPL.
12

13 iv. The test results shall be submitted by the EOR on PSLUSD form prior to being
14 considered passing.
15

16 **h. Infiltration/Ex-filtration Test (pump station and interceptor)**

17

18 1. Infiltration and ex-filtration testing shall be performed on interceptors and pump
19 stations to assure there are no leaks from joints or as a result of improper construction.
20 The following observation and test shall be conducted by the EOR in the presence of the
21 PSLUSD inspector:
22

23 i. Visual – During and after construction the inside of the structure shall be closely
24 observed for signs of wetness and leaks. PSLUSD will fail the inspection if wetness
25 and leaks are visible.
26

27 ii. Ex-filtration Test – All pipe openings shall be plugged and the interceptor/wet-well
28 shall be filled with water to the level of the underside of the access covers. After
29 allowing for an initial drop in elevation the chamber shall be refilled and the level
30 observed for duration of 2 hours. Any drop in water level is unacceptable and result in
31 the inspection being failed by PSLUSD. Pressure grouting shall not be considered an
32 acceptable method of repair.
33

34 iii. The results of the test shall be submitted by the EOR on PSLUSD form prior to
35 being considered passing.
36

37 **i. Pump Station Start-up and Testing**

38

39 1. Upon completion of the entire pump station, including approved Record Drawings
40 and complete Pump Station Data Sheet, an inspection shall be coordinated with the
41 EOR, PSLUSD, contractor, and manufacturer's representative for the station. The
42 EOR and PSLUSD shall be notified 48 hours in advance of the start-up. The following
43 items shall be the basis of a satisfactory inspection:
44

45 i. The station was built in accordance with the approved plans and Utility
46 Standards.
47

48 ii. The station is functioning as designed.
49

1 iii. Tests shall be conducted to determine if the pumps conform to the
2 specifications.
3

4 Specifically, the testing shall confirm that –
5

- 6 • The pumps are working per the design curve.
 - 7 ○ Shut-off head
 - 8 ○ Current pressure head
 - 9 ○ Future pressure head
- 10 • The design amperage is not being exceeded.
- 11 • Both pumps can be removed and reinstalled without obstructions.
- 12 • The pump station can be operated with a generator in the same manner as with
13 electric power. PSLUSD shall provide the generator for start-up for a lift
14 station. If the pump performance does not meet the specifications, corrective
15 measures shall be taken or pumps shall be removed and replaced with pumps
16 that satisfy the conditions specified.
17

18 iv. The contractor/manufacturer representative shall check direction of rotation of
19 all motors and reverse connections if necessary.
20

21 v. All pump operation settings, alarms, and shutdown devices shall be calibrated
22 and tested during the field test.
23

24 vi. Should any material or installation fail to meet the specifications, the
25 contractor shall take corrective measures, or the item shall be removed and
26 replaced.
27

28 vii. A repair kit shall be provided to PSLUSD at the time of start-up and testing
29 inspection. The kit shall include one full set of fuses for entire control panel, one
30 full set of fuses for the disconnect box (if fused), and one set of contacts for the
31 motor starts for each pump station.
32

33 viii. The test report shall be submitted by the EOR on PSLUSD form prior to
34 being considered passing. EOR is required to submit a report describing if the
35 station is running as designed or if modifications are needed.
36

37 **j. Gravity Sewer Inspection and Testing** 38

39 1. The contractor shall perform testing of all wastewater gravity mains, as set forth in the
40 following, and shall conduct said tests in the presence of representatives from PSLUSD
41 and the EOR.
42

43 **k. TV Inspection** 44

45 1. A television inspection shall be performed by the contractor or his representative as
46 stated below, in the presence of the EOR and PSLUSD prior to final inspection by
47 PSLUSD. Testing shall not proceed until the facilities have been backfilled and the
48 compaction of roadway base and Record Drawings are complete.
49

1 i. At time of inspection, the lines shall be clean with sufficient water having been
2 introduced into each segment of the line to show any sags or dips present. The video
3 camera shall have a depth gauge attached to the front of the camera that will show
4 depth of water in the line dips.

5
6 ii. If inspection reveals cracked, broken, or defective pipe or pipe misalignment
7 resulting in vertical sags $\frac{3}{4}$ " or more, the contractor shall be required to repair or
8 replace the pipeline at no cost to PSLUSD. Retesting is not allowed until repairs are
9 made, unless done on the same day, no exceptions. Prior to repair or replacement of
10 failed sewer pipe, the method of replacement shall be submitted to PSLUSD for
11 approval. Pressure grouting or pipe vibration shall not be considered as an acceptable
12 method of repair.

13
14 iii. The test results shall be submitted on PSLUSD form by the EOR prior to the
15 infiltration/ex-filtration test. Color CD/DVD and inspection logs shall be provided
16 prior to final inspection.

17 18 **I. Infiltration/Ex-filtration Test**

19
20 1. The gravity sewer shall be subjected to infiltration and/or ex-filtration tests after it has
21 passed the TV inspection. The test shall be conducted as follows:

22
23 i. When testing mains and laterals separate of the manholes and the groundwater is at
24 least 2' above the highest invert, infiltration testing shall be performed.

25
26 ii. When testing mains and laterals separate of the manholes and the groundwater is
27 less than 2' above the highest invert, ex-filtration testing shall be performed.

28
29 iii. All manholes shall be subject to an ex-filtration test and may be conducted in
30 conjunction with the testing of the mains and laterals. A maximum of 1200' of
31 mainline and four structures shall be tested. The PSLUSD inspector must be able to
32 view all the manholes from one location at the site.

33
34 iv. The allowable leakage shall not exceed 50 gallons/day/inch of diameter/mile.

35
36 v. Should the test fail, the contractor shall accomplish necessary repairs and the test
37 repeated until the results are satisfactory. The contractor shall furnish the necessary
38 labor, water, and all other items required to conduct the testing and shall perform the
39 necessary system repairs required to comply with the specified test. All re-testing
40 shall be at the contractor's expense.

41 vi. Pressure grouting or pipe vibration is not considered an acceptable repair.

42
43 vii. The test results shall be submitted by the EOR on PSLUSD form prior to being
44 considered passing.

1
2
3 **m. Deflection Test**
4

5 1. Testing is required for all flexible pipes to assure that deflection does not exceed 5%.
6 The test shall be performed as follows using a mandrel or a calibrated television/video
7 camera.

8
9 i. Test shall be conducted at least 30 days after the final backfill (including pavement
10 base course) has been in place to allow for stabilization of the soil-pipe system.

11
12 ii. If a mandrel is utilized, its diameter shall be 95% of the inside diameter of the
13 pipe being tested. Prior to use the mandrel shall be certified by the EOR and
14 PSLUSD. Use of an uncertified mandrel or a mandrel altered or modified after
15 certification will invalidate the test. The mandrel shall be flushed with water or
16 pulled through the pipe by hand with a 1/4" nylon rope; mechanical pulling devices
17 shall not be used. Excessive force shall not be applied in pulling the mandrel that
18 may damage the pipe or erroneously indicate that deflection was within acceptable
19 limits by temporarily expanding the pipe. The pipe shall be deemed acceptable if the
20 mandrel passes completely through the pipe without restriction. When the mandrel
21 does not pass through the pipe, the contractor shall locate and correct the defect to
22 the satisfaction of the EOR and PSLUSD. Retesting of the pipe after correction of
23 the defect shall be no sooner than 30 days after final backfill has been in place.

24
25 iii. The test report shall be submitted by the EOR on PSLUSD form prior to being
26 considered passing.
27

28 **n. Reclaimed Water System Start-up and Testing**
29

30 1. All reclaimed water main shall be tested in accordance with the Hydrostatic and
31 Leakage Testing procedure specified in this section. The test results shall be submitted by
32 the EOR on PSLUSD form immediately upon completion.
33

34 2. The EOR and PSLUSD shall be notified 48 hours prior to start-up and final inspection
35 of the reuse metering station.

36 3. All systems shall be exercised through operational tests in the presence of the EOR and
37 PSLUSD representatives to demonstrate achievement of the specified performance. The
38 scheduling of tests shall be coordinated by the contractor, so that the tests may proceed
39 without delays or disruption by incomplete work.
40

41 4. During start-up, the contractor's and/or manufacturer's representative shall be present
42 at the job site.
43

44 **C. RECORD DRAWINGS**
45

46 1. The goal is to be able to accurately record utility improvements and to be able to easily locate
47 these improvements with or without using specialized equipment.
48

- 1 2. Completed Record Drawings with a PSLUSD approval stamp are required for all new
2 facilities prior to Utility Completion (Final) Inspection.
3
- 4 3. Photographs by the EOR and contractor are encouraged for above-ground and below-ground
5 improvements.
6
- 7 4. Record Drawings shall be prepared by a Professional Engineer licensed in the State of Florida
8 AND signed and sealed according to the State requirements. Information from a Florida licensed
9 surveyor is also required as noted below and incorporated into the Record Drawings.
10
- 11 5. Record Drawings are to be reviewed by the contractor and EOR prior to submitting to
12 PSLUSD.
13
- 14 6. The surveyor shall show actual location and elevation of all pressure mains at 100-foot
15 intervals, tees, wyes, crosses, bends, reducers, sleeves, terminal ends, corporation stops, valves,
16 fire hydrants, air release valves, restraints, sleeves, casing pipes, sampling points, ends, reducers,
17 connection points, and anywhere that cover is less than 36” or more than 60”, etc. A complete
18 point data file shall also be submitted in Excel format.
19
- 20 7. EOR shall submit all Record Drawings electronically in PDF, (CAD files to be provided with
21 first submittal and after approved). After approval, Record Drawings shall be submitted as a
22 single PDF file (300 DPI) of the full set of Record Drawings, one Signed and Sealed bound 24”
23 X 36” paper set, one AutoCAD DWG file with all reference files, line-types, fonts, etc. bound to
24 the DWG file in State Plane Coordinates. Photos, PDFs and other attachments in the drawing
25 file shall be transmitted with the drawing. When possible, use the “eTransmit” command and
26 include plot styles and fonts.
27
- 28 8. Using the EOR’s CAD file as the base drawing, redraw all information in the actual location
29 Record Drawing in State Plane Coordinates, Florida NAD 83 State Plane East Zone, US Foot.
30 Elevation information shall be referenced to the North American Vertical Datum of 1988
31 (NAVD 88).
32
- 33 9. Fonts, line-types and line weights must be such that different lines are distinguishable, and the
34 Record Drawing information is the most prominent information on the sheet. (mains cannot look
35 like sidewalks, edge of pavement, etc.)
36
- 37 10. The EOR shall ensure each sheet is labeled “RECORD DRAWINGS” in 1” high block
38 printed letters.
39
- 40 11. The EOR shall label the point of service for all potable water, fire lines, wastewater, or
41 reclaimed water services.
42
- 43 12. The scale and size shall be the same as the approved construction plans.
44
- 45 13. Record Drawing data should be redrawn by surveyor over the design plan information and be
46 on a separate layer system so that design plans (proposed construction) can be turned off and on
47 for comparison.
48

- 1 14. Utilize Record Drawing layer in CAD drawing for surveyor to fill in required Record
2 Drawing data.
3
- 4 15. EOR shall allow room on the plan sheet for Record Drawing/record information. Areas of
5 congestion or detail may require blow-up details.
6
- 7 16. The EOR shall ensure that Record Drawings match, sheet by sheet, the construction plans
8 approved and stamped by PSLUSD. Additional sheets may be submitted if necessary.
9
- 10 17. Horizontal dimensions shall be to the nearest tenth of a foot (0.1) and vertical
11 dimensions/elevations shall be to the nearest hundredth of a foot (23.11). Sanitary sewer slopes
12 shall be to the hundredth of a percent (0.40 % or 0.0040).
13
- 14 18. Trace wire* and electronic marker balls* are not to be shown, but locations clearly described
15 with notes. For example: *Trace wire on all pressure mains and water services. Electronic*
16 *marker balls placed on all fittings, valves and service ends as confirmed by the 05/24/2018*
17 *passing inspection.*
18
- 19 19. The EOR shall provide one NAVD 1988 benchmark reference per plan set and the surveyor
20 shall provide at least two GPS reference points shown on the plans.
21
- 22 20. Pressure pipe lengths* are not required to be called out but totaled by size and material for
23 the entire plan.
24
- 25 21. Buildings or structures within 20' of the main shall be drawn and separation listed by EOR.
26
- 27 22. EOR shall provide special detail drawings and/or photos where installations are not as shown
28 on the construction drawings due to the field conditions or where required for clarity.
29
- 30 23. EOR shall provide right-of-way, lot lines and pertinent easement information to be shown.
31
- 32 24. EOR shall provide all easements (existing and proposed) and show Official Record Book and
33 Page Number for the recorded easement document or plat.
34
- 35 25. Project total quantities* listed in a table for pipes, manholes, valves, etc. to be used later in
36 the Bill of Sale/Asset List. Example below:
37
38
39
40
41
42
43
44
45
46
47
48
49

Record Drawing Final Quantities

Commercial Grinder Station - 240 Volt/3 Phase	_____	EACH
6" Sewer Service - PVC	_____	LF
Sewer Cleanout	_____	EACH
2" Poly Water Service	_____	LF
6" PVC Water Main	_____	LF
8" PVC Water Main	_____	LF
2" Force Main - PE	_____	LF
6" Gate Valves	_____	EACH
Fire Hydrant Assembly	_____	EACH
2" Compound Meter	_____	EACH
2" RPZ	_____	EACH

1 26. EOR must confirm project total quantities. EOR must ensure there is room so that all data
 2 can be kept on the same sheet; not tables on separate sheets.

3
 4 27. EOR shall show all information recorded during the work, including all subsurface
 5 anomalies.

6
 7 28. EOR shall provide pipe material and class that can be addressed in General Notes. Example:
 8 *All gravity sewer is PVC SDR-26.*

9
 10 29. EOR shall provide a Directional Drill Bore Log showing recorded X/Y/Z locations of the
 11 drill head at minimum every ten (10) feet under all roads, railroads, or other significant crossings
 12 as determined by City, or minimum every twenty-five (25) feet in other locations, or as specified
 13 on the plans or as noted in the written Pre-Construction Meeting summary. Bore company shall
 14 provide paint dots and depth along route to provide more accurate depth and location of the bore
 15 for the surveyor.

16
 17 30. EOR shall provide horizontal location of all conflicts with other utilities (mains only),
 18 including vertical clearance dimension in inches (if 24" or less, feet and tenths otherwise, i.e.
 19 3.1') at all conflicts or crossings and the conflicting utility type, size, material, etc. Callout with
 20 sequential numbers, beginning with 1, on the utility sheet.

21
 22 31. A Valve Table* including the Plan ID, Size (in.), Type, Fluid, Manufacturer, Date Set,
 23 Number of Turns, and PSLUSD ID # shall be on each sheet having valves. All information
 24 except the PSLUSD# shall be provided by the EOR. The PSLUSD# shall be provided by the
 25 City.

Valve Table							
Plan ID	Size (in.)	Type	Fluid	Manufacturer	Date Set	# Turns	PSLUSD #

27

1 32. The EOR shall ensure water and sewer services are redrawn as they were constructed
2 including any bends, skewes, etc. (Particular care needed in drawing needed in special situations,
3 i.e., cul-de-sacs and locations where services are not perpendicular to the main).
4

5 33. The surveyor shall ensure the location of all gravity sewer piping, wyes, tees, manholes,
6 cleanouts and points of connection to the existing system is shown as constructed. The EOR
7 shall ensure runs of gravity sewers are identified (e.g., *300' of 8" PVC SDR-26 at S=.0040 or*
8 *.40%*)*. Lengths of gravity sewer shall be measured from manhole to manhole with the actual
9 pipe length constructed.
10

11 34. Elevations shall be provided by the surveyor for the north rim of all manhole covers and at
12 all manhole inverts provided by the EOR. The surveyor shall provide sewer service elevation
13 and finished grade at the plumber tie-in or PSLUSD point of service.
14

15 **a. Wastewater Pump Stations**

16
17 i. The surveyor shall provide a detail of the pump station site showing above-ground and
18 below-ground improvements. The EOR shall provide wet-well internal diameter size,
19 lining material, and location. Elevations shall be indicated at inverts, floats/probes, wet-
20 well top**/bottom, and at ground adjacent to wet-well and fence corners**.
21

22 ii. The surveyor shall provide all mains (material and size), fittings services, conduits
23 servicing the pump station, pull boxes, transformers, pedestals, water meters, electric
24 meters, slabs, odor control facilities and antennas within the pump station site/easement
25 shall be shown in the actual locations. A permanent benchmark shall be placed on the lift
26 station in the NE corner of the concrete pad.
27

28 iii. EOR shall ensure that all schedules* that show pump, motor and electrical data shall
29 show the Record Drawing conditions. Indicate the make, model number, serial number,
30 horsepower, impeller and condition point of each pump installed, location of control
31 panel, conduits, transformers, location of pump out connection, hose bib, RPZ, generator,
32 irrigation system, fence, and any deviation from the plans.
33

34 * The EOR is responsible for certifying these items

35 **Items provided by the surveyor
36

37 **D. COMPLETION INSPECTION PACKAGE**

38
39 1. The completion inspection shall be scheduled by contacting the Utility Engineering Division
40 Inspection group at inspectors@cityofpsl.com. The Utility Completion Inspection Package shall
41 be submitted **prior** to PSLUSD scheduling a completion inspection, including but not limited to
42 the following items: (each signed item must be accompanied by the Sunbiz page for authorized
43 signatures).
44

45 2. PSLUSD will schedule the inspection no more than 7 calendar days after receiving a
46 completed package. If the package contains unacceptable information, the inspection is
47 considered as not passing.
48

1 **a. Utility Completion Inspection Checklist**

2
3 i. The Utility Completion Inspection Package Checklist and other related forms can be
4 downloaded from the PSLUSD website at [https://utility.cityofpsl.com/get-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
5 [connected/divisions/utility-engineeringcommercial-development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/). The
6 EOR must initial each applicable item on the form to certify that the information is
7 satisfactory and meets the PSLUSD requirements. The required information must be
8 submitted together with the completed form; submittal of incomplete or unsatisfactory
9 information will delay transfer of the system to PSLUSD.

10
11 **b. Record Drawings**

12
13 i. One black or blue line set of Record Drawings, stamped approved by PSLUSD, shall be
14 submitted to PSLUSD at least 7 days prior to the desired inspection date together with a
15 completed form for project completion. If Record Drawing survey is not correct, the final
16 inspection will be completed but considered a failed inspection. A punch list compiled by
17 the EOR of incomplete minor items and a schedule for completion shall be submitted
18 with the Record Drawings.

19
20 **c. Project Completion Certification**

21
22 i. One original of the Project Completion Certification shall be signed by the Surveyor,
23 Contractor, and the EOR. This shall be submitted on PSLUSD Doc. No. 131.

24
25 **d. Bill of Sale with Sunbiz Detail by Entity Name**

- 26
27 i. This shall be a draft with all spaces filled in and proposed signers name (no signature).
28
29 ii. Bill of sale shall be submitted on the City’s standard form.
30
31 iii. Exhibit A – shall contain the legal description of the property.
32
33 iv. Exhibit B – shall contain the list that includes the “furnish and install” price of all
34 materials, equipment and labor. This shall be submitted on the City’s standard form.

35
36 **e. Gate Codes and Contact Information**

37
38 i. If applicable, submit all gate codes and contact information to gain entry to the property
39 for maintenance and repair of all PSLUSD facilities.

40
41 **CHAPTER IV**
42 **ACCEPTANCE OF SYSTEM FOR OPERATION**

43
44 **A. GENERAL**

45
46 1. Upon completion of construction by the contractor and passing of the completion inspection
47 by PSLUSD, the EOR must submit the turnover package to the PSLUSD office in PDF format.
48 The submittal will undergo an initial review for content only and shall be accepted or rejected for
49 a complete review. If the submittal is incomplete and rejected, it will be returned to the EOR in

1 its entirety. Once the submittal has been accepted by PSLUSD for complete review, the detailed
2 review will be completed within 7 days. NOTE: Items are not required if previously approved
3 by PSLUSD.
4

5 **B. UTILITY ACCEPTANCE TURNOVER PACKAGE**

6

7 1. The Utility Acceptance Turnover Package includes the following:
8

9 **a. Utility Acceptance Turnover Checklist**

10

11 i. The Utility Acceptance Turnover Checklist and other related forms can be downloaded
12 from the PSLUSD website at [https://utility.cityofpsl.com/get-connected/divisions/utility-](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/)
13 [engineeringcommercial-development/forms-downloads/](https://utility.cityofpsl.com/get-connected/divisions/utility-engineeringcommercial-development/forms-downloads/). The EOR must initial each
14 applicable item on the form to certify that the information is satisfactory and meets the
15 PSLUSD requirements. The required information must be submitted together with the
16 completed form. Submittal of incomplete or unsatisfactory information will delay
17 transfer of the system to PSLUSD. (each page with a signature must be accompanied by
18 the printout from Sunbiz showing the names of authorized signatures).
19

20 **b. Contractor's Affidavit & Release of Lien with Sunbiz Detail by Entity Name**

21

22 i. Contractor's affidavit and final release of lien shall be submitted on the City's standard
23 form.
24

25 ii. All Contractors who performed work on the utility portion of the project must submit
26 an affidavit and release of lien.
27

28 **c. Request to Place Water Distribution and/or Sewage Collection/Transmission System** 29 **into Operation**

30

31 i. A Request to Place a Water Distribution and/or Sewage Collection/Transmission
32 System into Operation shall be submitted on FDEP or PSLUSD forms, as applicable. If
33 the water and wastewater system are permitted by FDEP for construction, approval to
34 place the system into operation must be obtained from FDEP. PSLUSD will not release
35 the water and wastewater facilities for use until an approval has been issued by FDEP.
36 The FDEP forms must be completed and submitted to PSLUSD for signature. In addition,
37 the EOR shall include a map showing what area is sending in certification and what was
38 previously certified for that specific project/phase. The forms will be signed by PSLUSD
39 after the system has passed final inspection.
40

41 **d. Owner's Affidavit with Sunbiz Detail by Entity Name**

42

43 i. Owner's affidavit shall be submitted on the City's standard form. Exhibit A shall
44 contain the legal description of the property
45

46 **e. Bill of sale with Sunbiz Detail by Entity Name**

47

48 i. This shall be the complete signed original.
49

1 **f. Material and Installation Warranty**
2

3 i. Any cost associated with the repair or adjustment of PSLUSD facilities during the
4 warranty period shall be the responsibility of the contractor and/or developer. The
5 PSLUSD may perform the necessary work and bill the contractor and/or developer for
6 the expenses. The developer may perform this work with prior approval, and inspection
7 of the PSLUSD.
8

9 ii. The materials and workmanship shall be warranted on all equipment supplied for a
10 period of one (1) year. Warranty period shall commence on the date of PSLUSD
11 acceptance.
12

13 iii. The equipment shall be warranted to be free from defects in workmanship, design and
14 materials. If any part of the equipment should fail during the warranty period, it shall be
15 replaced in the machine(s) and the unit(s) restored to service at no expense to the
16 PSLUSD.
17

18 iv. The warranty shall be submitted on the City’s standard form on contractor’s
19 letterhead.
20

21 **g. Fees and Charges**
22

23 i. All fees and charges must be paid prior to acceptance of the turnover package,
24 including:

- 25 • Overtime inspection fees
- 26
- 27 • Re-Inspection fees
- 28
- 29 • All other fees incurred, including Guaranteed Revenue
- 30

31 **h. Passing Final Completion Report**
32

33 i. A completion inspection report completed by the EOR on PSLUSD forms must
34 indicate compliance with all items on the form. The final inspection shall be considered
35 unsatisfactory by PSLUSD if any items on the report do not comply with the Utility
36 Standards even if the EOR has noted that the project did pass final inspection.
37
38

39 **C. APPROVAL TO PLACE SYSTEM INTO OPERATION**
40

41 1. When all the items, as required in Sections A and B above, are in compliance, PSLUSD will
42 issue a Letter of Acceptance, release the water meter(s) to be installed and begin billing, and give
43 clearance to the Building Department for issuance of a Certificate of Occupancy.