City of Largo

Engineering Design and Construction Standards

2023 Edition

COMMISSION APPROVED

Published By:
Engineering Services Department

City of Largo
Engineering Design and Construction Standards
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DUST CONTROL NOTES

DEFINITION:

REDUCING SURFACE AND AIR MOVEMENT OF DUST DURING LAND DISTURBING, DEMOLITION AND CONSTRUCTION ACTIVITIES.

PROPOSE:

TO PREVENT SURFACE AND AIR MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES AND REDUCE THE PRESENCE OF AIRBORNE SUBSTANCES WHICH MAY BE HARMFUL OR INJURIOUS TO HUMAN HEALTH, WELFARE, OR SAFETY, OR TO ANIMAL OR PLANT LIFE.

CONDITIONS WERE PRACTICE APPLIES:

IN AREA SUBJECT TO SURFACE AND AIR MOVEMENT OF DUST WHERE ON -SITE AND OFF- SITE DAMAGE IS LIKELY TO OCCUR IF PREVENTIVE MEASURES ARE NOT TAKEN.

PLANNING CONSTRUCTIONS:

CONSTRUCTION ACTIVITIES INEVITABLY RESULT IN THE EXPOSURE AND DISTURBANCE OF SOIL. FUGITIVE DUST IS EMITTED BOTH DURING THE ACTIVITIES (I.E., EXCAVATION,DEMOLITION, VEHICLE TRAFFIC, HUMAN ACTIVITY) AND AS A RESULT OF WIND EROSION OVER THE EXPOSED EARTH SURFACES. LARGE QUANTITIES OF DUST ARE TYPICALLY GENERATED IN "HEAVY" CONSTRUCTION ACTIVITIES, SUCH AS ROAD AND STREET CONSTRUCTION AND SUBDIVISION, COMMERCIAL AND INDUSTRIAL DEVELOPMENT, WHICH INVOLVE DISTURBANCE OF SIGNIFICANT AREAS OF SOIL SURFACE. RESEARCH AT CONSTRUCTION SITES HAS ESTABLISHED AN AVERAGE DUST EMISSION RATE OF 1.2 TONS/ACRE/MONTH FOR ACTIVE CONSTRUCTION. EARTH- MOVING ACTIVITIES COMPRISE THE MAJOR SORES OF CONSTRUCTION DUST EMISSIONS, BUT TRAFFIC AND GENERAL DISTURBANCE OF THE SOIL ALSO GENERATE SIGNIFICANT DUST EMISSION. IN PLANNING FOR DUST CONTROL, IT SHOULD BE OBVIOUS THAT THE LESS SOIL IS EXPOSED AT ANY ONE TIME, THE LESS POTENTIAL THERE WILL BE FOR DUST GENERATION. PHASING A PROJECT AND UTILIZING TEMPORARY STABILIZATION PRACTICES UPON THE COMPLETION OF GRADING CAN SIGNIFICANTLY REDUCE DUST EMISSION.

TEMPORARY MEASURES:

1. MULCHES- A NATURAL OR ARTIFICIAL LAYER OF PLANT MATERIALS OR OTHER MATERIALS THAT WILL NOT FLOAT OR WASH AWAY.
2. VEGETATIVE- TEMPORARY SEEDING OR GROUND COVERS.
3. TILLAGE- THIS PRACTICE IS DESIGNED TO ROUGHEN AND BRING CLODS TO THE SURFACE. IT IS AN EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE WIND EROSION STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL -TYPE PLOWS (WITH 12-INCH SPACING), SPRING -TOOTHED HARROWS, AND SIMILAR PLOWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.
4. IRRIGATION- THIS IS GENERALLY DONE AS AN EMERGENCY TREATMENT. SITE IS SPRINKLED WITH WATER UNTIL THE SURFACE IS WET. REPEAT AS NEEDED. TO PREVENT CARRYOUT OF MUD ONTO STREETS, REFER TO TEMPORARY GRAVEL CONSTRUCTION ENTRANCE.
5. BARRIERS- SOLID BOARD FENCE, BUR LAY FENCE, CREATE WALLS, BALES OF HAY AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND AT INTERVALS OF ABOUT 15 TIMES THE BARRIER HEIGHT ARE EFFECTIVE IN CONTROLLING WIND EROSION.
6. PERMANENT VEGETATION- PERMANENT SEEDING AND PERMANENT STABILIZATION WITH SOD.
7. TOP SOILING- THIS ENTAILS COVERING THE SURFACE WITH LESS EROSIVE SOIL MATERIAL.
8. STONE- COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

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TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Dust Control Notes	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-01
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

SEDIMENT AND EROSION CONTROL MEASURES NOTES PAGE 1 OF 2

1. SEDIMENT AND EROSION AND TURBIDITY CONTROL MEASURES ARE PART OF THE CITY OF LARGO'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT ISSUED BY THE US ENVIRONMENTAL PROTECTION AGENCY (EPA), THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND THE FLORIDA WATER MANAGEMENT DISTRICT. PERMITS SHALL BE STRICTLY ENFORCED BY THE CITY AND THESE AGENCIES.
2. ALL SEDIMENT AND EROSION CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE BREAKING GROUND PROCESS AND PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES INCLUDING DEMOLITION ACTIVITIES.
3. SILT FENCE MUST WRAP ENTIRE AREA OF CONSTRUCTION UNLESS DIRECTED OTHERWISE BY THE CITY ENGINEER. FINAL LOCATIONS OF TURBIDITY CONTROL DEVICES MAY BE ADJUSTED AS DIRECTED BY THE CITY ENGINEER OR REPRESENTATIVES OF THE PERMITTING AGENCIES WITHOUT ADDITIONAL COMPENSATION.
4. UNTIL COMPLETION OF INSTALLATION OF THE TURBIDITY AND SEDIMENT CONTROL DEVICE, THE CONTRACTOR CANNOT "BREAK GROUND " OR PERFORM ANY LAND CLEARING ACTIVITIES INCLUDING, BUT NOT LIMITED TO, TREE REMOVAL, DEMOLITION, SCALPING, DIGGING, OR STOCKPILING OF DIRT UNTIL EROSION CONTROL DEVICE ARE APPROVED AND SIGNED OFF BY THE INSPECTOR.
5. INSPECTION AND MAINTENANCE OF SEDIMENT AND EROSION, AND TURBIDITY CONTROL MEASURES SHALL BE A CONTINUING FUNCTION OF THE CONTRACTOR WITHOUT ADDITIONAL COMPENSATION FOR THE DURATION OF THE PROJECT AND UNTIL A CERTIFICATE OF OCCUPANCY IS ISSUED. REMOVAL OF ALL SEDIMENT, EROSION AND TURBIDITY CONTROL DEVICES PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY MUST BE APPROVED BY THE CITY OF LARGO. MAINTAINCE OF THESE DEVICES SHALL BE AS DIRECTED BY THE CITY ENGINEER.
6. THE LIFE CYCLE OF SILT SCREEN AND HAY BALES IS LIMITED. SILT FENCES HAVE A MAXIMUM USABLE LIFE OF 6 MONTHS AND THE USABLE LIFE OF HAY BALES IS 3 MONTHS. SILT SCREENS AND HAY BALES SHALL BE REPLACED AT THE END OF THEIR USABLE LIFE. THE CITY ENGINEER MAY REQUIRE REPLACEMENT PRIOR TO THE USABLE LIFE BASED UPON FIELD CONDITIONS. ADDITIONAL TURBIDITY AND/OR SEDIMENT CONTROL DEVICES MAY REQUIRED AS DIRECTED BY THE ENGINEER.
7. PROTECTION OF EXISTING AND PROPOSED STORM SEWER SYSTEM: DURING CONSTRUCTION, ALL STORM SEWER INLETS IN THE VICINITY OF THE PROJECT SHALL BE PROTECTED BY APPROVED TURBIDITY CONTROL MEASURES AND SEDIMENT TRAPS SUCH AS SECURED HAY BALES, SILT FENCES, SOD, STONE, ECT. THESE DEVICES SHALL BE MAINTAINED, CLEANED, MODIFIED AND REPAIRED BY THE CONTRACTOR AS REQUIRED BY CONSTRUCTION PROGRESS OR AS DIRECTED BY THE ENGINEER (SEE FOOT INDEX NO. 102).
8. SEDIMENT TRAPPING MEASURES: SEDIMENT BASINS AND TRAPS, PERIMETER BEERS, FILTER FENCE, BERMS, SEDIMENT BARRIERS, VEGETATIVE BUFFERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT AND/OR PREVENT THE TRANSPORT OF SEDIMENT ONTO ADJACENT PROPERTIES, OR INTO EXISTING WATER BODIES, MUST BE INSTALLED, CONSTRUCTED OR, IN THE CASE OF VEGETATIVE BUFFER, PROTECTED FROM DISTURBANCE AS THE FIRST STEP IN THE LAND ALTERATION PROCESS.
9. ALL EROSION CONTROL DEVICES SHALL BE CHECKED DAILY, ESPECIALLY AFTER EACH RAINFALL EVENT AND SHALL BE CLEANED OUT AND/OR REPAIRED AS REQUIRED. ALL VIOLATIONS MUST BE REPORTED TO THE CITY ENGINEER WITHIN 24 HOURS. COPIES OF THE STANDARD OPERATOR PROCEDURE FOR VIOLATION NOTICES ARE AVAILABLE FOR THE ENGINEERING DIVISION.
10. FULL SOD STABILIZATION SHALL OCCUR WITHIN 72 HOURS OF OBTAINING FINAL GRADE.
11. THE CONTRACTOR SHALL PROVIDE TURBIDITY BARRIERS AS DIRECTED BY THE CITY ENGINEER TO CONTROL EROSION AND SEDIMENTATION FROM TAKING PLACE OUTSIDE THE LIMITS OF THE PROJECT. THE TURBIDITY BARRIERS SHALL BE PLACED IN ACCORDANCE WITH REQUIREMENTS OF THE CITY LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS, MOST RECENT EDITION.
12. FAILURE TO COMPLY WITH EROSION CONTROL MEASURES WILL RESULT IN A NOTICE OF VIOLATION BEING ISSUED. THE NOTICE WILL STIPULATE THE TIME FRAME ALLOWED FOR COMPLIANCE. IF THE PROJECT IS NOT IN COMPLIANCE WITHIN THE TIME FRAME GIVEN, A STOP WORK ORDER WILL BE ISSUED.
13. DEMOLITION AND TYPICAL CONSTRUCTION PROJECTS USUALLY GENERATE LARGE AMOUNT OF DUST WITH SIGNIFICANT CONCENTRATIONS OF HEAVY METALS AND OTHER TOXIC POLLUTANTS. DUST CONTROL TECHNIQUES SHALL BE USED TO CONTROL DUST. SEDIMENT SHALL BE RETAINED ON SITE AND NOT BE ALLOWED TO RUN DIRECTLY INTO WATER COURSES OR STORM WATER CONVEYANCE SYSTEM. USE OF CALCIUM CHLORIDE, OIL OR OTHER CHEMICAL DUST AGENTS IS PROHIBITED, UNLESS APPROVED BY CITY ENGINEER.
14. FOR PROJECTS OVER 1 ACRE THE PROJECT SHALL ADHERE TO THE REQUIREMENTS OF THE EPA AND FDEP NOTICE OF INTENT (NOI) TO USE THE NPDES GENERAL PERMIT AND STORM WATER POLLUTION PREVENTION PLAN (SWP3)

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TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Sediment and Erosion Control Measures Notes	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-02
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

SEDIMENT AND EROSION CONTROL MEASURES NOTES
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14. FOR PROJECTS OVER 1 ACRE THE PROJECT SHALL ADHERE TO THE REQUIREMENTS OF THE EPA AND FDEP NOTICE OF INTENT (NOI) TO USE THE NPDES GENERAL PERMIT AND STORM WATER POLLUTION PREVENTION PLAN (SWP3)
15. ALL CONTRACTORS AND SUBCONTRACTORS INVOLVED WITH STORM WATER POLLUTION PREVENTION SHALL OBTAIN A COPY OF THE STORM WATER POLLUTION PREVENTION PLAN (SWP3) AND THE STATE OF FLORIDA NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT (NPDES PERMIT) AND BECOME FAMILIAR WITH THEIR CONTENTS.
16. ALL WASH WATER (CONCRETE TRUCKS, VEHICLE CLEANING , EQUIPMENT CLEANING, ETC.) SHALL BE DISPOSED OF IN A MANNER THAT PREVENTS TRANSPORT OF THESE MATERIALS INTO STORM WATER CONVEYANCE SYSTEM.
17. NO RUBBISH, TRASH, GARBAGE, OR OTHER SUCH MATERIALS SHALL BE DISCHARGED IN DRAINAGE DITCH OR WATER OF THE STATE.
18. DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITY IS PLANNED TO BE STOPPED FOR AT LEAST 21 DAYS, SHALL BE TEMPORARILY SEEDED AND MULCHED. THESE AREAS SHALL BE SEEDED AND MULCHED NO LATER THAN 3 DAYS FROM THE LAST CONSTRUCTION ACTIVITY OCCURRING IN THESE AREAS.
19. DISTURBED PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS PERMANENTLY STOPPED SHALL BE PERMANENTLY SEEDED, AND MULCHED OR SODDED AS DIRECTED BY THE CITY ENGINEER. THESE AREAS SHALL BE PERMANENTLY SEEDED OR SODDED NO LATER THAN 3 DAYS AFTER THE LAST CONSTRUCTION ACTIVITY OCCURRING IN THESE AREAS.
20. IF THE ACTION OF VEHICLES TRAVELING OVER THE GRAVEL CONSTRUCTION ENTRANCE IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF DIRT OR MUD AS IDENTIFIED BY THE CITY ENGINEER THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLES ENTER A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF THE SITE. THE EXACT LOCATIONS SHALL BE COORDINATED WITH THE OWNERS CONSTRUCTION MANAGER. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING WASH WATER AT THE SITE.
21. ALL MATERIAL SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAIN MUST BE REMOVED IMMEDIATELY. ROADWAYS AND RIGHT-OF-WAYS SHALL BE CLEANED DAILY BY A VACUUM STREET SWEEPER OR AS DIRECTED BY THE CITY ENGINEER.
22. CONTRACTOR OR SUBCONTRACTORS WILL BE RESPONSIBLE FOR REMOVING SEDIMENT IN THE DETENTION POND AFTER THE STABILIZATION OF THE SITE AND ALSO ANY SEDIMENT THAT MAY HAVE COLLECTED IN THE STORM SEWER DRAINAGE SYSTEM.
23. IF SOIL STOCKPILING IS EMPLOYED ON THE SITE,SILT FENCES COVERING WITH PLASTIC TARP AND OTHER MEANS SHALL BE USED TO HELP CONTAIN THE SEDIMENT.
24. SLOPES SHALL BE LEFT IN A ROUGHENED CONDITION DURING THE GRADING PHASE TO REDUCE RUNOFF VELOCITIES AND EROSION OR TEMPORARY SEEDED AND MULCHED.
25. DUE TO THE GRADE CHANGES DURING THE DEVELOPMENT OF THE PROJECT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING THE EROSION CONTROL MEASURES (SILT FENCES, STRAW BALES, ECT.) TO HELP PREVENT EROSION AND STORM WATER POLLUTION.
26. ALL OFF SITE CONSTRUCTION SHALL BE STABILIZED AT EACH END OF EACH WORKING DAY, THIS INCLUDES BACK FILLING OF TRENCHES FOR STORM DRAIN CONSTRUCTION AND PLACEMENT OF GRAVEL OR BITUMINOUS PAVING FOR ROAD CONSTRUCTION.
27. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND STAY IN PLACE UNTIL FINAL STABILIZATION HAS OCCURRED AND UNTIL APPROVED BY THE ENGINEERING INSPECTOR OR CITY ENGINEER.

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TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Sediment and Erosion Control Measures Notes	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-02
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE AND EXIT NOTES

DEFINITION:

A STONE STABILIZER PAD LOCATED AT POINTS OF VEHICULAR INGRESS AND EGRESS ON A CONSTRUCTION SITE.

PURPOSE:

TO STABILIZE ENTRANCES TO THE CONSTRUCTION SITE AND REDUCE THE AMOUNT OF SEDIMENT TRANSPORTED ONTO PUBLIC ROADS AND STORM WATER SYSTEMS BY MOTOR VEHICLES OR RUNOFF.

CODITIONS WHERE PRACTICE APPLIES:

WHEREVER TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY INTO A PUBLIC ROAD OR OTHER PAVED AREA.

PLANNING CONSIDERATIONS:

CONSTRUCTION ENTRANCES PROVIDE AN AREA WHERE MUD CAN BE REMOVED FROM CONSTRUCTION VEHICLE TIRES BEFORE THEY ENTER A PUBLIC ROAD. IF THE ACTION OF THE VEHICLE TRAVELING OVER THE GRAVEL PAD IS NOT SUFFICIENT TO REMOVE MOST OF THE MUD, THEN THE TIRES MUST BE WASHED BEFORE THE VEHICLE ENTERS A PUBLIC ROAD. IF WASHING IS USED, PROVISIONS MUST BE MADE TO INTERCEPT THE WASH WATER AND TRAP THE SEDIMENT BEFORE IT IS CARRIED OFF- SITE. CONSTRUCTION ENTRANCE SHOULD BE USED IN CONJUNCTION WITH THE STABILIZATION OF CONSTRUCTION ROADS TO REDUCE THE AMOUNT OF MUD PICKED UP BY CONSTRUCTION VEHICLES.

DESIGN CRITERIA

AGGREGATE SIZE:

FDOT NO. 1 COARSE AGGREGATE (1.5-3.5 INCH STONE) (4-9 CM) SHOULD BE USED.

ENTRANCE DIMENSIONS:

THE AGGREGATE MUST BE AT LEAST 6 INCHES (15 CM) THICK. IT MUST EXTEND THE FULL WIDTH OF THE VEHICULAR INGRESS AND EGRESS AREA, OR A MINIMUM OF 20'. THE LENGTH OF THE ENTRANCE MUST BE AT LEAST 50 FEET (20 M). IF POSSIBLE OR AS DIRECTED BY THE CITY ENGINEER THE ENTRANCE MUST WIDEN AT ITS CONNECTION TO THE ROADWAY IN ORDER TO ACCOMMODATE THE TURNING RADIUS OF LARGE TRUCKS.

WASHING:

IF CONDITIONS ON THE SITE AREA IS SUCH THAT MOST OF THE MUD IS NOT REMOVED BY THE VEHICLES TRAVELING OVER THE GRAVEL, THEN THE TIRES OF THE VEHICLES MUST BE WASHED BEFORE ENTERING A PUBLIC ROAD. WASH WATER MUST BE CARRIED AWAY FROM THE ENTRANCE TO THE SETTING AREA TO REMOVE SEDIMENT. A WASH RACK MAY ALSO BE USED TO MAKE WASHING MORE CONVENIENT AND EFFECTIVE.

LOCATION:

THE ENTRANCE SHOULD BE LOCATED FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES.

CONSTRUCTION SPECIFICATIONS:

THE AREA OF THE ENTRANCE SHOULD BE CLEARED OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL. A GEOTEXTILE SHOULD BE LAID DOWN TO IMPROVE STABILITY AND SIMPLIFY MAINTENANCE. THE GRAVEL SHALL THEN BE LACED OVER THE GEOTEXTILE TO THE SPECIFIED DIMENSIONS.

MAINTENANECE:

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 2 -INCH (5 CM) STONE, AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEAN OUT OF ANY STRUCTURES USED TO TRAP SEDIMENTS. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLES ONTO ROADWAYS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY. LOOK FOR SIGNS OF TRUCKS AND TRAILERED EQUIPMENT "CUTTING CORNERS" WHERE GRAVEL MEETS THE ROADWAY. SWEEP THE PAVED ROAD DAILY FOR SEDIMENTS AND STONES.

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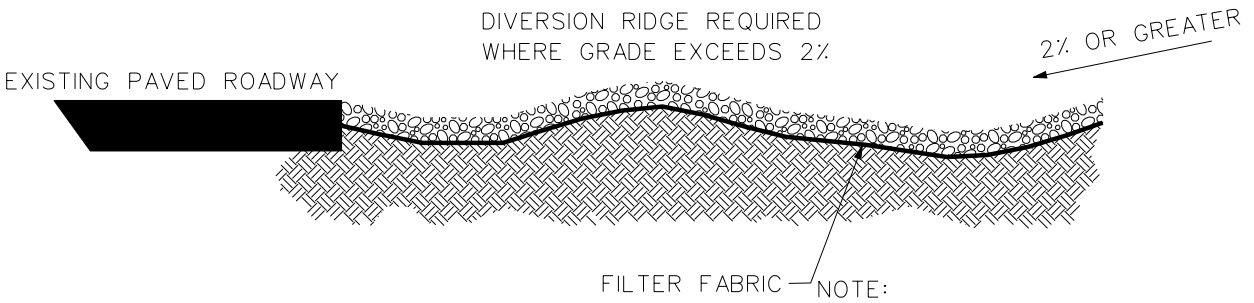
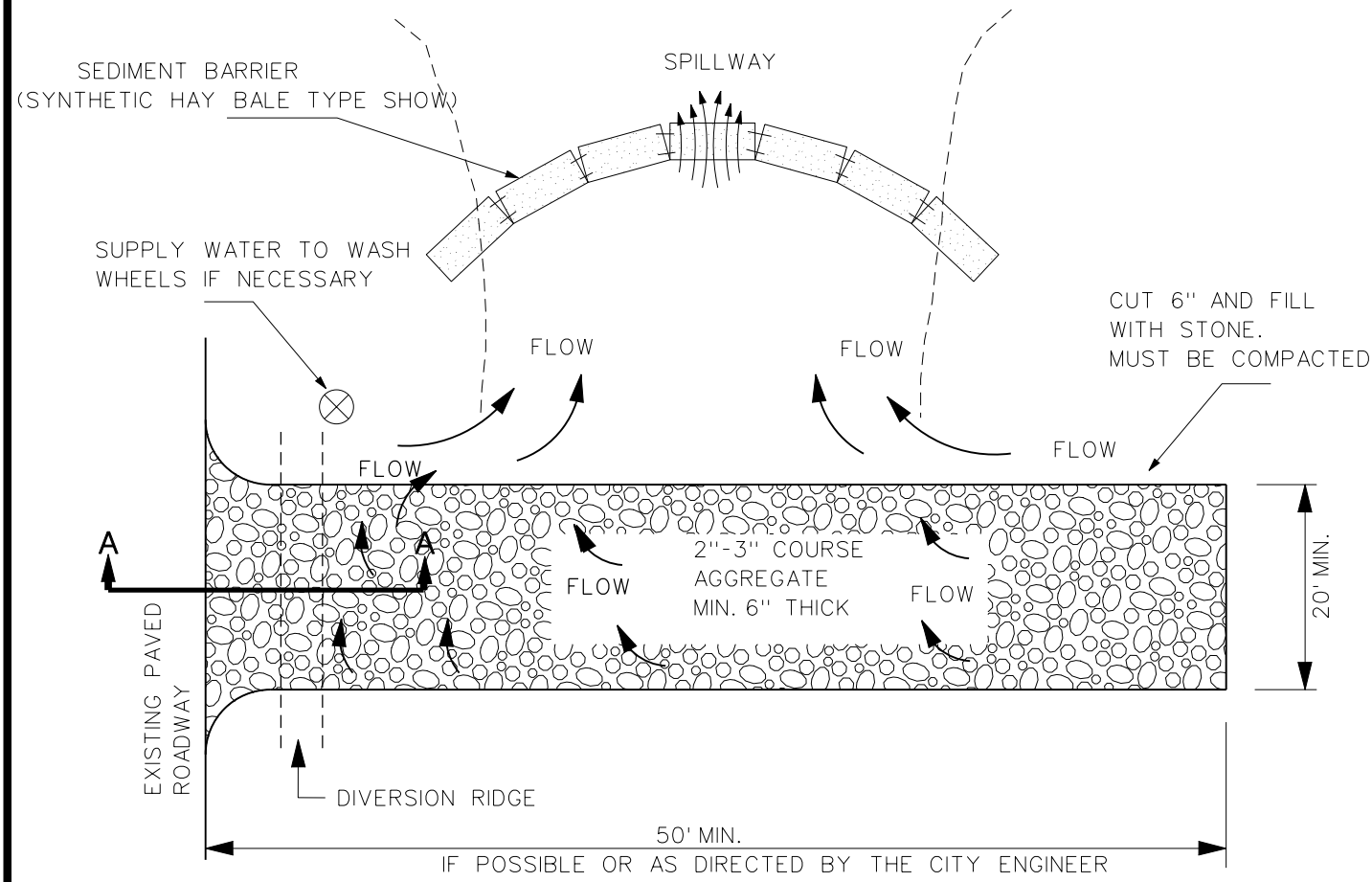
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Temporary Gravel Construction Entrance and Exit Notes	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-03
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



NOTE:
USE SANDBAGS, SYNTHETIC HAY BALES OR OTHER APPROVED METHODS TO CHANNELIZE RUNOFF TO BASIN AS REQUIRED.

SECTION A–A



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF WAY OR STORM WATER SYSTEMS. THEY MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE INTO THE PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

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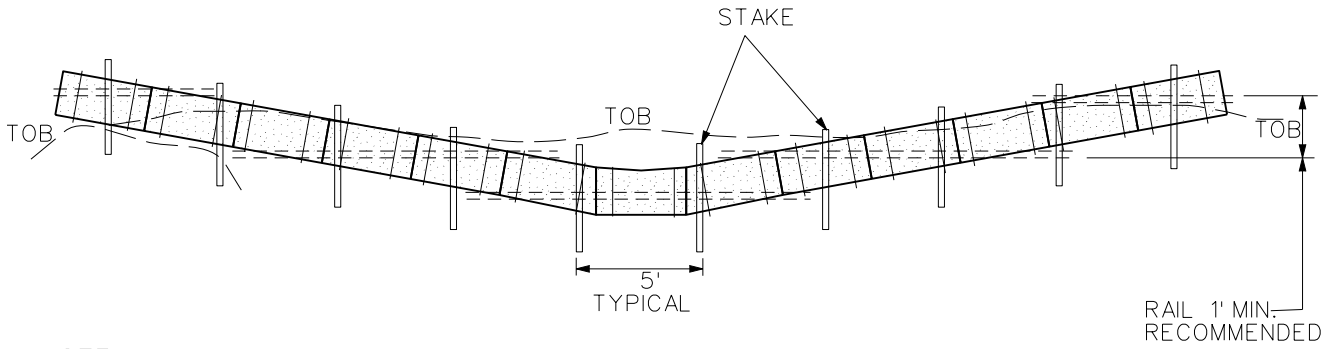
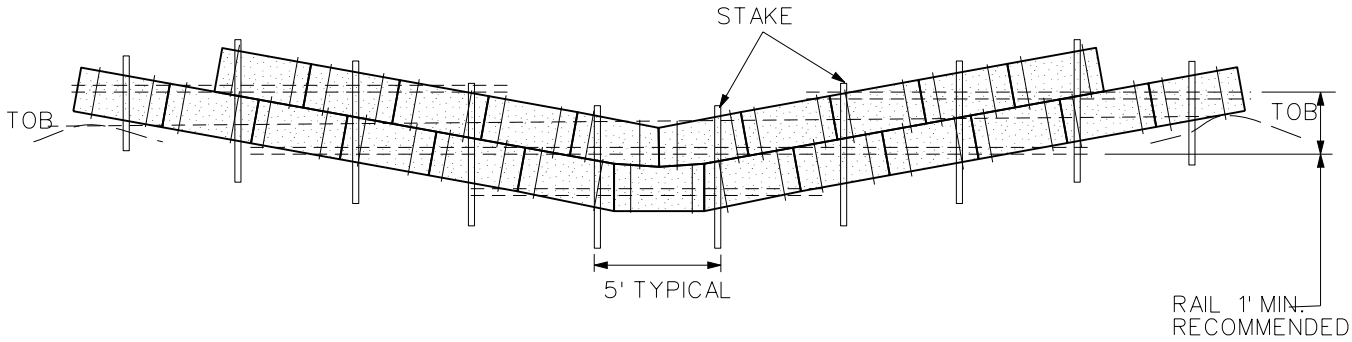
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Temporary Gravel Construction Entrance with Wheel Wash	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-04
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



NOTE:
SYNTHETIC HAY BALES MUST BE USED
ANCHOR BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE.

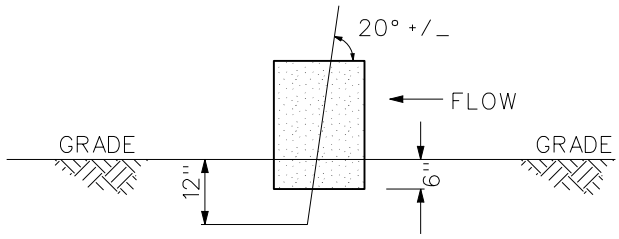
TYPE 1



NOTE:

ANCHOR LOWER BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE. #5 OR LARGER REBAR IS ACCEPTABLE.
ANCHOR TOP BALES TO LOWER BALES WITH TWO(2) 2"x2"x4' STAKES PER BALE.

TYPE 2



PROFILE

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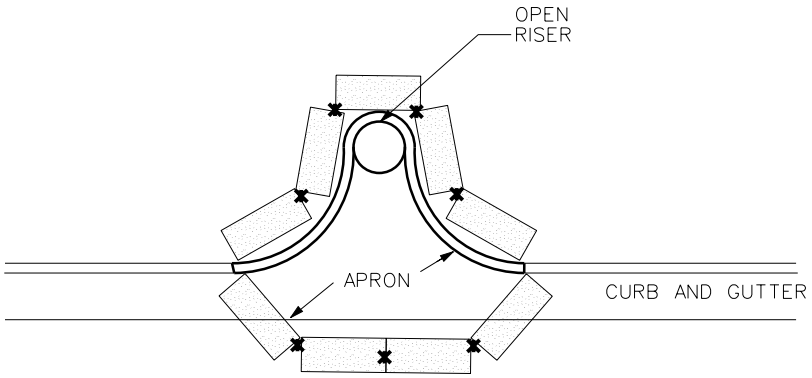
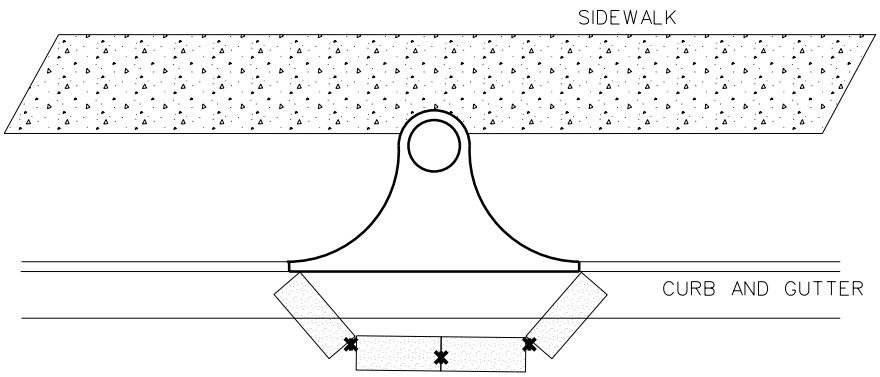
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Haybale Barrier for Unpaved Ditches	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-05
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

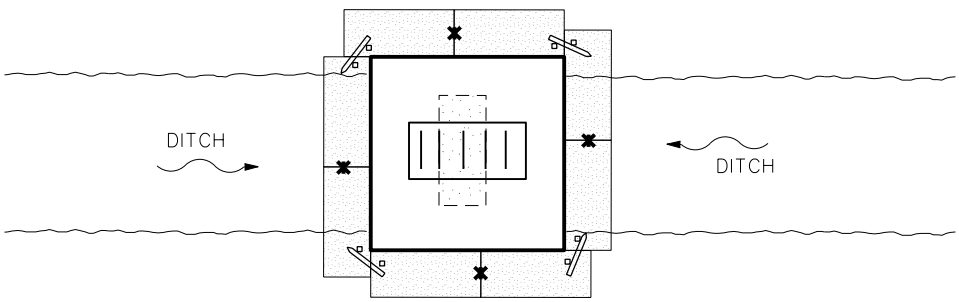


PARTIAL INLET

MUST BE STACKED WITH WOOD OR REBAR



COMPLETED INLET



DITCH BOTTOM INLET

NOTE: SYNTHETIC HAY BALES MUST BE USED

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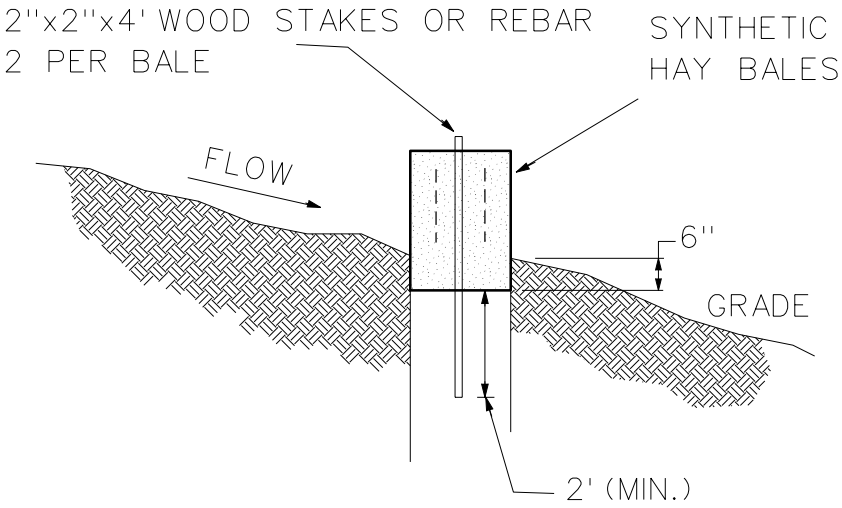
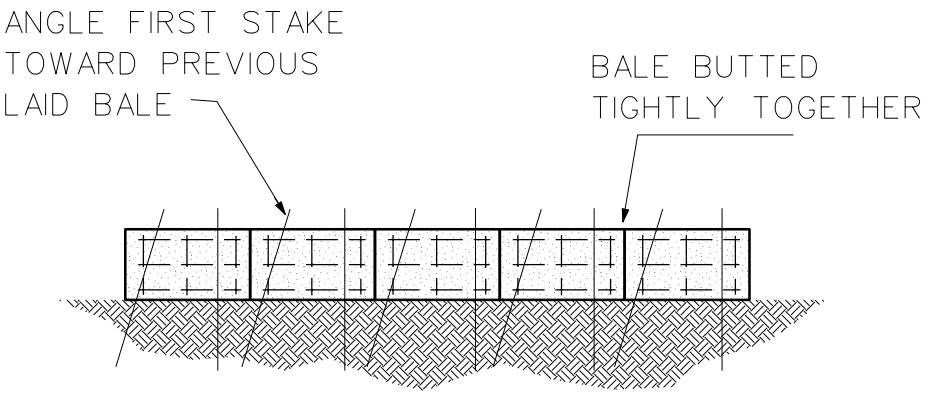
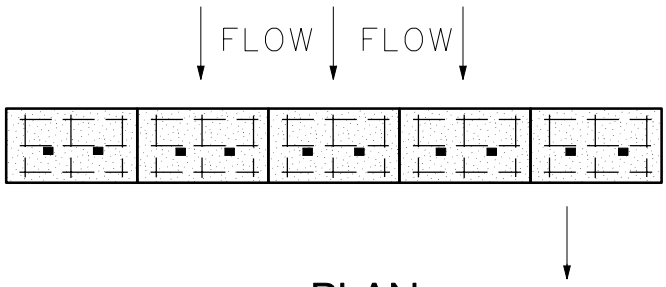
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Hay Protection Around Inlets/Structures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-06
CITY ENGINEER: LELAND E. DICUS	DRAWING SCALE: NOT TO SCALE	



SECTION



ELEVATION



PLAN

*IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.

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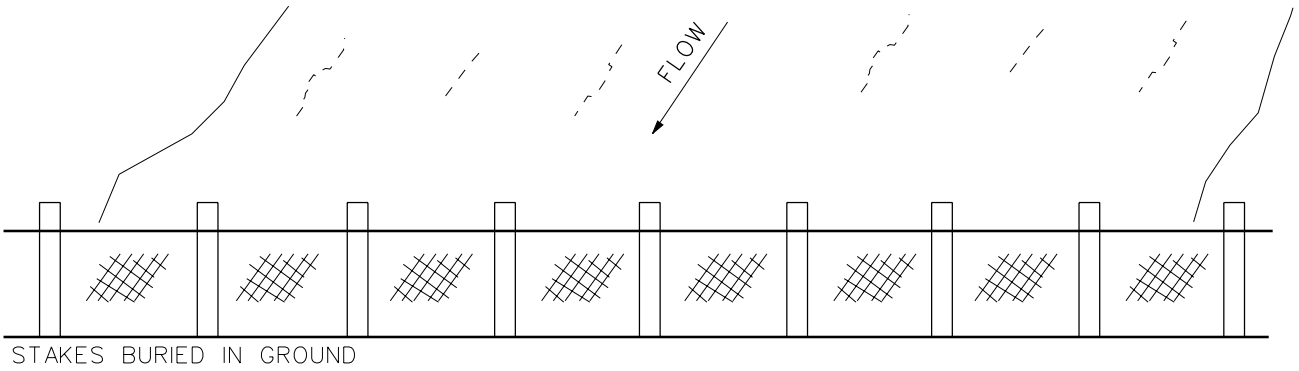
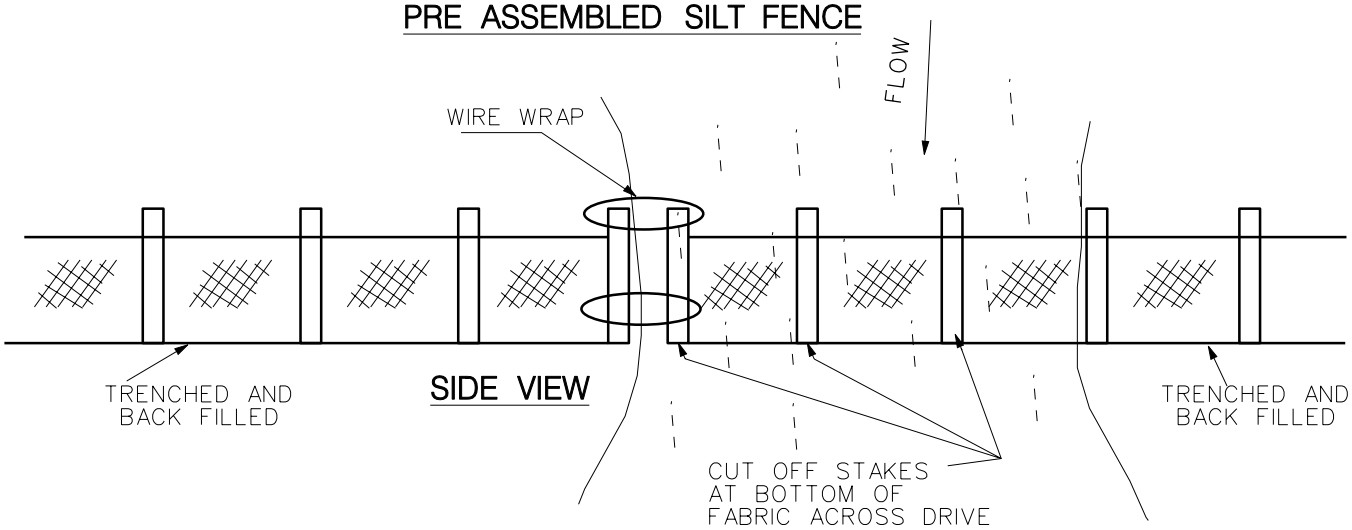
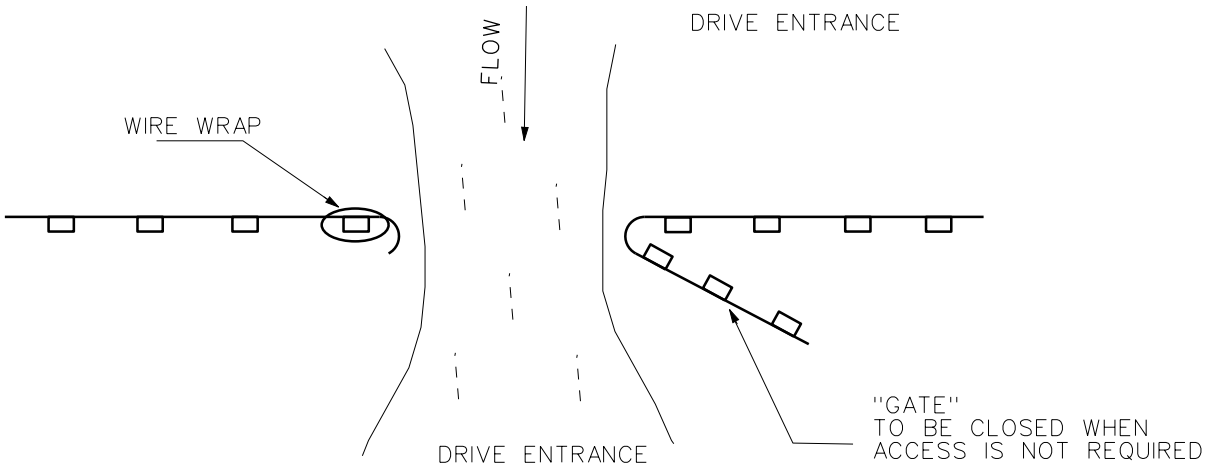
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Bale Barrier	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-07
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



PRE ASSEMBLED SILT FENCE





TOP VIEW

NOTE:

1. FOR ENTRY INTO SITE WITH EQUIPMENT YOU MAY LEAVE A SMALL SECTION UN TRENCHED, CUT OFF THE STAKE FLUSH WITH BOTTOM OF FABRIC. THIS MAKES A "GATE" THAT CAN BE OPENED AND CLOSED (WIRE LOOPS WILL HOLD GATE SHUT)

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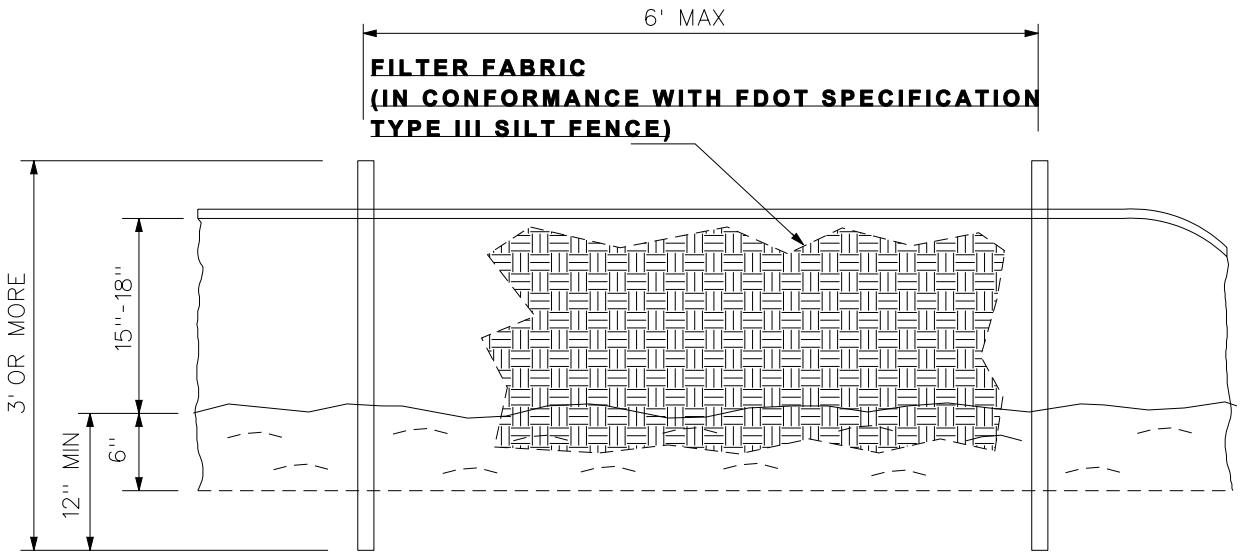
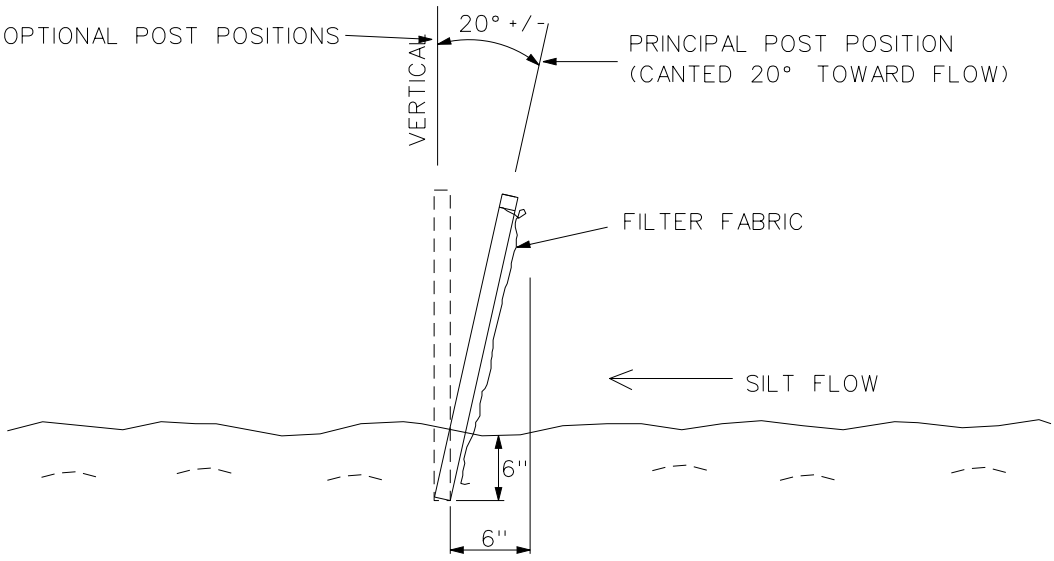
TITLE:	DESCRIPTION:
Engineering Design and Construction Standards	Residential Temporary Access Detail

COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SE-08
CITY ENGINEER:	DRAWING SCALE:	
LELAND E. DICUS, P.E.	NOT TO SCALE	



ELEVATION



SECTION

NOTES:

1. THE FABRIC SHOULD FACE THE AREA OF CONSTRUCTION WITH THE STAKES ON THE OUTSIDE AWAY FROM CONSTRUCTION.
2. FABRIC MUST BE TRENCHED IN AND BACK FILLED. THIS CAN BE DONE WITH A TRENCHER, FRONT BUCKET, OR HAND.
3. FILTER FABRIC MUST BE TAUT.

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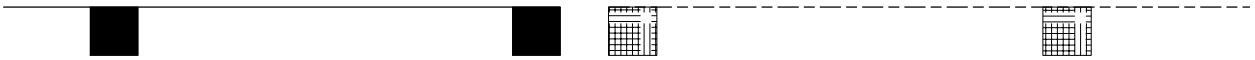
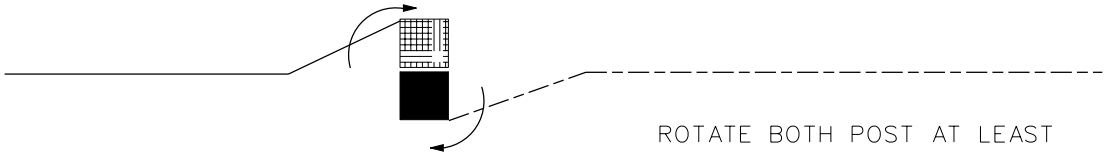
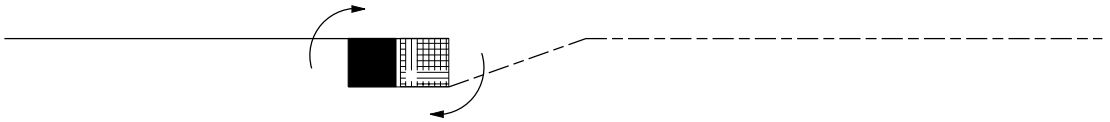
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Type III Silt Fence	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-09
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



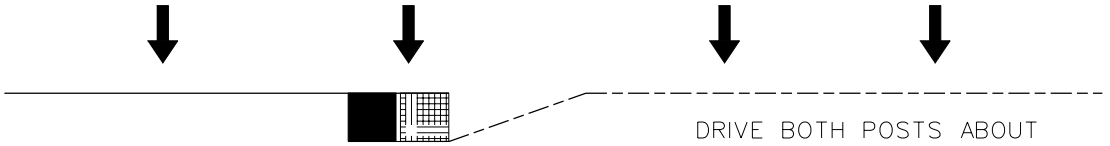
PLACE THE END POST OF THE
SECOND FENCE INSIDE THE
END POST OF THE FIRST FENCE



ROTATE BOTH POST AT LEAST
180 DEGREES IN A CLOCKWISE
DIRECTION TO CREATE A TIGHT
SEAL WITH THE FABRIC MATERIAL



DIRECTION OF RUNOFF WATER



DRIVE BOTH POSTS ABOUT
10 INCHES INTO THE
GROUND AND BURY FLAP

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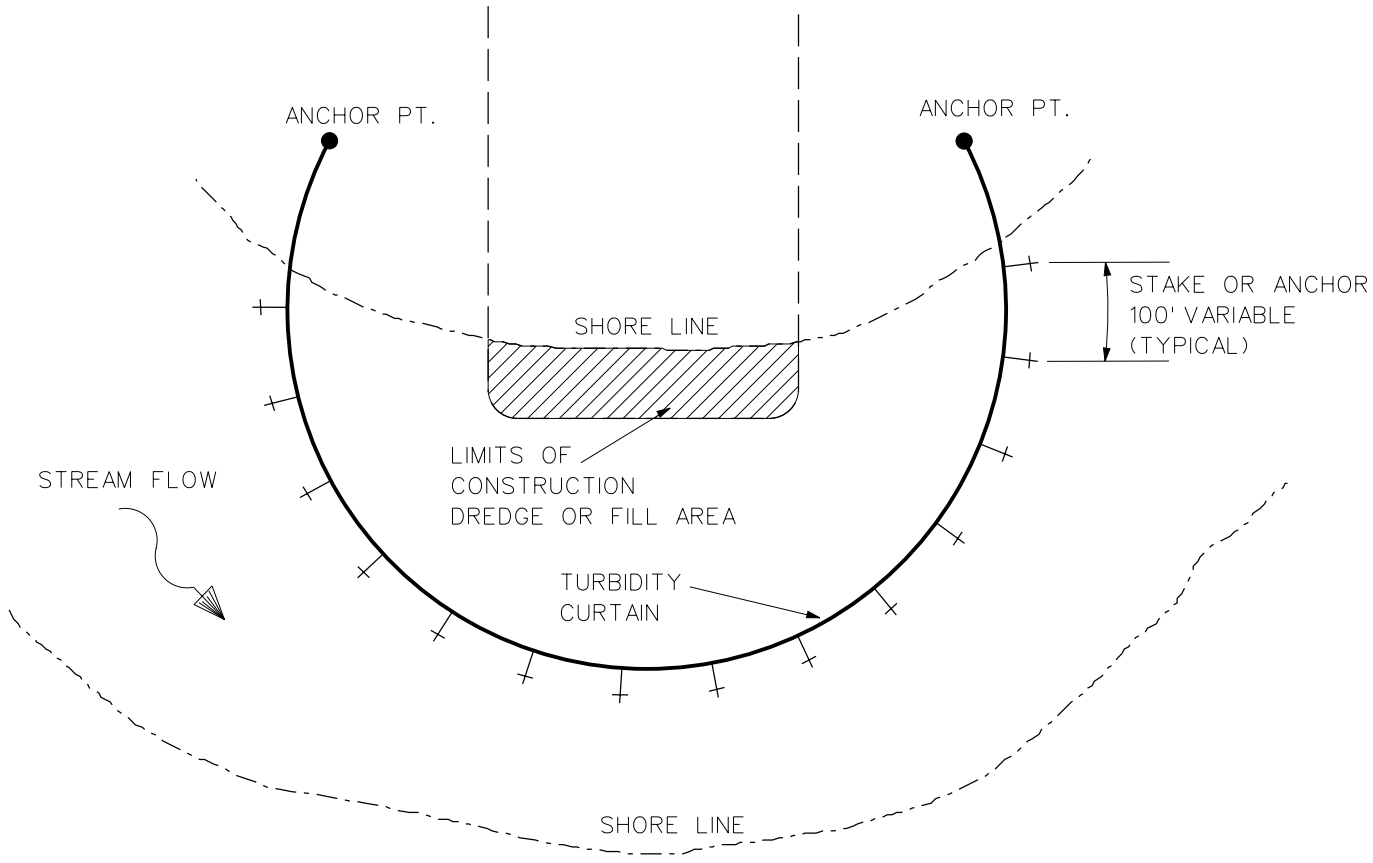
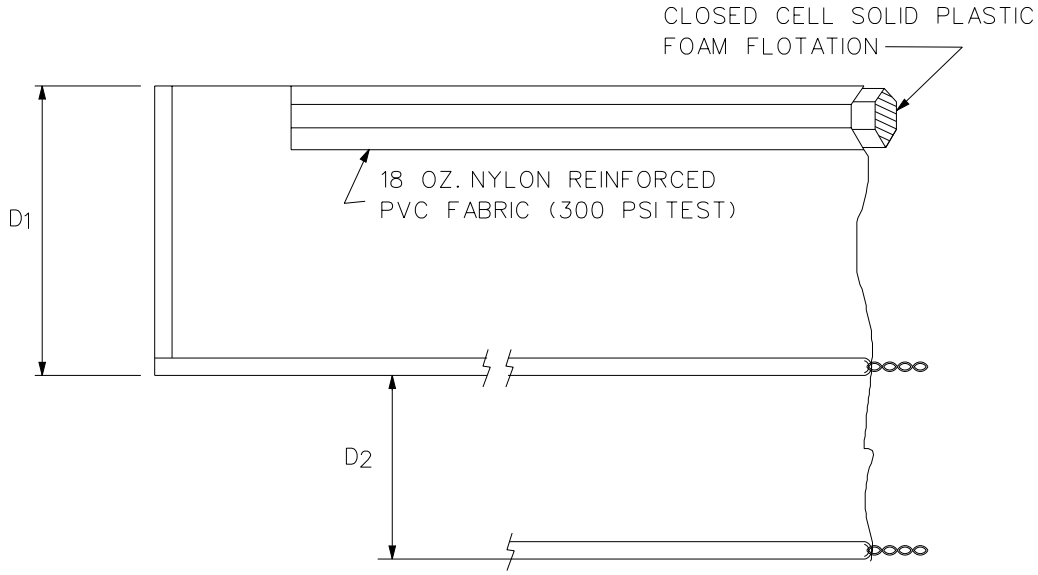
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Attaching Two Silt Fences	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-10
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	





NOTES:

D1 = 5' STD. (SINGLE PANEL FOR DEPTHS 5' OR LESS)
D2 = 5' STD. (ADDITIONAL PANEL FOR DEPTH >5')
CURTAIN TO REACH BOTTOM. ADDITIONAL PANELS
TO BE USED TO REACH BOTTOM IF SINGLE ROW
DOES NOT REACH.

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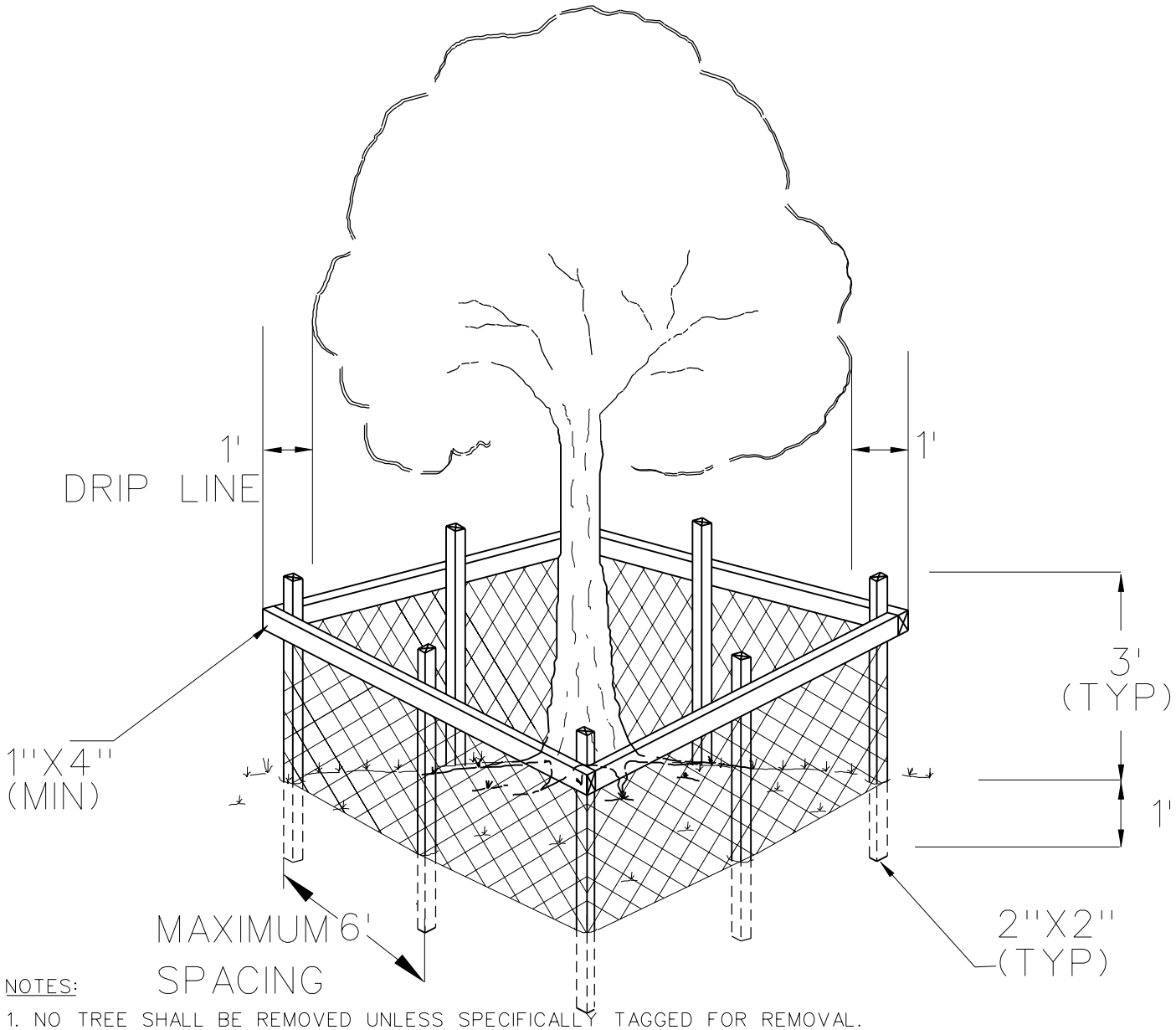
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Floating Turbidity Barrier	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-11
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

ANY TREE REMOVABLE REQUIRES A PERMIT



NOTES:

1. NO TREE SHALL BE REMOVED UNLESS SPECIFICALLY TAGGED FOR REMOVAL.
2. A PROTECTIVE BARRIER SHALL BE ERECTED AROUND ALL TREES AND NATIVE VEGETATION THAT ARE TO REMAIN PERMANENTLY ON-SITE.
3. ROOTS GREATER THAN 1" DIAMETER SHALL NOT BE CUT UNLESS OTHERWISE APPROVED.
4. TREE ROOTS ONE FOOT OUTSIDE OF BARRIER MUST COMPLY WITH SECTION 6300 SUBSECTION 6303(B) OF LARGO'S COMPREHENSIVE DEVELOPMENT CODE (CDC).
5. STOCKPILED MATERIALS OR UNNECESSARY VEHICULAR TRAFFIC SHALL NOT BE ALLOWED OVER ANY TREE ROOTS SYSTEM.
6. PROTECTIVE BARRIERS ARE TO BE CONSTRUCTED USING NO LESS THAN 2"X2" LUMBER FOR THE UPRIGHTPOSTS. UPRIGHT POSTS ARE TO BE AT LEAST 4 FEET IN LENGTH WITH A MINIMUM OF ONE FOOT ANCHORED IN THE GROUND AND THREE FEET ABOVE GROUND. UPRIGHT POSTS ARE TO BE PLACED AT A MAXIMUM DISTANCE OF 6 FEET APART. HORIZONTAL RAILS ARE TO BE CONSTRUCTED USING NO LESS THAN 1"X4" LUMBER AND SHALL BE SECURELY ATTACHED TO THE TOP OF THE UPRIGHT POSTS. A PVC- TYPE SAFETY FENCE THE HEIGHT OF THE BARRIER SHALL BE ATTACHED TO THE UPRIGHT POSTS, THE TOP RAIL, AND THE GROUND, WITHFASTENERS A MAXIMUM OF 8 INCHES APART. BARRIERS SHALL EXTEND AT LEAST ONE FOOT BEYOND THE DRIP LINE OF ALL PROTECTED TREES ON THE PROPERTY AND SHALL BE AT LEAST THREE FEET HIGH.

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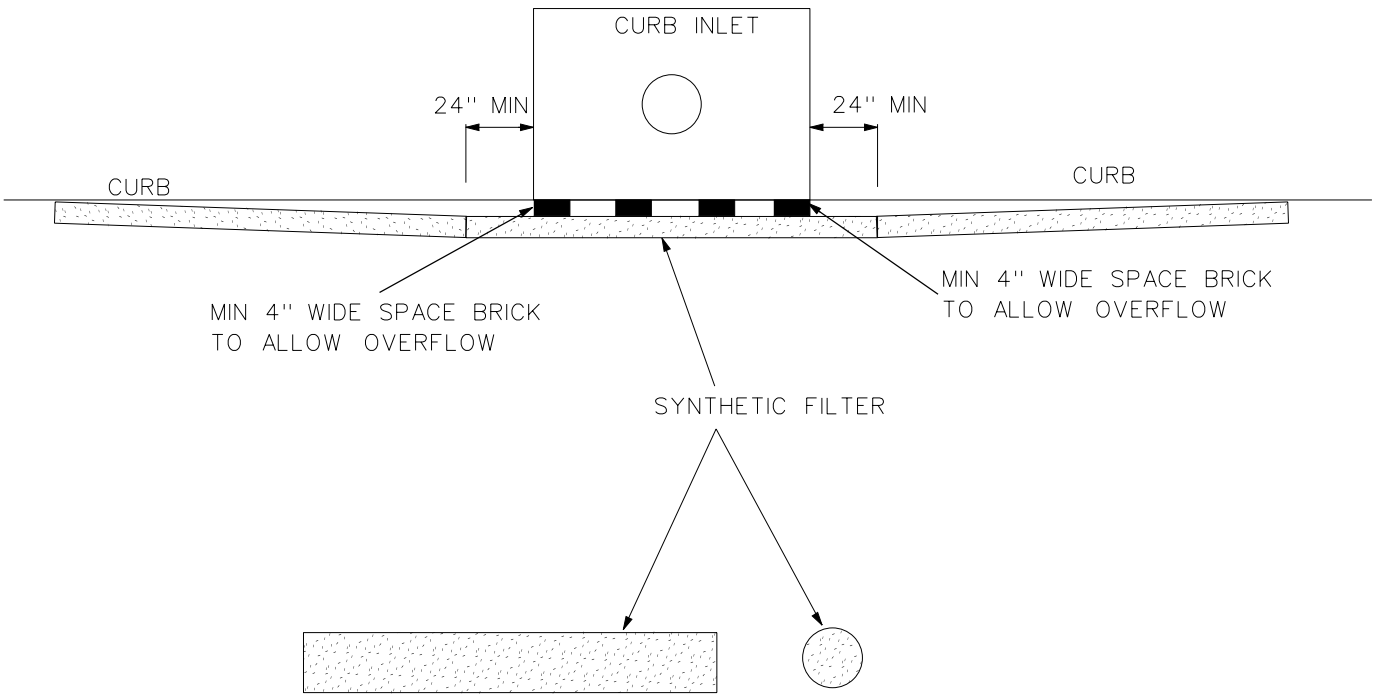
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Tree Protection	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-12
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

SYNTHETIC CURB INLET FILTER



SIDE VIEW

END VIEW

NOTE:

1. GEOHAY OR APPROVED EQUAL.
2. IF OVERFLOW HOLES ARE PRESENT IN THE SYNTHETIC FILTER, THEY SHOULD BE INSTALLED AT A 45° ANGLE.

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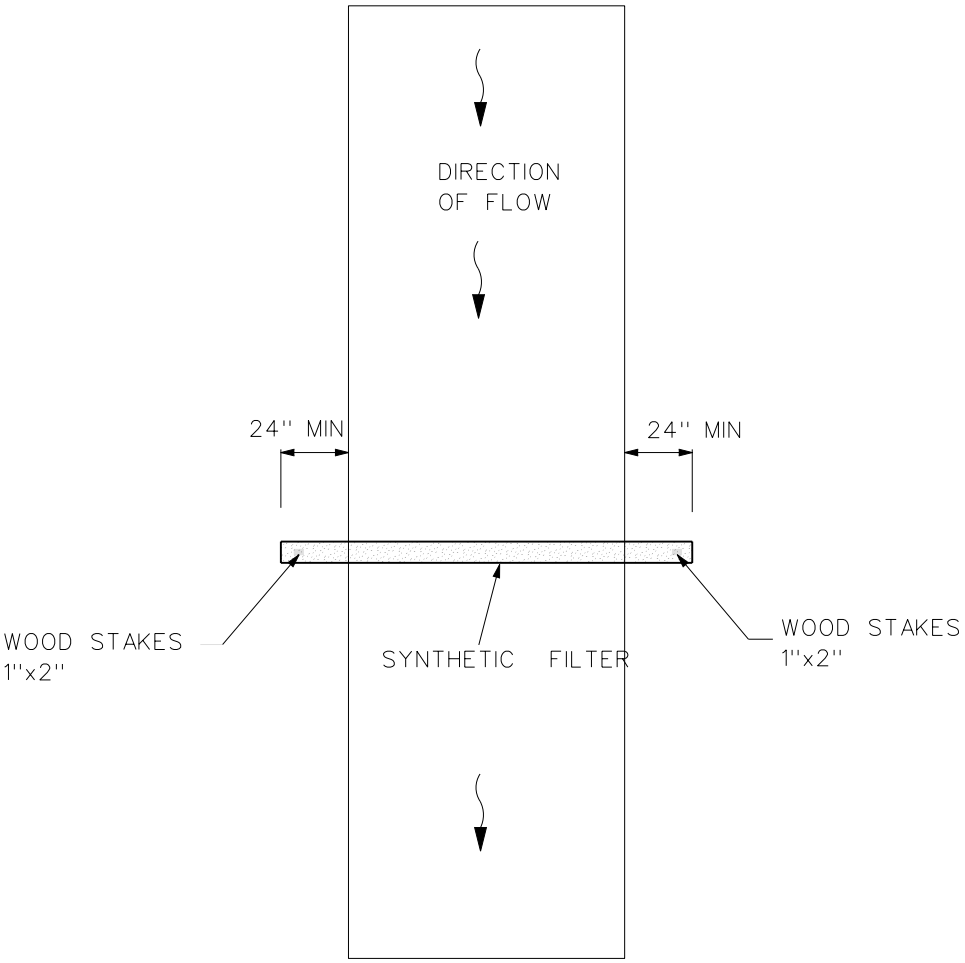
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Curb Inlet Filter	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-13
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



NOTE:

1. GEOHAY OR APPROVED EQUAL.

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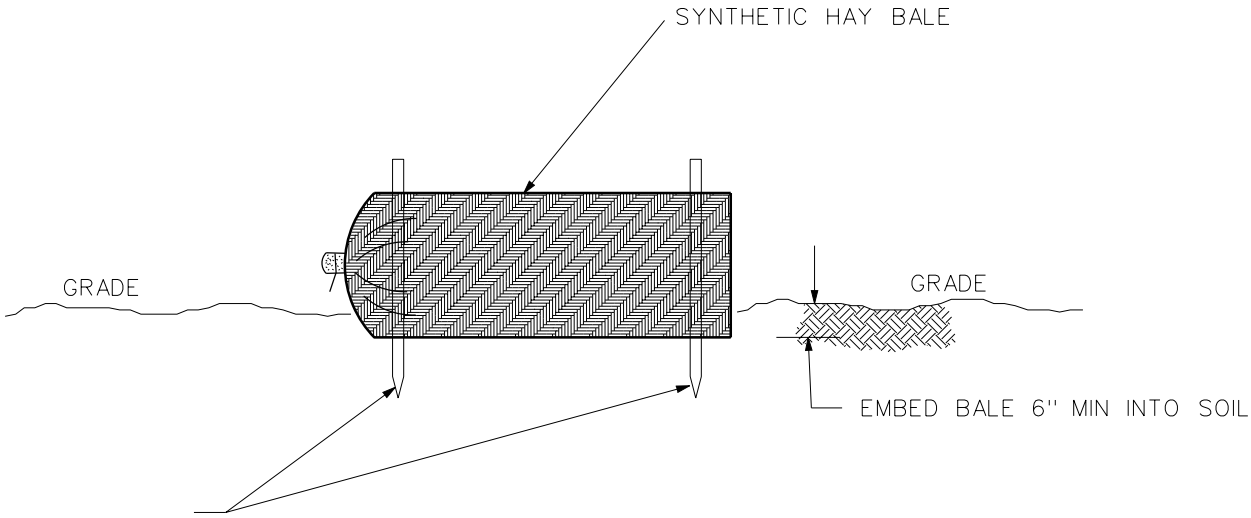
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Ditch Pavement Filters	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-14
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



NOTE:

1. GEOHAY OR APPROVED EQUAL.
2. IF REBAR IS TO BE USED, OSHA STANDARDS MUST BE MET.

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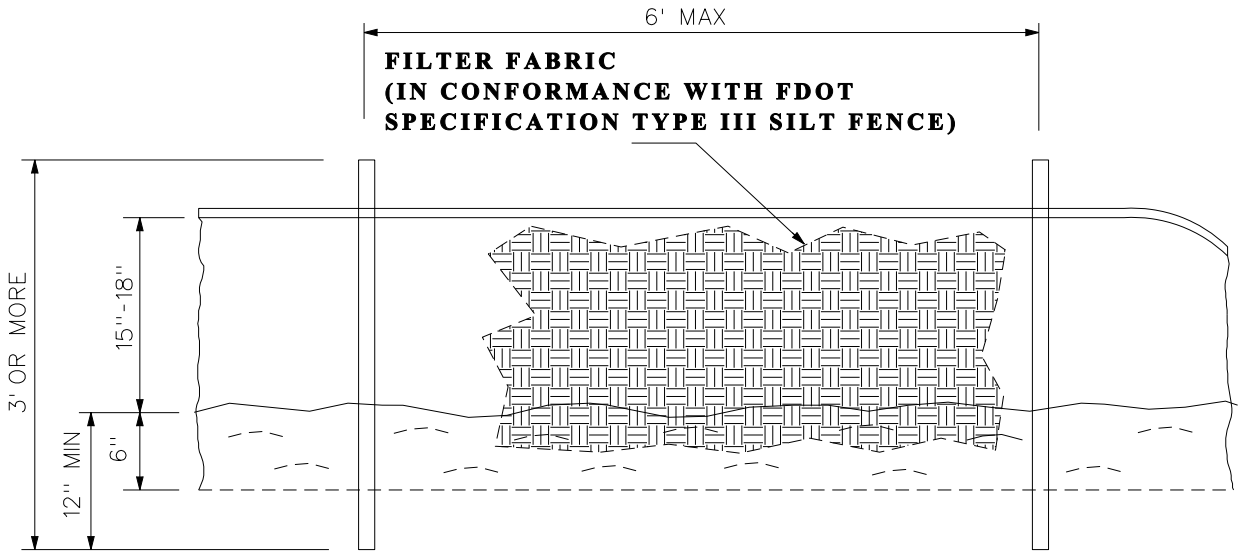
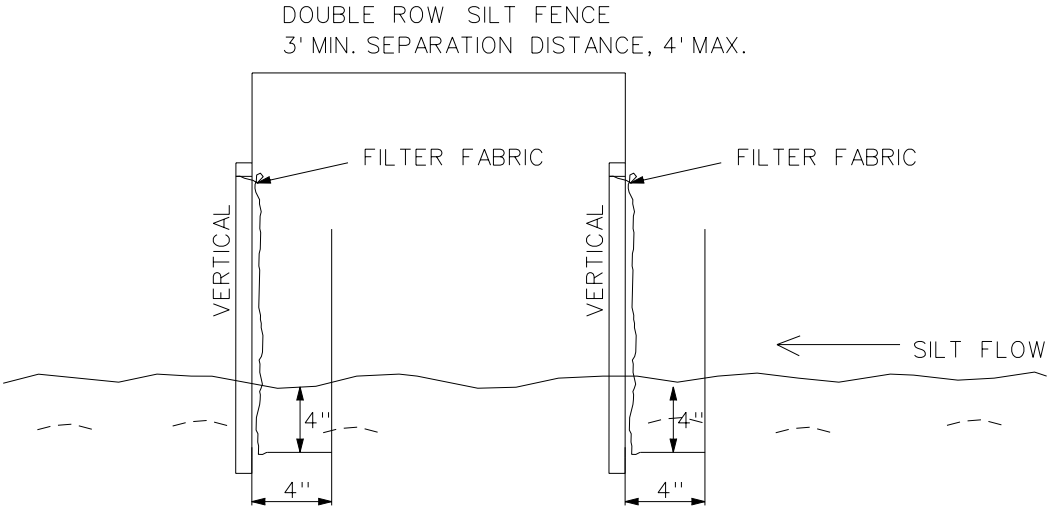
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Synthetic Haybale Installation	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-15
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

DOUBLE ROW SILT FENCE



ELEVATION



SECTION

NOTES:

1. THE FABRIC SHALL FACE THE AREA OF CONSTRUCTION WITH THE STAKES ON THE OUTSIDE AWAY FROM CONSTRUCTION.
2. FABRIC MUST BE TRENCHED IN AND BACK FILLED. THIS CAN BE DONE WITH A TRENCHER, FRONT BUCKET, OR BY HAND. FLAP MUST BE FOUR INCHES BELOW GRADE AND EXTEND FOUR INCHES TOWARDS THE FLOW OF SILT.
3. DOUBLE ROW SHALL BE USED ON ANY SITE NEAR A WATER BODY OR A STORM WATER CONVEYANCE SYSTEM. DOUBLE ROW WILL ALSO BE USED ON ANY SITE THAT IS NEAR AN INLET STRUCTURE THAT LEADS DIRECTLY TO A WATER BODY, EVEN IF THE SITE ITSELF IS NOT NEAR THE WATER BODY.

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TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Double Row Silt Fence	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SE-16
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

City of Largo
2023 Engineering Design and Construction Standards
Roadway and Traffic (RT) Section 2023 Updates
Revision Log

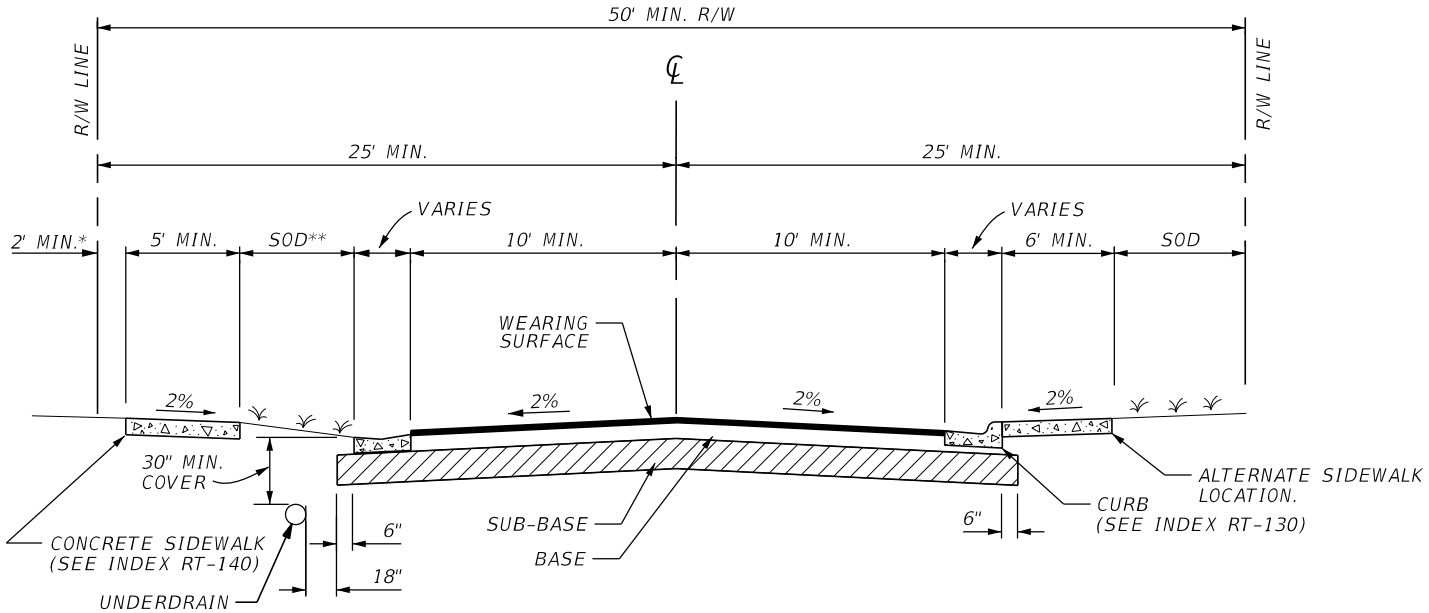
2023 Index Number	2023 Index Title	Description of Changes
RT-010	Residential Pavement Section	**SKETCH:** -Update to minimum dimensions and clarification of sidewalk location **TABLE:** -Specified wearing surface lift requirements **NOTES/SPECS:** - Update to Note 5 that miami or header curb is not permitted when sidewalk is contiguous to curb
RT-020	Typical Residential Road and Right-Of-Way Section	**SKETCH:** -Changed spacing from varies between sidewalk and edge of utility pole to 2' minimum. **NOTES/SPECS:** No changes
RT-030	Minimum Residential Roadway Width and Radii	Updated sketch with no technical changes.
RT-040	Typical Turning Radii Cul-De-Sac Street	No changes
RT-050	Driveway Locations at Intersections	No changes
RT-060	Pavement Joint	No changes
RT-070	Pavement Repair	**SKETCH:** -Updated milling limits **NOTES/SPECS:** -Fixed typos
RT-080	Typical Trench	**SKETCH:** - No changes **NOTES/SPECS:** -Note 1: Removed requirement of bedding wrapping.

City of Largo
2023 Engineering Design and Construction Standards
Roadway and Traffic (RT) Section 2023 Updates
Revision Log

2023 Index Number	2023 Index Title	Description of Changes
RT-090	Brick Pavement Trench Repair	**SKETCH:** -No changes **NOTES/SPECS:** - Fixed typos
RT-100	Structure Bedding	**SKETCH:** - No changes **NOTES/SPECS:** -Note 2: Added washed requirement
RT-110	Flowable Fill Mix	Updated flowable fill types
RT-120	Milling and Resurfacing	Updated Index name to remove "various roads" **SKETCH:** - No changes **NOTES/SPECS:** -Added Note 2 regarding finished asphalt thickness
RT-130	Curb and Gutter	No changes
RT-140	Sidewalks	No changes
RT-150	Curb-Cut Sidewalk Ramps	**SKETCHES:** -Updated all slope call-outs for consistent nomenclature **NOTES/SPECS:** -Note 1: Updated ADA reference year
RT-160	Intersection Control	No changes
RT-170	Crosswalk	No changes
RT-180	Pavement Marking Specifications	Updates to the following notes: Note 2: Changed title from "Permanent Markings" to "Thermoplastic" Note 7: Changed "paved surfaces" to "roadway pavement markings" Note 11: Removed "Private" from title. Added thermoplastic is required in the right-of-way. Removed cure time requirement.
RT-190	Traffic Sign	No changes
RT-191	Specialized Parking Signs	Added "Accessible EV Charging - Use Last" Signage
RT-200	Street Sign	No changes

City of Largo
2023 Engineering Design and Construction Standards
Roadway and Traffic (RT) Section 2023 Updates
Revision Log

2023 Index Number	2023 Index Title	Description of Changes
RT-210	Parking Lot	- New Note 2: Wheel stops -Removed Throat Depth dimension
RT-220	Typical Parking Lot Spaces/Section	**SKETCH:** -Corrected sidewalk ramp index reference **NOTES/SPECS:** -Note 1: Added requirement when abutting a sidewalk
RT-221	Electric Vehicle Parking Spaces	-Increased the minimum required stall depth for accessible stalls to 20' -Modification of Handicap Accessible signage and pavement markings -Addition of Notes section
RT-230	Wheel Stops	No changes
RT-240	Bollard Detail	-Changed minimum diameter of bollard from 4" to 6"
RT-260	Brick Street Reconstruction	**SKETCH:** No changes **TABLE:** -Updated Sub-base requirement **NOTES/SPECS:** Removed Note #5
RT-270a	Driveway	-Renumbered standard from RT-270 to RT-270a **Notes:** -Removed paver driveway requirements. This information can now be found in new standard RT-270b
RT-270b	Paver Driveway	NEW STANDARD
RT-280	Sidewalk Deflection	No changes
RT-290	ADA Ramps	No changes
RT-300	Sight Triangle	No changes
RT-310	Sight Triangle Distances	No changes
RT-320	Speed Table Assembly – Flat Top	No changes



* SIDEWALK TO BE PLACED AS FAR FROM THE ROADWAY AS PRACTICAL

** IF SIDEWALK IS LESS THAN 2' FROM BACK OF CURB, UTILIZE ALTERNATE SIDEWALK LOCATION

MINIMUM PAVEMENT SPECIFICATIONS - RESIDENTIAL PAVEMENT	
WEARING SURFACE	1½" TYPE SP-9.5 (SINGLE LIFT)
BASE	8" CRUSHED CONCRETE OR LIMEROCK COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180 (100 LBR). PRIME OR TACK LIMEROCK, OR SPRAY CRUSHED CONCRETE WITH WATER BEFORE PAVING PER F.D.O.T. STANDARDS.
SUB-BASE	12" STABILIZED (40 LBR) AND COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180.

MINIMUM PAVEMENT SPECIFICATIONS COLLECTOR AND ABOVE	
WEARING SURFACE	3" MIN. SP-12.5 (TWO LIFTS)
BASE	10½" MIN. CRUSHED CONCRETE OR LIMEROCK COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180 (100 LBR). PRIME OR TACK LIMEROCK, OR SPRAY CRUSHED CONCRETE WITH WATER BEFORE PAVING PER F.D.O.T. STANDARDS.
SUB-BASE	12" STABILIZED (40 LBR) AND COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180.

NOTES:

1. VARIATION FROM MATERIAL SPECIFICATIONS WILL BE CONSIDERED ON A CASE BY CASE BASIS BY THE CITY ENGINEER.
2. BACK OF SIDEWALK TO MATCH CENTERLINE CROWN ELEVATION.
3. UNDER DRAIN REQUIREMENTS MAY BE REDUCED OR WAIVED AS APPROPRIATE BY THE CITY ENGINEER.
4. REFER TO INDEX RT-060 FOR PAVEMENT JOINTS.
5. INSTALL CURB WHERE REQUIRED BY PLAN. MIAMI OR HEADER CURB IS NOT PERMITTED WHEN SIDEWALK IS CONTIGUOUS TO CURB.
6. REFER TO COMPREHENSIVE DEVELOPMENT CODE FOR FUTURE R.O.W. WIDTH AND MULTIMODAL REQUIREMENTS.

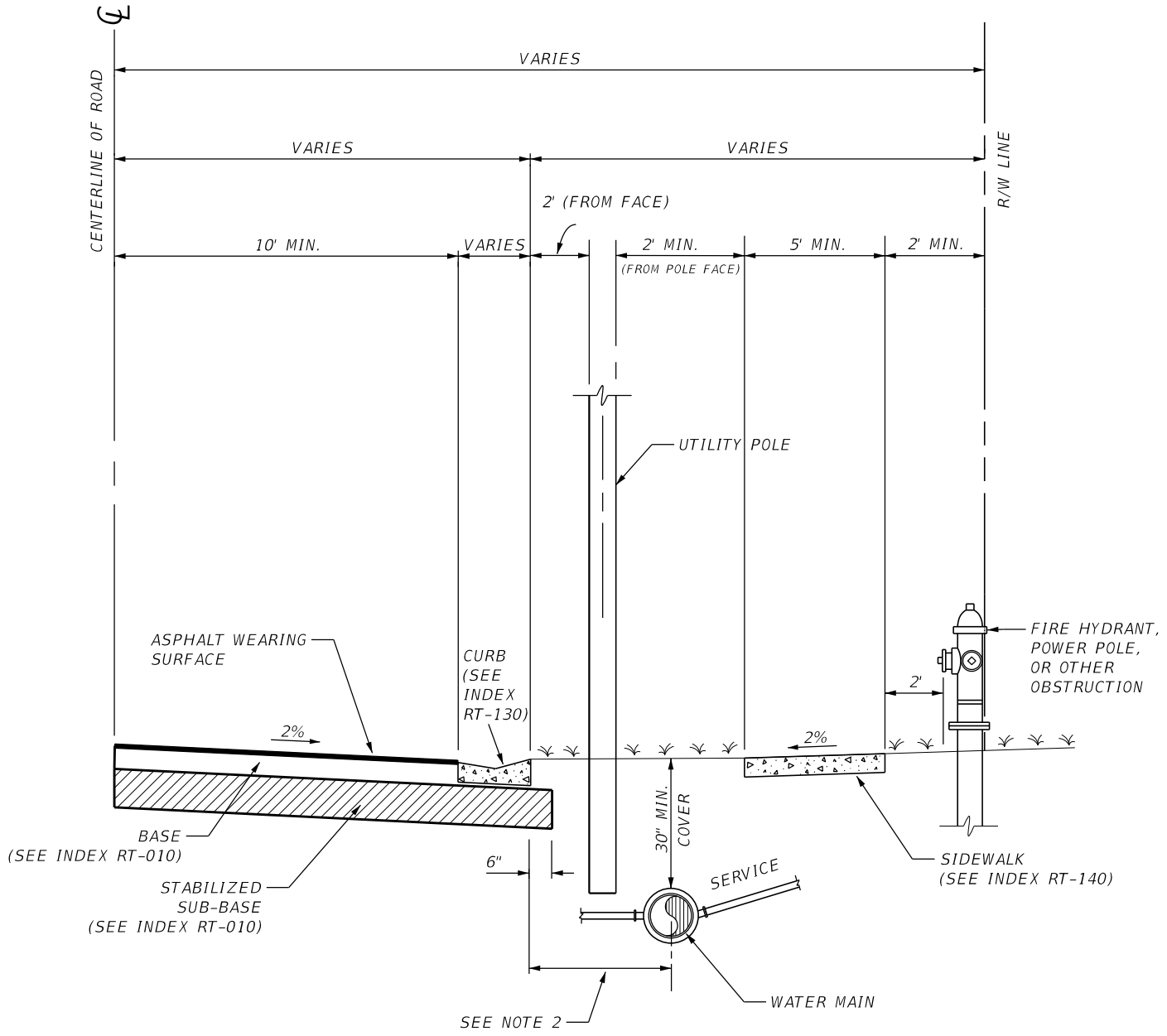
CONSTRUCTION INDEX RT-010

RESIDENTIAL PAVEMENT SECTION
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-010	**Residential Pavement Section**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. RIGHT-OF-WAY SHALL BE ROUGH GRADE PRIOR TO WATER METER INSTALLATION.
2. UTILITIES ARE REQUIRED TO MEET CLEAR ZONE REQUIREMENTS.
3. REFER TO INDEX RT-010 FOR PAVEMENT SECTION DETAILS.

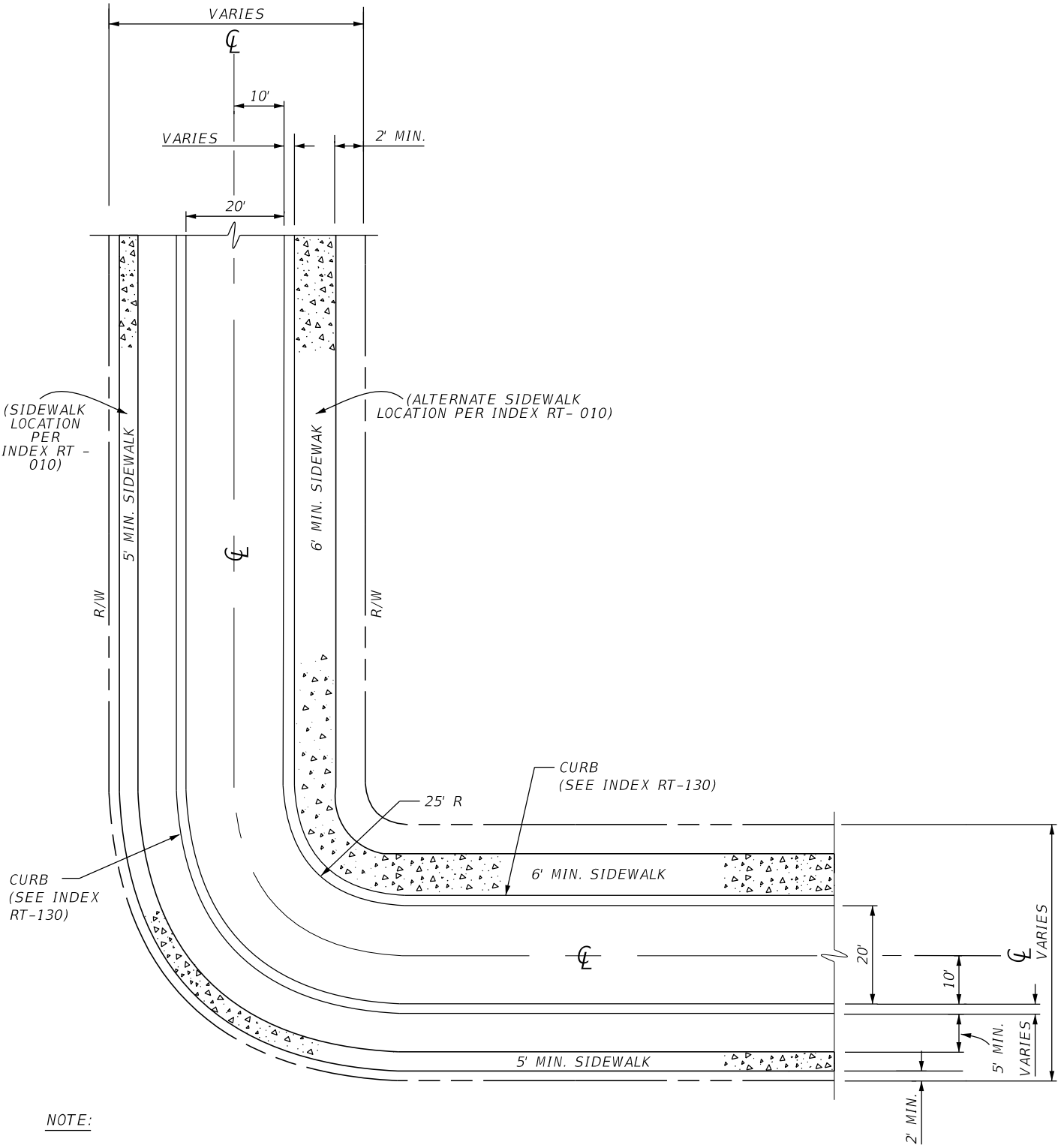
CONSTRUCTION INDEX RT-020

TYPICAL RESIDENTIAL ROAD AND RIGHT-OF-WAY SECTION
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-020	**Typical Residential Road and Right-Of-Way Section**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTE:

1. ALL CALL-OUTS ARE TO EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.

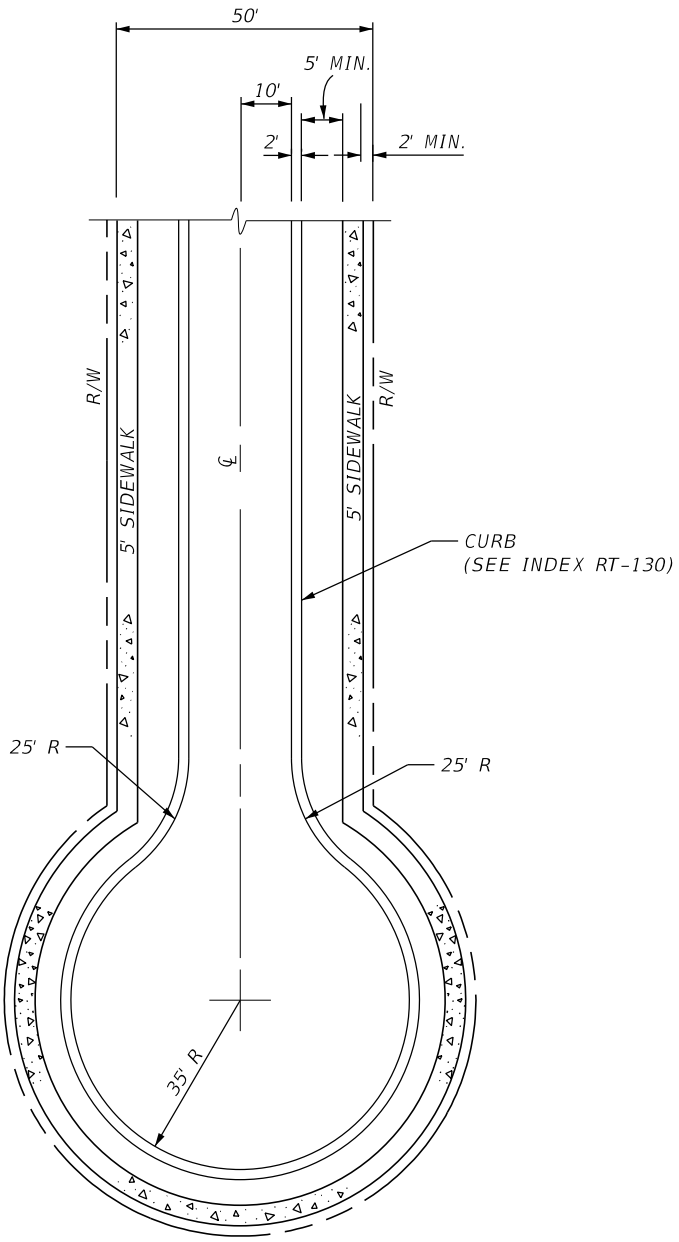
CONSTRUCTION INDEX RT-030

MINIMUM RESIDENTIAL ROADWAY WIDTH AND RADII
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-030	**Minimum Residential Roadway Width and Radii**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



PLAN

NOTES:

1. ALTERNATIVE TURNAROUNDS WILL BE CONSIDERED ON A CASE-BY-CASE BASIS, AS REVIEWED BY PUBLIC WORKS AND THE FIRE DEPARTMENT AND APPROVED BY THE CITY ENGINEER.

2. ALL RADIUS DESIGNS AND CALL-OUTS ARE TO EDGE OF THE PAVEMENT UNLESS OTHERWISE NOTED.

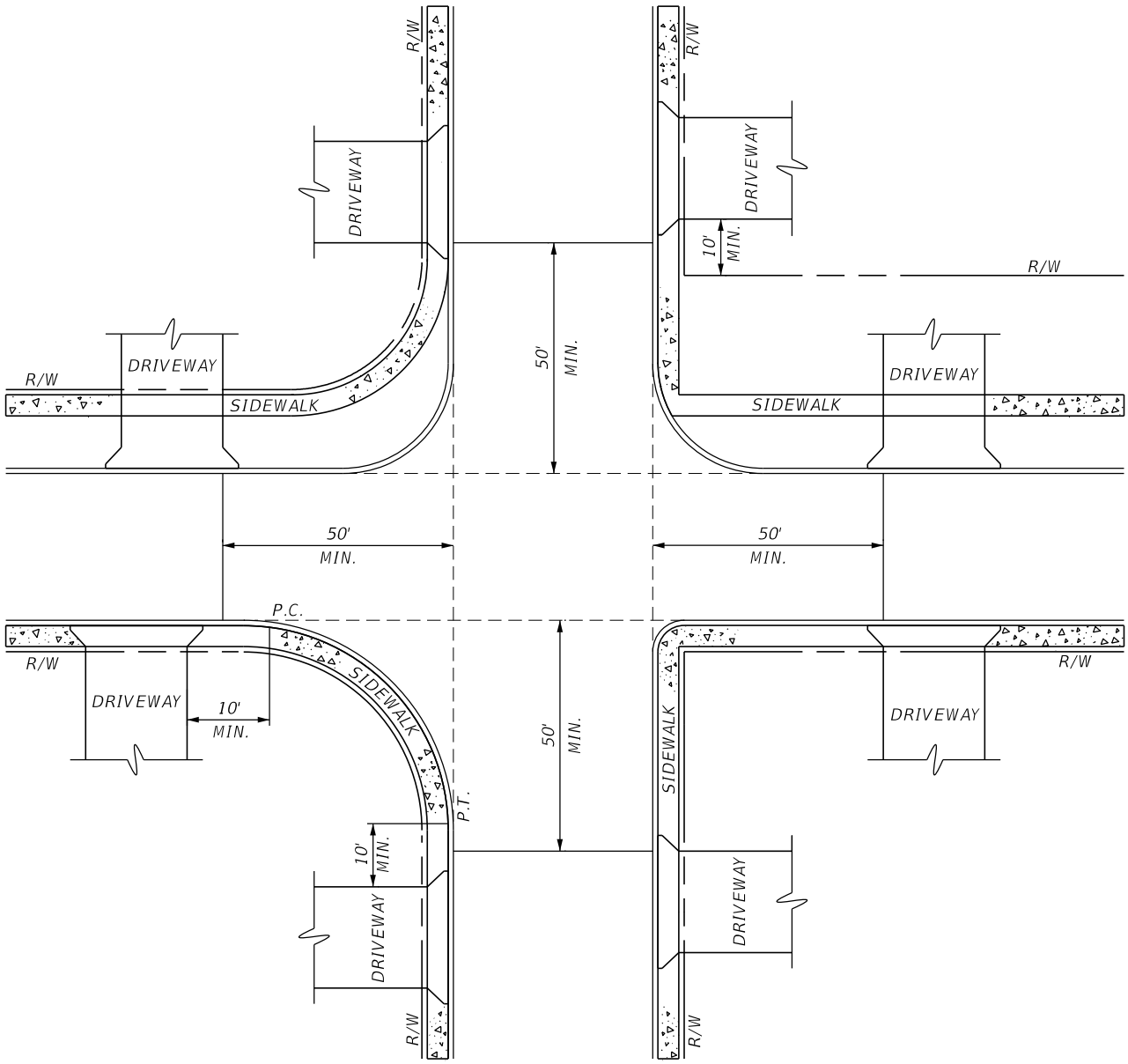
CONSTRUCTION INDEX RT-040

TYPICAL TURNING RADII CUL-DE-SAC STREET
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-040	**Typical Turning Radii Cul-De-Sac Street**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTE:

1. DRIVEWAYS TO BEGIN A MINIMUM OF 50' FROM EDGE OF PAVEMENT, 10' FROM P.C. OR P.T., OR 10' FROM R/W LINE WHICHEVER IS GREATER.

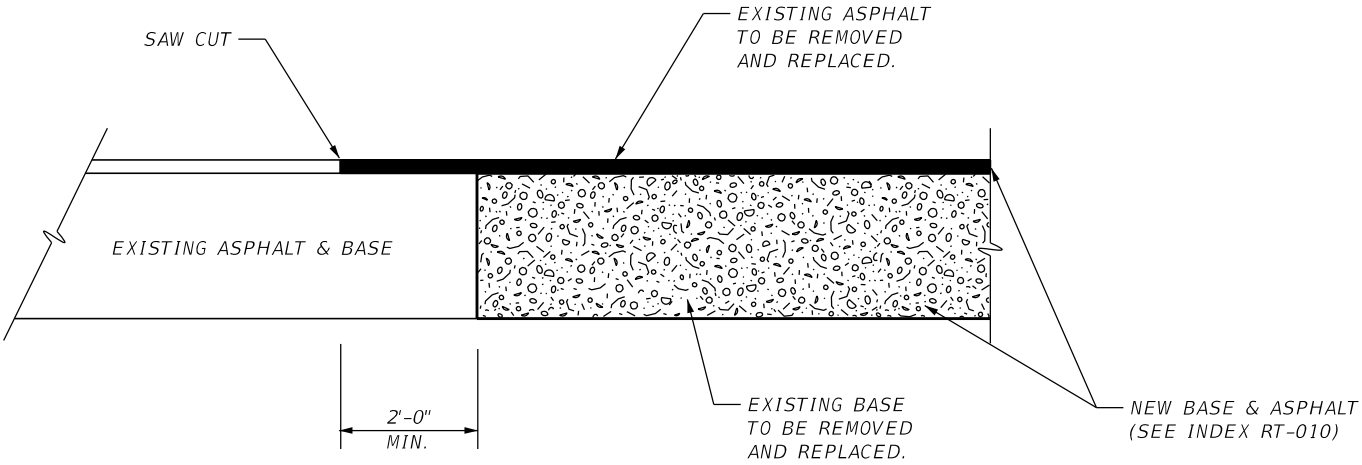
CONSTRUCTION INDEX RT-050

DRIVEWAY LOCATIONS AT INTERSECTIONS
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-050	**Driveway Locations at Intersections**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTE:

1. THIS METHOD OF PAVEMENT JOINT SHALL BE USED FOR ANY APPLICATION OR CONSTRUCTION WHERE PROPOSED PAVEMENT AND BASE WILL BE CONNECTED TO EXISTING PAVEMENT AND BASE.

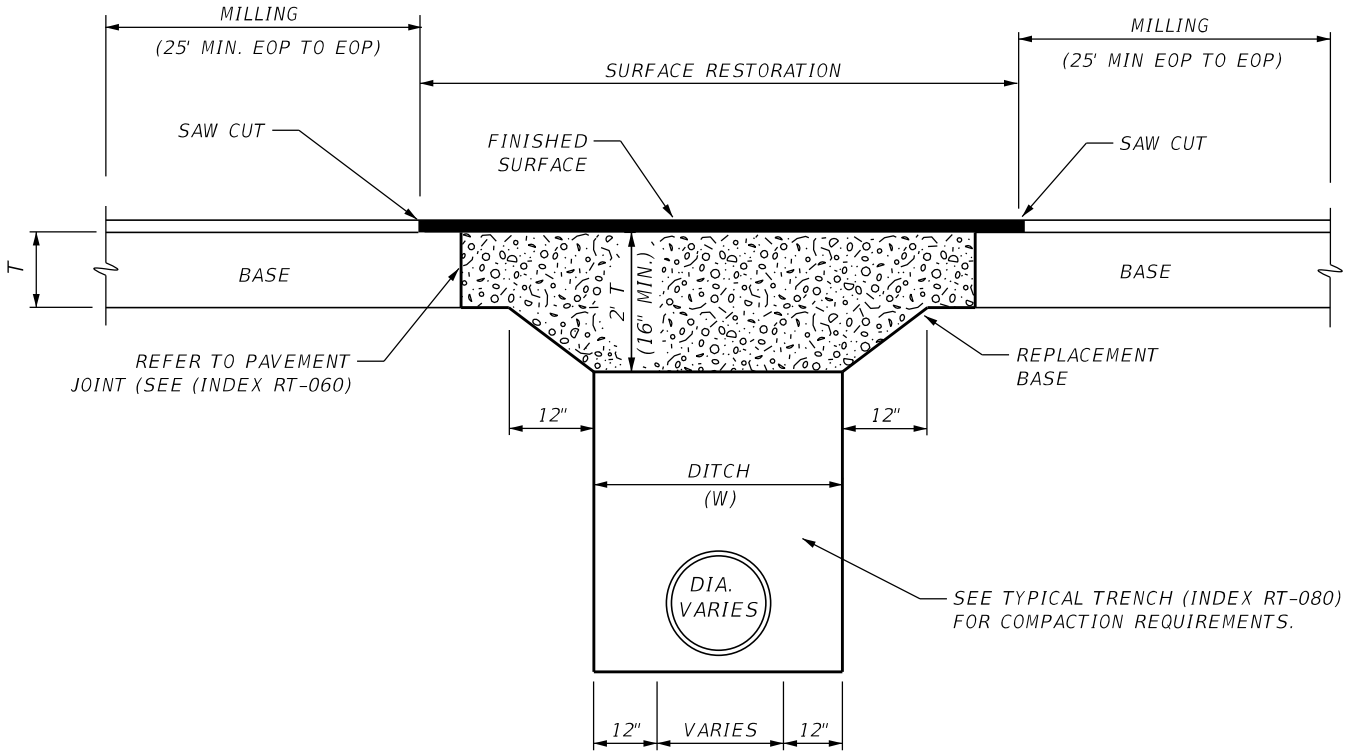
CONSTRUCTION INDEX RT-060

PAVEMENT JOINT
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-060	**Pavement Joint**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. REPLACEMENT BASE MATERIAL OVER DITCH SHALL BE AT MINIMUM 16" THICK OR TWICE THE THICKNESS OF THE EXISTING BASE, WHICHEVER IS GREATER.
2. BASE MATERIAL SHALL BE PLACED IN THREE OR MORE LIFTS AND EACH LIFT COMPACTED TO 98% DENSITY PER A.A.S.H.T.O. T-180, LBR 100 (MAX. LIFT THICKNESS = 6").
3. FLOWABLE FILL MAY BE USED AS A REPLACEMENT FOR SUB-BASE MATERIAL WITH CITY'S APPROVAL.
4. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED AND ALL SURFACES TACK COATED.
5. SURFACE MATERIAL SHALL CONFORM TO INDEX RT-010.
6. ANY PAVEMENT CUTS SHALL BE COLD PATCHED AT END OF EACH WORKING DAY TO FACILITATE UNHINDERED TRAFFIC FLOW.
7. ALL DISTURBED PAVEMENT MARKINGS SHALL BE RESTORED IN ACCORDANCE WITH CITY STANDARDS.
8. NO OPEN CUT OF ROADS THAT HAVE BEEN NEWLY BUILT OR RESURFACED WITHIN THE LAST FIVE YEARS. CONTRACTOR TO VERIFY WITH ENGINEERING STAFF.
9. SEE INDEX RT-080 FOR BEDDING REQUIREMENTS ON ALL PIPING.
10. VARIATION FROM MILLING LIMITS WILL BE CONSIDERED ON A CASE BY CASE BASIS BY THE CITY ENGINEER.

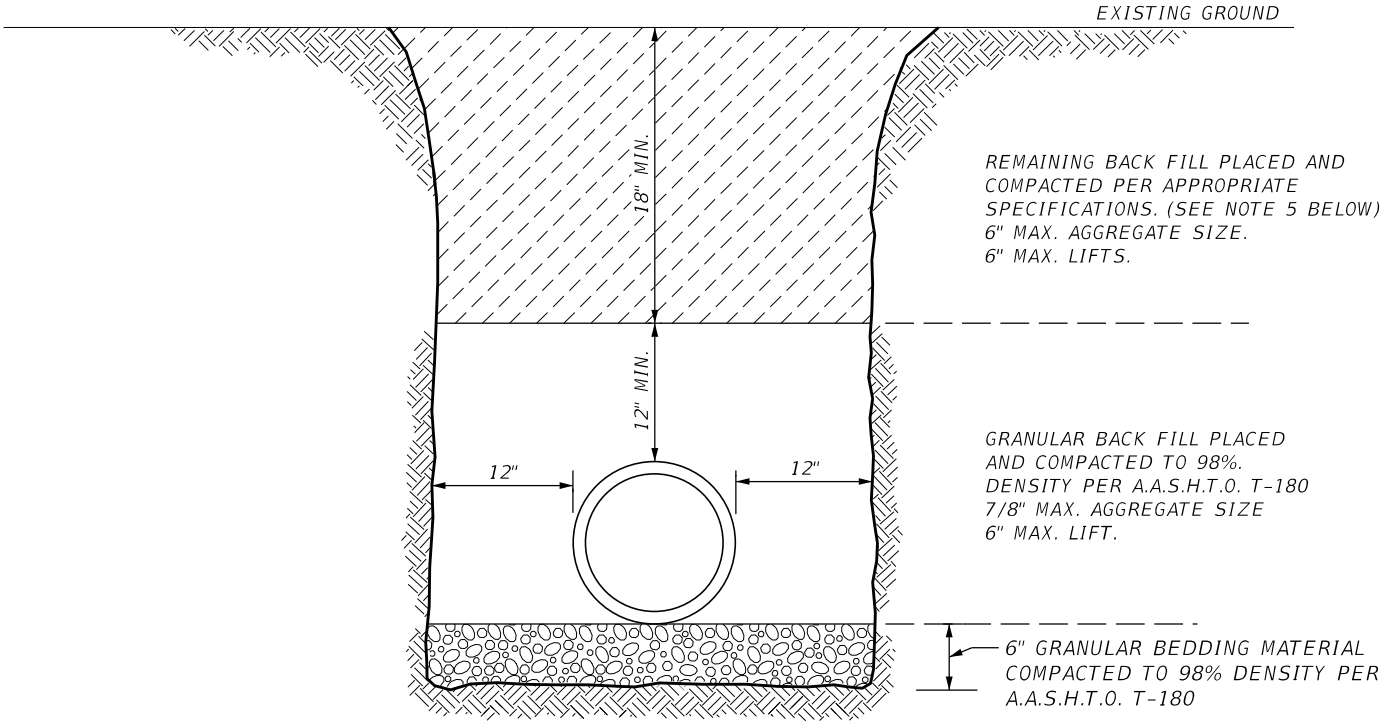
CONSTRUCTION INDEX RT-070

PAVEMENT REPAIR
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-070	**Pavement Repair**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. BEDDING SHALL CONSIST OF UNWASHED AND GRADED ROCK 3/8"-7/8" SIZING. UNSUITABLE IN-SITU MATERIALS SUCH AS MUCK, DEBRIS AND LARGE ROCKS SHALL BE REMOVED.
2. THE PIPE SHALL BE FULLY SUPPORTED FOR ITS ENTIRE LENGTH WITH APPROPRIATE COMPACTION UNDER THE PIPE HAUNCHES.
3. THE PIPE SHALL BE PLACED IN A DRY TRENCH.
4. BACK FILL SHALL BE FREE OF UNSUITABLE MATERIAL SUCH AS LARGE ROCK, MUCK, AND DEBRIS.
5. COMPACT BACK FILL TO 100% DENSITY, (A.A.S.H.T.O. T-99, METHOD C)
6. COMPACTION AND DENSITY TESTS SHALL BE COMPLETED DURING BACK FILL OPERATIONS; CONTRACTORS NOT FOLLOWING THIS PROCEDURE, FOR WHATEVER REASONS, SHALL BE REQUIRED TO RE-EXCAVATE THE AREA IN QUESTION, DOWN TO THE BEDDING MATERIAL, THEN BACK FILL IN ACCORDANCE WITH THE ABOVE PROCEDURES.

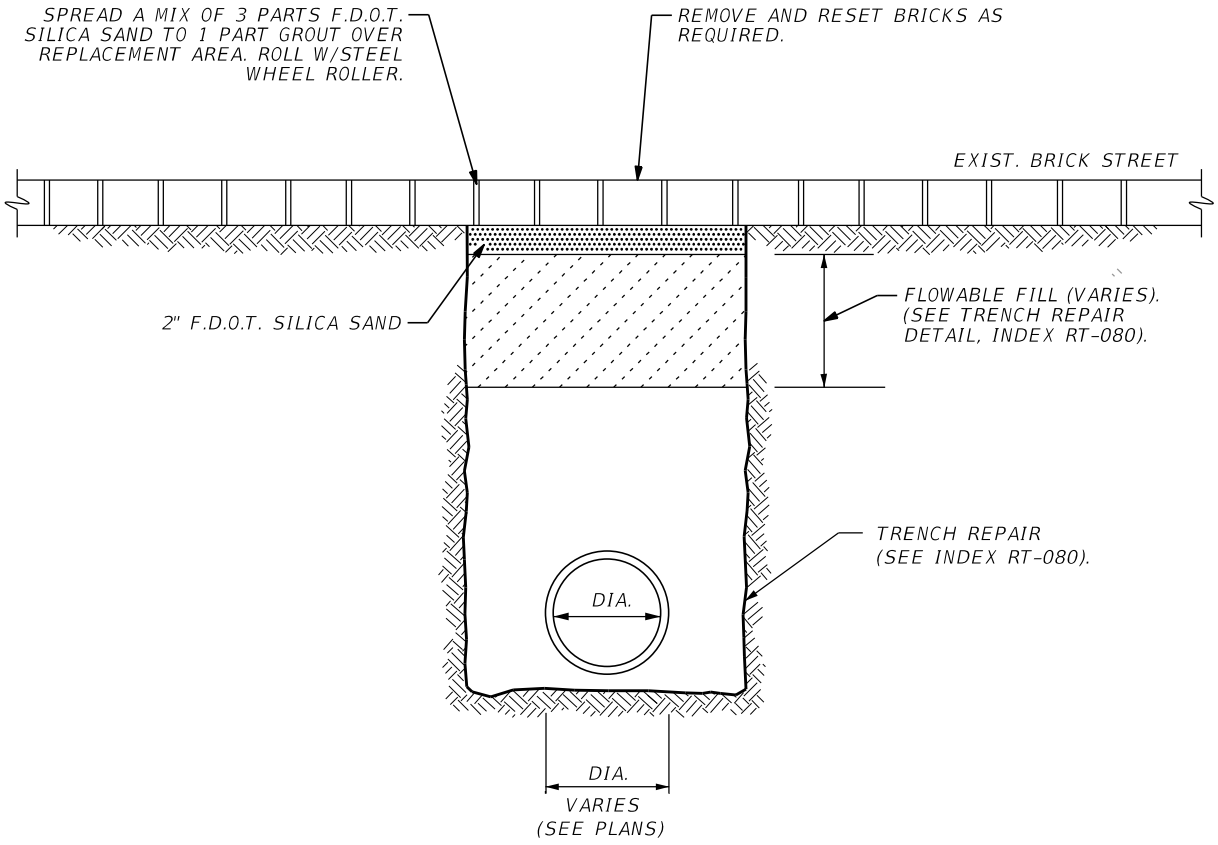
CONSTRUCTION INDEX RT-080

TYPICAL TRENCH
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-080	**Typical Trench**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. CONTRACTOR SHALL ENDEAVOUR TO KEEP TRENCHING DISTURBANCE TO A MINIMUM IN BRICK PAVEMENT AREAS.
2. REPLACED BRICKS TO MATCH EXISTING PATTERN, SLOPE AND ELEVATION.
3. THIS INDEX RT-090 SHALL BE UTILIZED IN AREAS WHERE EXISTING BRICK STREETS WILL REQUIRE TRENCHING, BUT NO FULL WIDTH STREET RECONSTRUCTION IS PROPOSED (SEE INDEX RT-260).

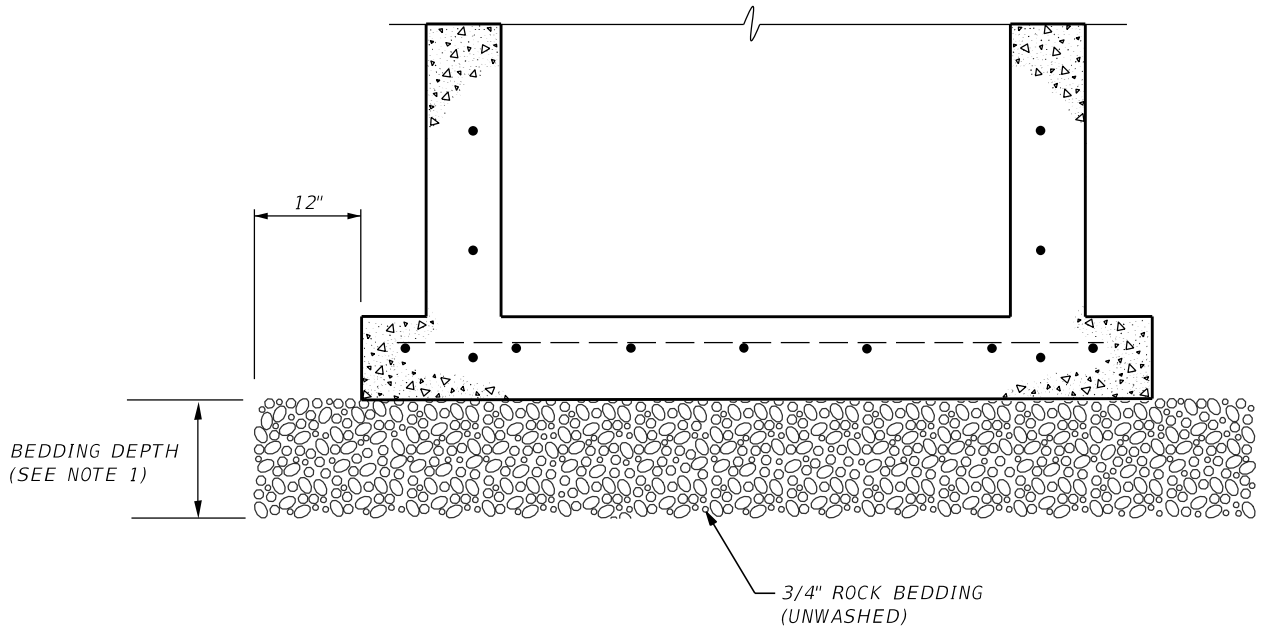
CONSTRUCTION INDEX RT-090

BRICK PAVEMENT TRENCH REPAIR
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-090	**Brick Pavement Trench Repair**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.

2. IF STRUCTURE INCLUDES WEEP HOLES, ROCK SHALL BE WASHED AND WRAPPED IN FILTER FABRIC THAT MEETS THE REQUIREMENTS OF F.D.O.T. SPECIFICATION SECTION 985.

3. SEE DRAINAGE AND WASTEWATER DETAILS FOR ANY ADDITIONAL BEDDING WRAPPING REQUIREMENTS

CONSTRUCTION INDEX RT-100

STRUCTURE BEDDING
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-100	**Structure Bedding**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

FLOWABLE FILL MIXES

EXCAVATABLE

CEMENT	75-100 lbs/yd3
POZZOLANS OR SLAG	0 lbs
AIR**	5-35%
28 DAY COMPRESSIVE STRENGTH	MAX 100 PSI
WATER	*
UNIT WEIGHT**	90-110 LB/FT3
FINE AGGREGATE	***

NON-EXCAVATABLE

CEMENT	75-150 lbs/yd3
POZZOLANS OR SLAG	150-600 lbs/yd3
AIR**	5-15%
28 DAY COMPRESSIVE STRENGTH	MIN 125 PSI
WATER	*
UNIT WEIGHT**	100-125 lb/ft3
FINE AGGREGATE	***

NOTES:

1. FLOWABLE FILL MIXES SHALL BE COMPLIANT WITH FDOT SPECIFICATIONS.

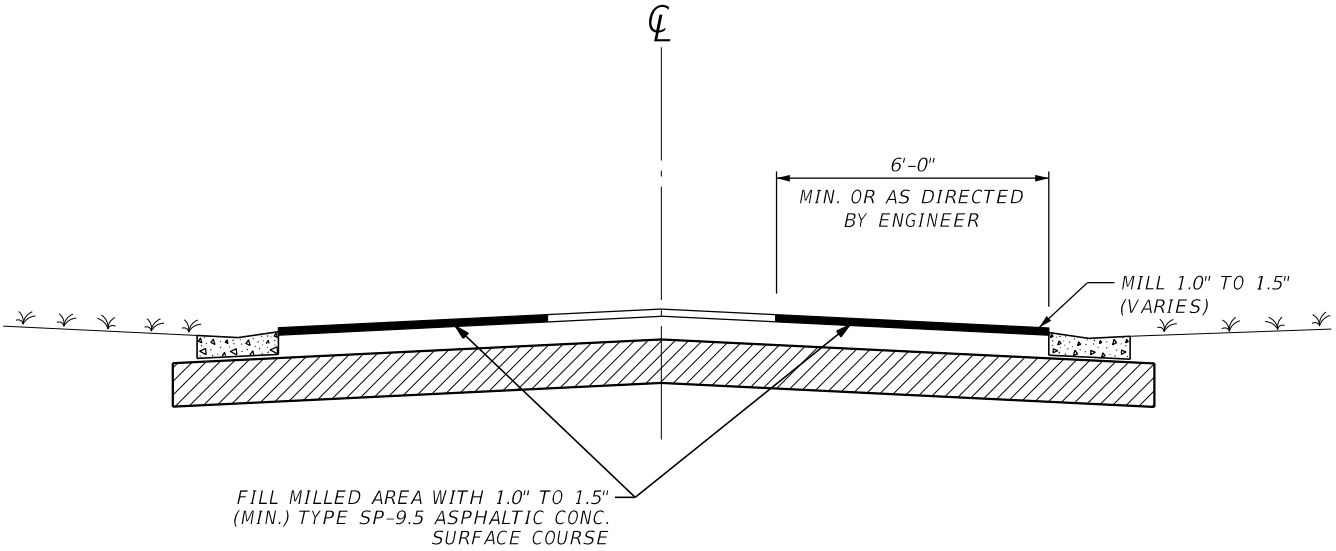
CONSTRUCTION INDEX RT-110

FLOWABLE FILL MIX
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-110	**Flowable Fill Mix**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTE:

1. ALL MILLINGS REMAIN THE PROPERTY OF THE CITY UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

2. THE FINISHED ASPHALT THICKNESS MUST BE 1 1/2".

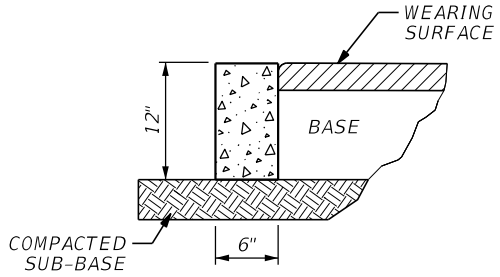
CONSTRUCTION INDEX RT-120

MILLING AND RESURFACING
(N.T.S.)

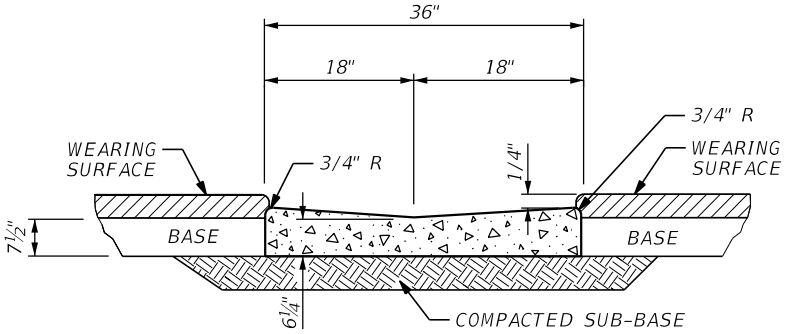
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-120	**Milling and Resurfacing**

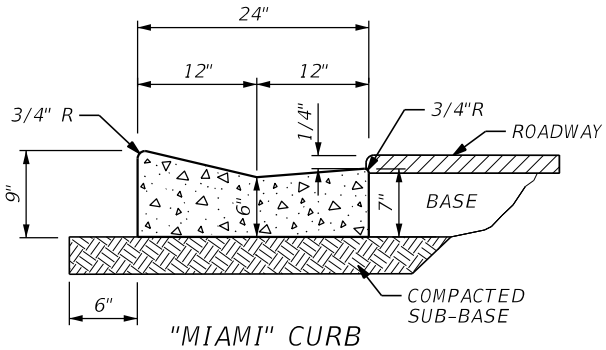
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



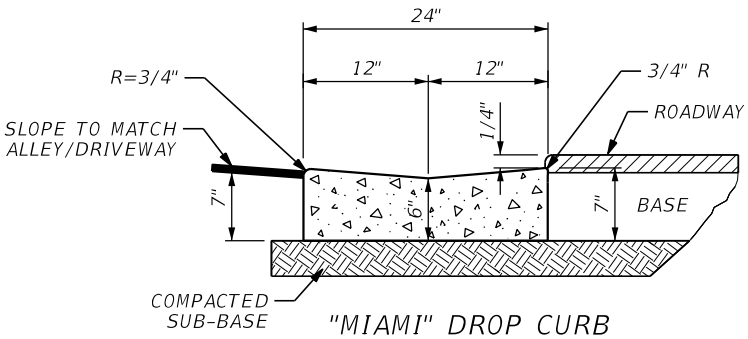
CONCRETE HEADER CURB



VALLEY CURB

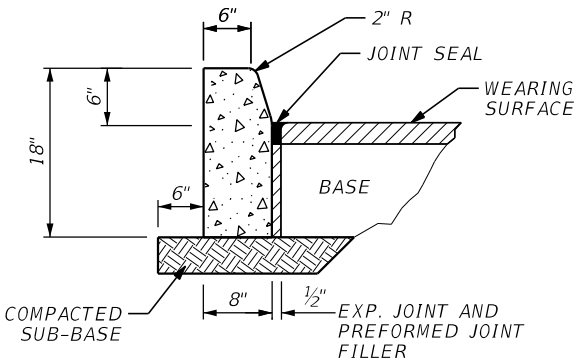


"MIAMI" CURB

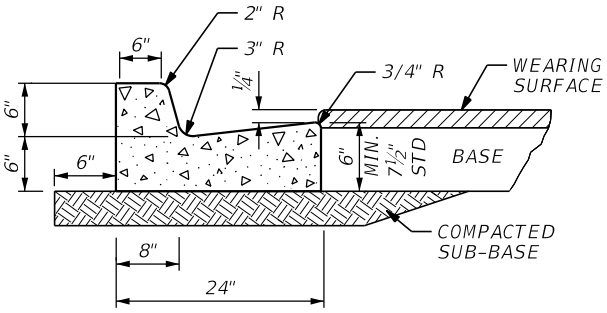


"MIAMI" DROP CURB

(AT DRIVEWAYS AND ALLEYS)



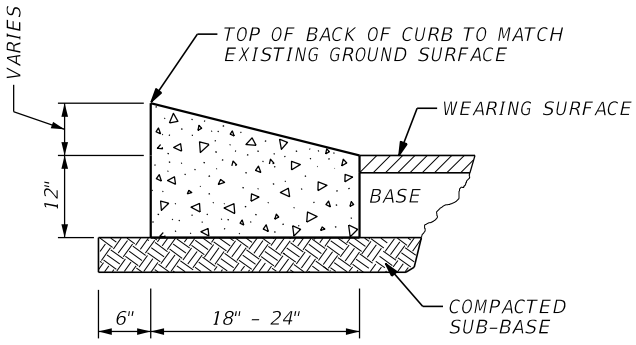
FDOT TYPE "D" CONCRETE CURB



NOTE:

WHEN USED ON HIGH SIDE OF ROADWAYS, CROSS SLOPE OF THE GUTTER SHALL MATCH THE CROSS SLOPE OF THE ADJACENT PAVEMENT AND THE THICKNESS OF THE LIP SHALL BE 6".

FDOT TYPE "F" CONCRETE CURB



CONCRETE "SLANT" CURB

NOTES:

1. ROADWAY SUB-BASE SHALL IN ALL CASES EXTEND 6" BEYOND CURBING.
2. SAWCUTS AT 10' CENTERS SHALL BE MADE WITHIN 24 HOURS OF CONCRETE PLACEMENT.
3. CONCRETE SHALL BE 3000 P.S.I. WITH FIBERMESH.

CONSTRUCTION INDEX RT-130

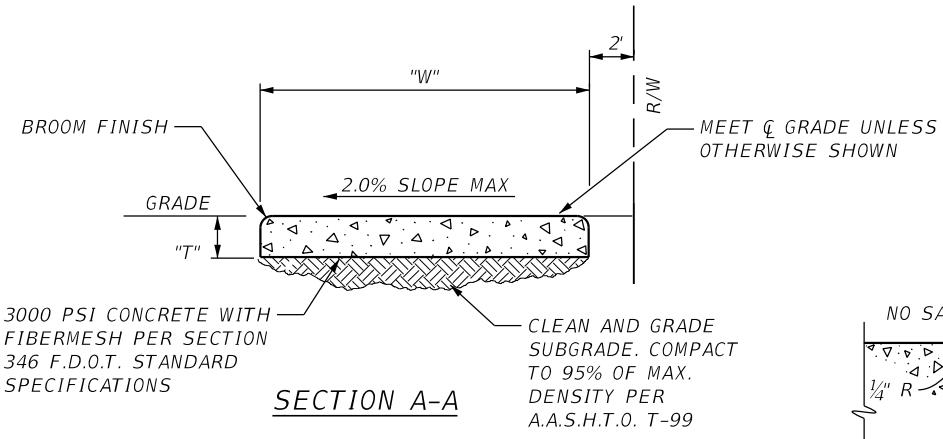
CURB AND GUTTER

(N.T.S.)

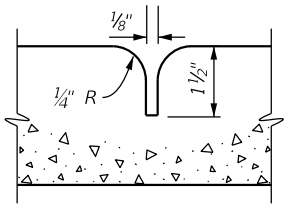
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-130	**Curb and Gutter**

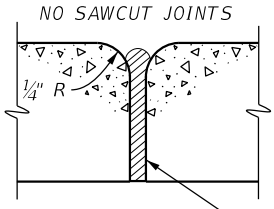
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



SECTION A-A



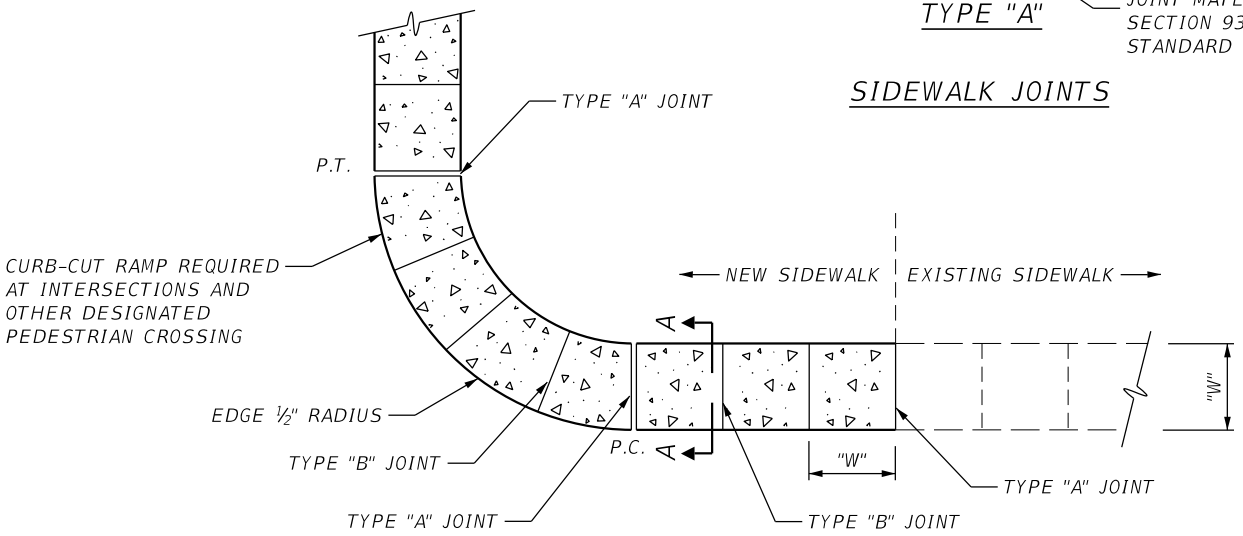
TYPE "B"



TYPE "A"

½" PRE-MOLDED EXPANSION JOINT MATERIAL PER SECTION 932-1.1 F.D.O.T. STANDARD SPECIFICATIONS

SIDEWALK JOINTS



PLAN

TABLE OF SIDEWALK THICKNESS - "T"	
RESIDENTIAL AREAS	4"
10' EITHER SIDE OF CROSS-STREETS, COMMERCIAL AND INDUSTRIAL ACCESS. AT DRIVEWAYS & OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER.	6"

TABLE OF SIDEWALK WIDTHS - "W"	
RESIDENTIAL ROADS.	5'
ARTERIAL AND COLLECTOR ROADS.	5'
OTHER AREAS AS SPECIFIED BY THE CITY ENGINEER.	

TABLE OF SIDEWALK JOINTS	
TYPE	LOCATION
"A"	P.C. AND P.T. OF CURVES JUNCTION OF EXISTING AND NEW SIDEWALKS AND EVERY 50' FOR 5' WIDE.
"B"	WIDTH OF SIDEWALK CENTER TO CENTER ON SIDEWALKS SCORED DURING PLACEMENT WITHIN 24 HOURS OF PLACEMENT.
"A"	WHERE SIDEWALK ABUTS CONCRETE CURBS, DRIVEWAYS, AND SIMILAR STRUCTURES.

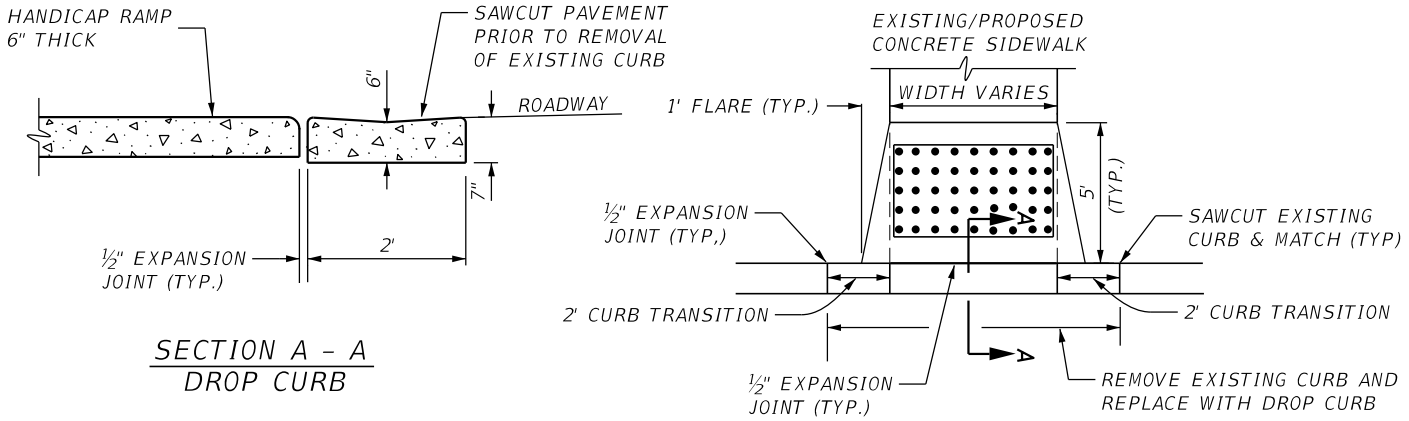
CONSTRUCTION INDEX RT-140

SIDEWALKS
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-140	**Sidewalks**

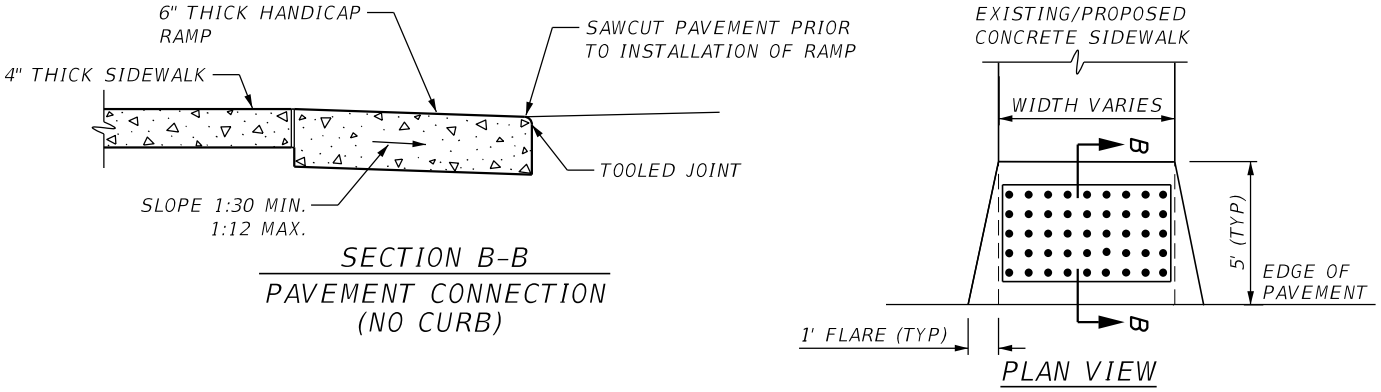
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



SECTION A - A
DROP CURB

PLAN VIEW

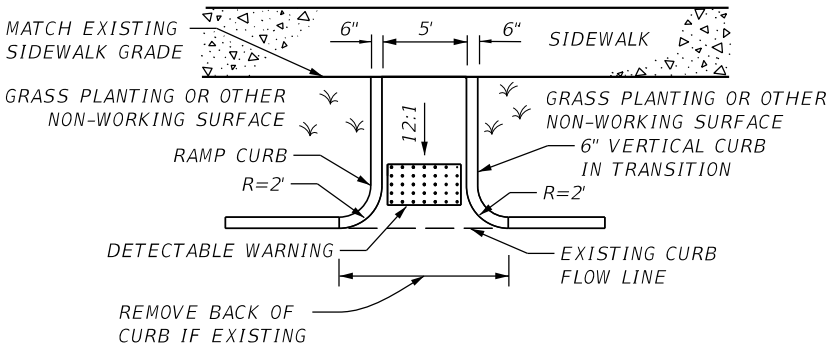
P.C. TYPE-A HANDICAP RAMP



SECTION B-B
PAVEMENT CONNECTION
(NO CURB)

PLAN VIEW

P.C. TYPE-B HANDICAP RAMP



RETURNED CURB RAMPS

NOTES:

1. RAMP SHALL COMPLY WITH THE UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND WITH THE AMERICANS WITH DISABILITIES ACT OF 2010 (ADA).

2. RAMPS SHALL HAVE A DETECTABLE WARNING, IN COMPLIANCE WITH REQUIREMENTS OF F.D.O.T. STANDARD PLANS FOR ROAD CONSTRUCTION, INDEX 522-002. ALL DETECTABLE WARNINGS IN CITY RIGHT-OF-WAY SHALL BE YELLOW. CHECK APPLICABLE AGENCY STANDARD COLOR FOR COUNTY AND STATE RIGHT-OF-WAY.

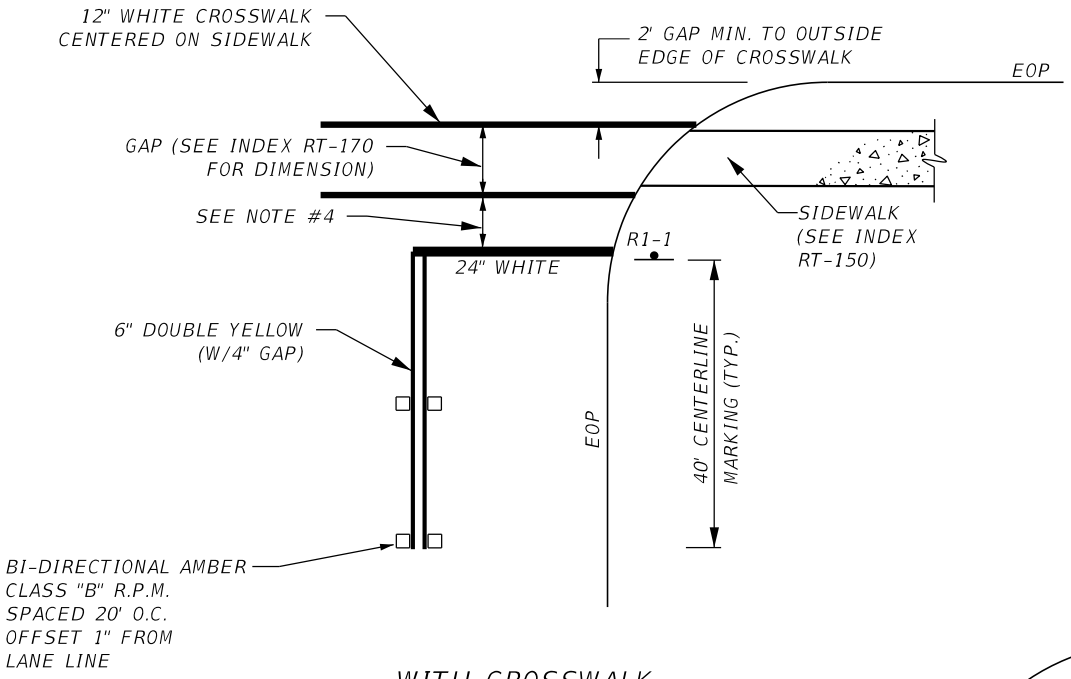
CONSTRUCTION INDEX RT-150

CURB-CUT SIDEWALK RAMPS
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

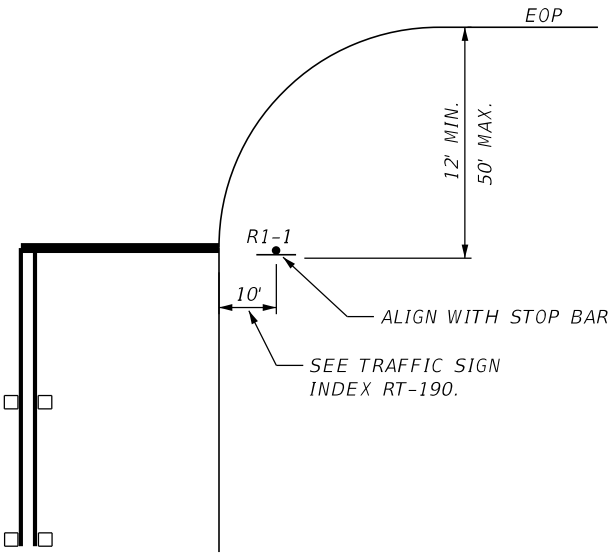
INDEX NUMBER	DESCRIPTION
RT-150	**Curb-Cut Sidewalk Ramps**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK**	



WITH CROSSWALK

(SEE INDEX RT-170 FOR SCHOOL CROSSWALK)



WITHOUT CROSSWALK

NOTES:

1. THE 40' OF CENTERLINE MARKING AND R.P.M.'S ARE ONLY REQUIRED ON AN APPROACH TO A COLLECTOR, MINOR ARTERIAL, ARTERIAL OR MAJOR HIGHWAY.
2. ALL STRIPING AND DELINEATION SHALL BE THERMOPLASTIC AND CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. SEE PAVEMENT MARKING SPECIFICATION INDEX RT-180 FOR FURTHER DETAILS.
4. 4' BETWEEN EDGE OF CROSSWALK OR CROSSING LOCATION AND EDGE OF STOP BAR.

CONSTRUCTION INDEX RT-160

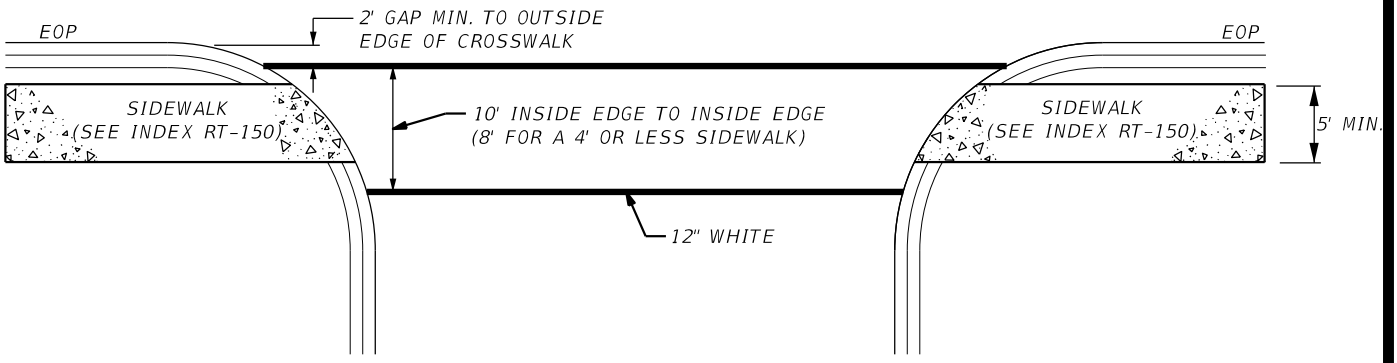
INTERSECTION CONTROL

(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-160	**Intersection Control**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

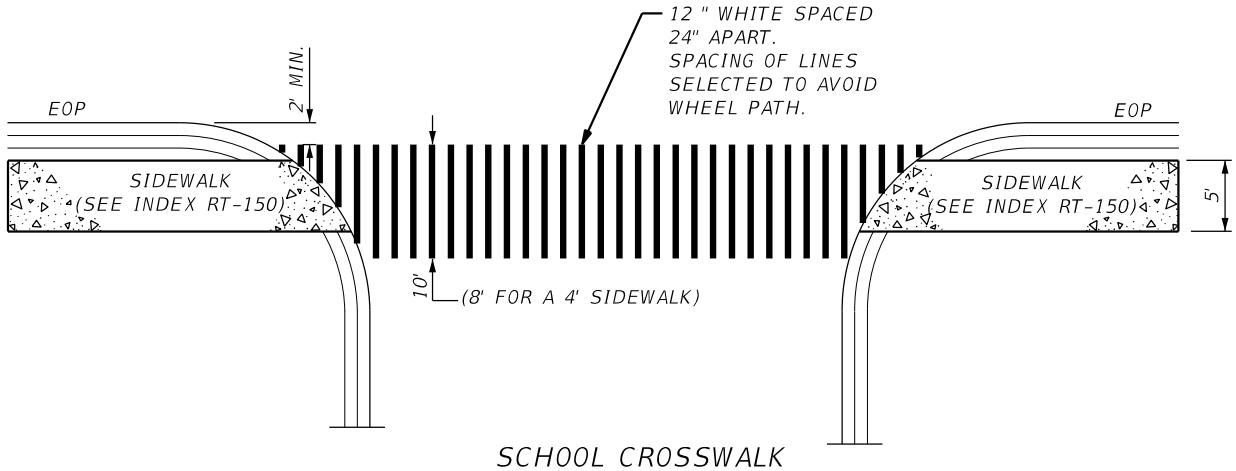


STANDARD CROSSWALK

NOTES:

1. STANDARD CROSSWALK STRIPING TO BE INSTALLED AT THE FOLLOWING LOCATIONS:
   - SIGNALIZED INTERSECTIONS
   - ALONG COLLECTORS OR ARTERIALS
   - BIKE PATH CROSSINGS
   - CROSSWALKS WITH HIGH EXPECTED PEDESTRIAN VOLUME
   - SCHOOL ACCESS ROUTES.

2. SIGNS AT MID-BLOCK PEDESTRIAN CROSSWALKS WITHOUT BEACONS TO BE DESIGNED AND INSTALLED PER THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION. SIGNS AT MID-BLOCK PEDESTRIAN CROSSWALKS WITH BEACONS TO BE DESIGNED AND INSTALLED PER F.D.O.T. STANDARD INDEX 654-001 AND 665-001.



SCHOOL CROSSWALK

NOTES:

1. SCHOOL CROSSWALK STRIPING TO BE USED AS DIRECTED.

2. SIGNS AND ADVANCED PAVEMENT MESSAGES TO BE DESIGNED AND INSTALLED PER F.D.O.T. STANDARD PLANS INDEX 711-001.

CONSTRUCTION INDEX RT-170

CROSSWALK
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-170	**Crosswalk**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

1. ALL ROAD PAVEMENT MARKINGS SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS OF THIS STANDARD INDEX, AND SHALL CONFORM TO THE REQUIREMENTS OF FLORIDA DEPARTMENT OF TRANSPORTATION (F.D.O.T.) STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION AND THE U.S. FEDERAL HIGHWAY AUTHORITY (FHWA) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D). ANY DEVIATION FROM THIS STANDARD MUST BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

2. THERMOPLASTIC INSTALLATION:
ALL MARKINGS SHALL BE INSTALLED BY THE EXTRUSION METHOD. MARKINGS SHALL BE FREE OF WEAVES, BOWS, DRIPS, DRAGS, AND OTHER DEGRADING ITEMS. INSTALLATION OF PAVEMENT MARKINGS SHALL BE PERFORMED 14 DAYS AFTER THE FINAL SURFACE LAYER OF ASPHALT IS APPLIED.

3. PERMANENT MARKINGS MATERIALS:
ALL MATERIALS SHALL BE LEAD-FREE, NON-SOLVENT BASED THERMOPLASTIC, AND SHALL MEET ALL F.D.O.T. SPECIFICATIONS.

4. PERMANENT MARKINGS THICKNESS:
ALL MARKINGS SHALL BE INSTALLED TO YIELD 90 MILS OF MATERIAL MEASURED ABOVE THE PAVEMENT SURFACE.

5. REFLECTIVE BEADS:
REFLECTIVE BEADS ARE TO BE INSTALLED PER F.D.O.T. SPECIFICATIONS ON ALL MARKINGS.

6. PERMANENT MARKINGS LAYOUT:
LAYOUT SHALL BE MADE PRIOR TO INSTALLATION. MARKING LAYOUT SHALL BE INSPECTED BY THE CITY ENGINEER PRIOR TO THE PLACEMENT OF FINAL MARKINGS.

7. ALL PAVEMENT MARKINGS:
ALL ROADWAY PAVEMENT MARKINGS SHALL BE PROPERLY MARKED PRIOR TO THE HOURS OF DARKNESS.

8. RAISED PAVEMENT MARKERS (R.P.M.S.)
R.P.M.S. SHALL BE INSTALLED ON ALL LANE LINES AND CENTERLINE, SPACED AT 20' OR 40', PER F.D.O.T. INDEX No. 706-001. R.P.M.S SHALL BE A 4'x4" TYPE CLASS "B" MARKER MEETING F.D.O.T. SPECIFICATIONS AND SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO USE. R.P.M.S. SHALL BE INSTALLED USING THERMOPLASTIC ON ASPHALT AND EPOXY ON CONCRETE.

9. TEMPORARY PAVEMENT MARKINGS:
TEMPORARY MARKINGS SHALL BE USED ONLY AS SPECIFIED IN THIS STANDARD INDEX, OR AS APPROVED AND / OR DIRECTED BY THE CITY ENGINEER.

10. OTHER PAVEMENT SURFACES:
INTERIOR MARKINGS IN PRIVATE LOTS AND INTERMEDIATE PAVEMENT SURFACES MAY BE MARKED WITH F.D.O.T. APPROVED MATERIALS, I.E: PERMANENT PAINT ETC.

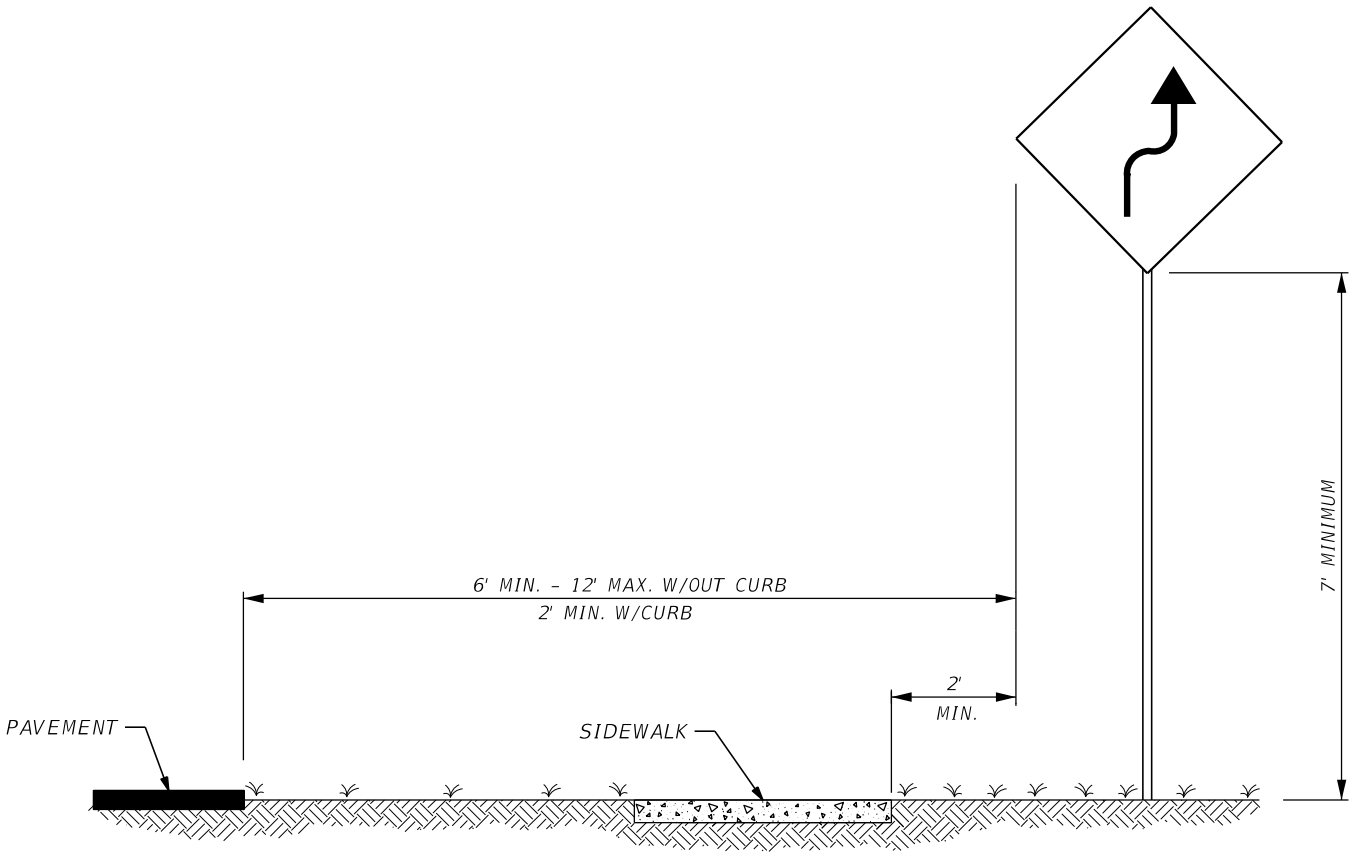
11. PARKING LOTS:
THERMOPLASTIC FOR STOP BARS AND CROSS WALKS IN THE RIGHT-OF-WAY. ALL OTHER PAINT MAY BE USED.

CONSTRUCTION INDEX RT-180
PAVEMENT MARKING SPECIFICATIONS

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-180	**Pavement Marking Specifications**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



SIGN SYMBOL:

NOTES:

1. ALL SIGNS SHALL FOLLOW F.H.W.A. "STANDARD HIGHWAY SIGNS", "THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND F.D.O.T. "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION".
2. ALL SIGNS SHALL BE FACED WITH HIGH INTENSITY SHEETING MATERIAL OR BETTER.
3. SIGNS SHALL BE MANUFACTURED WITH 0.080" ALUMINUM BLANK.
4. POSTS SHALL BE GALVANIZED CHANNEL AT 2 LBS/L.F.
5. ANY DEVIATION FROM THIS TYPICAL SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.

CONSTRUCTION INDEX RT-190

TRAFFIC SIGN
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

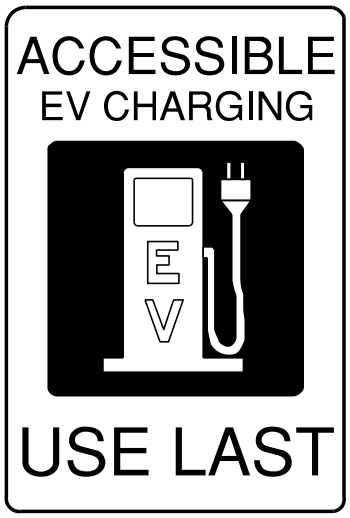
INDEX NUMBER	DESCRIPTION
RT-190	**Traffic Sign**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

FTP-20-06
12"x18"

FTP-22-06 (OPTIONAL)
6"x12"

12"x18"



SIGN COLORS SHALL BE BLUE AND WHITE

12"x18"

NOTES:

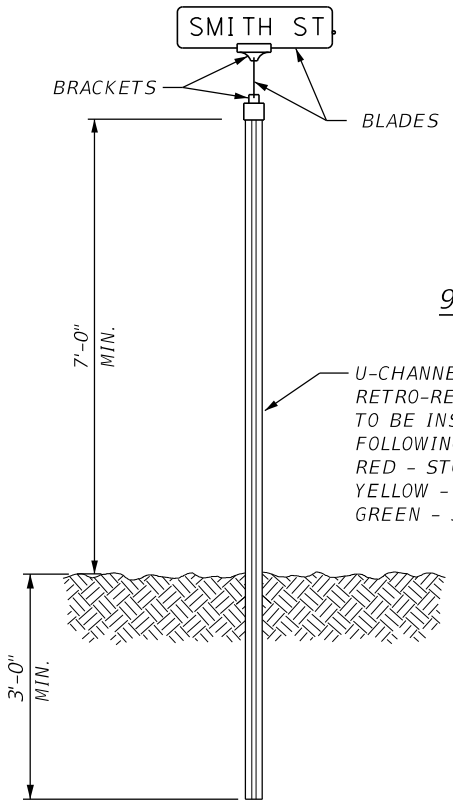
1. FINE PER STATE OR LOCAL ORDINANCE.
2. MOUNT ON STANDARD SIGN POST (SEE INDEX RT-200).
3. SEE INDEX RT-190 FOR ADDITIONAL SIGN NOTES.

CONSTRUCTION INDEX RT-191
SPECIALIZED PARKING SIGNS
(N.T.S.)

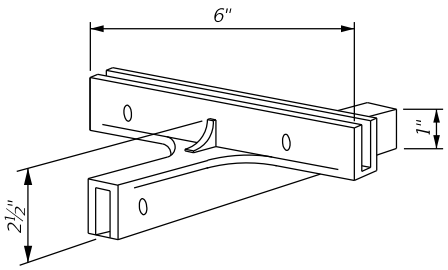
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-191	**Specialized Parking Signs**

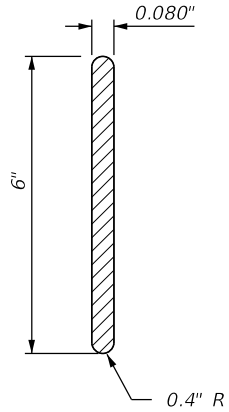
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



U-CHANNEL POST:
RETRO-REFLECTIVE MATERIAL STRIP
TO BE INSTALLED ON POST FOR THE
FOLLOWING SIGN TYPES:
RED - STOP, YIELD AND DO NOT ENTER SIGNS
YELLOW - WARNING SIGNS
GREEN - SCHOOL SIGNS

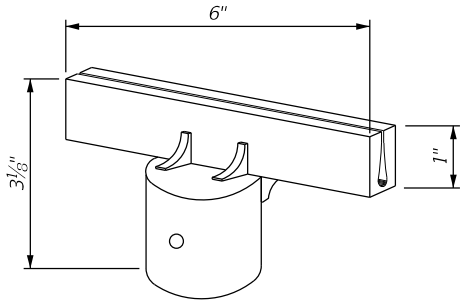


90° CROSS BRACKET FOR FLAT BLADES



9"ALONG COLLECTORS
AND ARTERIALS.

FLAT BLADE SECTION



POST CAP BRACKET FOR U-CHANNEL

GENERAL SPECIFICATIONS:

BLADE: ALCOA NO.86054,6063-T6 ALLOY, ETCHED DEGREASED DEBURRED, WITH NO.1200 ALDOLINE FINISH WITH HIGH INTENSITY BACKGROUND DIMENSIONS 6" OR 9" HEIGHT, 24", 30" OR 36" LENGTHS.

LETTERS: NAME 4" SERIES "B" HIGH INTENSITY
SUFFIX 2" SERIES "B" HIGH INTENSITY

ALL LETTERS FOR SIGNS ALONG COLLECTOR OR ARTERIAL ROADWAYS SHALL BE 6" SERIES "B" WITH 4" SERIES "B" SUFFIX ON 9" HIGH BLADES.

POST: STEEL GALVANIZED U-CHANNEL, 2 LBS/FT. PER A.S.T.M. A 123 WITHOUT ANCHOR PLATES.

BRACKETS: DIE CAST HIGH STRENGTH ALUMINUM ALLOY, MIN. TENSILE STRENGTH 45,000 P.S.I., DEGREASED, TUMBLED AND POLISHED, SIDES OF ALL SLOTS SHALL BE SOLID METAL WITH TWO HOLES PER SLOT DRILLED TO 7/32" AND TAPPED TO 1/4" TO RECEIVE STAINLESS STEEL ALLEN HEAD SET SCREWS, SKIRT OF POST CAP BRACKET TO BE DRILLED AND TAPPED FOR 3 SCREWS OF WHICH NO TWO ARE TO BE LESS THAN 90° OR MORE THAN 135° APART (METRO HUSKEY No. 6 OR EQUAL).

NOTE:

1. PLACEMENT OF SIGN ON THE RIGHT-OF-WAY SHALL CONFORM TO THE CITY TRAFFIC SIGN STANDARD (INDEX RT-190).

CONSTRUCTION INDEX RT-200

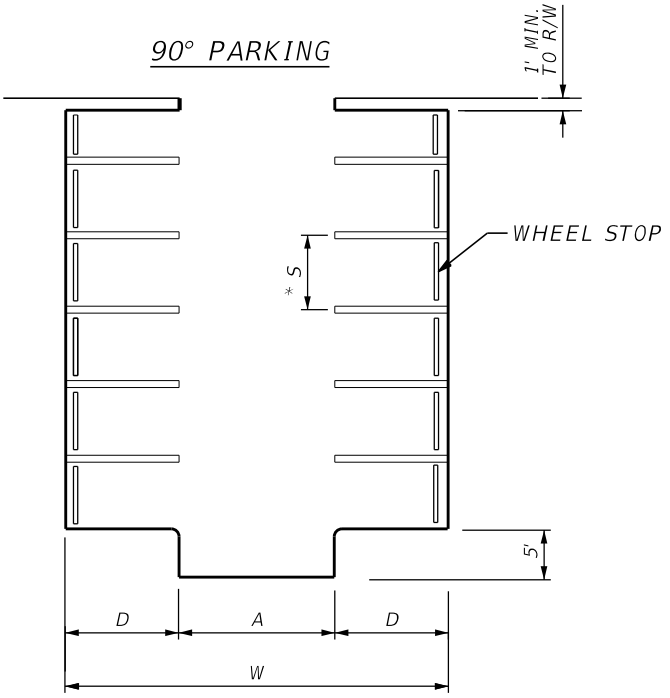
STREET SIGN
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

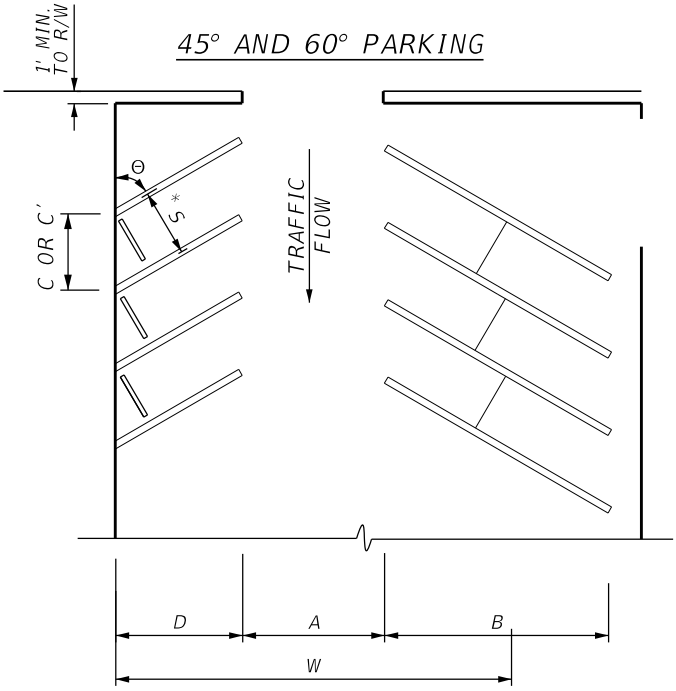
INDEX NUMBER	DESCRIPTION
RT-200	**Street Sign**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

90° PARKING



45° AND 60° PARKING

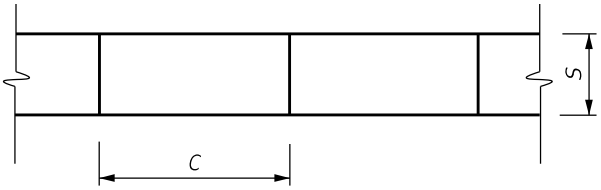


MIN. DIMENSION		
	DEFINITION	90°
A	AISLE	24.0'
S	STALL WIDTH	9.0'
D	STALL DEPTH	18.0'
W	MODULE WIDTH	60.0'

* HANDICAP SPACES -12.0'
** WHERE FEASIBLE

MIN. DIMENSION			
	DEFINITION	Θ=60°	Θ=45°
A	AISLE	18.0'	14.0'
B	DOUBLE SPACE LENGTH	36.0'	32.0'
C	STALL SPACING	10.5'	12.75'
C'	HANDICAP STALL SPACING	14.0'	17.0'
S	STALL WIDTH (PARALLEL TO WHEEL STOP)	9.0'	9.0'
D	STALL DEPTH	20.0'	19.0'
W	MODULE WIDTH	58.0'	52.0'

PARALLEL PARKING



STANDARD		PP
C	STALL LENGTH	22.0'
S	STALL WIDTH	8.0'

NOTE:

1. ALL HANDICAP PARKING SHALL HAVE A 5' ACCESSIBLE AISLE PER ADA REQUIREMENTS (SEE INDEX RT-220).
2. WHEEL STOPS ARE OPTIONAL WHEN PARKINGS STALLS ARE BACK TO BACK.

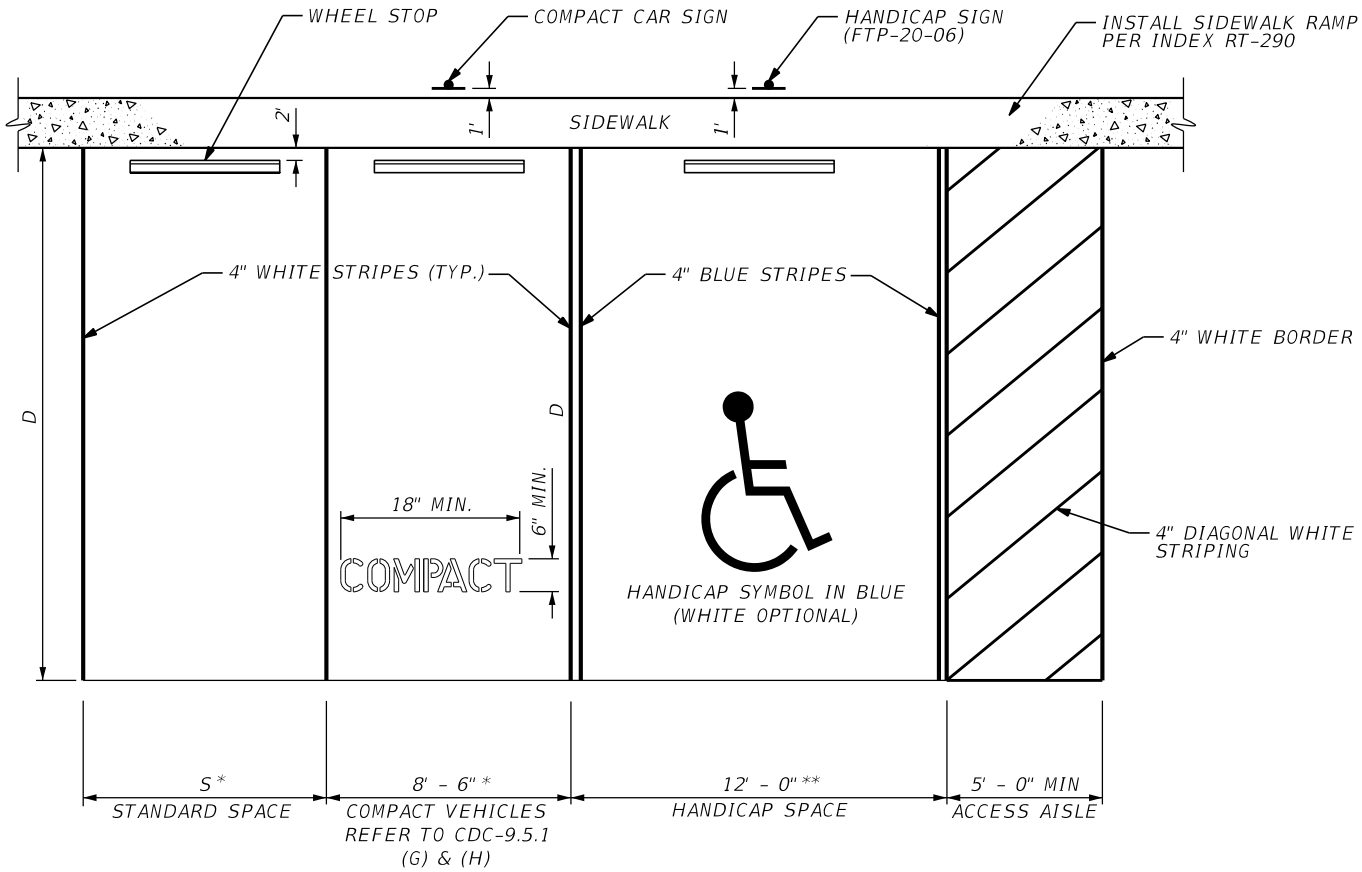
CONSTRUCTION INDEX RT-210

PARKING LOT
(N.T.S.)

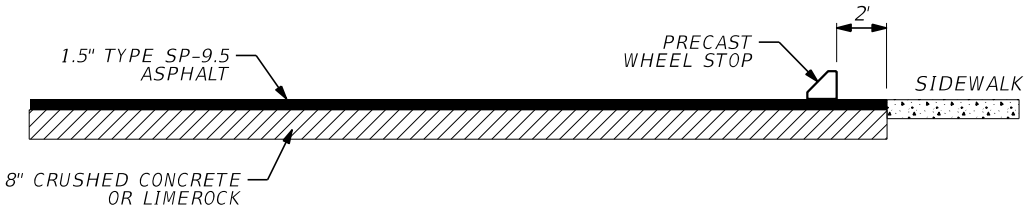
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-210	**Parking Lot**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



* MEASURED FROM CENTER TO CENTER OF STRIPING.
** MEASURED FROM CENTER OF PARKING STRIPE TO OUTSIDE OF ACCESS AISLE STRIPE.



PAVEMENT SECTION

NOTES:

1. PARKING SHALL HAVE WHEEL STOP FOR ALL PARKING SPACES THAT ABUT A SIDEWALK EXCEPT FOR PARALLEL PARKING SPACES OR AS DIRECTED BY THE CITY ENGINEER.
2. HANDICAP SIGNS SHALL BE MOUNTED AT 7' (PAVEMENT TO BOTTOM OF SIGN).
3. THERMOPLASTIC PAVEMENT MARKINGS SHALL BE INSTALLED WITHIN THE RIGHT-OF-WAY. PAINTED PAVEMENT MARKINGS ARE ALLOWED ON PRIVATE PROPERTY.
4. REFER TO INDEX RT-191 FOR PARKING SIGN REQUIREMENTS. REFER TO CDC-9.5.1 (G) & (H) FOR COMPACT VEHICLE REQUIREMENTS.
5. SEPARATION BETWEEN BLUE AND WHITE STRIPES SHALL BE 2".

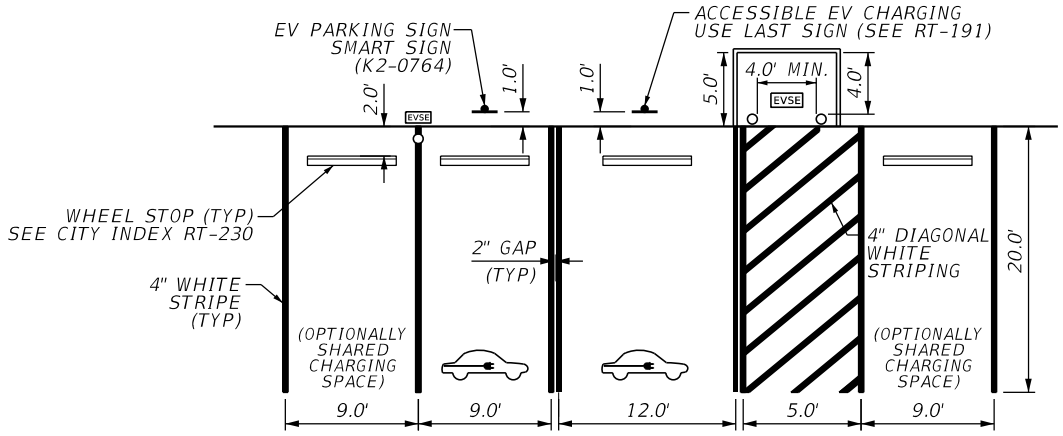
CONSTRUCTION INDEX RT-220

TYPICAL PARKING LOT SPACES/SECTION
(N.T.S.)

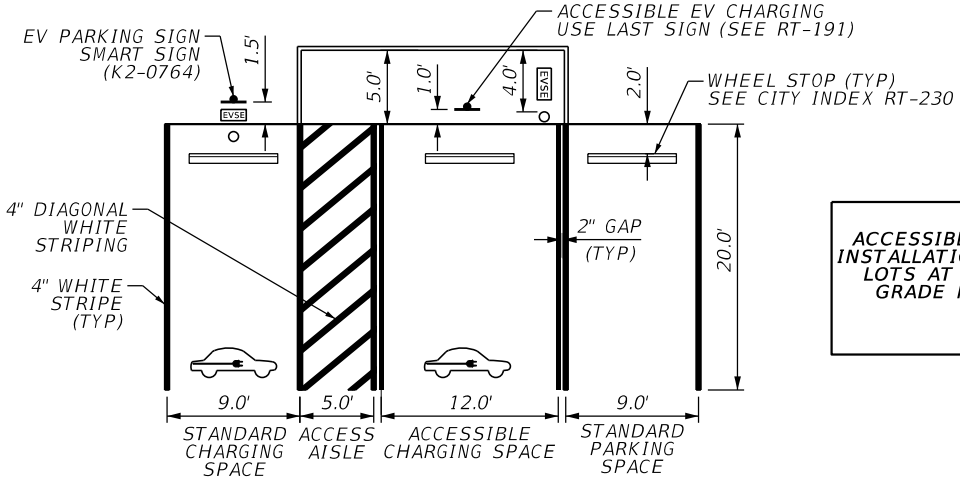
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-220	**Typical Parking Lot Spaces/Section**

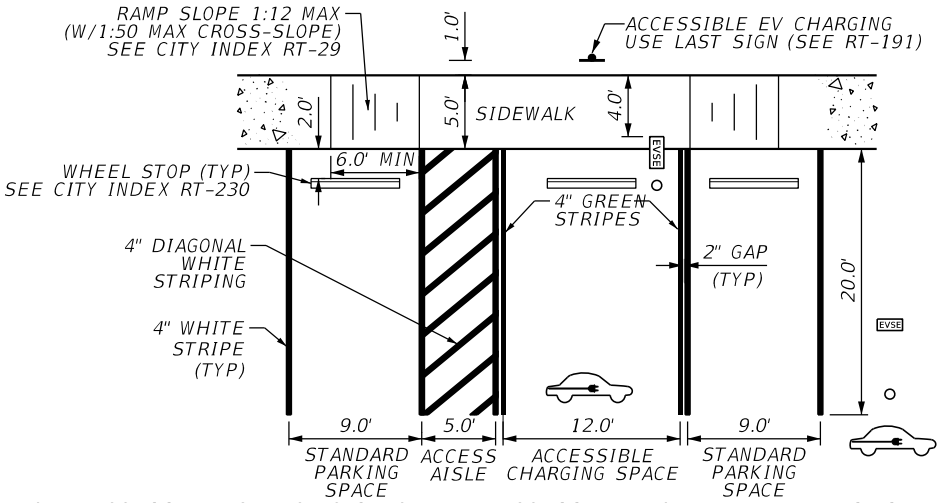
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



ACCESSIBLE LAYOUT #1
INSTALLATION IN PARKING LOTS AT MEDIANS OR GRADE PERIMETERS



ACCESSIBLE LAYOUT #2
INSTALLATION IN PARKING LOTS AT MEDIANS OR GRADE PERIMETERS



ACCESSIBLE LAYOUT #3
INSTALLATION IN PARKING LOTS AT SIDEWALK BOUNDARIES

LEGEND

EVSE — EV SUPPLY EQUIPMENT (CHARGING EQUIPMENT) MAY BE ORIENTED AS APPROPRIATE

○ — OPTIONAL PROTECTIVE BOLLARD

EV (ELECTRIC VEHICLE) SYMBOL (WHITE AND/OR GREEN)

NOTES:

1. MINIMUM OF 1 ACCESSIBLE CHARGING SPACE WITH ACCESSIBLE MOBILITY FEATURES IS REQUIRED PER EV CHARGING AREA. ADDITIONAL ACCESSIBLE EV CHARGING STATIONS MAY BE REQUIRED WHEN THERE ARE MORE THAN 25 EV CHARGING STATIONS PER AREA
2. ACCESSIBLE CHARGING SPACES MUST BE CONNECTED TO AN ACCESSIBLE ROUTE PER ADA STANDARDS.
3. WHERE EV CHARGING STATIONS ARE ADDED TO EXISTING PARKING AREAS, THE MINIMUM STALL DEPTH MAY BE REDUCED TO 18.0".
4. TWO ACCESSIBLE EV CHARGING SPACES CAN SHARE THE SAME ACCESS AISLE.

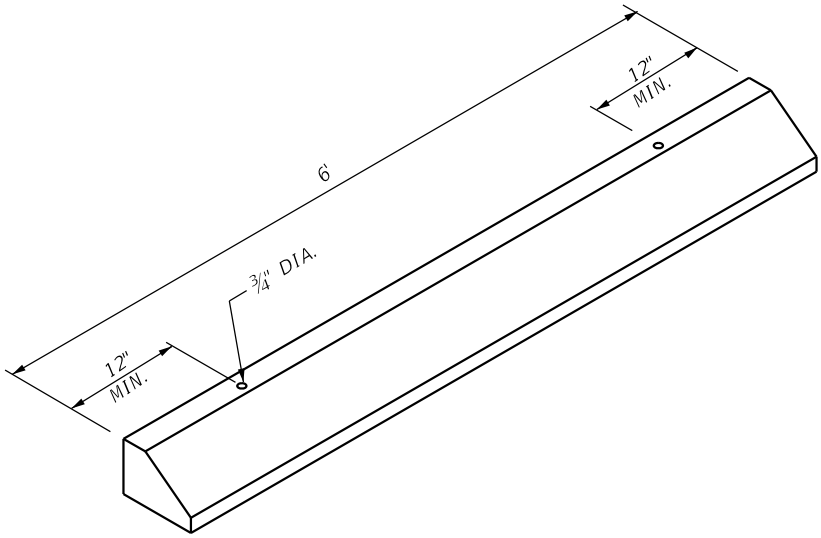
CONSTRUCTION INDEX RT-221

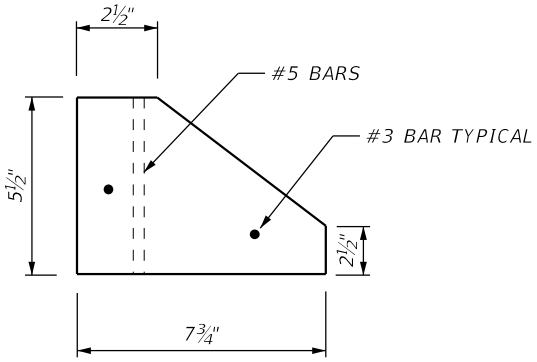
ELECTRIC VEHICLE PARKING SPACES
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

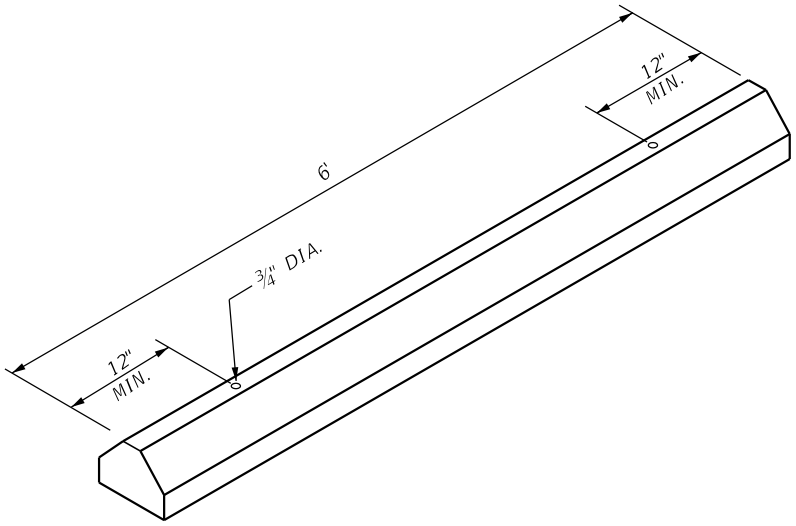
INDEX NUMBER	DESCRIPTION
RT-221	**Electric Vehicle Parking Spaces**

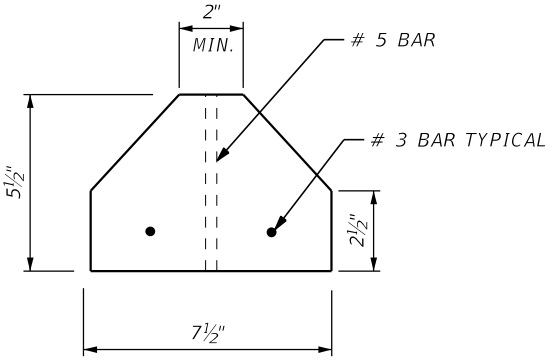
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	





TYPE "A"





TYPE "C"

NOTES:

1. CONCRETE TO BE 3,000 P.S.I.
2. WHEEL STOPS TO BE SECURED TO PAVEMENT WITH TWO 18" NO. #5 BARS.
3. RECYCLED PLASTIC WHEEL STOPS MAY BE USED IN LIEU OF CONCRETE.
4. DIMENSIONS OF WHEEL STOPS MAY DIFFER FROM THE ABOVE SPECIFICATIONS IF APPROVED BY CITY ENGINEER.

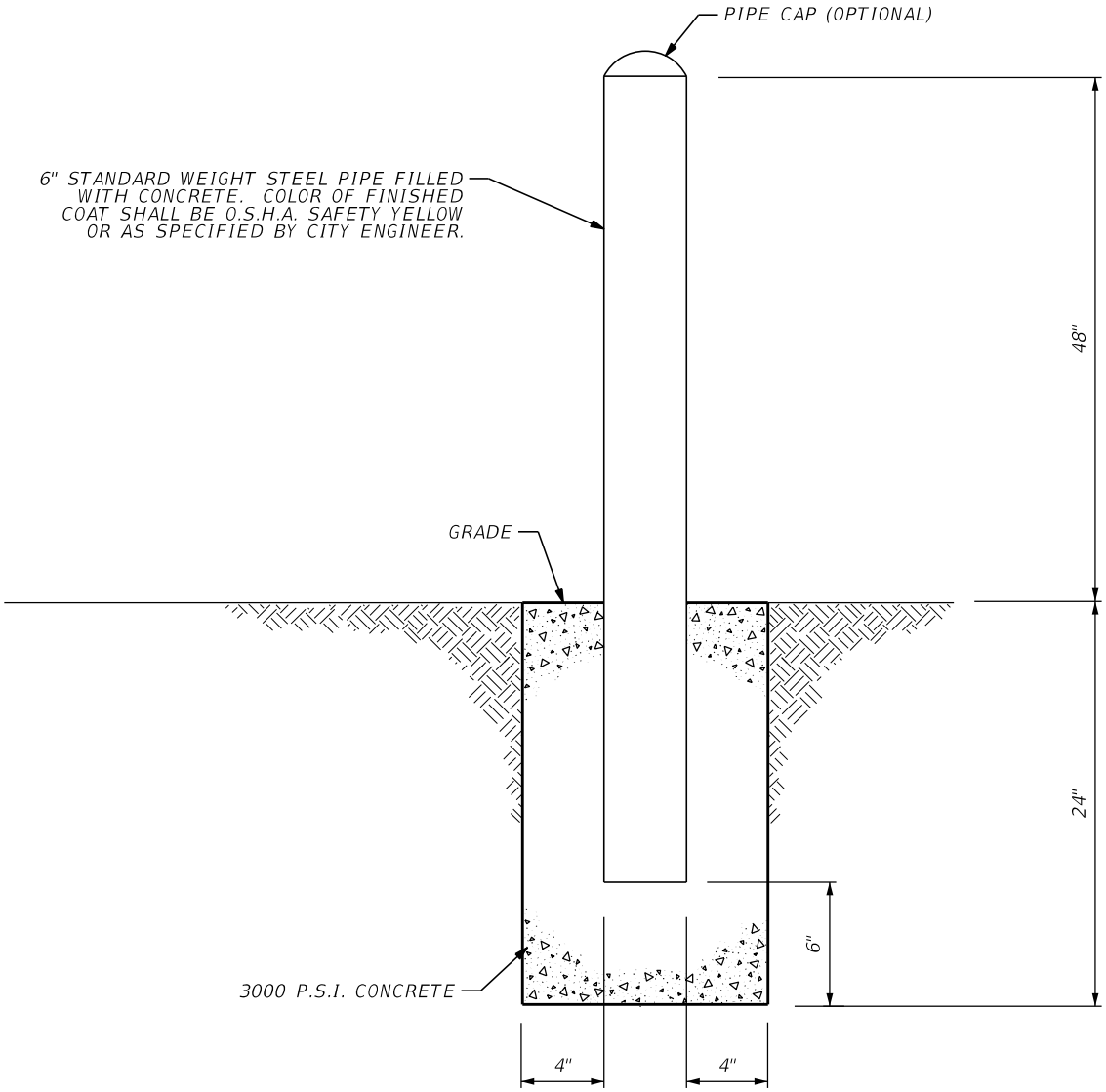
CONSTRUCTION INDEX RT-230

WHEEL STOPS
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-230	**Wheel Stops**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



NOTES:

1. ALL DIMENSIONS ARE MINIMUM REQUIREMENTS.

CONSTRUCTION INDEX RT-240

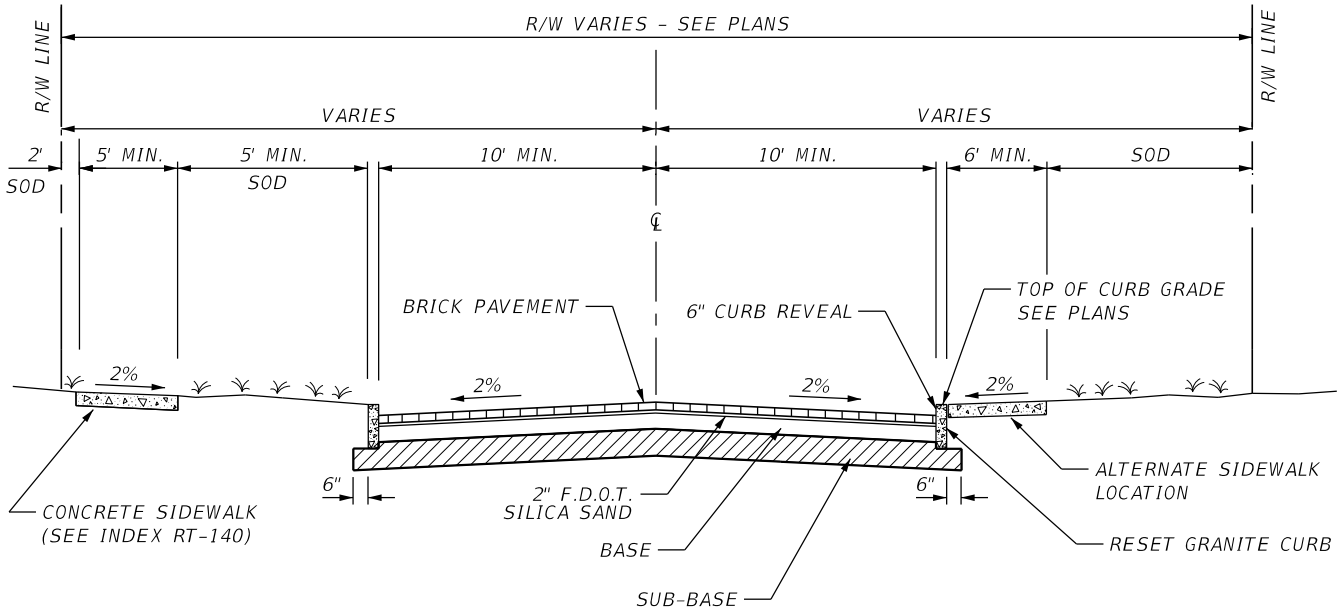
BOLLARD DETAIL

(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-240	**Bollard Detail**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



PAVEMENT SPECIFICATIONS	
WEARING SURFACE	BRICK
BASE	8" CRUSHED CONCRETE COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180. (100 LBR) OR AS IDENTIFIED IN FIELD
SUB-BASE	12" STABILIZED (40 LBR) AND COMPACTED TO 98% MAX. DENSITY PER A.A.S.H.T.O. T-180.

NOTES:

1. ALL GRANITE CURB TO REMAIN IN PLACE.
2. BRICKS SHALL BE HAND REMOVED AND CLEANED PRIOR TO RESETTING.
3. EXISTING SAND BASE SHALL BE REMOVED AND REPLACED WITH AN 8" CRUSHED CONCRETE BASE AND 2" SAND BEDDING.
4. SPREAD A MIX OF 3 PARTS F.D.O.T. SILICA SAND TO 1 PART GROUT OVER REPLACEMENT AREA. ROLL WITH STEEL WHEEL ROLLER.

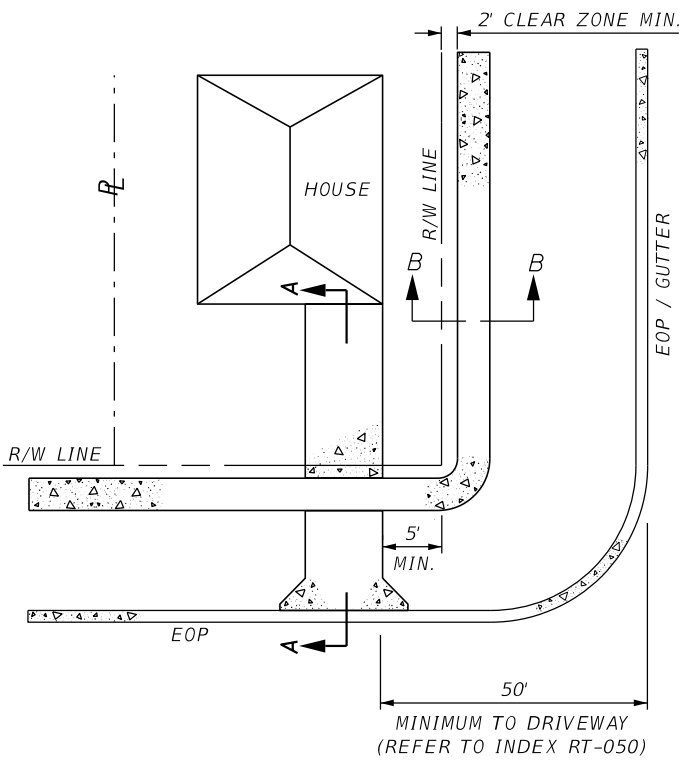
CONSTRUCTION INDEX RT-260

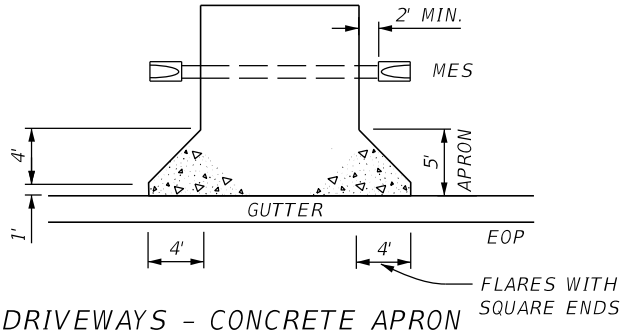
BRICK STREET RECONSTRUCTION
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

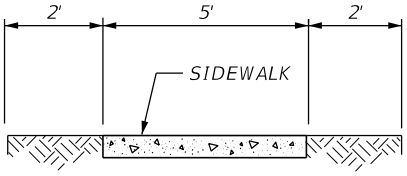
INDEX NUMBER	DESCRIPTION
RT-260	**Brick Street Reconstruction**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

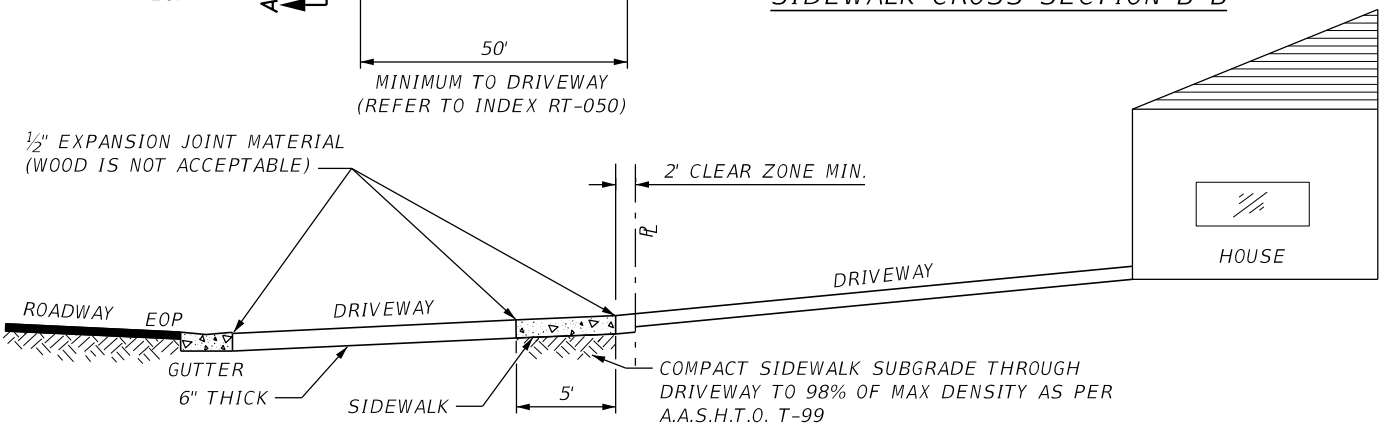




DRIVEWAYS - CONCRETE APRON



SIDEWALK CROSS-SECTION B-B



SIDEWALK CROSS-SECTION A-A

NOTES:

SIDEWALK:
ALL SIDEWALK TO BE IN ACCORDANCE WITH INDEX RT-140. SIDEWALK MUST RUN CONTINUOUSLY THROUGH DRIVEWAYS.

DRIVEWAYS:
ALL DRIVEWAY APRONS ARE TO BE CONCRETE, BRICK OR PAVERS. 10' MINIMUM TO 24' MAXIMUM WIDTH (NOT TO EXCEED 35% OF FRONT LINEAR MEASUREMENT.) CONCRETE TO BE 6" THICK WITHIN R.O.W. (PROPERTY LINE TO CURB OR EDGE OF PAVEMENT). 5' MINIMUM SETBACK FROM PROPERTY LINE.

CURB CUTS INCLUDING CIRCULAR DRIVEWAYS:
CIRCULAR DRIVEWAY CONSTRUCTION REQUIRES CITY ENGINEER REVIEW AND APPROVAL. CORNER LOT CURB CUTS SHALL BE ON STREET WITH LOWEST FUNCTIONAL CLASSIFICATION.

DRAINAGE: (IF APPLICABLE)
DRAINAGE PIPES UNDER DRIVEWAYS MUST BE RCP 15" MINIMUM DIAMETER OR 12"x18" ERCP WITH MITERED END AND 2' MINIMUM SETBACK OR AS APPROVED BY THE CITY ENGINEER.

STRUCTURAL REINFORCEMENT:
ALL CONCRETE WITHIN RIGHT-OF-WAY SHALL BE 3,000 PSI MINIMUM WITH FIBERMESH IN RIGHT-OF-WAY.

CONSTRUCTION INDEX RT-270a

DRIVEWAY
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-270a	**Driveway**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

NOTES:

1. INTERLOCKING PAVING UNITS SHALL GENERALLY BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS

2. MINIMUM PAVER THICKNESS: 2-3/8" (CONCRETE), 2-1/4" (CLAY BRICK).

3. MINIMUM BASE THICKNESS: 6" (WITH IN R.O.W), 4" (OUTSIDE R.O.W.)

4. CURB WILL NEED TO BE CONSTRUCTED ALONG THE ROADWAY EDGE OF PAVEMENT AT THE DRIVEWAY. AS AN ALTERNATE, ON STREETS WITHOUT CURBING, A MINIMUM 6-INCH WIDTH IS ACCEPTABLE.

5. FINAL FINISHED SURFACE SHALL BE OF UNIFORM ELEVATION OR SLOPE.

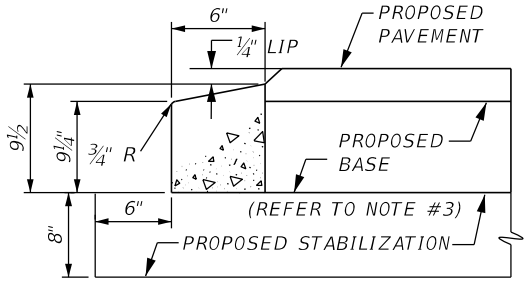
6. SUBGRADE SHALL BE FREE OF CLAY, ORGANICS, OR OTHER MATERIALS WHICH WILL ALLOW FUTURE SETTLEMENT.

7. POLYMERIC SAND OR OTHER JOINT FILLING MATERIAL, SHALL BE INSTALLED BETWEEN PAVERS. JOINT SAND SHALL MEET THE GRADING REQUIREMENTS OF ASTM C144 OR CSA-A179. BEDDING SAND MAY BE USED FOR JOINT SAND. JOINT WIDTH SHALL NOT EXCEED 1/8".

8. THE CROSS SLOPE ON ANY REQUIRED PEDESTRIAN PATH CROSSING A DRIVEWAY AND/OR DRIVE APRON CANNOT EXCEED 2%.

9. IN ACCORDANCE WITH THE 2010 ADA (AMERICANS WITH DISABILITIES ACT) STANDARDS FOR ACCESSIBLE DESIGN (403, 405, 406) THE SURFACE TEXTURE OF PAVERS SHALL BE VIBRATION FREE WITH A LIMIT OF 1/4" OR LESS RISE NOT MORE THAN EVERY 30 INCHES. PAVERS SHALL BE INSTALLED IN A TIGHT UNIFORM CONFIGURATION THAT PROVIDES A SMOOTH SURFACE.

10. PAVERS SHALL NOT IMPEDE DRAINAGE OR RESULT IN ANY PONDING OF WATER. EXISTING DRAINAGE FLOWS SHALL NOT BE ALTERED.



PROFILE VIEW OF HEADER CURB

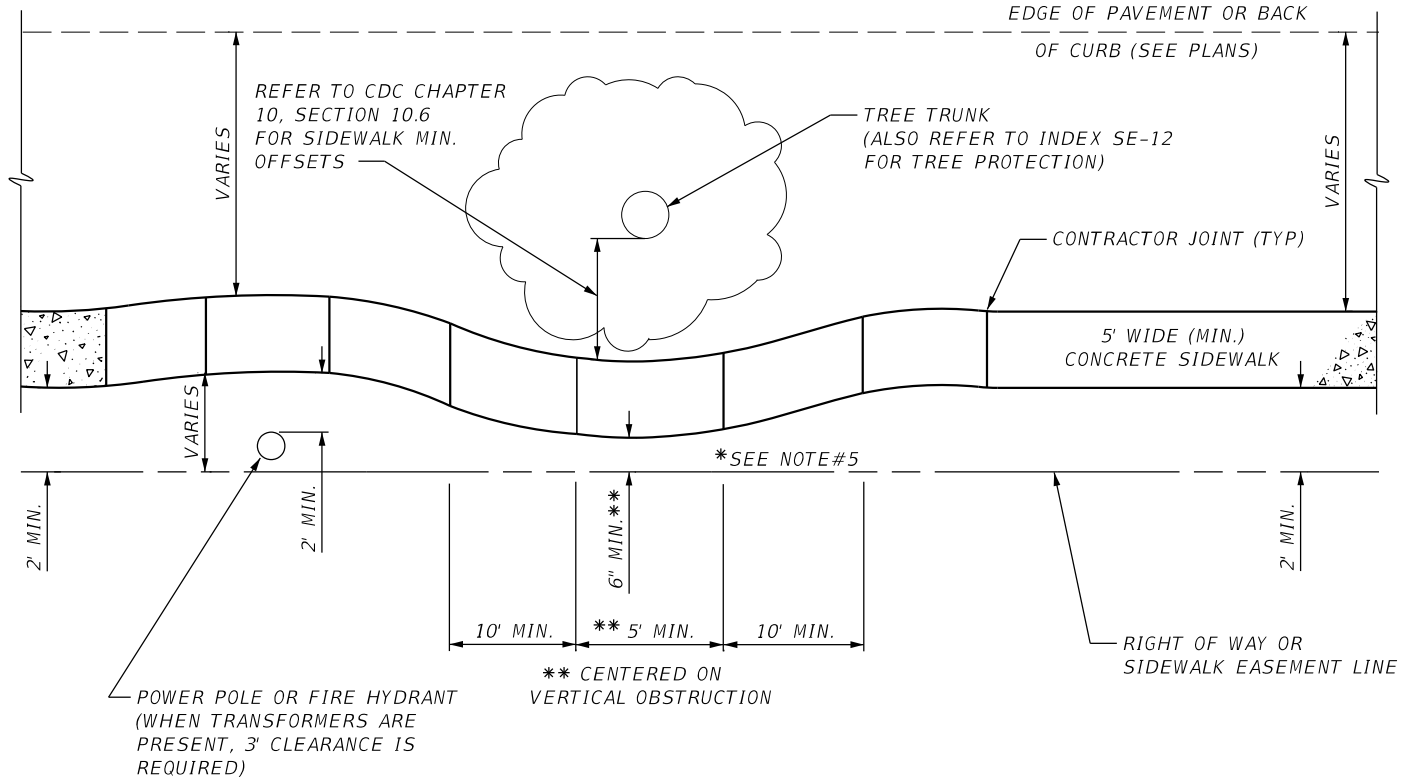
CONSTRUCTION INDEX RT-270b

PAVER DRIVEWAY
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-270b	**Paver Driveway**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



PLAN VIEW

NOTES:

1. ADJUST SIDEWALK TO AVOID OBSTRUCTIONS, AS SHOWN OR AS DIRECTED BY THE ENGINEER.
2. CONSTRUCTION OF SIDEWALKS SHALL MEET A.D.A. REQUIREMENTS AS SPECIFIED IN INDEX RT-140.
3. POWER POLES SHALL BE MOVED AS NEEDED.
4. TREES SHALL BE TRIMMED TO MAINTAIN VERTICAL CLEARANCE (FOLLOWING ANSI 300 STANDARDS): NINE (9') FEET FOR SIDEWALKS AND EIGHTEEN (18') FEET FOR ROADS.

*5. MAXIMUM LATERAL DEFLECTION SHALL BE 5:1.

6. REMOVE TREE ROOTS WITHIN TEN INCHES (10") OF PROPOSED GRADE. ROOTS SHALL ROOT PRUNE PRIOR TO REMOVAL COORDINATE WITH CITY STAFF.
7. CONTRACTION JOINTS SHALL MEET INDEX RT-140.
8. CRITICAL ROOT ZONE: REFER TO CDC CHAPTER 10, SECTION 10.6 FOR SIDEWALK MINIMUM OFFSETS.
9. CONTRACTOR SHALL TAKE GREAT CARE IN THE REMOVAL AND REPLACEMENT OF SIDEWALK UNDER THE CANOPY OF EXISTING TREES, IN ORDER TO MINIMIZE THE DISTURBANCE OF THE ROOT ZONE. INSTALLATION OF THE NEW SIDEWALK UNDER THE CANOPY ZONE SHALL BE ON GRADE IF CONDITIONS ALLOW. TO PROTECT THE ROOT ZONE FROM COMPACTION, THE CONTRACTOR MY BE REQUIRED TO LAY DOWN MULCH. THE MULCH MAY BE SUPPLIED BY THE CITY OF LARGO.
10. ANY DAMAGE TO TREES BY THE CONTRACTOR WILL RESULT IN FINE OR REPLACEMENT BY THE CONTRACTOR. FINE SHALL BE THE CITY STANDARD FEE.

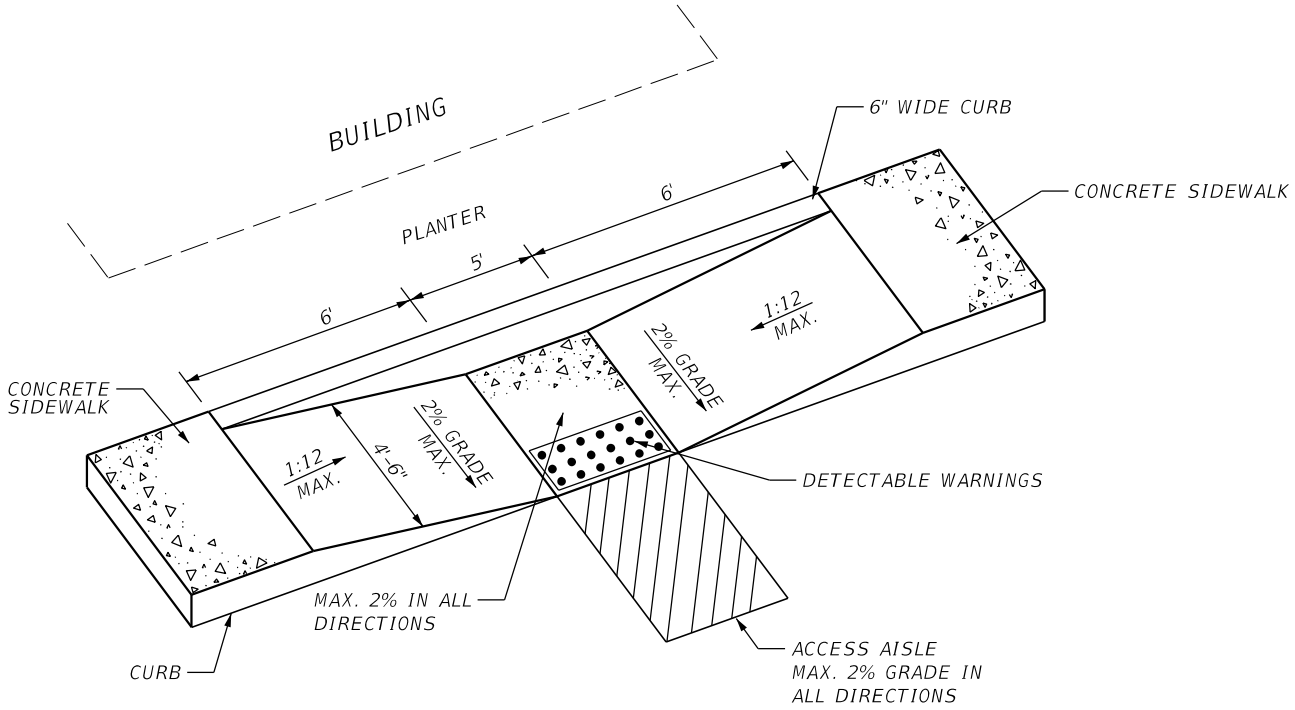
CONSTRUCTION INDEX RT-280

SIDEWALK DEFLECTION
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

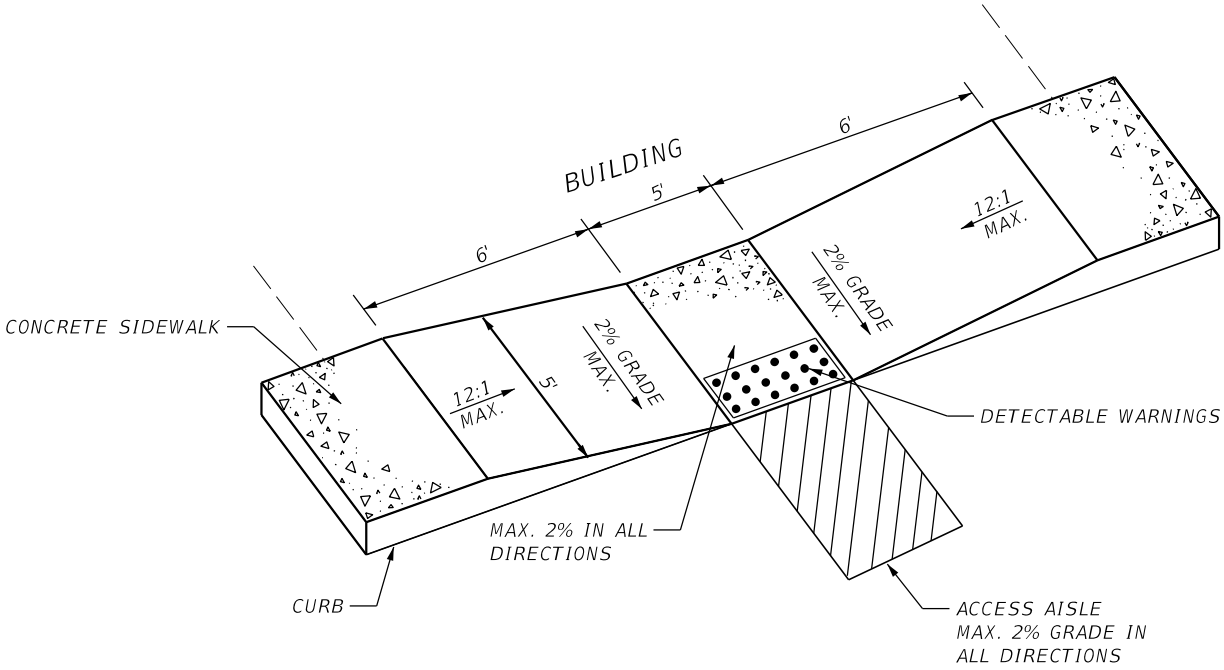
INDEX NUMBER	DESCRIPTION
RT-280	**Sidewalk Deflection**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



WHEN BUILDING HAS PLANTER AGAINST SIDEWALK

(N.T.S.)



WHEN BUILDING ABUTS SIDEWALK

(N.T.S.)

CONSTRUCTION INDEX RT-290

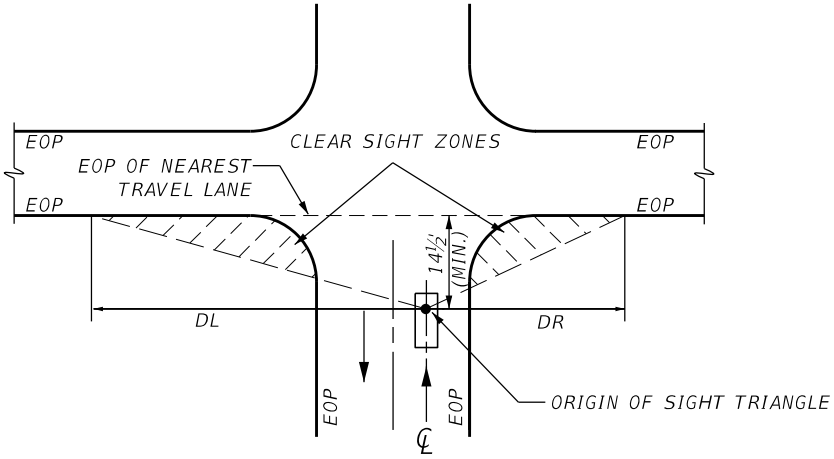
ADA RAMPS

(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-290	**ADA Ramps**

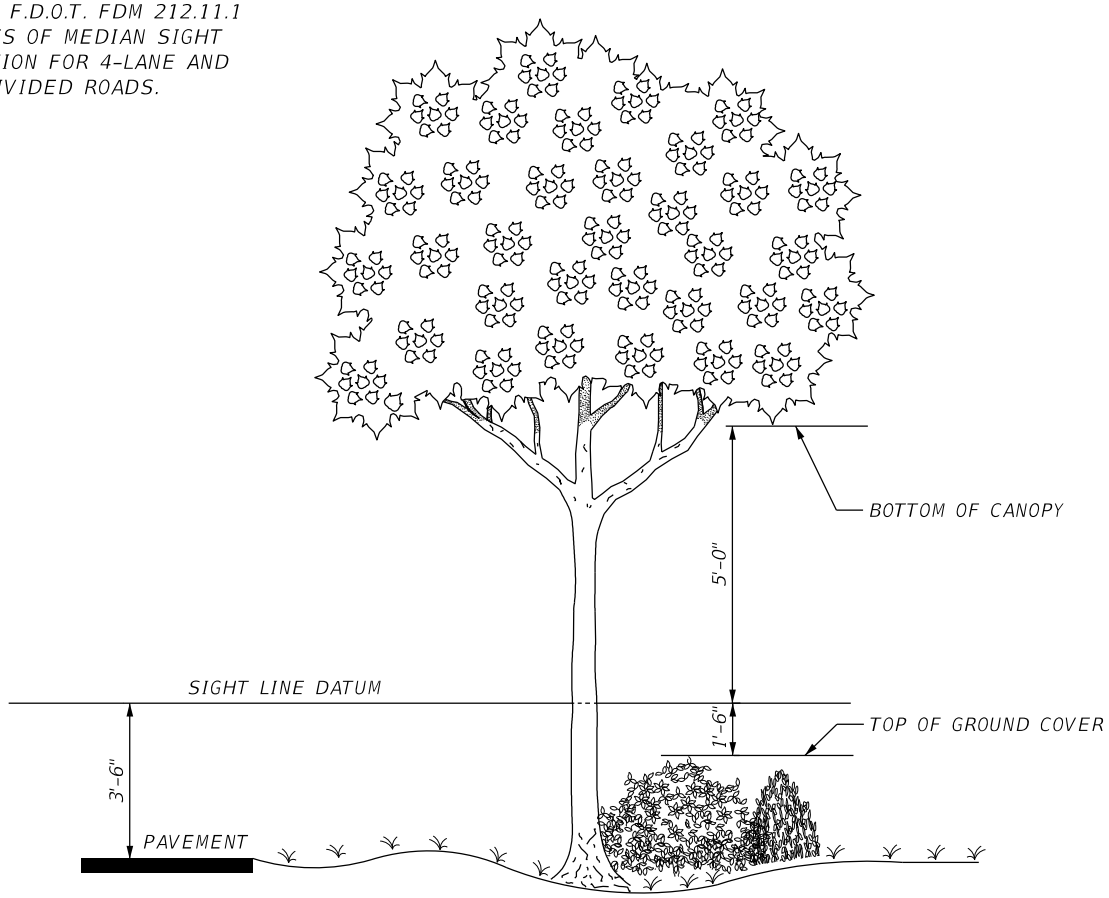
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



SIGHT TRIANGLE SECTION

NOTE:

REFER TO F.D.O.T. FDM 212.11.1 FOR LIMITS OF MEDIAN SIGHT OBSTRUCTION FOR 4-LANE AND 6-LANE DIVIDED ROADS.



VISIBILITY TRIANGLE FROM STREET INTERSECTIONS

NOTES:

1. THE INTENT OF THIS STANDARD IS TO PROVIDE A WINDOW WITH VERTICAL LIMITS OF NOT LESS THAN 5' ABOVE AND 1'-6" BELOW THE SIGHT LINE DATUM, AND HORIZONTAL LIMITS DEFINED BY LIMITS OF CLEAR SIGHT. REFER TO INDEX RT-310 FOR DISTANCES.

2. REFER TO CITY OF LARGO, FL: COMPREHENSIVE DEVELOPMENT CODE CHAPTER 9: ACCESS MANAGEMENT, TRAFFIC CIRCULATION AND PARKING STANDARDS FOR ADDITIONAL DESIGN GUIDANCE.

CONSTRUCTION INDEX RT-300

SIGHT TRIANGLE
(N.T.S.)

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-300	**Sight Triangle**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	

1. 2 LANE UNDIVIDED (TYPICAL RESIDENTIAL STREET)

MPH	DL (FT)	DR (FT)
≤ 30	240	155
35	275	175
40	315	200
45	355	225

2. 2 LANE WITH LEFT TURN LANE

MPH	DL (FT)	DR (FT)
≤ 30	195	135
35	230	160
40	260	180
45	290	200

3. 4 LANE UNDIVIDED

MPH	DL (FT)	DR (FT)
≤ 30	255	120
35	295	135
40	335	155
45	375	175

4. 4 LANE UNDIVIDED WITH LEFT TURN LANE

MPH	DL (FT)	DR (FT)
≤ 30	205	110
35	245	130
40	275	145
45	310	165

5. 4 LANE DIVIDED MEDIAN < 22'

MPH	DL (FT)	DR (FT)	DM (FT)
≤ 30	280	90	325
35	325	100	380
40	375	115	430
45	420	130	485

6. 6 LANE DIVIDED MEDIAN < 22'

MPH	DL (FT)	DR (FT)	DM (FT)
≤ 30	295	80	355
35	345	90	415
40	395	105	470
45	445	115	530

NOTE:

IF CROSSING STREET IS MAINTAINED BY ANOTHER AGENCY, USE MOST RESTRICTIVE AGENCY'S CRITERIA.

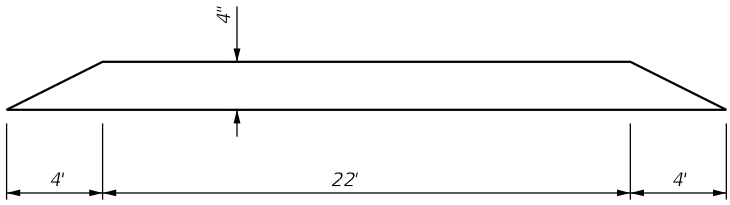
CONSTRUCTION INDEX RT-310

SIGHT TRIANGLE DISTANCES
(N.T.S.)

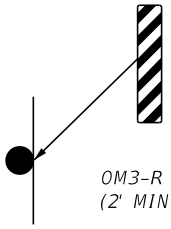
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-310	**Sight Triangle Distances**

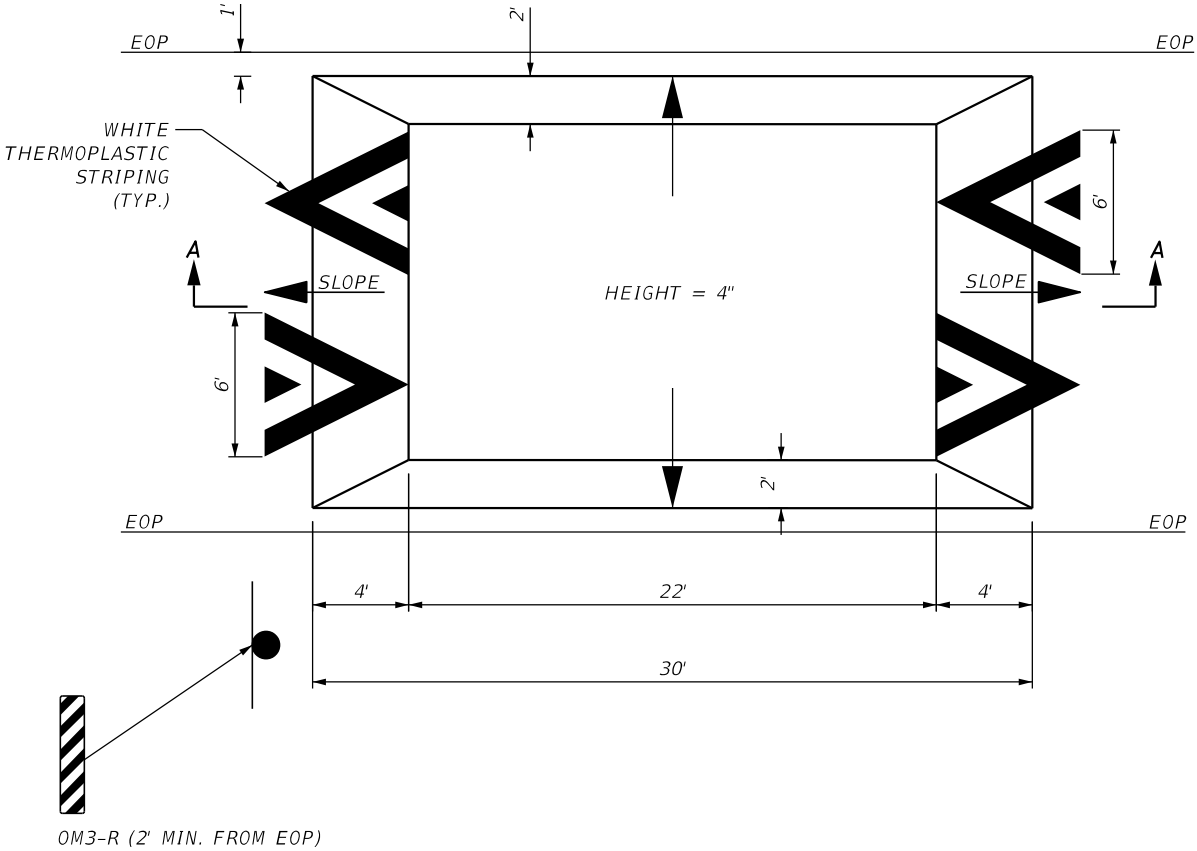
PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



SECTION A-A
(N.T.S.)



OM3-R
(2' MIN. FROM EOP)



OM3-R (2' MIN. FROM EOP)

NOTES:

1. LOCATIONS OF SPEED TABLES TO BE FIELD DETERMINED BY ENGINEER.
2. CONSTRUCTION TO CONFORM TO SUPPLEMENTAL SPECIFICATION.
3. SIGNAGE & PAVEMENT MARKINGS SHALL CONFORM TO M.U.T.C.D.
4. DIMENSIONS MAY VARY AS APPROVED BY CITY ENGINEER.

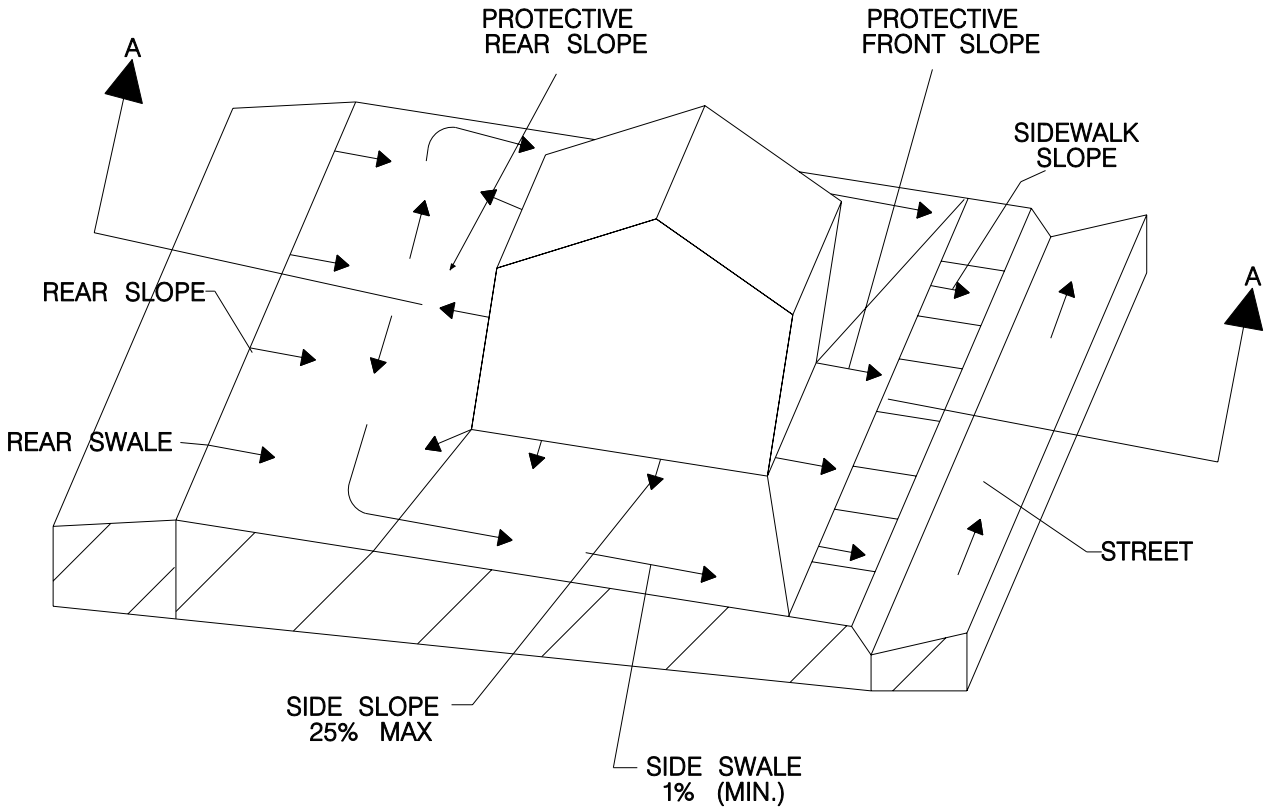
CONSTRUCTION INDEX RT-320

SPEED TABLE ASSEMBLY FLAT TOP
(N.T.S.)

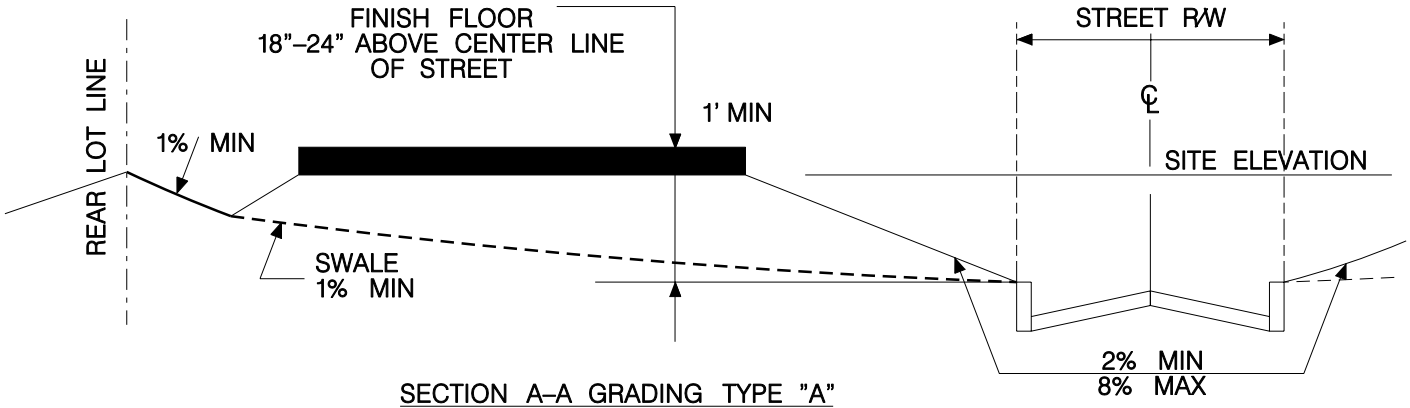
City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RT-320	**Speed Table Assembly Flat Top**

PUBLICATION DATE	DRAWING SCALE	TITLE
APRIL 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK**	



TYPE "A" ALL DRAINAGE TO STREET WITH A 1% (MIN.) SWALE

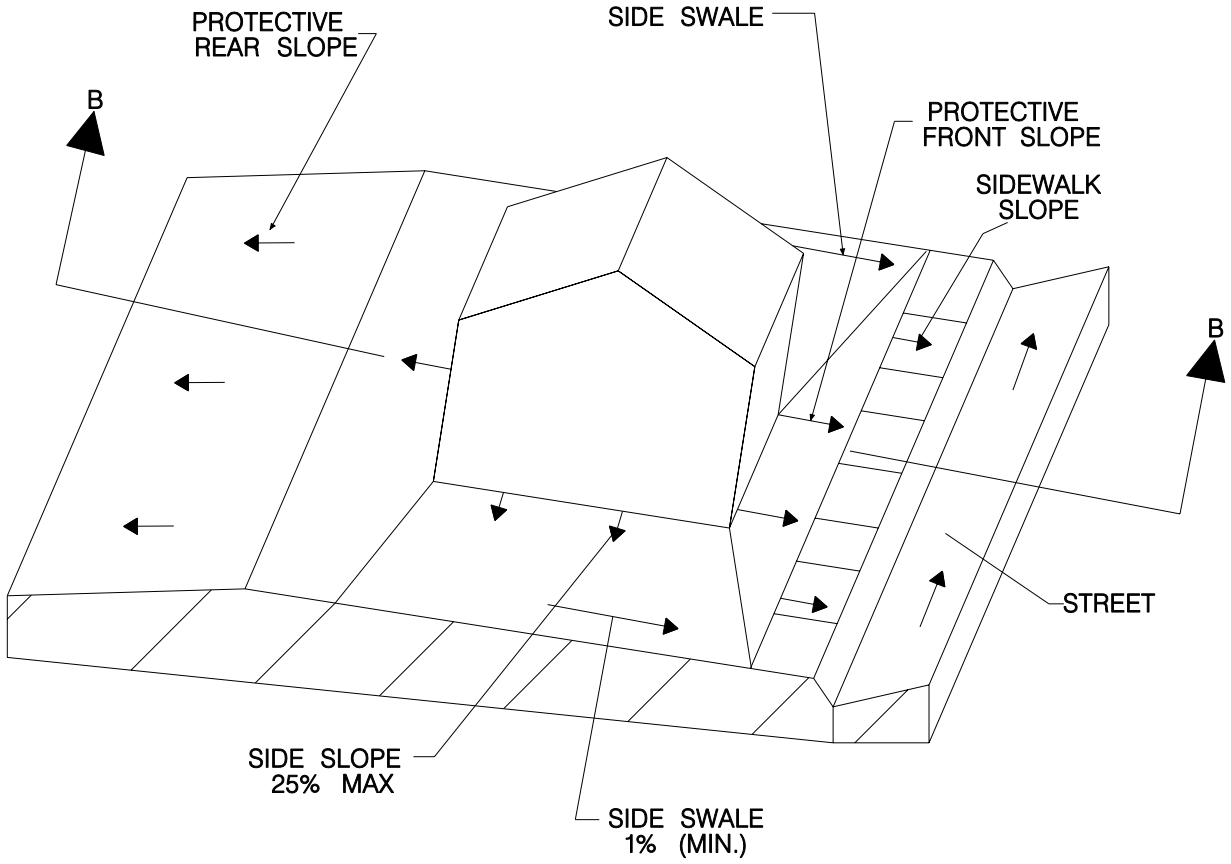


SECTION A–A GRADING TYPE "A"

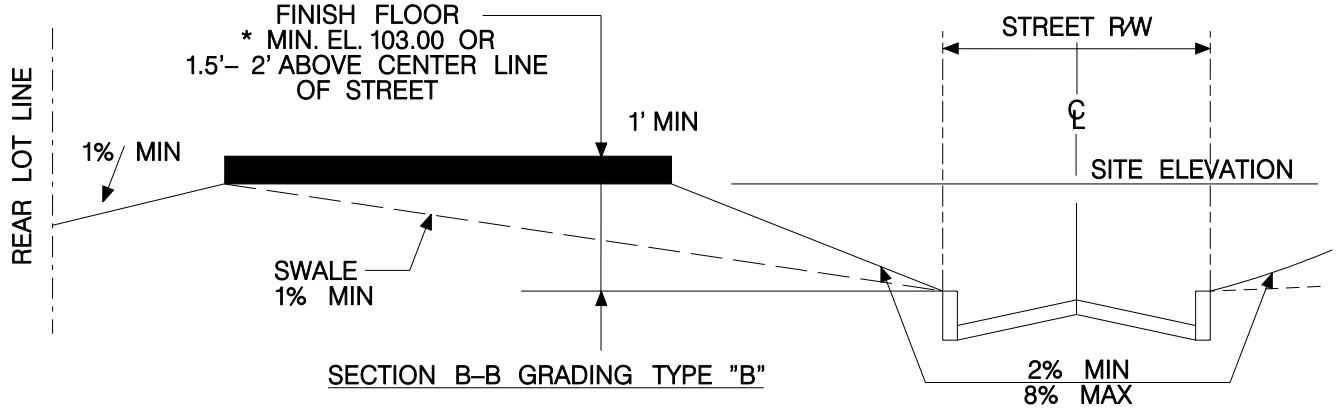
NOTES:
1.) DESIGN PLANS MUST SHOW EXISTING AND PROPOSED ELEVATIONS FOR BUILDING AND LOT CORNERS
2.) FOR TYPE "A" GRADING MIN. FINISH FLOOR SHALL BE 18"–24" ABOVE THE CENTERLINE OF THE STREET, AND NOT LESS THAN ONE FOOT ABOVE 100 YEAR BASE FLOOD ELEVATION(BFE), OR AS DIRECTED BY THE CITY ENGINEER
3.) ROOF GUTTERS AND YARD DRAINS MAY BE REQUIRED,AS DIRECTED BY THE CITY ENGINEER TO PROVIDE ADEQUATE DRAINAGE.
4.) DESIGN PLANS FOR IN–FILL LOTS IN EXISTING SUBDIVISIONS MUST SHOW EXISTING ELEVATIONS 15' ONTO ADJACENT PROPERTIES AND AT 15' ON CENTER TO VALIDATE THE LOT GRADING DESIGN.
5.) SIDE SLOPES SHALL NOT EXCEED A MAXIMUM OF 4:1.
6.) LOTS WITHIN THE VELOCITY ZONE, THE 100 YEAR FLOOD ZONE, AND IN–FILL LOTS WILL REQUIRE DRAINAGE AND ACCEPTABLE GRADE TRANSITIONS TO ADJACENT LOT ELEVATIONS.
7.) LOT GRADING SHALL MAINTAIN HISTORICAL FLOW PATHS AND PREVENT THE ACCUMULATION OF WATER, OR CREAT EXCESSIVE RUNOFF ONTO ADJACENT PROPERTIES
8.) REAR SWALE'S SHALL DRAIN TO SIDE SWALE'S AND TO STREETS ON EACH LOT AND SHALL FUNCTION INDEPENDENTLY FROM ALL ADJOINING LOTS.

City of Largo
Community Development Department
Engineering Services Division
201 Highland Avenue, Largo, FL, 33770–2512
TEL: (727) 587–6713 FAX: (727) 586–7413
WWW: http://www.largo.com

TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Residential Grading Type "A"	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RG–01
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	



TYPE "B" ALL DRAINAGE TO STREET WITH A 1% (MIN.) SWALE



SECTION B–B GRADING TYPE "B"

1.) DESIGN PLANS MUST SHOW EXISTING AND PROPOSED ELEVATIONS ARE REQUIRED FOR POINTS ON ALL BUILDING AND LOT CORNERS.
2.) FOR TYPE "B" GRADING, MIN. ELEVATION SHALL BE 18"–24" ABOVE THE CENTERLINE OF THE STREET AND NOT LESS THAN ONE FOOT ABOVE THE 100YEAR BASE FLOOD ELEVATION(BFE) OR AS DIRECTED BY THE CITY ENGINEER.
3.) ROOF GUTTERS AND YARD DRAINS MAY BE REQUIRED, AS DETERMINED BY THE CITY ENGINEER TO PROVIDE ADEQUATE DRAINAGE.
4.) DESIGN PLANS FOR IN–FILL LOTS IN EXISTING SUBDIVISIONS MUST SHOW EXISTING ELEVATIONS 15' ONTO ADJACENT PROPERTIES AND AT 15' ON CENTER TO VALIDATE THE LOT GRADING DESIGN.
5.) SIDE SLOPES SHALL NOT EXCEED A MAXIMUM OF 4:1.
6.) LOTS WITHIN THE VELOCITY ZONE, THE 100 YEAR FLOOD ZONE, AND INFILL LOTS WILL REQUIRE DRAINAGE AND ACCEPTABLE GRADE TRANSITIONS TO ADJACENT LOT ELEVATIONS.
7.) LOT GRADING SHALL MAINTAIN HISTORICAL FLOW PATHS AND PREVENT THE ACCUMULATION OF WATER, OR CREATE EXCESSIVE RUNOFF ONTO ADJACENT PROPERTIES.
8.) TYPE "B" LOT GRADING IS USED WHERE:
A.) AN INVERTED CROWN ALLEY EXISTS AT REAR.
B.) HISTORICAL FLOW PATHS OCCUR TO AN EXISTING STORMWATER SYSTEM OR OVER LAND WITH A SLOPE GREATER THAN 1%.
9.) SIDE SWALES SHALL DRAIN TO THE STREET ON EACH LOT AND SHALL FUNCTION INDEPENDANTLY FROM ALL ADJOINING LOTS.

City of Largo
Community Development Department
Engineering Services Division
201 Highland Avenue, Largo, FL, 33770–2512
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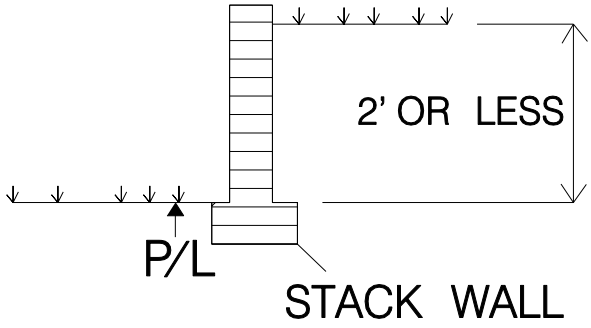
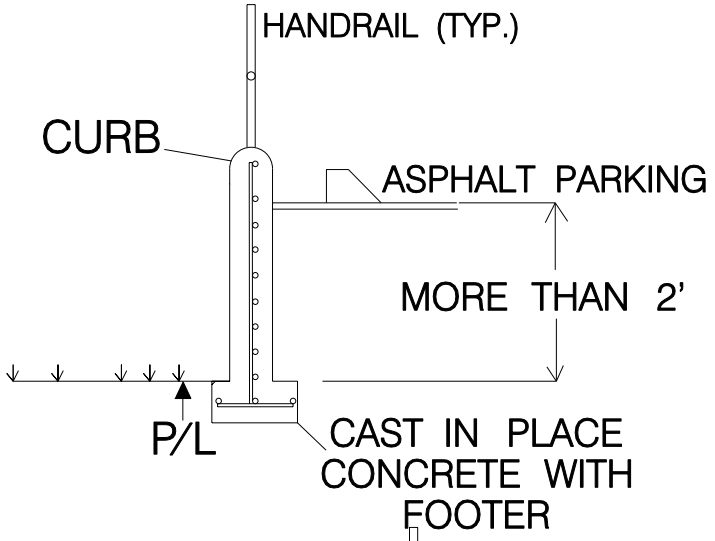
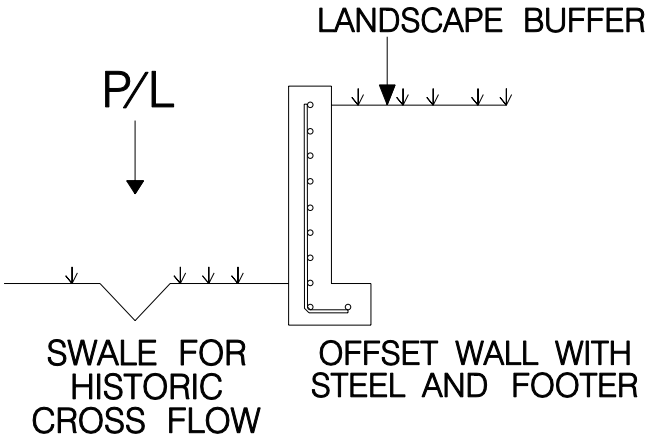
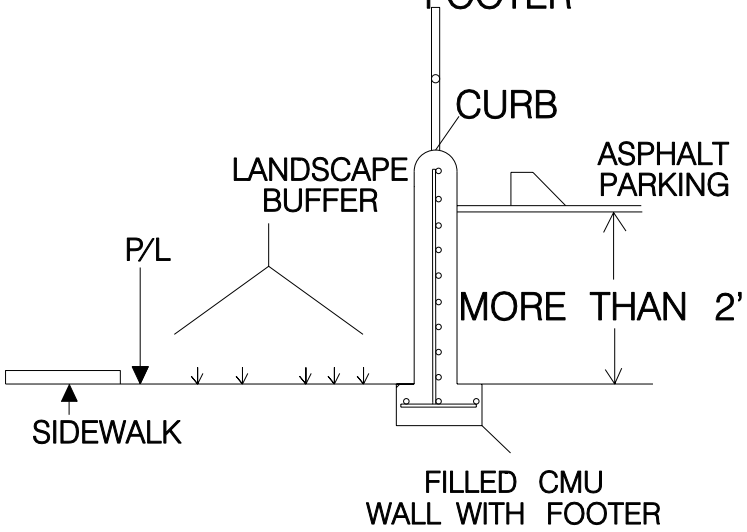
WWW: http://www.largo.com

TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Residential Grading Type "B"	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: RG–02
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	









NOTES

1. ALL GRADE CHANGES AT PROPERTY LINES, ADJACENT TO PRIVATE PROPERTY OR R.O.W., SHALL NOT EXCEED A 6:1 SLOPE.
2. IF GRADE CHANGE IS TOO GREAT BETWEEN PROPERTIES, A RETAINING WALL OF APPROPRIATE HEIGHT SHALL BE CONSTRUCTED TO REDUCE THE GRADES TO 6:1.
3. THE TYPE OF WALL MATERIAL, HEIGHT OF WALL AND PLACEMENT OF WALL WILL DEPEND ON SPECIFIC SITE CONDITIONS. ANY VARIATIONS SHALL BE APPROVED, IN WRITING, BY THE CITY OF LARGO ENGINEERING SERVICES DIVISION. FAILURE TO OBTAIN ADVANCED APPROVAL WILL RESULT IN DEMOLITION AND/OR RECONSTRUCTION OF THE WALL BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE. OTHER SITE OBSTRUCTIONS OF THE WALL, SHALL BE INCLUDED IN THE DEMOLITION AND RECONSTRUCTION.
4. SWALES, DRAINAGE INLETS, ETC MAY BE NECESSARY TO CONTROL EXISTING CROSS FLOW DRAINAGE AND PREVENT FLOODING OF ADJACENT PROPERTIES.
5. BOTH PLAN AND PROFILE VIEWS OF WALL, SWALES AND INLETS SHALL BE INCLUDED IN CIVIL SITE PLANS FOR REVIEW AND APPROVAL DURING DEVELOPMENT REVIEW. PLAN VIEWS WILL ALSO BE INCLUDED IN LANDSCAPE PLANS FOR REVIEW BY THE BUILDING DIVISION.
6. LANDSCAPING PLANTS AND MATERIALS THAT ARE RESISTANT TO WASH OUT OR FLOATING, AND ARE SUITABLE FOR THE GRADE AND RESISTANT TO EROSION SHALL BE SPECIFIED.
7. ABOVE ARE SOME COMMON PROBLEMS AND THE PREFERRED SOLUTIONS. ANY CONDITIONS NOT COVERED, MUST BE BROUGHT TO CITY OF LARGO'S ATTENTION DURING REVIEW FOR ASSISTANCE WITH SPECIFIC APPLICATION.
8. THIS DETAIL IS FOR GENERAL WALL PLACEMENT REQUIREMENTS. ACTUAL WAL DESIGN MUST BE DONE BY A REGISTERED PROFESSIONAL STRUCTUAL ENGINEER.

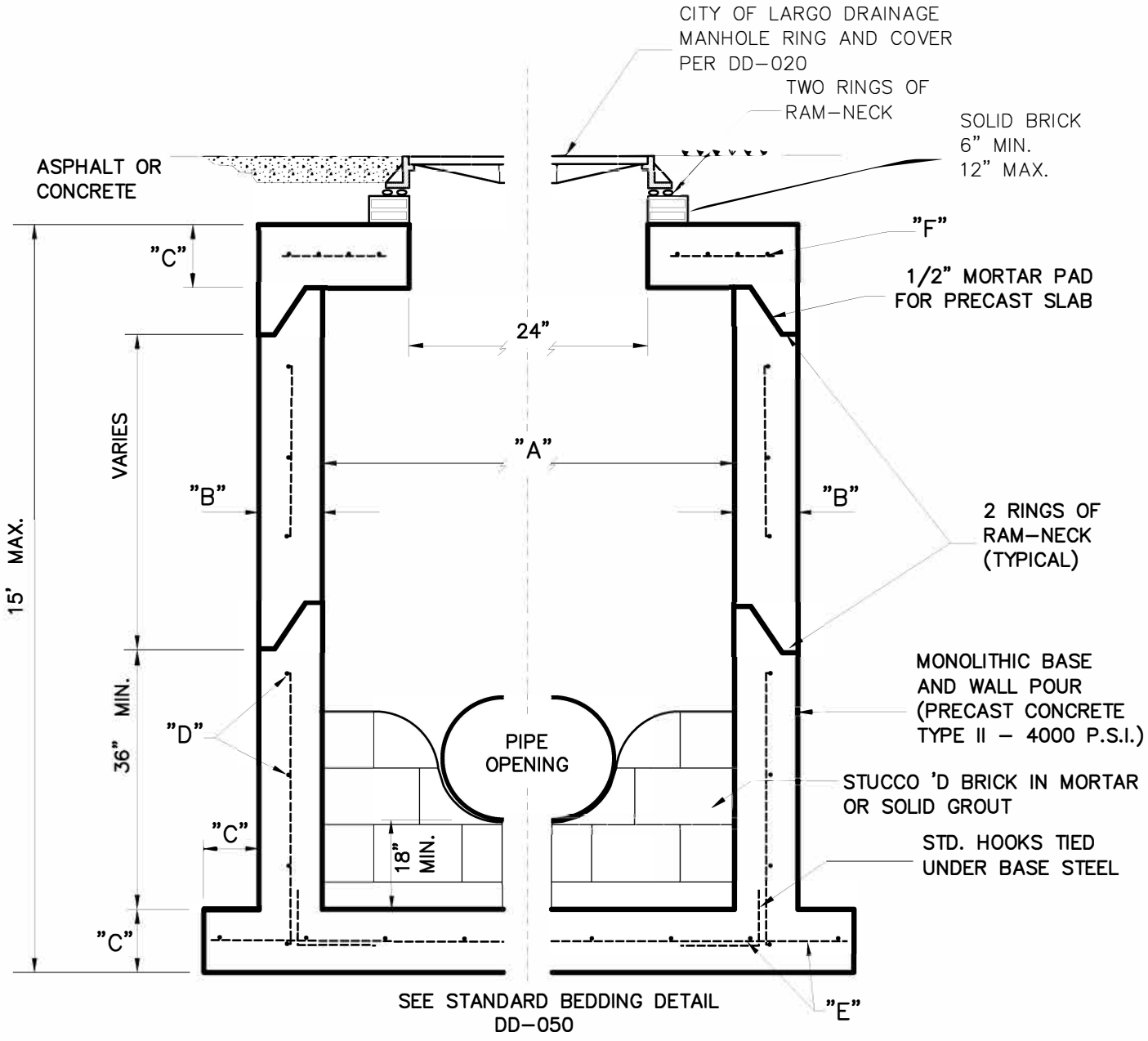
City of Largo
Community Development Department
Engineering Services Division
201 Highland Avenue, Largo, FL, 33770-2512
TEL: (727) 587-6713 FAX: (727) 586-7413
WWW: http://www.largo.com

TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	PERIMETER GRADING	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: CG-01
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	

City of Largo
2008 Engineering Design and Construction Standards
Drainage (DD) Section 2020 Updates
Revision Log

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
DD-01	DD-010	Drainage Manhole and Other Storm Structures	-Updated manhole ring and cover reference number. -Revised bedding detail reference number. -Note 2: Changed "PVC 900" to "PVC C-900." -Revised detail numbering in title block.
DD-02	DD-020	Drainage Inlet Frame and Cover - Heavy Duty	-Note 1: Added US Foundry option. -Fixed note alignment. -Revised detail numbering in title block.
DD-03	DD-030	Drainage Inlet Frame and Cover - Non-Traffic	-Note 1: Added US Foundry option. -Fixed note alignment and punctuation. -Revised detail numbering in title block.
DD-04	DD-040	Underdrain	-Fixed note 3 spacing. -Revised detail numbering in title block.
DD-05	DD-050	Standard Bedding	-Note 2 revised to "…wrapped in Mirafi Filter fabric 140N minimum or approved equal." -Revised detail numbering in title block.
	DD-060A	Curbed Inlets General Notes	-New detail incorporating common notes from the DD-060 series.
DD-06A	DD-060B	Curbed Inlets Details Pg 1 of 6	-Increased text size and font to match rest of set. -Corrected labeling for Section E-E and Section C-C. -Revised numbering for references to other sections. -Revised detail numbering in title block.
DD-06B	DD-060C	Curbed Inlets Details Pg 2 of 6	-Added 306 SS nose angle and callout. -Updated numbering format for manhole lid reference. -Resized text to match rest of set. -Revised numbering for references to other sections. -Revised detail numbering in title block.
DD-06C	DD-060D	Curbed Inlets Details Pg 3 of 6	-Resized text to match rest of set. -Revised numbering for references to other sections. -Revised detail numbering in title block.
DD-06D	DD-060E	Curbed Inlets Details Pg 4 of 6	-Note 1: Revised RT reference to "RT-130." -Note 11: Revised to reference "FDOT Standard Index 425-010." -Added new Note 12: "All 4 inch concrete support posts shall be SDR 26." -Moved all General Notes on page to new DD-060A detail. -Revised numbering for references to other sections. -Revised detail numbering in title block. -Revised detail numbering in title block.
DD-06E	DD-060F	Curbed Inlets Details Pg 5 of 6	-Revised reference in Top View from "DD-03" to "DD-030." -Note 5: Changes "chamber" to "chamfer." -Moved all General Notes on page to new DD-060A

			detail. -Revised numbering for references to other sections. -Revised detail numbering in title block.
DD-06F	DD-060G	Curbed Inlets Details Pg 6 of 6	-Changed note to a numbered list. -Revised numbering for references to other sections. -Revised detail numbering in title block.
DD-06F	DD-070	Miscellaneous Drainage Details	-New details.



"A"	"B"	"C"	"D"	"E"	"F"	MAX. PIPE
4'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 4 @ 12" OCEW	# 4 @ 6" OCEW	30"
5'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 5 @ 12" OCEW	# 5 @ 6" OCEW	42"
6'-0" DIA	6"	8"	# 4 @ 12" OCEW	# 5 @ 6" OCEW	# 5 @ 6" OCEW	48"
8'-0" DIA	8"	12"	# 4 @ 10" OCEW	# 5 @ 6" OCEW	# 6 @ 6" OCEW	72"

NOTES:

1. ALL CONCRETE PIPE SHALL BE CLASS III, UNLESS IT IS UNDER A ROADWAY THEN IT SHALL BE CLASS IV.
2. ALL PVC PIPE SHALL BE PVC C-900 OR SDR 18/19.

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INDEX NUMBER
DD-010

DESCRIPTION
DRAINAGE MANHOLE AND OTHER STORM STRUCTURES

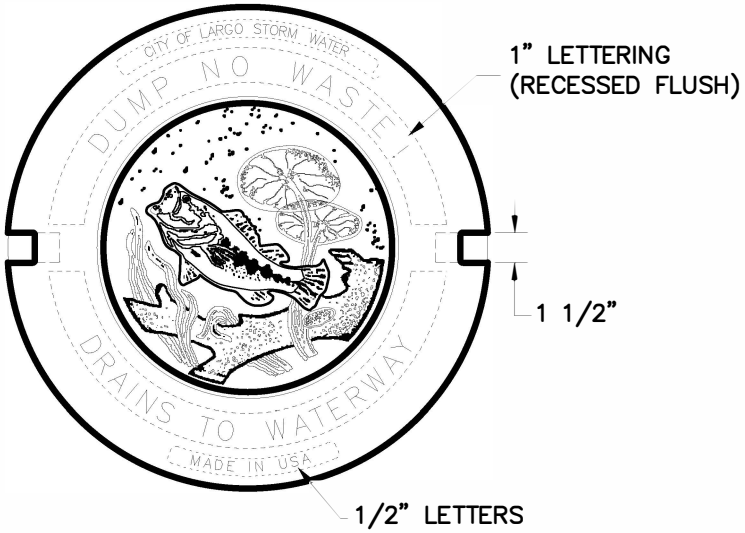
PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

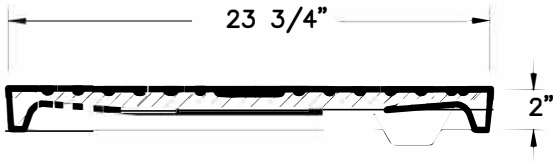
CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.

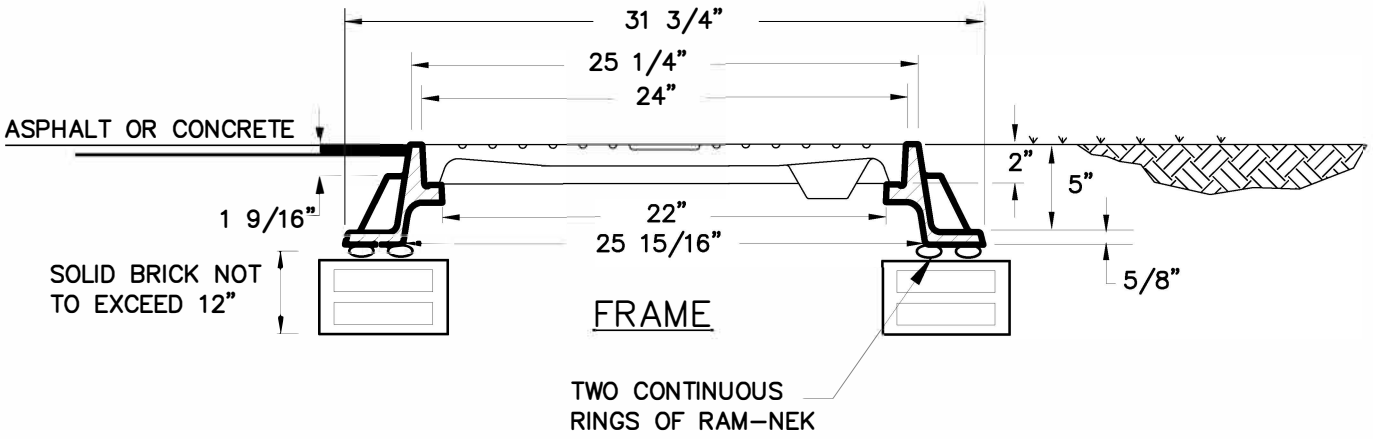
TITLE
Engineering Design and Construction Standards



SOLID COVER



SOLID COVER SECTION



NOTES:

1. FRAME AND COVER SHALL BE EAST JORDAN IRONWORKS, INC. MODEL V-1317, U.S. FOUNDRY NO. 420-G, OR APPROVED EQUAL COATED WITH BITUMASTIC COAL TAR.
2. WHERE INLET GRATE IS REQUIRED USE 5640 GRATE.

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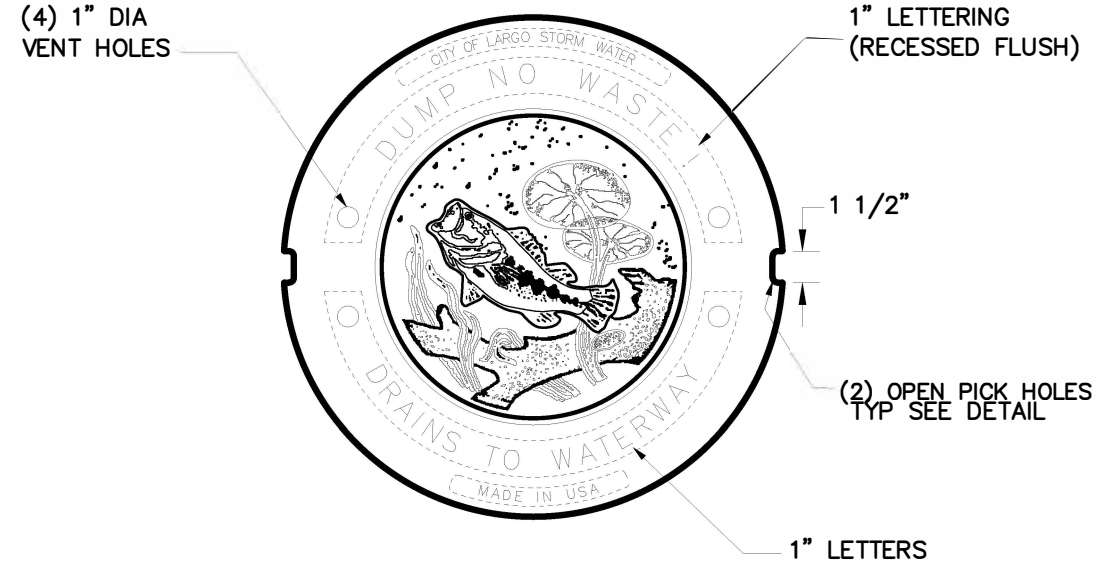
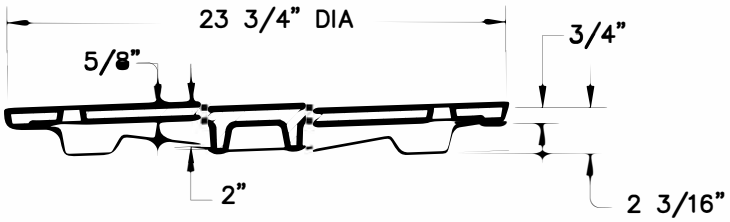
INDEX NUMBER	DESCRIPTION
DD-020	**DRAINAGE INLET FRAME AND COVER - HEAVY DUTY**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

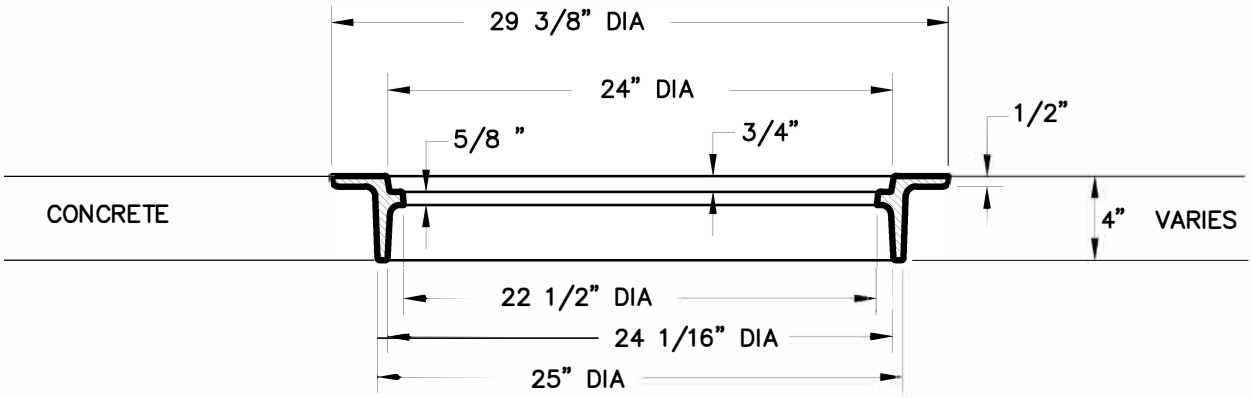
CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



SOLID COVER



SOLID COVER SECTION



FRAME

NOTES:

1. FRAME AND COVER SHALL BE EAST JORDAN IRONWORKS, INC. MODEL V–1317, U.S. FOUNDRY NO. 1259–LU, OR APPROVED EQUAL, COATED WITH BITUMASTIC COAL TAR.
2. WHERE INLET GRATE IS REQUIRED USE 5640 GRATE.

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INDEX NUMBER
DD-030

DESCRIPTION
DRAINAGE INLET FRAME AND COVER - NON-TRAFFIC

PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

CITY ENGINEERING DIRECTOR
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ASST. ENGINEERING DIRECTOR
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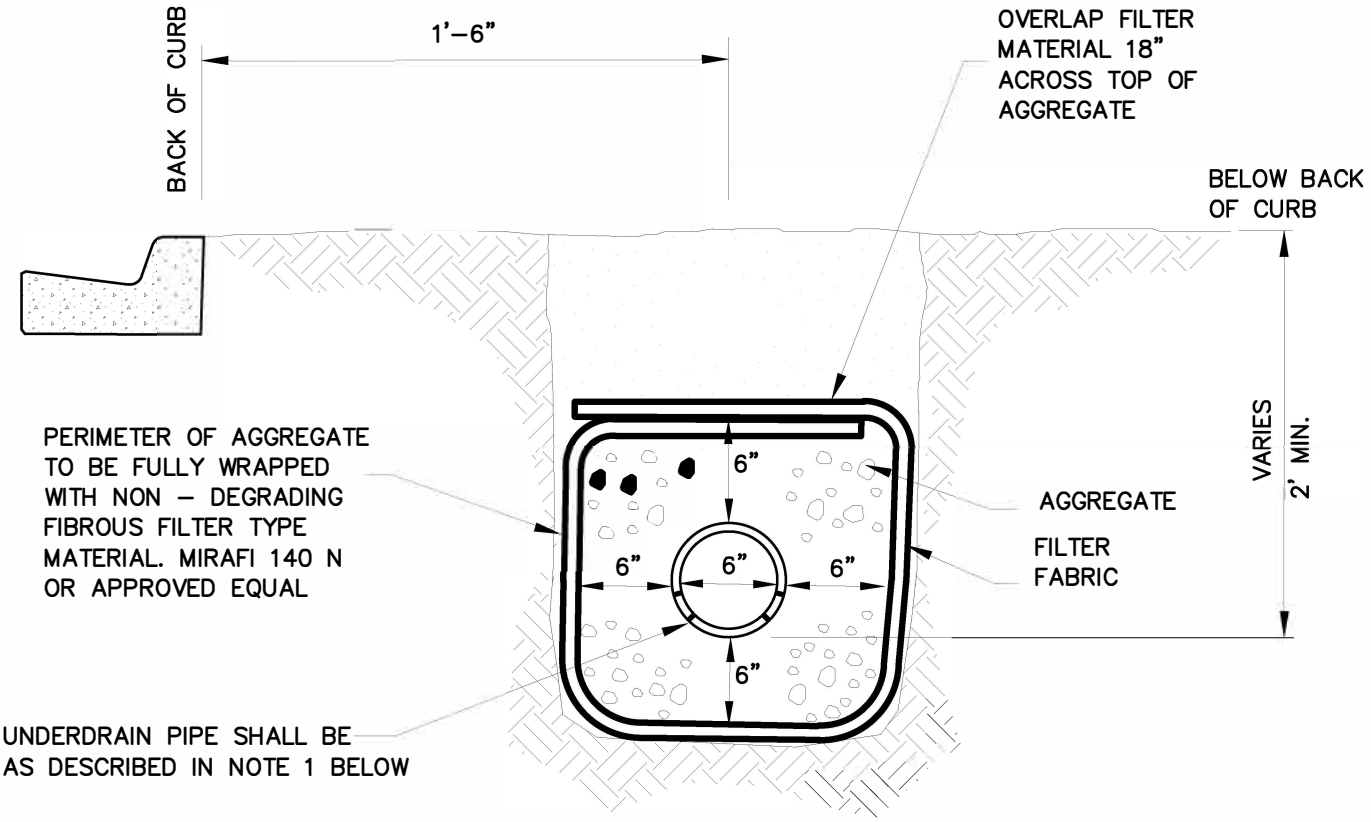
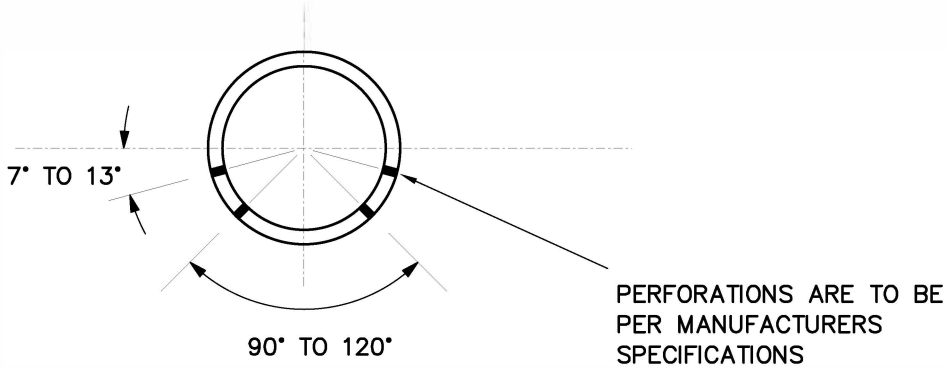
TITLE
Engineering Design and Construction Standards



TYPICAL SECTION



NOTES:

1. P.V.C. PIPE SHALL CONFORM TO EITHER A.S.T.M. F758, A.S.T.M. F949, OR EQUAL.
2. AGGREGATE SHALL BE COURSE AGGREGATE #57. LIMEROCK BASE ROCK SHALL NOT BE USED.
3. DIAMETER OF PERFORATIONS SHALL BE 3/16" TO 3/8" AND SHALL BE REPEATED ALONG THE PIPE LENGTH
4. AGGREGATE SHALL EXTEND 6" BEYOND END OF PERFORATED P.V.C.

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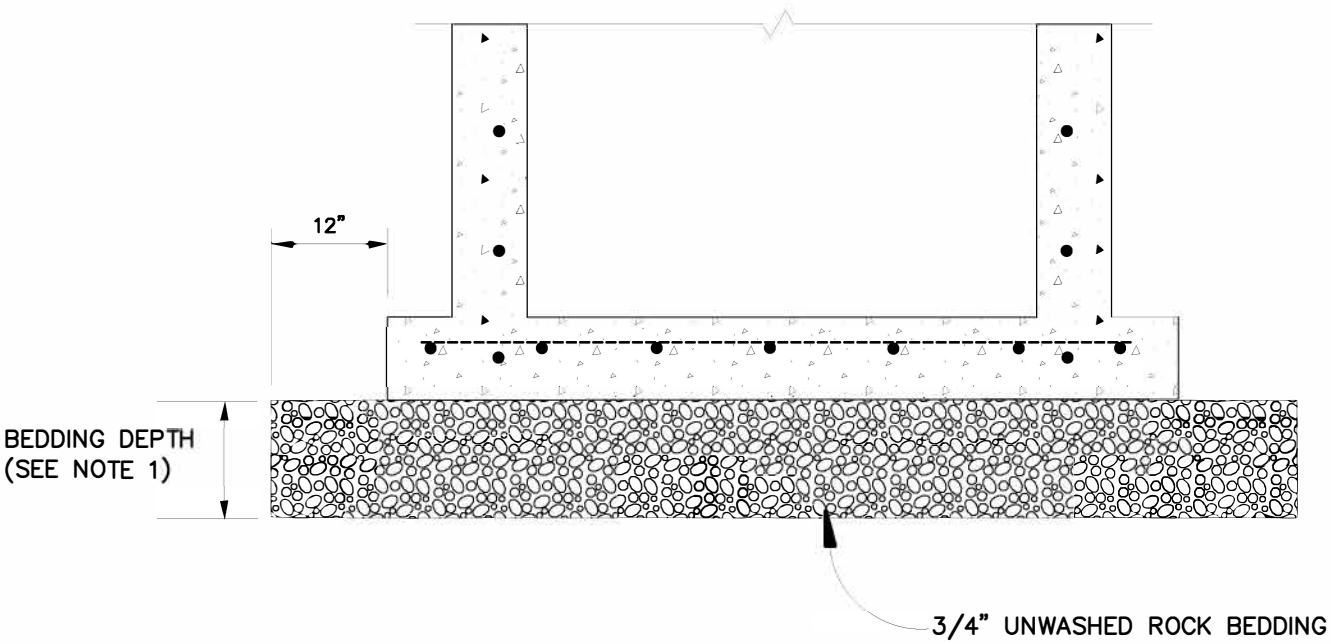
INDEX NUMBER	DESCRIPTION
DD-040	**UNDERDRAIN**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



NOTES:

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.
2. IF STRUCTURE INCLUDES WEEP HOLES OR IS UNDER A ROADWAY, ROCK SHALL BE WRAPPED IN MIRAFI FILTER FABRIC 140N MINIMUM OR APPROVED EQUAL

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INDEX NUMBER	DESCRIPTION
DD-050	**STANDARD BEDDING**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

GENERAL NOTES

1. THESE INLETS ARE FOR USE WITH THE CITY OF LARGO'S APPROVED CURB AND GUTTER DESIGNS. (RT-130)

2. ℄ OF INLETS SHOULD BE LOCATED AT PROPERTY LINES UNLESS OTHERWISE APPROVED.

3. COVER FOR ALL REINFORCING STEEL SHALL BE 2" MINIMUM.

4. SUGGESTED MAXIMUM INLET DESIGN FLOWS FOR 0.4% PROFILE GRADE AND 1/4"/FT. CROSS SLOPE.
   RC-3: 4.5 CFS (3'-6" WIDTH) / 5.5 CFS (5'-0" WIDTH)
   RC-4: 6.5 CFS (3'-6" WIDTH) / 7.5 CFS (5'-0" WIDTH)
   RC-5: 3 CFS (3'-6" WIDTH) / 4 CFS (5'-0" WIDTH)

5. INLETS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE, AND MAY BE EITHER PRECAST OR POURED IN PLACE.

6. CONCRETE FOR TOP SLABS, BOTTOM SLABS, APRONS, AND CURB-AND-GUTTER TRANSITION SECTIONS SHALL BE SHALL BE CLASS II , WITH Fc' = 3400 PSI (MIN). (Fc' = 4000 PSI (MIN) FOR TOP SLAB).

7. REINFORCING STEEL SHALL BE GRADE 60, DEFORMED, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 615

8. WHEN INLET TOPS EXTEND INTO SIDEWALK OR OTHER PAVED AREAS, THE FINISHED SURFACE OF THE INLET TOPS SHALL CONFORM TO THE FINISHED GRADE AND CROSS SLOPE OF THE ADJACENT SIDEWALK OR PAVEMENT. TO ACHIEVE THIS CONFORMITY THE DEPTH OF THE INLET SLAB MAY BE INCREASED WHERE NECESSARY, AND/OR THE HEIGHT OF THE INLET SIDE AND REAR WALLS MAY BE INCREASED OR DECREASED AS REQUIRED. HOWEVER, THE THICKNESS OF THE INLET SLAB AT ANY POINT SHALL NOT BE LESS THAN THAT SHOWN IN THE PLANS, AND NO ADJUSTMENT SHALL BE MADE TO THE DEPTH OF INLET OPENINGS OR THE HEIGHT OF THE TOP FRONT EDGE OF THE INLET SLAB.

9. UNLESS OTHERWISE NOTED, ALL EXPOSED EDGES AND CORNERS OF CONCRETE SHALL HAVE A 3/4" CHAMFER.

10. FDOT TYPE 'J' BOTTOM MAY BE USED WITH 'RC-3', 'RC-4' AND 'RC-5' INLETS. IN SUCH CASES THE STRUCTURE BOTTOM MAY BE ROTATED AS DIRECTED BY ENGINEER IN ORDER TO FACILITATE CONNECTIONS BETWEEN THE STRUCTURE WALLS AND STORM SEWER PIPES.

11. REFER TO FDOT STANDARD INDEX 425-010 FOR REINFORCING STEEL REQUIREMENTS AT PIPE OPENINGS. ANY PORTION OF THE PIPE PROTRUDING BEYOND THE SURFACE OF THE BRICK WALLS SHALL BE PLASTERED WITH ONE-HALF INCH MINIMUM THICKNESS OF 1:2 MIX SAND-CEMENT MORTAR AND LEFT WITH A SMOOTH FINISH.

12. ALL 4" CONCRETE SUPPORT POSTS SHALL BE SDR 26.

13. COVER FOR ALL REINFORCING STEEL SHALL BE 2" MINIMUM.

14. INLETS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE, AND MAY BE EITHER PRECAST OR POURED IN PLACE.

15. CONCRETE SHALL BE CLASS II, WITH Fc' = 3400 PSI (MIN). CONCRETE SHALL BE IN ACCORDANCE WITH SECTION 346 OF F.D.O.T'S STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

16. REINFORCING STEEL SHALL BE GRADE 60, DEFORMED, AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM SPECIFICATION A 615.

17. UNLESS OTHERWISE NOTED, ALL EXPOSED EDGES AND CORNERS OF CONCRETE SHALL HAVE A 3/4" CHAMFER.

18. CONFLICT MANHOLE TO BE DESIGNED BY ENGINEER OF RECORD.

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INDEX NUMBER
DD-060A

DESCRIPTION
CURBED INLETS GENERAL NOTES

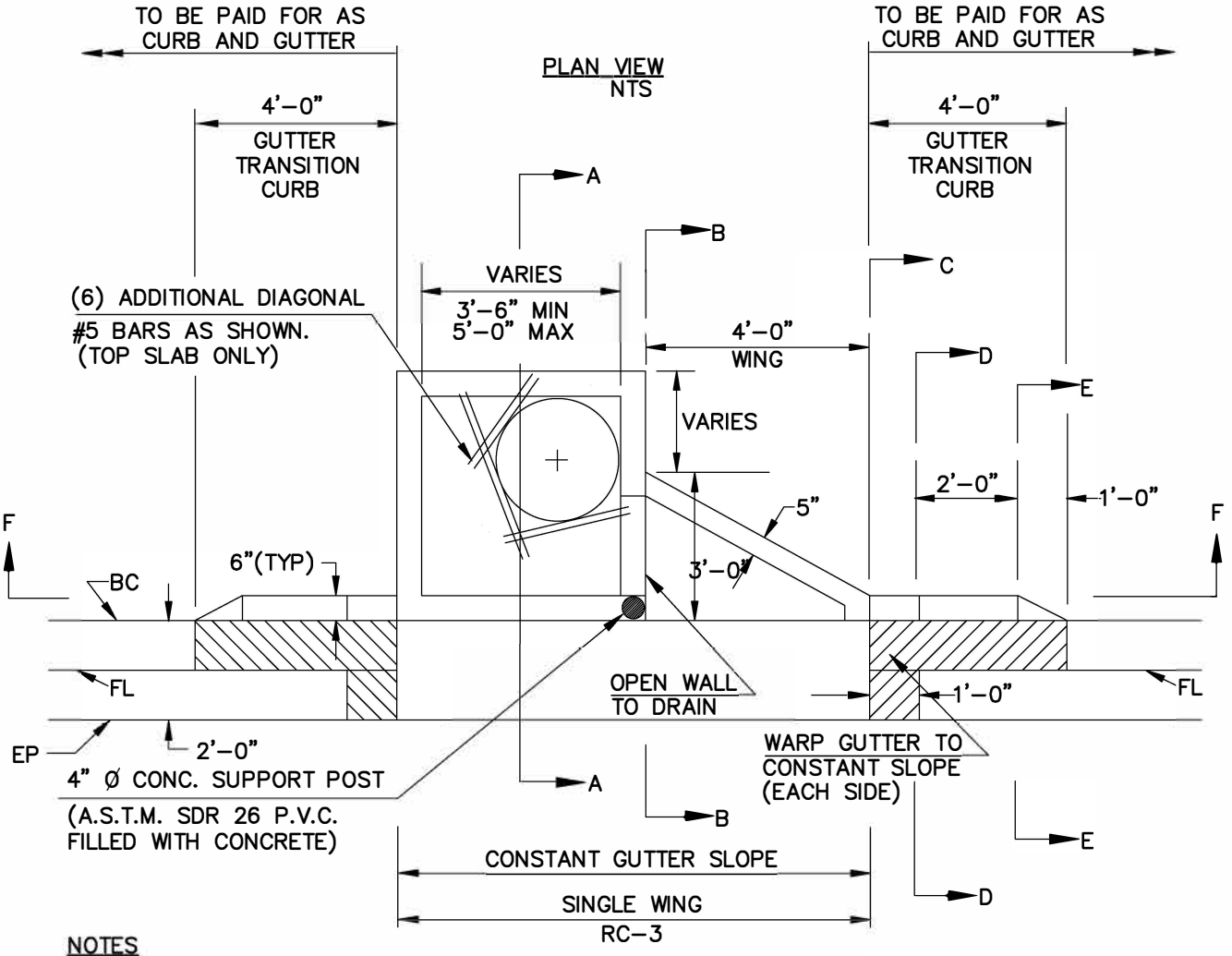
PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

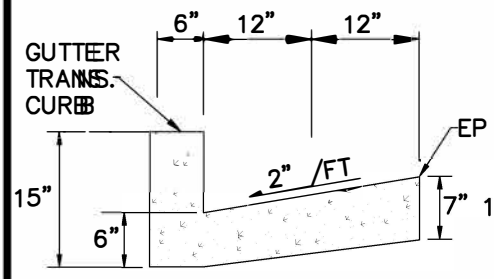
ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.

TITLE
Engineering Design and Construction Standards

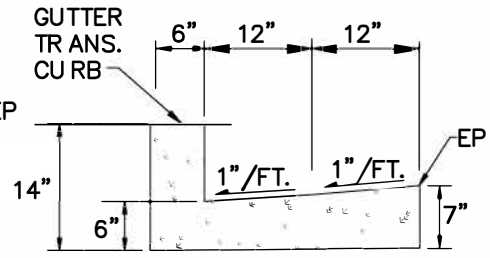


NOTES

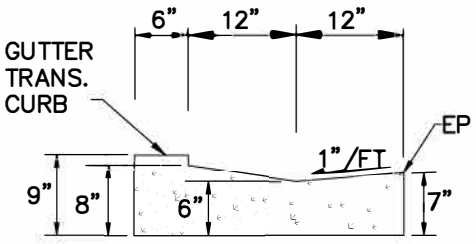
1. SECTIONS 'A'-'A' AND 'B'-'B' ARE ON SHEET 2 OF 6.
2. SECTIONS 'C'-'C', 'D'-'D', AND 'E'-'E' ON THIS SHEET SHOW TRANSITION FOR CURB AND GUTTER. TRANSITION LENGTH TO BE DETERMINED BY FDOT STANDARDS
3. TRANSITION FOR TYPE 'F' CURB IS ON SHEET 4 OF 6.
4. SECTION 'F'-'F' IS ON SHEET 3 OF 6.
5. RC-4 IS SYMMETRICAL ABOUT THE CENTERLINE.
6. RC-5 IS CONSTRUCTED WITHOUT WINGS.



SECTION C-C
INLET



SECTION D-D
TRANSITION



SECTION E-E
GUTTER

See Sections DD-060C through DD-060G

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INDEX NUMBER
DD-060B

DESCRIPTION
CURBED INLETS DETAILS
PG. 1 OF 6

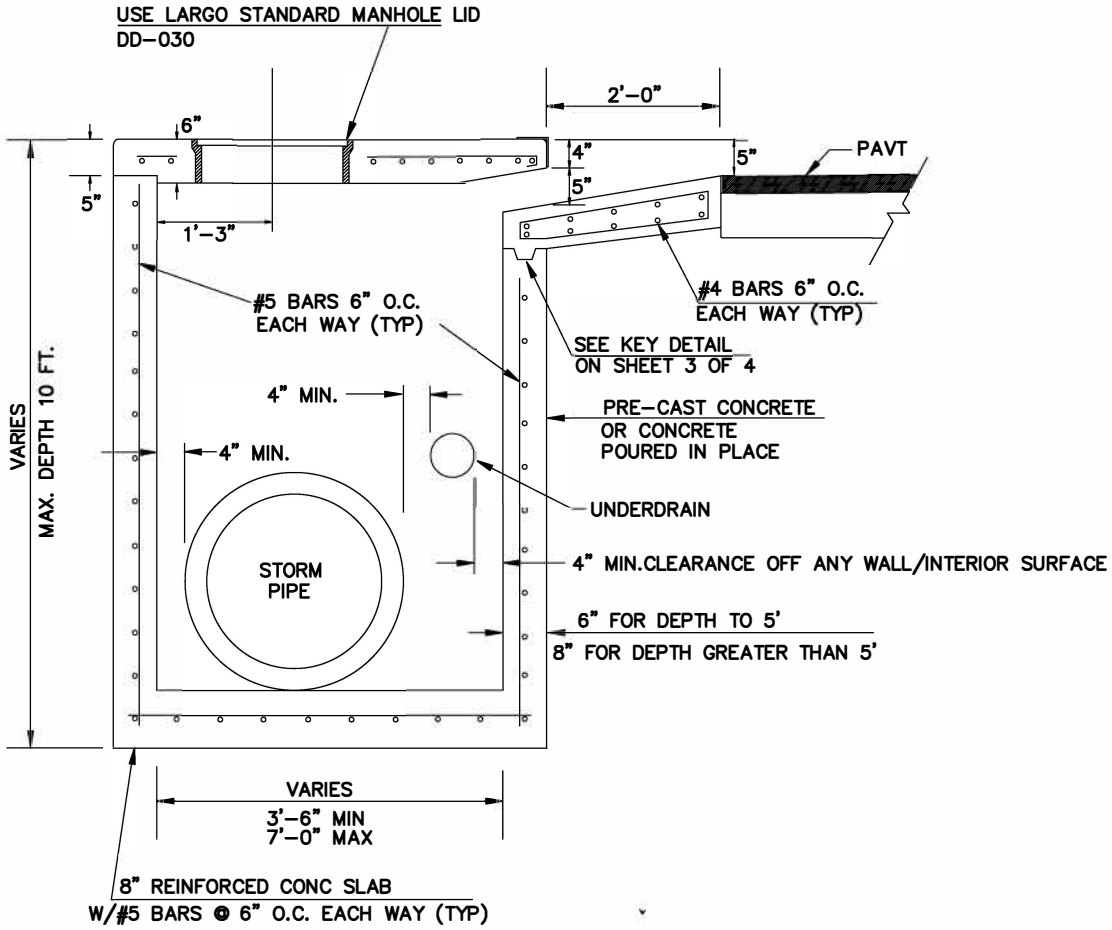
PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.

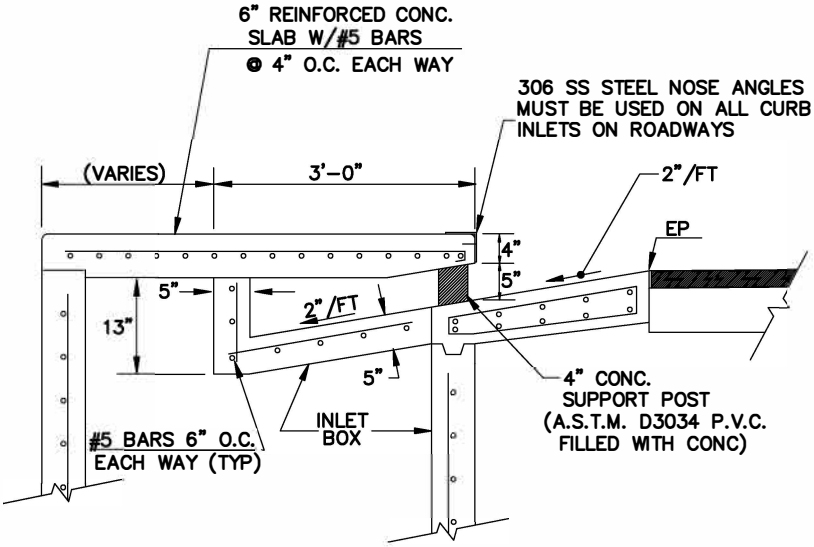
TITLE
Engineering Design and Construction Standards



SECTION A-A
NTS

NOTES

1. RC-4 IS SYMMETRICAL ABOUT THE CENTERLINE
2. RC-5 IS CONSTRUCTED WITHOUT WINGS



See Sections DD-060B and DD-060D Through DD-060G

SECTION B-B
(VIEW THROUGH INLET BOX AND WING TRANSITION)

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INDEX NUMBER	DESCRIPTION
DD-060C	**CURBED INLETS DETAILS PG. 2 OF 6**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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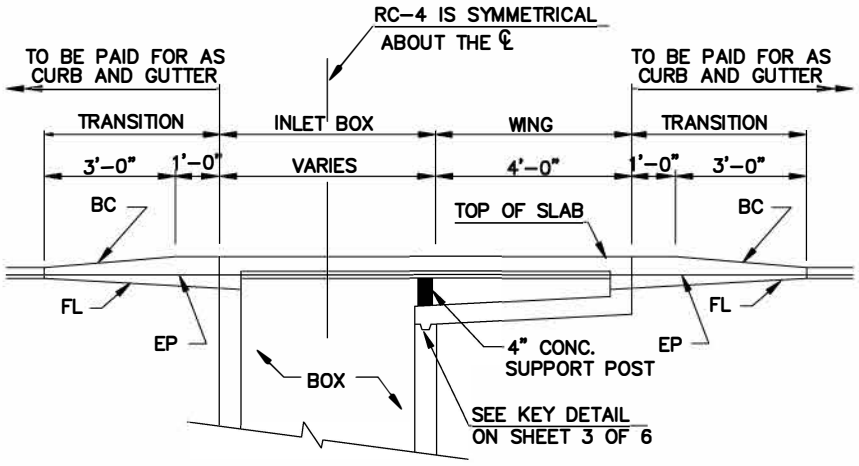
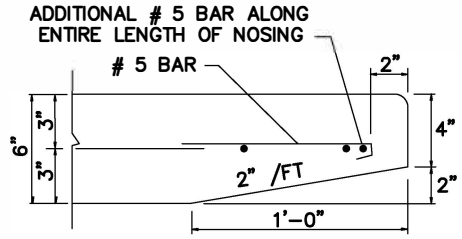


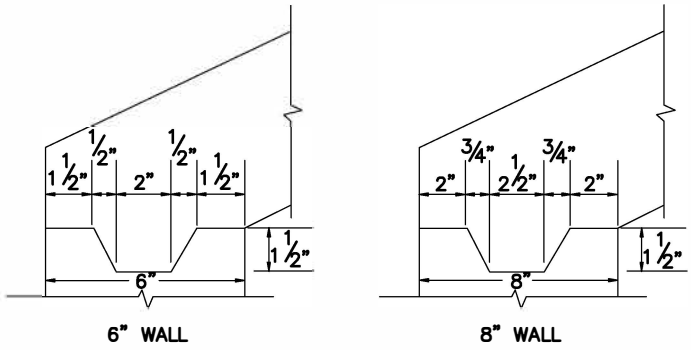
SECTION F–F
NTS

NOTES

1. RC–4 IS SYMMETRICAL ABOUT THE CENTERLINE
2. RC–5 IS CONSTRUCTED WITHOUT WINGS



NOSING DETAIL
NTS



KEY DETAIL
NTS

See Sections DD–060B Through DD–060C and DD–060E Through DD–06G

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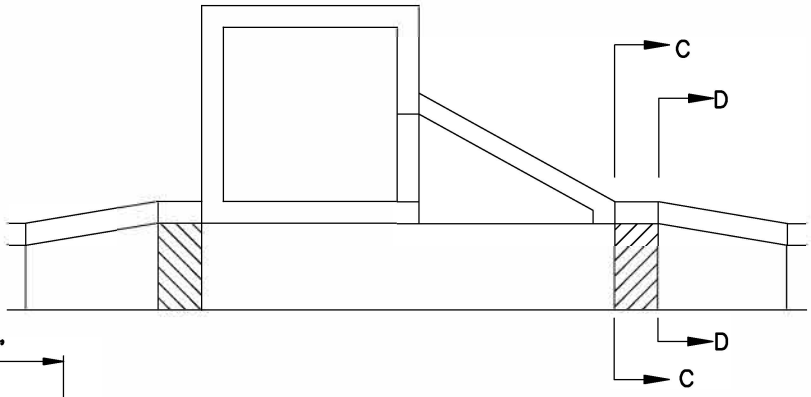
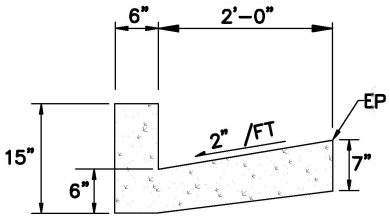
INDEX NUMBER	DESCRIPTION
DD-060D	**CURBED INLETS DETAILS PG. 3 OF 6**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

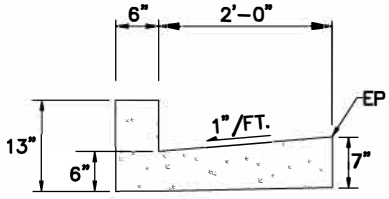




SECTION C–C

NOTE

1. SECTIONS 'C'–'C' AND 'D'–'D' ON THIS SHEET SHOW TRANSITION FOR TYPE 'F' CURB



SECTION D–D

* INLET SHOWN IS TYPE 'RC–3' (SINGLE WING). TYPE 'RC–4' (DOUBLE WING) IS THE SAME AS 'RC–3', EXCEPT THAT IT IS SYMMETRICAL ABOUT CENTERLINE OF BOX, AND RC–5 IS THE SAME, EXCEPT THAT IT IS CONSTRUCTED WITHOUT WINGS.

See Sections DD–060B Through DD–060D and DD–060F Through DD–060G

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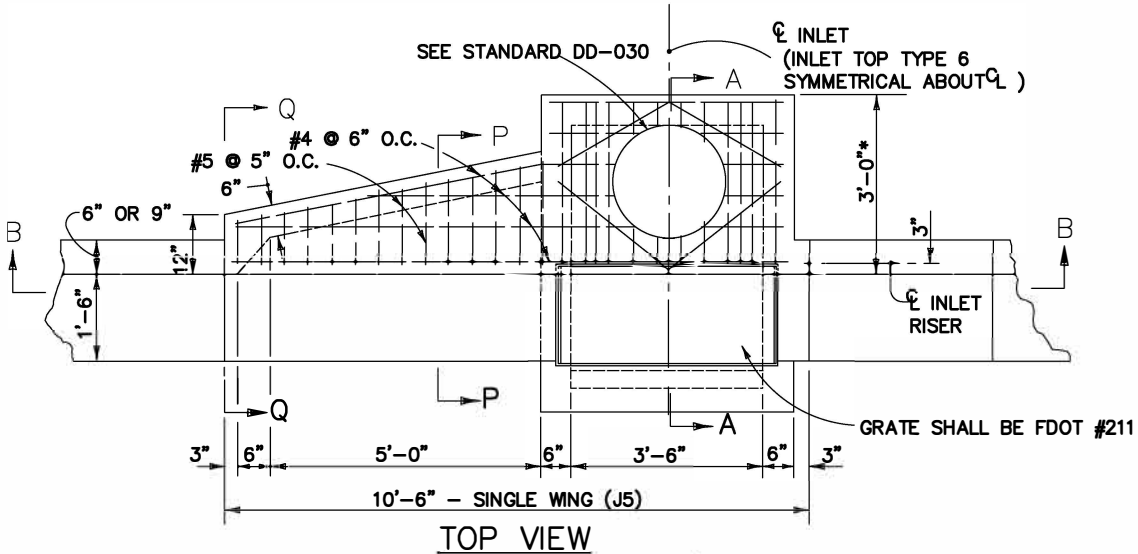
INDEX NUMBER	DESCRIPTION
DD-060E	**CURBED INLETS DETAILS PG. 4 OF 6**

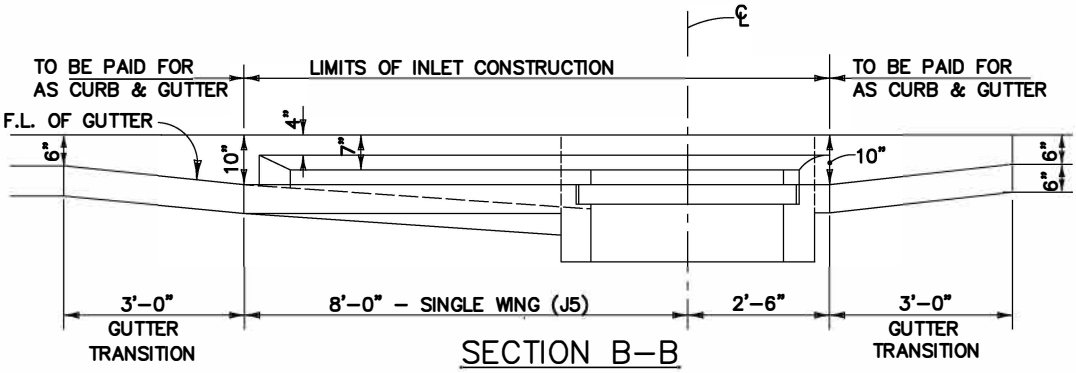
PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



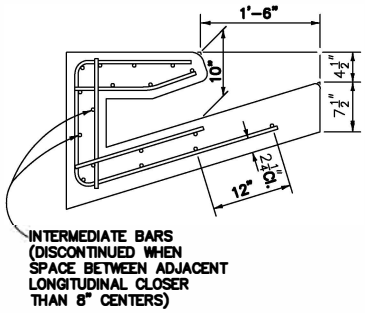
TOP VIEW

NTS



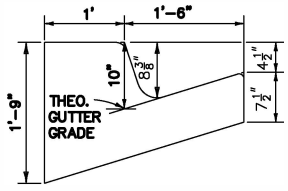
SECTION B–B

(CURB INLET TOP TYPE J6 IS SYMMETRICAL ABOUT THE CENTER LINE)



SECTION P–P

NTS



SECTION Q–Q

NTS

See Sections DD–060B Through DD–060E and DD–060G

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DD-060F	**CURBED INLETS DETAILS PG. 5 OF 6**

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April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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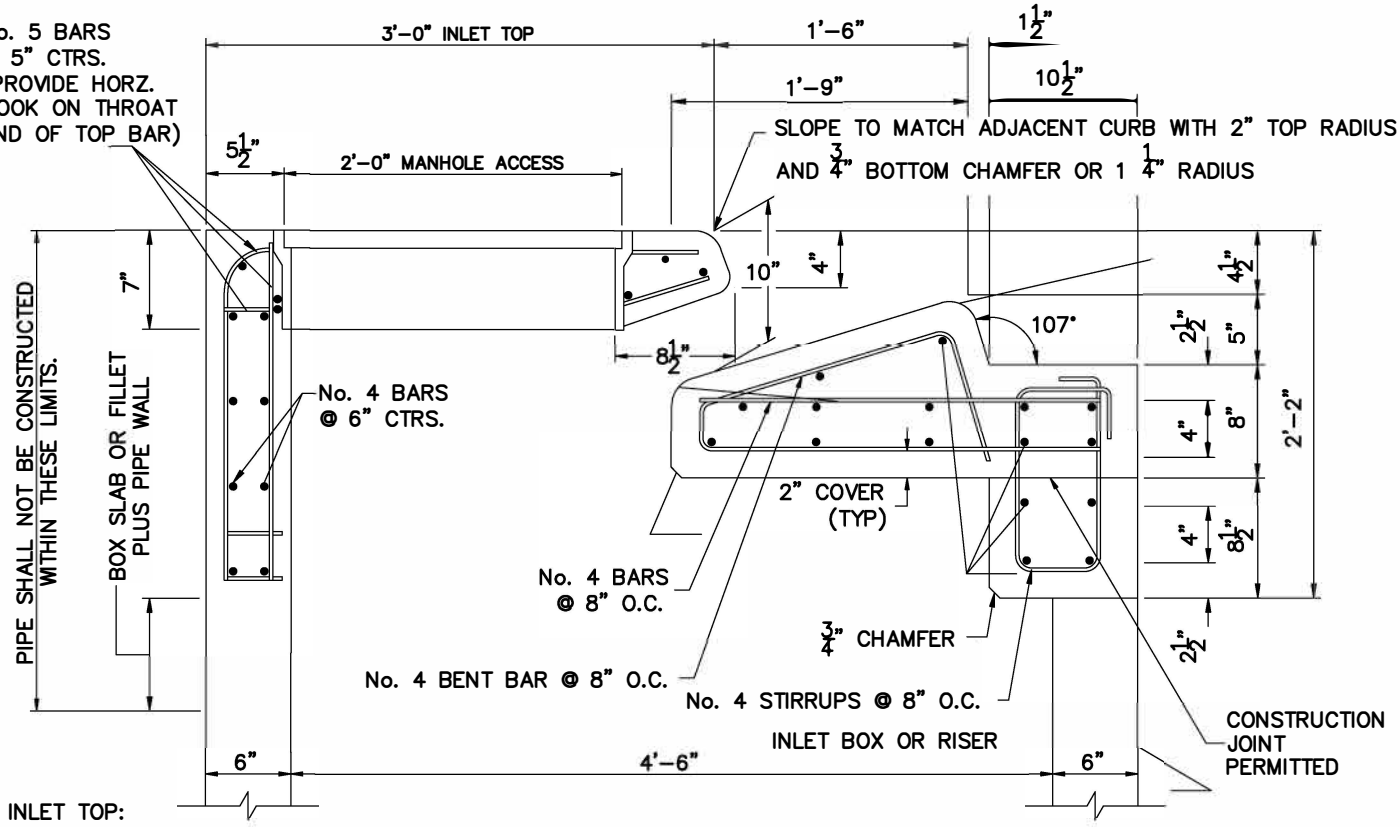

(CONCRETE COVER SHOWN)

SECTION A–A

N.T.S.

NOTE:

1. MANHOLE COVER & FRAME TO BE LARGO STANDARD DD–030
2. CONTRACTOR TO SUBMIT SHOP DRAWING TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
3. J5 DESIGNATES A SINGLE WING INLET.
4. J6 DESIGNATES A DOUBLE WING INLET.

See Section DD–060B Through DD–060F

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April 06, 2021	N.T.S.	Engineering Design and Construction Standards

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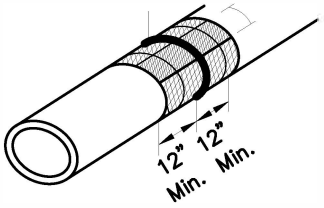
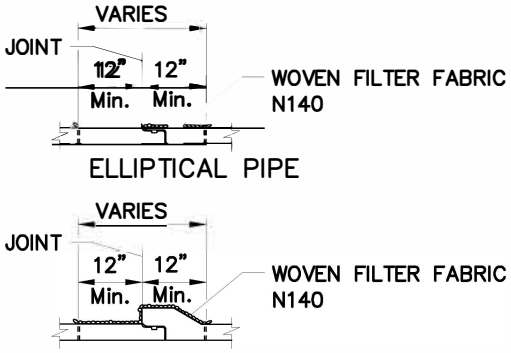


ELLIPTICAL PIPE SHOWN

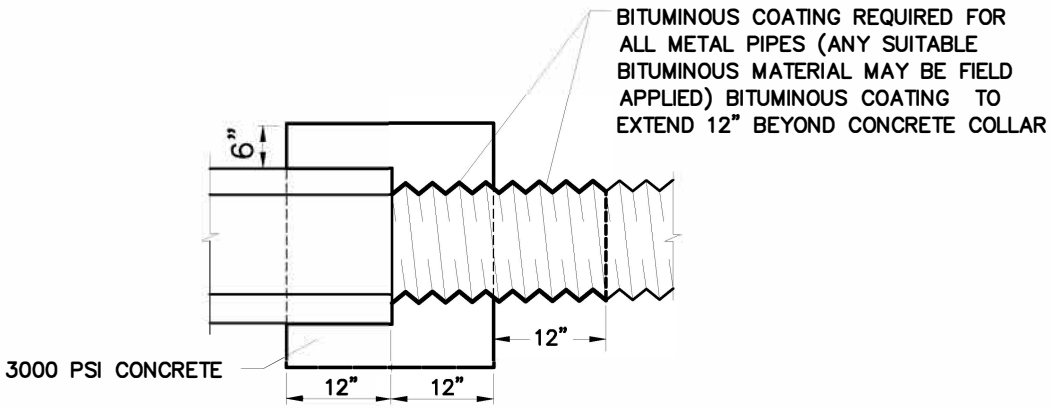
ISOMETRIC VIEW



PIPE SECTIONS

COST OF FILTER FABRIC JACKET TO BE INCLUDED IN COST OF PIPE CULVERTS.

FOR ALL PIPE TYPES – CONCRETE PIPE SHOWN
FILTER FABRIC JACKET

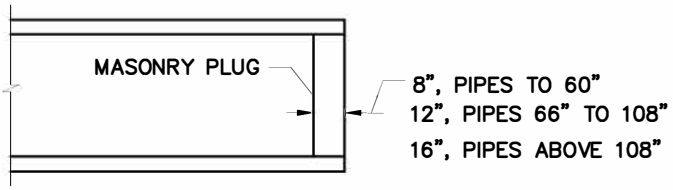


NOTE: COST OF CONCRETE AND BITUMINOUS COATING TO BE INCLUDED IN CONTRACT UNIT PRICE FOR EITHER NEW PIPE OR MITERED END SECTION.

ALTERNATE CONNECTION MUST BE APPROVED BY THE CITY ENGINEER.

DISSIMILAR TYPES

CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS



NOTE: UNLESS OTHERWISE CALLED FOR IN THE PLANS, THE COST OF PLUGGING PIPES TO BE INCLUDED IN CONTRACT UNIT PRICE FOR NEW PIPE.

PIPE PLUG

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INDEX NUMBER	DESCRIPTION
DD-070	**MISCELLANEOUS DRAINAGE DETAILS**

PUBLICATION DATE	DRAWING SCALE	TITLE
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CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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City of Largo
2008 Engineering Design and Construction Standards
Wastewater (WW) Section 2020 Updates
Revision Log

2008 Index Number	2020 Index Number	2020 Index Title	Description of Changes
WW-01	WW-010	General Sanitary Sewer Notes	- Note 2: Added "With rubber boot with stainless steel straps for connection to manhole. Then strong seal coated after connection is approved" . - Note 6: Added "See City standard WW-10". - Note 8: Replaced "If unsuitable subsurface material is encountered excavate extra 6" and back fill with 3/4" gravel" with "Bedding shall consist of unwashed and graded 3/4" to 7/8" rock." - Note 15: Changed warranty period from 1 to 2 years. Changed "TV" to "CCTV". Note 16: Added "Unless otherwise directed".
WW-02	WW-020	Standard Manhole	- Remove bolts and associated notes - Added "or approved equal to "HDPE rain tray" call out - Added Flexible rubber sleeve boot and stainless steel clamp drawing to pipe - Changed call out for bedding dimension from 2" to 12" - Revised exterior coating callout to require Ram-Nek at seams - Changed invert bench call out to "Unreinforced Class B concrete bench with trowel finished (4000 psi) with acid resistant polymer or epoxy mortar" -Note 2: Added "Per manufacturer spec" - Note 4: Added "with no obstructions"
WW-03	WW-030	Offset Manhole	- Remove bolts and associated notes - Added "or approved equal to "HDPE rain tray" call out - Added Flexible rubber sleeve boot and stainless steel clamp drawing to pipe - Changed call out for bedding dimension from 2" to 12" - Revised exterior coating callout to require Ram-Nek at seams - Changed invert bench call out to "Unreinforced Class B concrete bench with trowel finished (4000 psi) with acid resistant polymer or epoxy mortar" -Note 2: Added "Per manufacturer spec" - Note 4: Added "with no obstructions"
WW-04	WW-040	Shallow Manhole	- Remove bolts and associated notes - Added "or approved equal to "HDPE rain tray" call out - Added Flexible rubber sleeve boot and stainless steel clamp drawing to pipe

			- Added bedding to detail - Revised exterior coating callout to require Ram-Nek at seams - Changed invert bench call out to "Unreinforced Class B concrete bench with trowel finished (4000 psi) with acid resistant polymer or epoxy mortar" -Note 2: Added "Per manufacturer spec" - Note 4: Added "with no obstructions"
WW-05	WW-050	Inside Drop Manhole	- Remove bolts and associated notes
WW-06	WW-060	Invert Flow Channels	- Added Main flow and secondary flow designations - Added call out "Invert of secondary shall be "A" above invert of flow thru pipe" - Added table for flow thru pipe size designations - Added joint and 2'6" distance requirement
WW-07	WW-070	Sanitary Sewer Manhole Frame and Cover	- Corrected "HOPE" to "HDPE" - Removed bolts and associated notes
WW-08	WW-080	Sanitary Sewer Force Main Manhole Entrance	- Added "pipe" to "Force main or gravity" - Added flow arrow - Note 6: Added "See Detail WW-06"
WW-09	WW-090	Sanitary Sewer Service Lay-Out	- Changed SDR callout from 35 to 26
WW-10	WW-100	Sanitary Sewer Clean-Out	- Changed from tee to wye
WW-11	WW-110	Water Main and Sanitary Sewer Line Conflict	- Removed "or RC-900"
WW-12	WW-120	Water Main and Sanitary Sewer Line Conflict Notes	No edits
WW-13	WW-130	Standard Bedding Detail	No edits
WW-14	WW-140	Depth of Sewer Pipe	- Note 4: Changed Class 52 to 53 and changed poly lining to epoxy lining - Added Note 5: "All buried ductile iron pipe and fittings shall be polywrapped.".

GENERAL SANITARY SEWER NOTES

1. MANHOLES SHALL BE INSPECTED BY THE CITY AFTER THE COMPLETION OF ALL BASE WORK, AND PRIOR TO SURFACE TREATMENT.
2. ALL OPENINGS IN PRE-CAST MANHOLES SHALL BE CAST AT TIME OF MANUFACTURE. CONNECTIONS TO EXISTING MANHOLES SHALL BE CORE ENTRY ONLY. WITH RUBBER BOOT WITH STAINLESS STEEL STRAPS FOR CONNECTION TO MANHOLE. THEN STRONG SEAL COATED AFTER CONNECTION IS APPROVED.
3. ALL MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE.
4. ALL P.V.C. GRAVITY SEWER PIPES SHALL CONFORM TO A.S.T.M. D-3034, S.D.R.-26, LATEST REVISIONS, WITH PUSH-ON RUBBER GASKET JOINTS.
5. ALL D.I.P. GRAVITY SEWER PIPES SHALL BE CLASS 52, EPOXY LINED OR AS OTHERWISE APPROVED BY THE CITY ENGINEER.
6. NO SERVICE CONNECTIONS, WYES, SERVICES OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS, EXCEPT UPON APPROVAL OF THE CITY ENGINEER. SEE CITY STANDARD WW-100.
7. MANHOLE FRAMES THAT ARE NOT SUPPORTED BY ASPHALT OR CONCRETE SHALL BE ATTACHED AND SEALED WITH A MINIMUM OF TWO 1/2" BEADS OF RAM-NEK CAULKING.
8. TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER ON UNDISTURBED SOIL. BEDDING SHALL CONSIST OF UNWASHED AND GRADED $\frac{3}{4}$" TO $\frac{7}{8}$" ROCK.
9. P.V.C. PIPES SHALL BE LAID IN STRICT CONFORMANCE TO THE MANUFACTURER'S SPECIFICATIONS (E.G., "JOHNS MANVILLE RING TITE P.V.C. PIPE INSTALLATION GUIDE" OR EQUAL.) BACKFILLING OF UTILITY TRENCHES WILL NOT BE ALLOWED UNTIL INSPECTED BY THE CITY.
10. BACK FILL MATERIAL FOR SEWER MAIN AND LINES SHALL BE NON-COHESIVE, NON-PLASTIC MATERIAL FREE OF ALL DEBRIS, LUMPS AND ORGANIC MATTER. BACK FILL MATERIAL PLACED WITHIN 1' OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN 2" IN DIAMETER (1" FOR P.V.C. PIPE), AND NO STONE LARGER 6" IN DIAMETER WILL BE PERMITTED IN ANY BACK FILL MATERIAL.
11. ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACK FILLED AND STABILIZED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO THE CONTRACTOR LEAVING THE CONSTRUCTION SITE.
12. IN ANY INSTANCE WHERE SEWER LINES ARE NOT INSTALLED WITHIN PUBLIC RIGHTS-OF-WAY, ALL LINES SHALL BE LOCATED IN A PUBLIC UTILITY EASEMENT, AND CITY MAINTENANCE RESPONSIBILITY IS MANHOLE TO MANHOLE ONLY.
13. UPON COMPLETION OF THE WORK AND PRIOR TO PLACEMENT OF ASPHALT A VISUAL INSPECTION AND VIDEO RECORDING SHALL BE MADE OF THE COMPLETED SYSTEM. THE CITY SHALL APPROVE THE SYSTEM PRIOR TO IT BEING PLACED IN SERVICE, AND BEING ACCEPTED FOR MAINTENANCE.
14. COMPLETE "AS-BUILT" INFORMATION RELATIVE TO MANHOLES, VALVES, SERVICES, FITTINGS, PIPE LENGTHS, INVERTS AND SLOPES SHALL BE ACCURATELY RECORDED AND SUBMITTED TO THE CITY, AND MUST BE SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR.
15. AT THE END OF THE TWO (2) YEAR WARRANTY PERIOD THE CITY WILL CCTV INSPECT, AND CHECK MANHOLE JOINTS AND CONNECTIONS TO DETERMINE IF REPAIRS ARE NECESSARY BEFORE THE WARRANTY BOND IS RELEASED.
16. ONLY EIGHT(8") INCH MAINS (PRIVATE), NOT SIX(6") INCH WILL BE VISUALLY INSPECTED AND VIDEO RECORDED. EIGHT(8") INCH PIPE LESS THAN SIXTY(60') FEET LONG WILL BE EXEMPT UNLESS OTHERWISE DIRECTED.

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INDEX NUMBER
WW-010

DESCRIPTION
GENERAL SANITARY SEWER NOTES

PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

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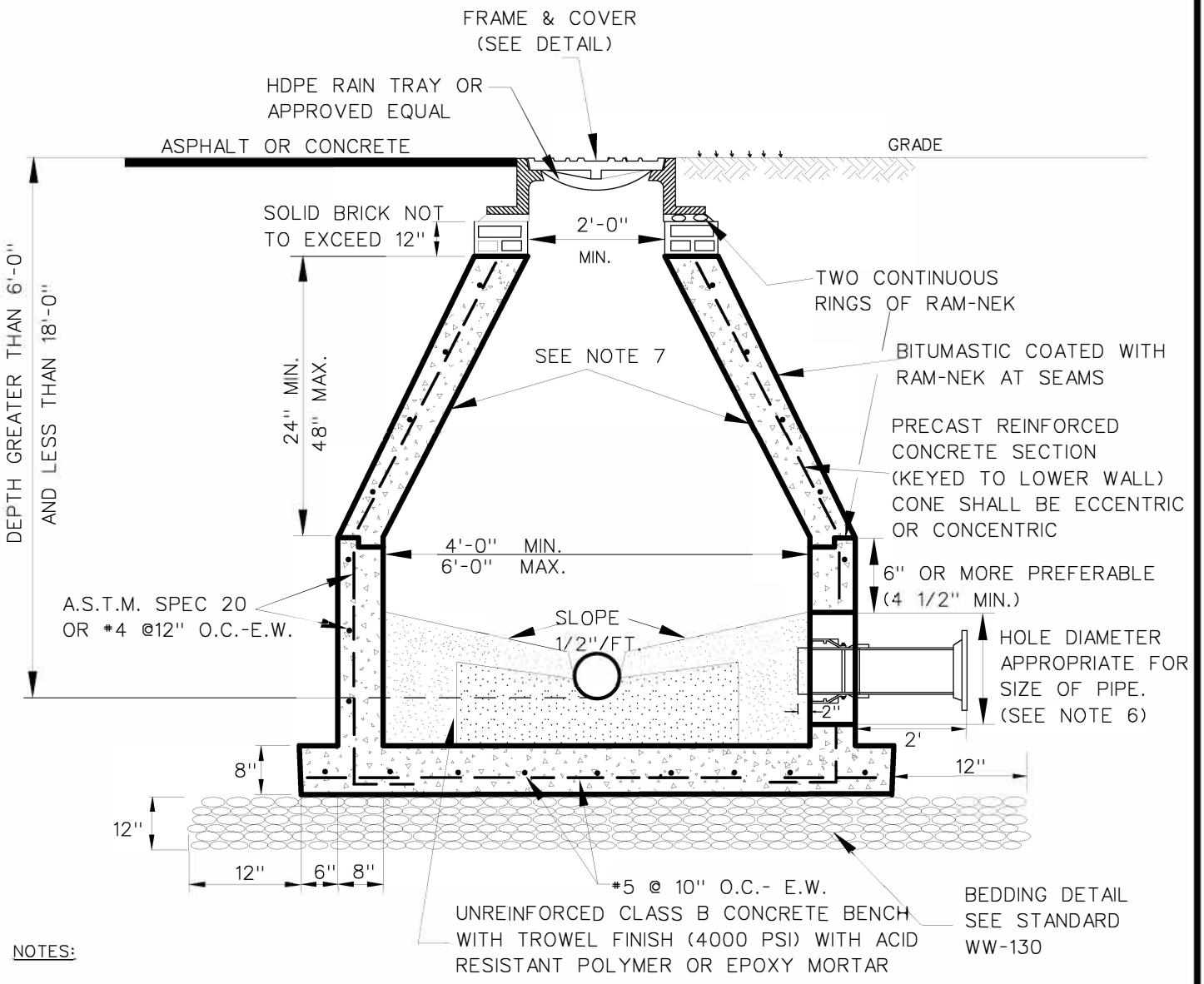
Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.



NOTES:

1. PRECAST CONCRETE TYPE II , 4000 P.S.I.
2. TWO CONTINUOS RINGS OF RAM-NEK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS (PER MANUFACTURER SPEC).
3. ALL OPENINGS SHALL BE SEALED WITH HDPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM WITH NO OBSTRUCTIONS.
5. ALL PIPE HOLES SHALL BE PRECAST.
6. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM, OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.
7. INSIDE OF MANHOLE SHALL BE LINED WITH HDPE THERMAL PLASTIC LINER, FIBERGLASS LINER OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS. THE HDPE LINER SHALL PROVIDE BACK PRESSURE RESISTANCE OF 29 P.S.I. AND SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRECAST OPERATION. OUTSIDE OF MANHOLE SHALL BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH A.S.T.M. C-478, LATEST STANDARD. UNLESS OTHERWISE DIRECTED BY OWNER.

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INDEX NUMBER	DESCRIPTION
WW-020	**STANDARD MAHOLE**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR	
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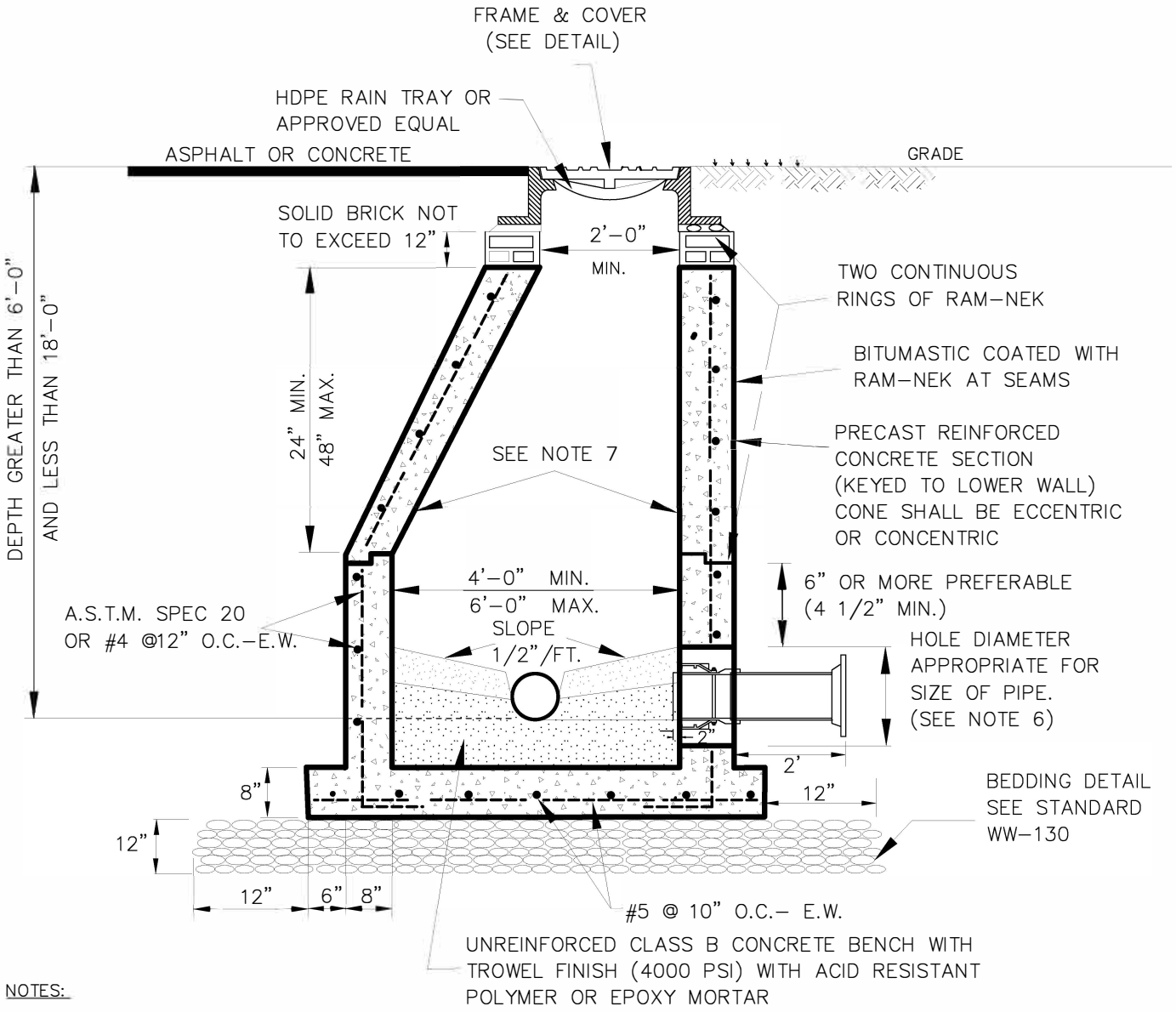

NOTES:

1. PRECAST CONCRETE TYPE II , 4000 P.S.I.
2. TWO CONTINUOS RINGS OF RAM-NEK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS (PER MANUFACTURER SPEC).
3. ALL OPENINGS SHALL BE SEALED WITH HDPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM WITH NO OBSTRUCTIONS.
5. ALL PIPE HOLES SHALL BE PRECAST.
6. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM, OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.
7. INSIDE OF MANHOLE SHALL BE LINED WITH HDPE THERMAL PLASTIC LINER, FIBERGLASS LINER OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS. THE HDPE LINER SHALL PROVIDE BACK PRESSURE RESISTANCE OF 29 P.S.I. AND SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRECAST OPERATION. OUTSIDE OF MANHOLE SHALL BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH A.S.T.M. C-478, LATEST STANDARD. UNLESS OTHERWISE DIRECTED BY OWNER.

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INDEX NUMBER	DESCRIPTION
WW-030	**OFFSET MANHOLE**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**
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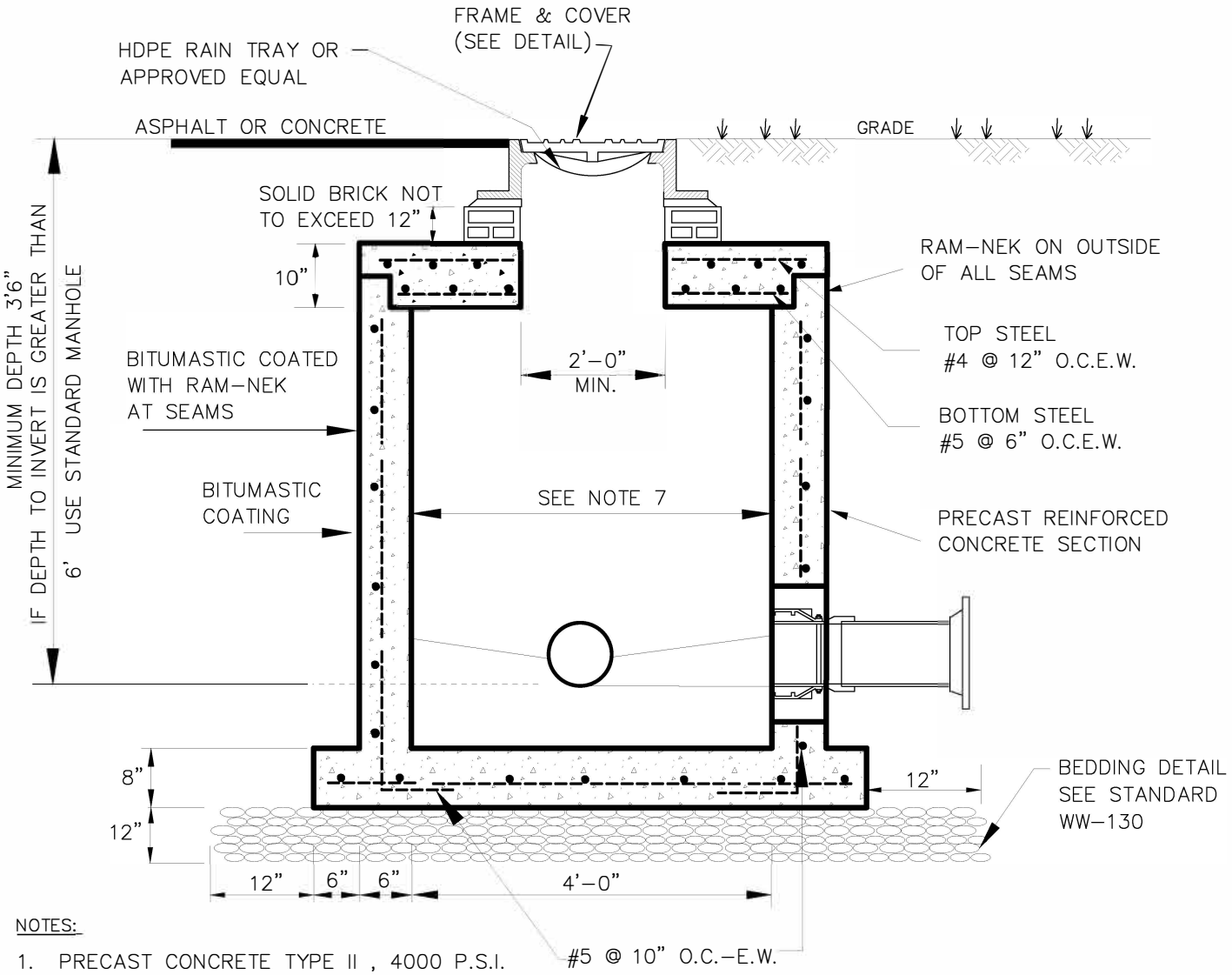

NOTES:

1. PRECAST CONCRETE TYPE II , 4000 P.S.I.
2. TWO CONTINUOS RINGS OF RAM-NEK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS (PER MANUFACTURER SPEC).
3. ALL OPENINGS SHALL BE SEALED WITH HDPE THERMAL PLASTIC LINER OR APPROVED EQUAL.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM WITH NO OBSTRUCTIONS.
5. ALL PIPE HOLES SHALL BE PRECAST.
6. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM, OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.
7. INSIDE OF MANHOLE SHALL BE LINED WITH H.D.P.E. THERMAL PLASTIC LINER, FIBERGLASS LINER OR APPROVED EQUAL CONSISTING OF STUDS PRODUCED DURING THE EXTRUSION PROCESS. THE H.D.P.E. LINER SHALL PROVIDE BACK PRESSURE RESISTANCE OF 29 P.S.I. AND SHALL BE MADE AN INTEGRAL PART OF THE CONCRETE STRUCTURE DURING THE PRECAST OPERATION. OUTSIDE OF MANHOLE SHALL BE COATED WITH TWO COATS OF KOPPERS BITUMASTIC 300M.
8. MANHOLE FABRICATION SHALL BE IN ACCORDANCE WITH ASTM C-478, LATEST STANDARD. UNLESS OTHERWISE DIRECTED BY OWNER.

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INDEX NUMBER	DESCRIPTION
WW-040	**SHALLOW MANHOLE**

PUBLICATION DATE	DRAWING SCALE	TITLE
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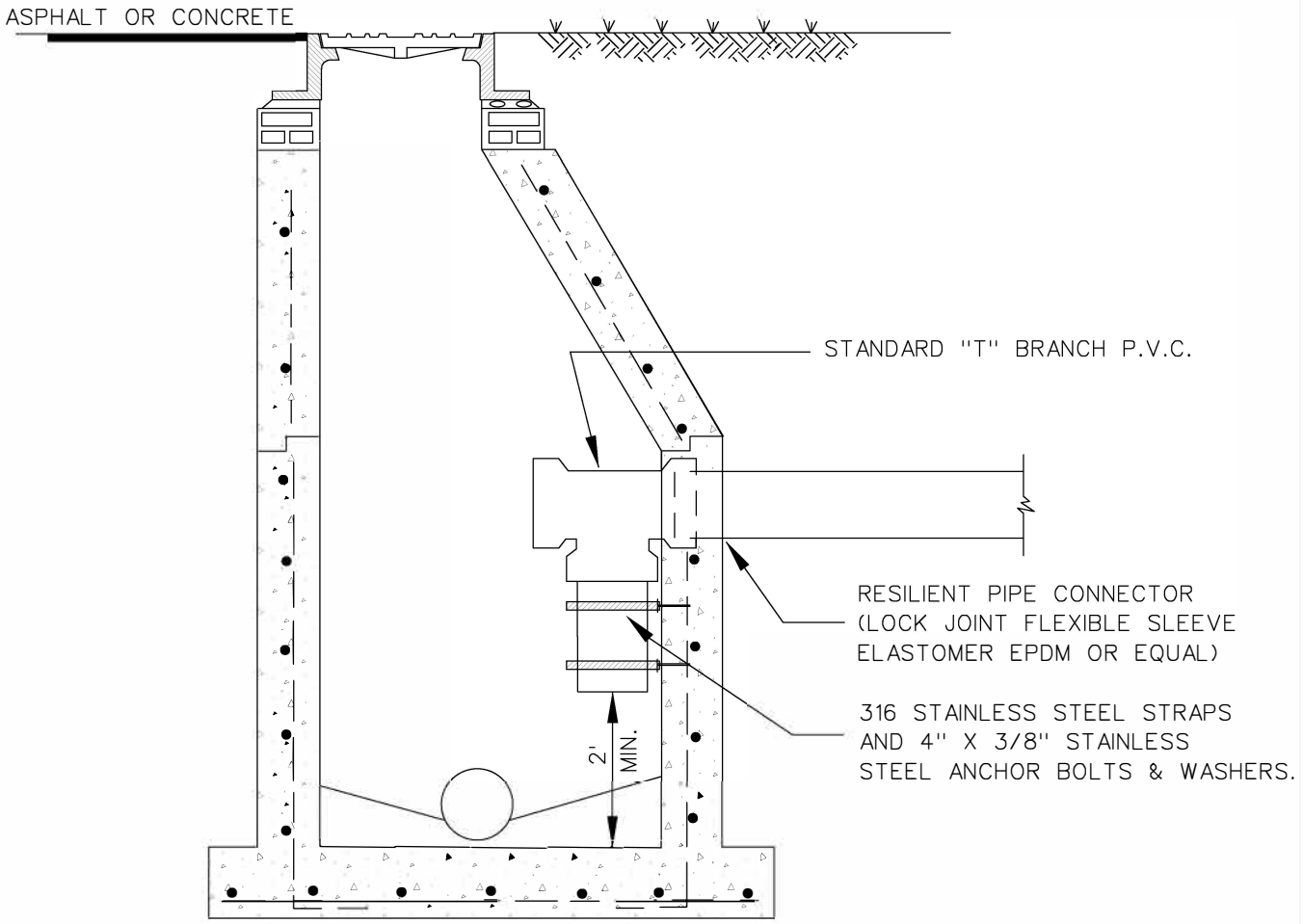
INSIDE DROP MANHOLE



NOTES:

1. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT INVERT IS LOCATED 2.0 FEET OR MORE ABOVE THE MAIN INVERT CHANNEL.

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INDEX NUMBER	DESCRIPTION
WW-050	**INSIDE DROP MANHOLE**

PUBLICATION DATE	DRAWING SCALE	TITLE
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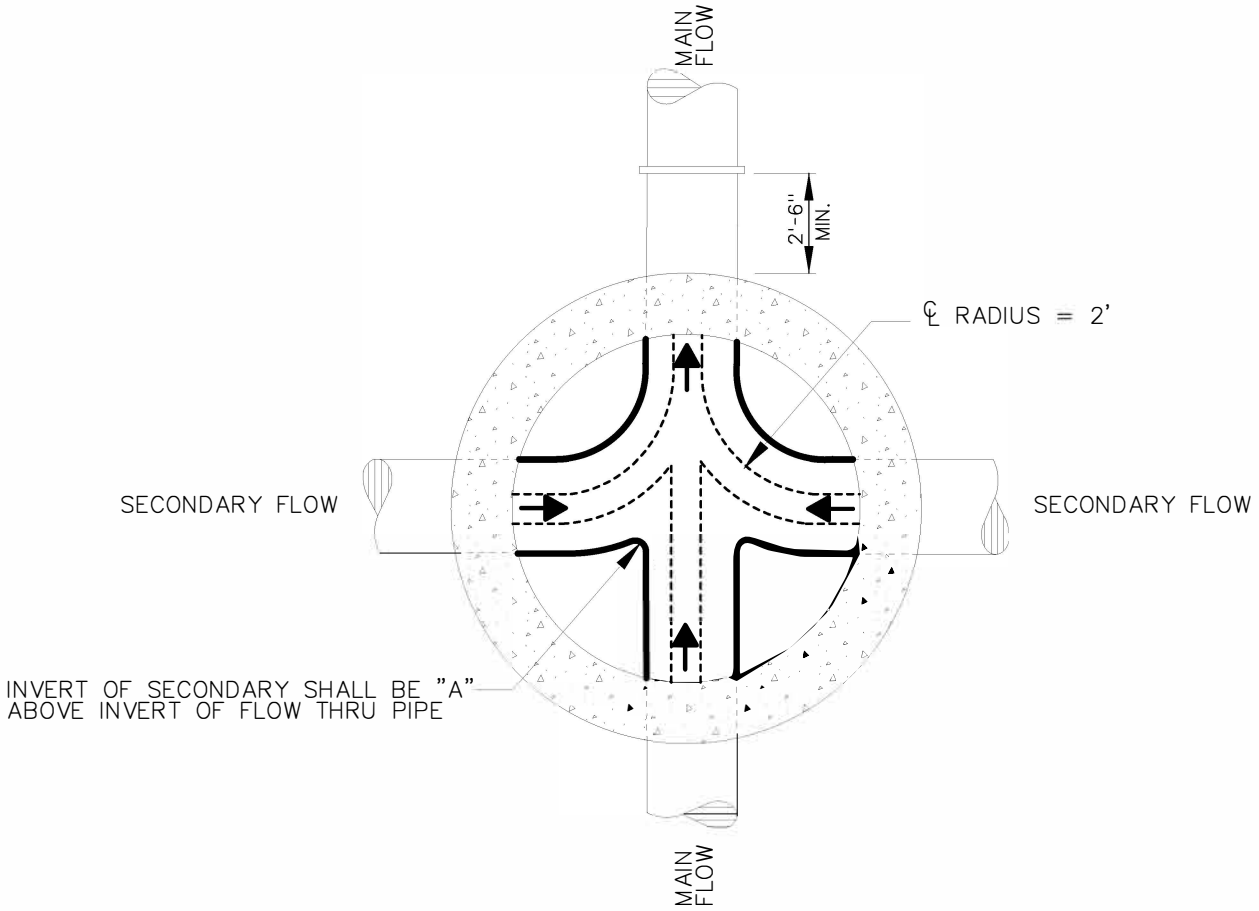
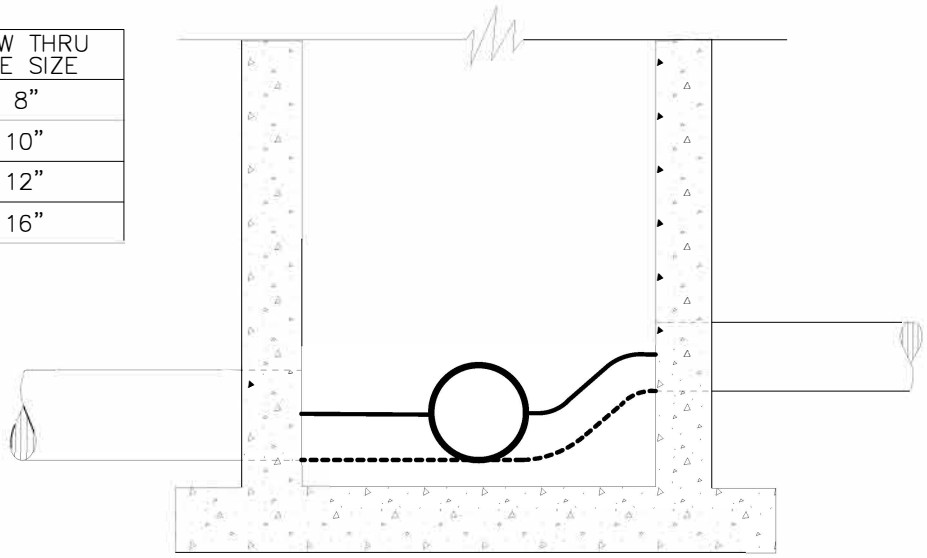


"A"	FLOW THRU PIPE SIZE
4"	8"
5"	10"
6"	12"
8"	16"



NOTES:

1. ALL INVERT CHANNELS ARE TO BE CONSTRUCTED FOR SMOOTH FLOW WITHOUT OBSTRUCTION OR TURBULENCE.
2. PROPERLY SHAPED SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS TO PROVIDE FOR SMOOTH FLOWS.
3. SOLID MANHOLE BRICK PERMITTED AS FLOW CHANNEL BUILDUP, EXECEPT IN HDPE THERMAL PLASTIC LINED MANHOLES.
4. ALL INVERTS SHALL HAVE A MINIMUM OF 1/4" PER FOOT 1/10 OR 10% FALL.

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INDEX NUMBER
WW-060

DESCRIPTION
INVERT FLOW CHANNELS

PUBLICATION DATE
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CITY ENGINEERING DIRECTOR
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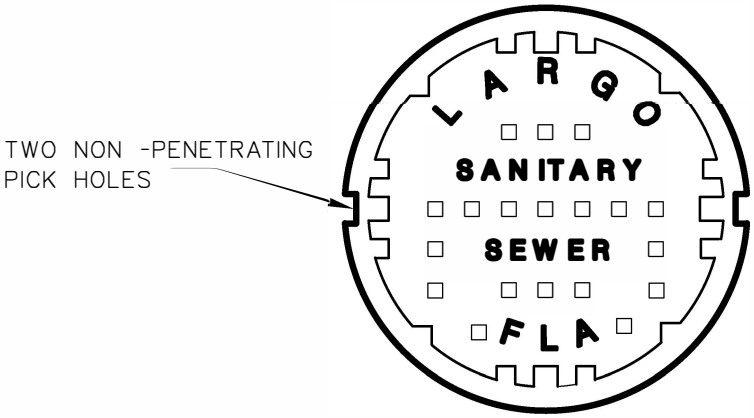
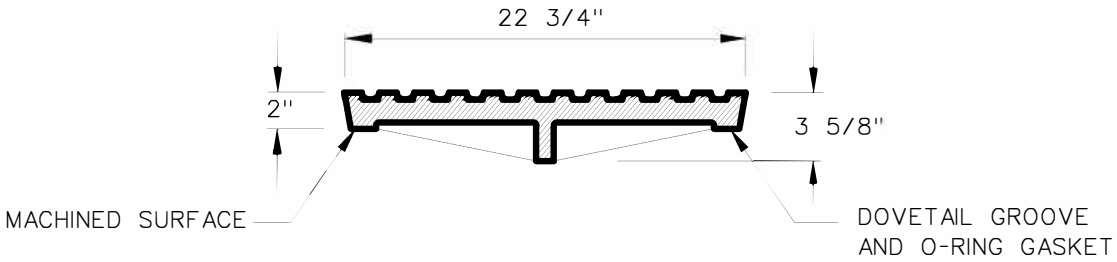
ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.

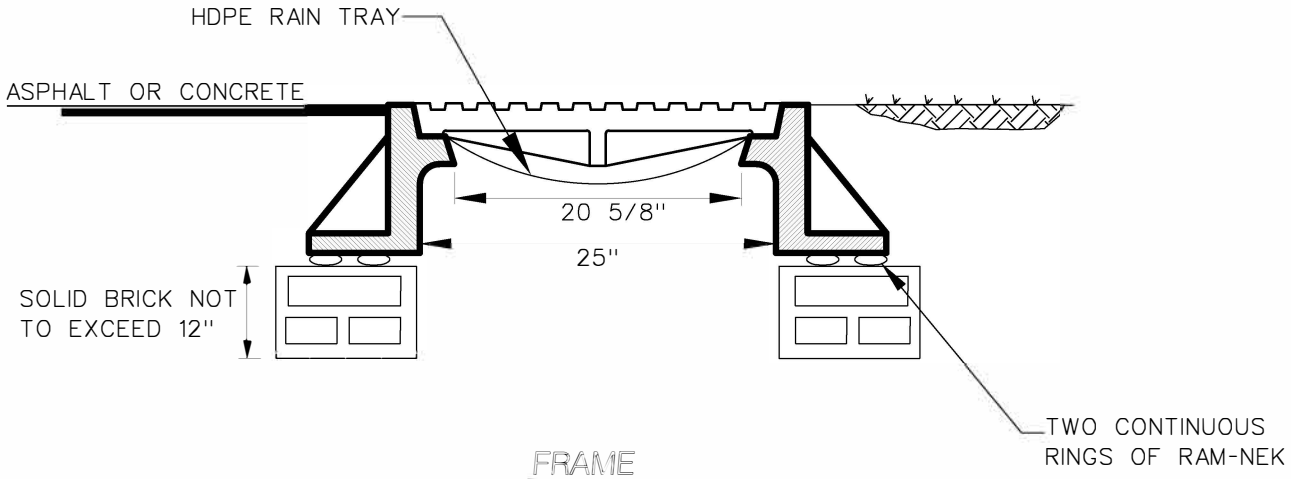


SOLID COVER



SOLID COVER SECTION

MIN. WEIGHT: 130 lbs.



FRAME

NOTES:

1. FRAME AND COVER SHALL BE U.S. FOUNDRY No.485G-ORS, COATED WITH BITUMASTIC COAL TAR.
2. COVER SHALL BE TYPE "G" AND SHALL CONTAIN "LARGO SANITARY SEWER" IMPRINTED AND NON-SKID CAST PATTERN.

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INDEX NUMBER	DESCRIPTION
WW-070	**MANHOLE FRAME AND COVER**

PUBLICATION DATE	DRAWING SCALE	TITLE
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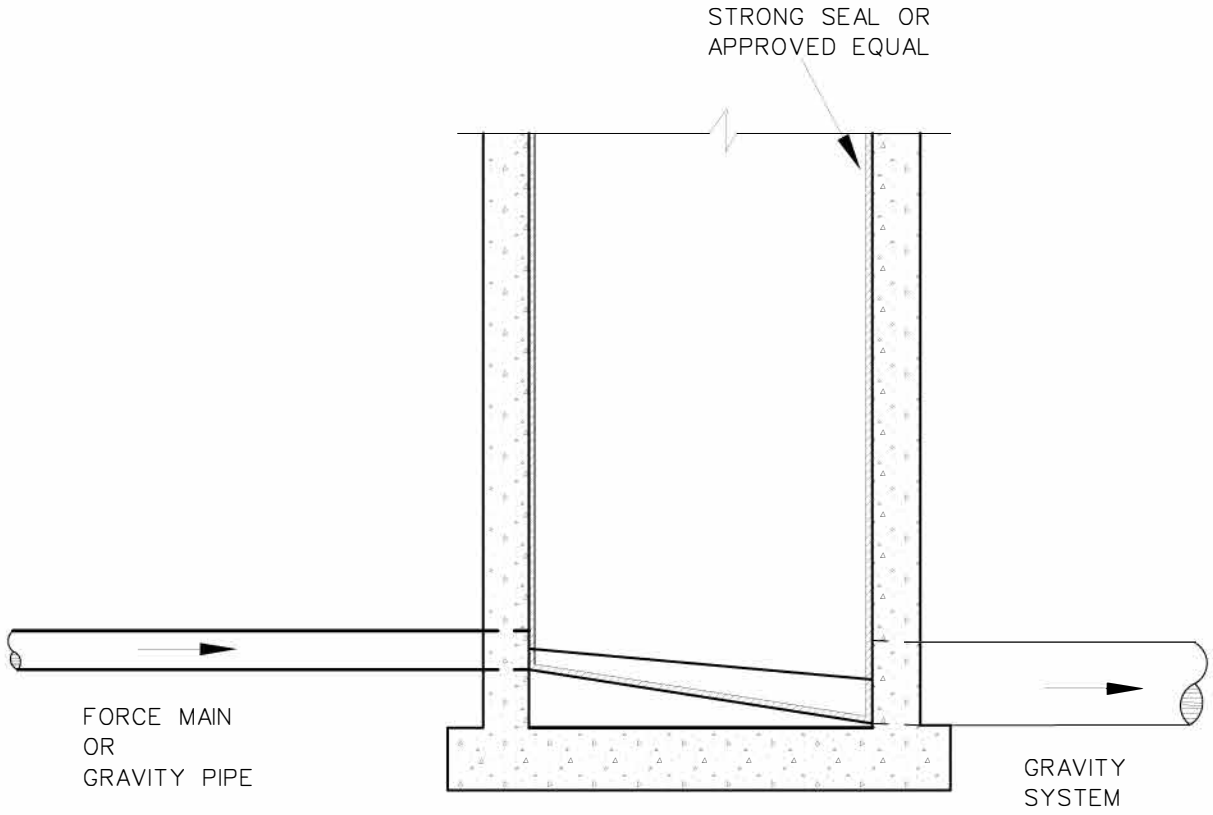
CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



MANHOLE

NOTES:

1. GRAVITY LINES TO ENTER MANHOLE NO LESS THAN 90° FROM FORCE MAIN.
2. FORCE MAIN TO ENTER MANHOLE AS CLOSE AS POSSIBLE TO 180° TO CENTERLINE OF FLOW FOR GRAVITY OUTLET.
3. THE INVERT LEVEL OF FORCE MAIN AT POINT OF ENTRY SHALL BE 6" ABOVE INVERT OF MANHOLE.
4. ENTRY INTO EXISTING MANHOLES SHALL CONSIST OF CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH 316 STAINLESS STEEL EXPANSION RING.
5. IF ELEVATION DROP IS REQUIRED TO ENTER MANHOLE APPROVAL SHALL BE OBTAINED FROM CITY ENGINEER.
6. FLOW CHANNEL REQUIRED. SEE DETAIL WW-060.

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INDEX NUMBER	DESCRIPTION
WW-080	**FORCE MAIN MANHOLE ENTRANCE**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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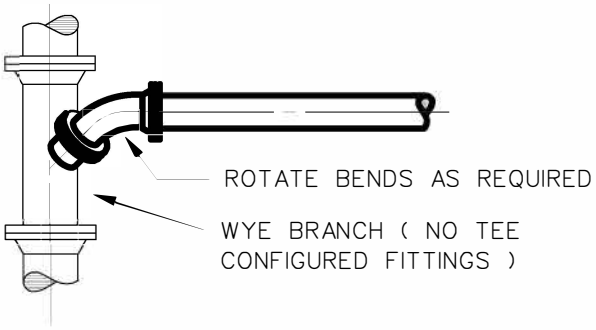

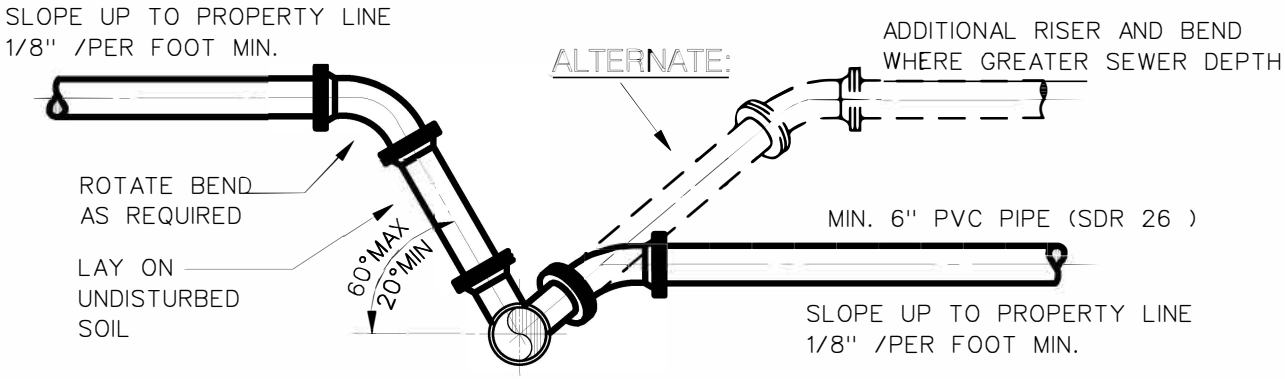

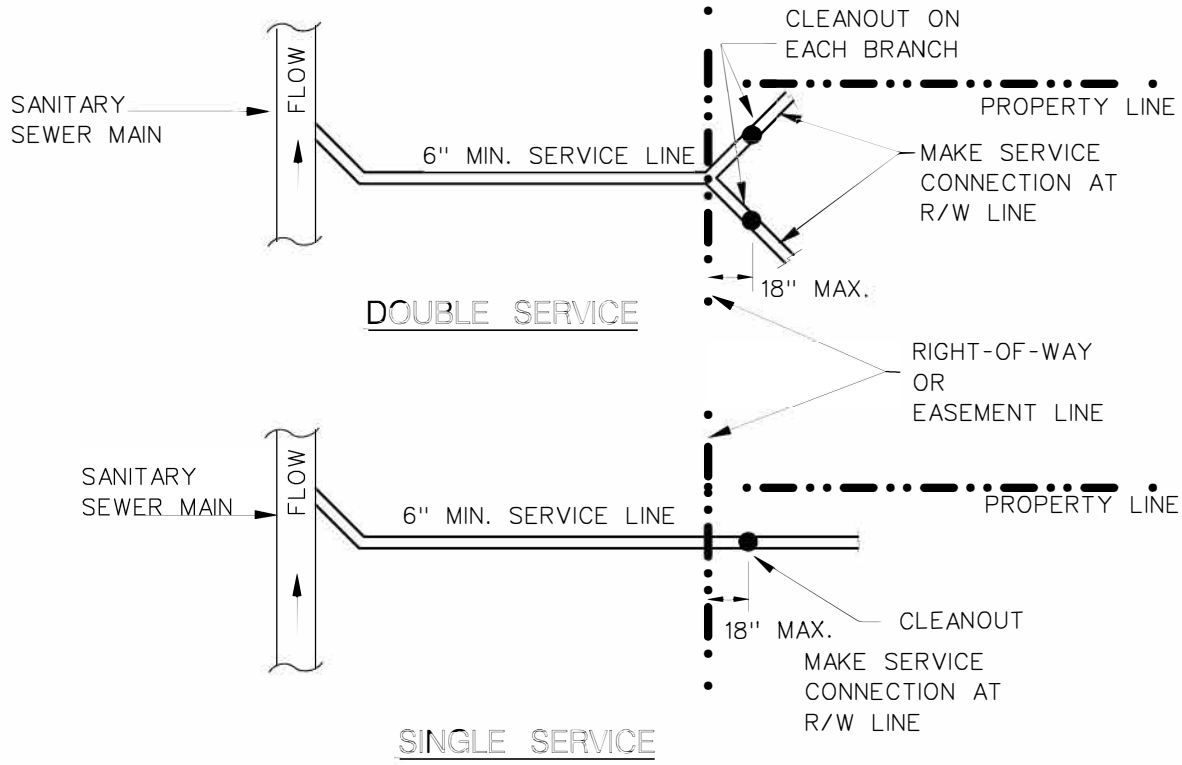

NOTE:

1. SERVICE LATERALS SHALL TERMINATE INSIDE THE PROPERTY LINE AT A DEPTH OF 3 FEET WITH CLEANOUT AND MARKED WITH A 2"X4" TREATED STAKE PAINTED GREEN.

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INDEX NUMBER	DESCRIPTION
WW-090	**SANITARY SEWER SERVICE LAY-OUT**

PUBLICATION DATE	DRAWING SCALE	TITLE
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CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR	
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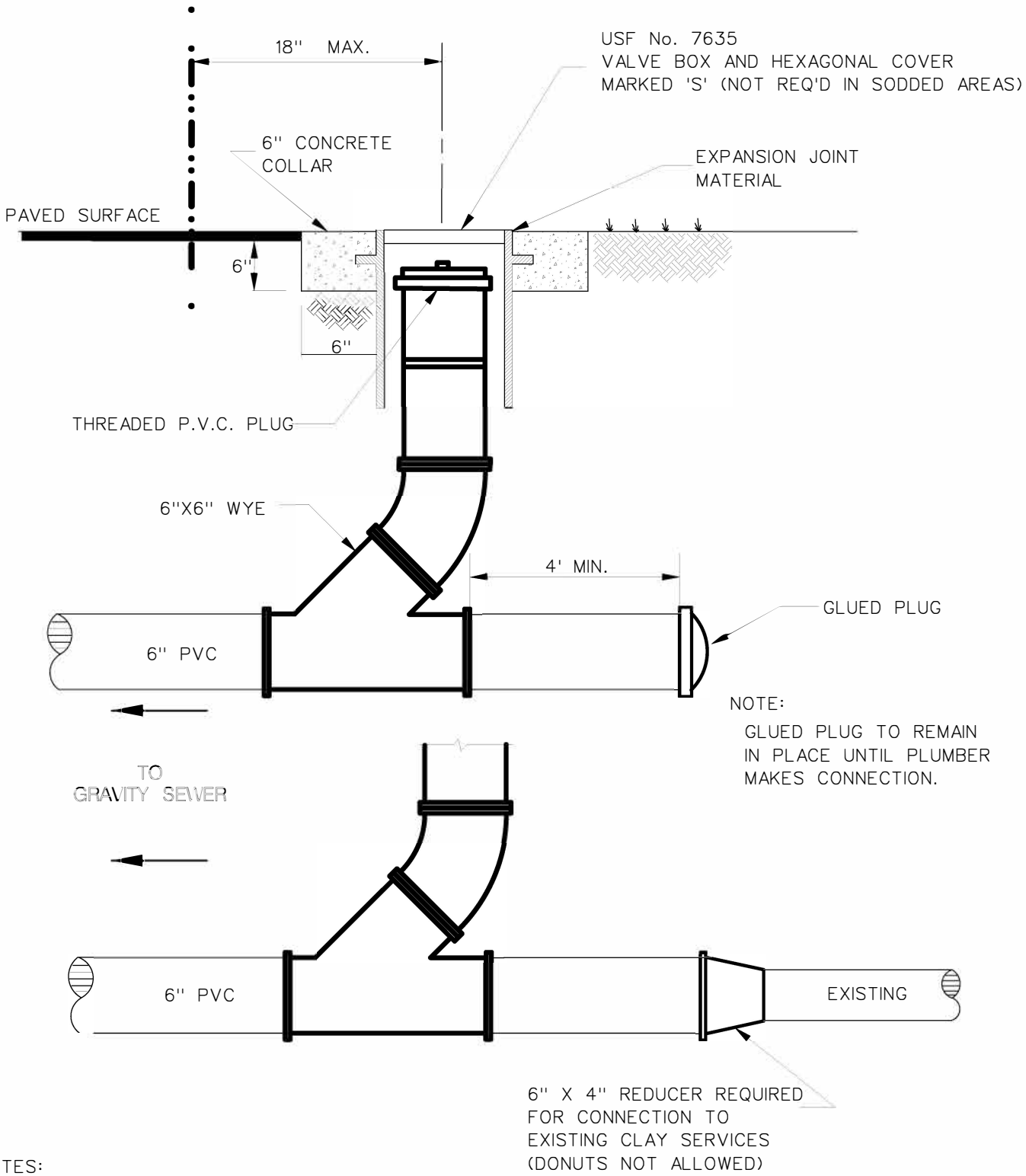

NOTES:

1. NEW SERVICES SHALL BE 6'' P.V.C.
2. CONTRACTOR SHALL BE REQUIRED TO MAKE CONNECTION TO EXISTING SERVICES AND TO PROVIDE UNINTERRUPTED SERVICE.

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INDEX NUMBER	DESCRIPTION
WW-100	**SANITARY SEWER CLEAN-OUT**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

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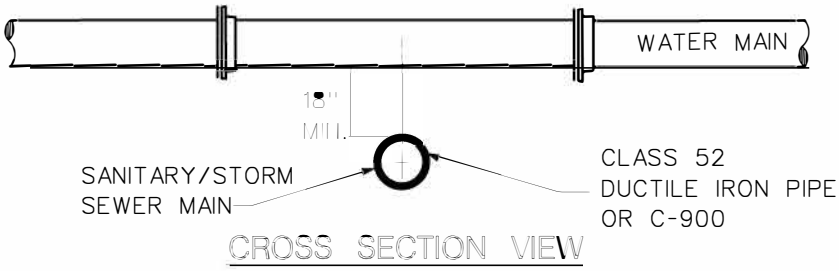
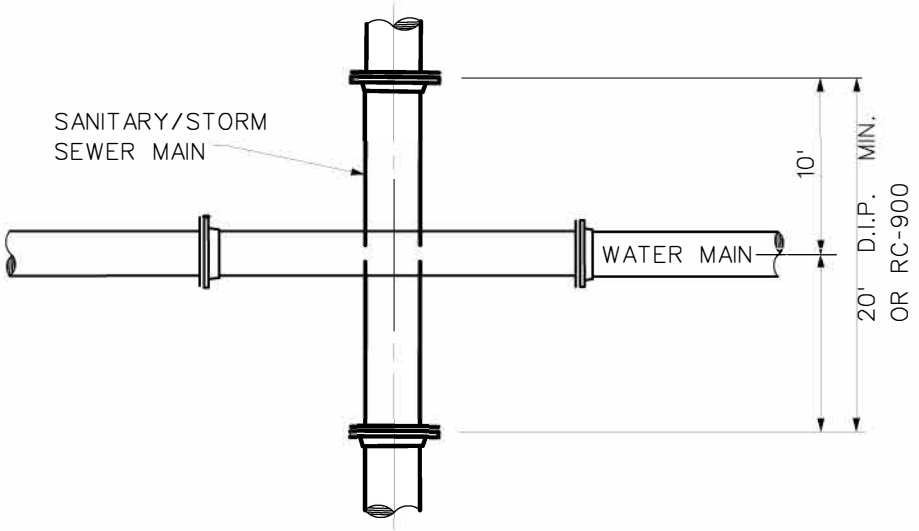
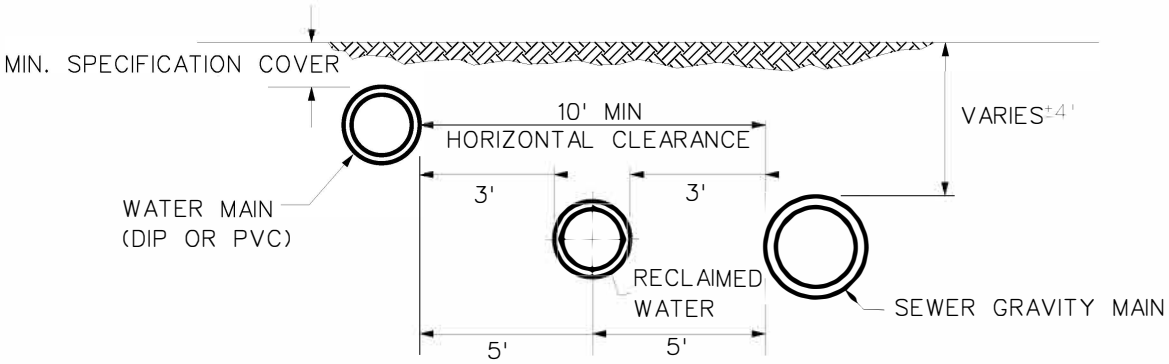


CROSS SECTION VIEW



PLAN VIEW



HORIZONTAL CLEARANCE

SEE NOTES PAGE WW-120

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INDEX NUMBER	DESCRIPTION
WW-110	**WATER MAIN CONFLICT**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION NOTES

PARALLEL INSTALLATION

1. POTABLE WATER, WASTEWATER GRAVITY/FORCE, OR RECLAIMED WATER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A MINIMUM OF HORIZONTAL DISTANCE 10' SHALL BE MAINTAINED BETWEEN POTABLE WATER AND ANY TYPE OF WASTEWATER LINE WHENEVER POSSIBLE. THE DISTANCE SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN-FOOT SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE WASTEWATER LINE AND AT AN ELEVATION SO THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE WASTEWATER LINE.

2. IF IT IS IMPOSSIBLE TO MAINTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE, THE WATER SHALL BE CONSTRUCTED OF D.I.P. AND THE WASTEWATER LINE SHALL BE C900 P.V.C. AND PRESSURE TESTED TO ONE-HUNDRED AND FIFTEY (150) P.S.I. TO INSURE WATER TIGHTNESS BEFORE BACKFILLING. THE PIPELINE JOINTS SHALL BE STAGGERED SO THAT THE WATER MAIN JOINTS SHALL BE AS FAR APART AS POSSIBLE FROM THE JOINTS ON THE WASTEWATER LINE

3. A MINIMUM HORIZONTAL SEPARATION OF FIVE (5) FEET CENTER TO CENTER THREE (3) FEET OUTSIDE EDGE TO OUTSIDE EDGE SHALL BE MAINTAINED BETWEEN RECLAIMED WATER MAINS AND POTABLE WATER OR WASTEWATER GRAVITY OR FORCE MAINS.

CROSSINGS

1. WASTEWATER MAINS SHALL CROSS UNDER RECLAIMED WATER MAINS. WASTEWATER AND RECLAIMED MAINS SHALL CROSS UNDER POTABLE WATER MAINS, WHEREVER POSSIBLE. THE MINIMUM VERTICAL DISTANCE BETWEEN MAINS AT A CROSSING IS EIGHTEEN (18) INCHES. THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER/RECLAIMED MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.

2. WHERE WASTEWATER OR RECLAIMED MAINS MUST CROSS A WATER MAIN WITH LESS THAN EIGHTEEN (18) INCHES OF VERTICAL CLEARANCE, THE RECLAIMED AND POTABLE WATER MAIN MUST BE CONSTRUCTED OF DUCTILE IRON PIPE AT THE CROSSING. A WASTEWATER GRAVITY OR FORCE MAIN SHALL BE CONSTRUCTED WITH C900 P.V.C. AT THE CROSSING. ALTERNATIVELY, ONE OF THE CROSSING MAINS SHALL BE ENCLOSED WITHIN A TWENTY (20) FOOT LONG STEEL OR P.V.C. CASING CENTERED ON THE CROSSING.

3. WHERE A WATER MAIN MUST CROSS UNDER A WASTEWATER GRAVITY MAIN, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE GRAVITY MAIN TO MAINTAIN LINE AND GRADE

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INDEX NUMBER
WW-120

DESCRIPTION
SANITARY SEWER LINE CONFLICT

PUBLICATION DATE
April 06, 2021

DRAWING SCALE
N.T.S.

TITLE
Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

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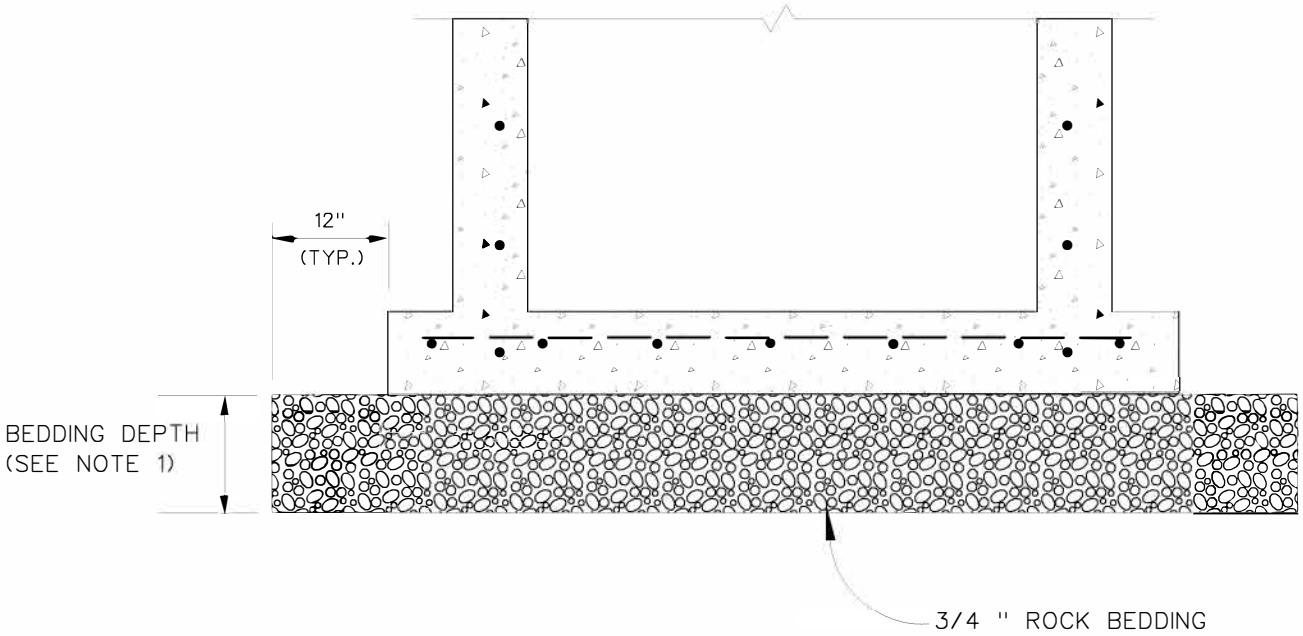
RAFAL CIESLAK, P.E.



NOTES:

1. BEDDING DEPTH SHALL BE 12" UNDER SANITARY MANHOLES AND DRAINAGE STRUCTURES, 18" UNDER SANITARY WET WELLS.
2. IF STRUCTURE INCLUDES WEEP HOLES, ROCK SHALL BE WRAPPED IN FILTER FABRIC THAT MEETS THE REQUIREMENTS OF F.D.O.T. SPECIFICATION SECTION 985.

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INDEX NUMBER	DESCRIPTION
WW-130	**STANDARD BEDDING**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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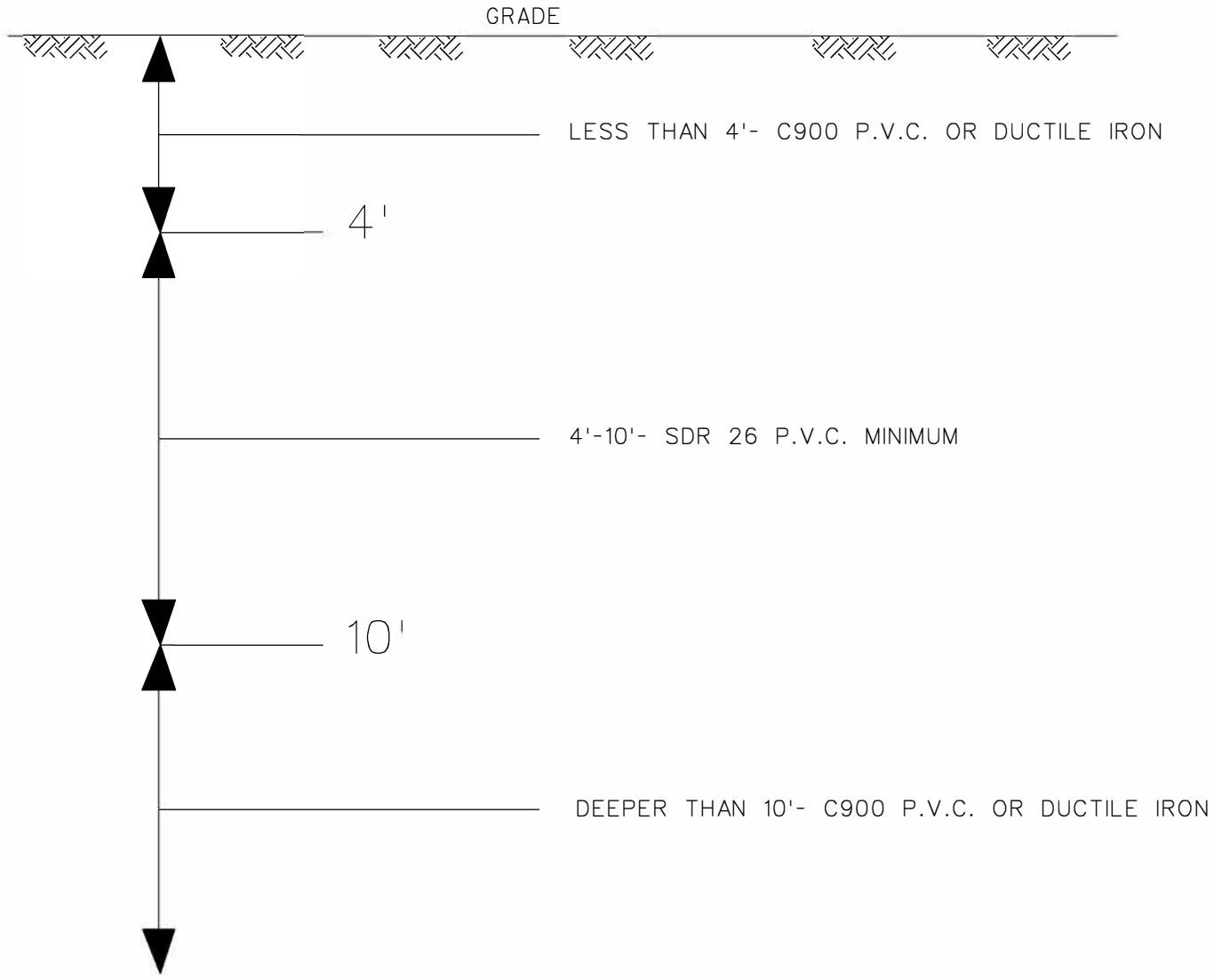
DEPTH LIMITATIONS OF SANITARY SEWER LINES



NOTE:

1. BURIED MAGNETIC TAPE SHALL BE PLACED IN THE TOP ONE (1') FOOT OF BACK FILL DIRECTLY ABOVE PIPE.
2. SDR 35 P.V.C. WILL NOT BE ALLOWED AT ANY DEPTH UNDER ANY CIRCUMSTANCES.
3. ALL P.V.C. SHALL BE GREEN IN COLOR FROM FACTORY (NO PAINT).
4. ALL DUCTILE IRON SHALL BE CLASS 53 WITH EPOXY LINING.
5. ALL BURIED DUCTILE IRON PIPE AND FITTINGS SHALL BE POLYWRAPPED.

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INDEX NUMBER	DESCRIPTION
WW-140	**DEPTH LIMITATIONS OF SEWER PIPE**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 06, 2021	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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City of Largo
2012 Engineering Design and Construction Standards
Lift Station (LS) Section 2022 Updates
Revision Log

2012 Index Number	2022 Index Number	2022 Index Title	Description of Changes
LS-01A and LS-01B	LS-010-A	GENERAL LIFT STATION REQUIREMENTS	-Reorganized notes -Various typo corrections -New note additions -Changed gate valve to plug valve -Changed check valve style -Eliminated floats -Clarified general requirements (applicable to private and City stations) and those specific to City lift stations only -Described conditions for aboveground piping versus valve vaults
	LS-010-B	CITY LIFT STATION REQUIREMENTS (1 OF 4)	
	LS-010-C	CITY LIFT STATION REQUIREMENTS (2 OF 4)	
	LS-010-D	CITY LIFT STATION REQUIREMENTS (3 OF 4)	
	LS-010-E	CITY LIFT STATION REQUIREMENTS (4 OF 4)	
LS-02	LS-020	LIFT STATION LAYOUT (VALVE VAULT)	-Changed fence to vinyl -Changed light to LED -Changed gate valves to plug style -Relocated water service -Added emergency suction riser -Changed radio to cellular comms -Added flow meter
LS-03	LS-030	LIFT STATION PLAN (VALVE VAULT)	-Added pipe coupling between structures -Changed valve style from gate to plug -Added vent -Added emergency suction riser -Added flow meter
LS-04	LS-040	LIFT STATION SECTION (VALVE VAULT)	-Changed floats to submersible transducers -Added stilling well -Added suction riser -Changed valve style from gate to plug -Added restrained flange coupling adapter in vault -Added flow meter
-	LS-050	LIFT STATION SECTION (WITHOUT VALVE VAULT)	-New sheet to show City preferred layout with abovegrade piping in lieu of a valve vault

City of Largo
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Lift Station (LS) Section 2022 Updates
Revision Log

-	LS-060	LIFT STATION PLAN (WITHOUT VALVE VAULT)	-New sheet to show City preferred layout with abovegrade piping in lieu of a valve vault
-	LS-070	LIFT STATION SECTION (WITHOUT VALVE VAULT)	-New drawing to show City preferred layout with abovegrade piping in lieu of a valve vault
-	LS-080-A	LIFT STATION MECHANICAL DETAILS (1 OF 2)	-New sheet, which includes emergency suction pipe detail and water service detail
-	LS-080-B	LIFT STATION MECHANICAL DETAILS (2 OF 2)	-New sheet, which includes vent detail, stilling well detail, and electromagnetic flow meter detail
LS-06	LS-090	REMOTE WIRELESS RAINFALL MONITOR REQUIREMENTS	-Reorganized notes -Incorporated SCADA system -Deleted several requirements
LS-07	LS-100-A	LIFT STATION GENERAL ELECTRICAL REQUIREMENTS (1 OF 2)	-Reorganized notes -Various typo corrections -Clarified enclosure as NEMA 4X -Changed supports to prestressed concrete posts -Changed finish to powder coat -Added HMI -Added conduit seal offs -Replaced floats with different level instruments -Added cell modem and cell antenna
LS-08	LS-100-B	LIFT STATION GENERAL ELECTRICAL REQUIREMENTS (2 OF 2)	-Reorganized notes -Various typo corrections -Changed generator receptacle model -Updated to reflect Duke -Updated component part numbers -Added canopy -Added modem

LS-09-A, LS-09-B, and LS-09-C	LS-110-A	REMOTE TERMINAL UNIT REQUIREMENTS (1 OF 2)	-Reorganized notes -Various typo corrections -Updated radio to cellular comms -Added modem -Added PLC -Added software references -Added cell modem specs
	LS-110-B	REMOTE TERMINAL UNIT REQUIREMENTS (2 OF 2)	-Reorganized notes -Various typo corrections -Changed floats to transducers -Updated inputs -Updated radio to cellular comms
LS-05	LS-120	LIFT STATION CONTROL PANEL MOUNTING DETAIL	-Changed alarm light to LED -Added canopy requirement (not shown) -Changed generator receptacle model -Updated to reflect Duke
-	LS-130	TYPICAL POWER RISER DIAGRAM	-New sheet, which shows a typical power riser diagram with cellular antenna and separate control and starter panels
LS-10-C, LS-11-C, and LS-12-C	LS-140	TYPICAL LIFT STATION CONTROL PANEL ELEVATION	-Updated to reflect City's latest preferences and HMI -Combined into 1 sheet since typical of all electrical service options
-	LS-150	TYPICAL LIFT STATION CONTROL PANEL INTERIOR LAYOUT	-New sheet, which illustrates typical interior panel layout and components
-	LS-160	TYPICAL LIFT STATION CONTROL PANEL BOM	-New sheet, which includes bill of materials with manufacturer information and catalog numbers
LS-10-D, LS-11-D, and LS-12-D	LS-170	TYPICAL LIFT STATION RTU TERMINAL STRIP	-Updated to reflect PLC and level transducer -Combined into 1 sheet since typical of all electrical service options
LS-10-A and LS-10-B	LS-180	230V 1PH PANEL WIRING DIAGRAM	-Updated to reflect PLC, level transducer, and cellular communications -Kept entire view on one sheet

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LS-11-A and LS-11-B	LS-190	230V 3PH PANEL WIRING DIAGRAM	-Updated to reflect PLC, level transducer, and cellular communications -Kept entire view on one sheet
LS-12-A and LS-12-B	LS-200	480V 3PH PANEL WIRING DIAGRAM	-Updated to reflect PLC, level transducer, and cellular communications -Kept entire view on one sheet.
-	LS-210	PRIVATE LIFT STATION REQUIREMENTS	-New sheet, which lists requirements unique to private lift stations
-	LS-220	PRIVATE LIFT STATION PLAN	-New sheet, which shows typical private lift station mechanical plan
-	LS-230	PRIVATE LIFT STATION SECTION	-New sheet, which shows typical private lift station mechanical section
-	LS-240	PRIVATE LIFT STATION CONTROL PANEL LAYOUT AND LEGEND	-New sheet, which shows typical private lift station control panel layout
-	LS-250	PRIVATE LIFT STATION CONTROL PANEL WIRING DIAGRAM	-New sheet, which shows typical private lift station control panel wiring diagram

Note: The description of revisions is intended to provide a general summary of substantive changes to the previous standards. The revision descriptions should not be taken as all-inclusive and shall not relieve the Contractor of the responsibility to review the updated standards in their entirety.

GENERAL LIFT STATION REQUIREMENTS

GENERAL

1. GENERAL LIFT STATION REQUIREMENTS ARE APPLICABLE TO BOTH PRIVATE LIFT STATIONS AND CITY LIFT STATIONS.

STRUCTURES

1. STRUCTURES SHALL BE DESIGNED TO PROTECT AGAINST FLOTATION. SUBMIT DESIGN CALCULATIONS, BUOYANCY CALCULATIONS AND SHOP DRAWINGS SIGNED AND SEALED BY PROFESSIONAL ENGINEER LICENSED IN FLORIDA. DESIGN STRUCTURES ASSUMING GROUNDWATER AT GRADE. STRUCTURES SHALL BE DESIGNED TO RESIST ALL PRESSURES INDUCED BY WATER, SOIL, AND LIVE LOADS.
2. WET WELL STRUCTURES SHALL BE SET ON A MINIMUM 18–INCH LAYER OF WASHED ROCK WRAPPED IN FILTER FABRIC, AS DETAILED.

PUMPS

1. SUBMERSIBLE PUMPS SHALL BE MINIMUM 3 HP, MINIMUM 3" SOLIDS PASSING, WITH MINIMUM 4" DIAMETER DISCHARGE CONNECTION SIZE.
2. PUMPS SHALL BE SELECTED TO OPERATE NEAR THE BEST EFFICIENCY POINT.
3. VIBRATION SHALL NOT BE EXCESSIVE AT ANY POINT THROUGHOUT THE PUMP CURVE.

LIQUID LEVEL SENSING SYSTEM

1. PROVIDE LEVEL BASED LIQUID LEVEL SENSING SYSTEM TO FACILITATE AUTOMATIC PUMP OPERATION.

PUMP STATION CONTROLS

1. OVERFLOW ALARM SHALL CONSIST OF AN ALARM HORN AND A BLINKING STROBE LIGHT WITH A RED GLOBE, GUARD, AND MOUNTING BASE. ALARM STROBE SHALL BE LOCATED ON THE TOP OF THE CONTROL PANEL.
2. ALL CONTROLS SHALL BE FACTORY AND SITE TESTED BY THE CONTRACTOR AND VERIFIED BY CITY'S ENVIRONMENTAL SERVICES DEPARTMENT PRIOR TO BEING ACCEPTED BY THE CITY.

PUMP STATION INSTALLATION

1. SEAL ALL CONDUIT ENTRIES IN CONTROL PANEL WITH ELECTRICAL DUCT SEAL AND EXPLOSION PROOF CONDUIT SEALING FITTINGS.
2. MEGGER TEST ALL POWER WIRES AND MOTORS. RECORD READINGS. READING SHALL BE MINIMUM 20 MEGAOHMS TO GROUND. DO NOT MEGGER TEST CONTROL WIRING.
3. OPERATE PUMPS, CHECK DIRECTION, RECORD VOLTAGE AND AMPERAGE. TEST FOR EACH UNIT OPERATELY INDEPENDENTLY AND WITH BOTH UNITS OPERATING IN PARALLEL. TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE PUMP MANUFACTURER'S AUTHORIZED FIELD SERVICE REPRESENTATIVE.
4. CHECK OPERATION USING CITY'S PORTABLE GENERATOR. CONFIRM CORRECT DIRECTION OF ROTATION.
5. FRONT FACE OF PUMP CONTROL PANEL SHALL BE A MINIMUM OF 60" FROM EDGE OF WET WELL FLOOR ACCESS DOOR OPENING AND VENT.
6. LOCATE ELECTRICAL AND MECHANICAL EQUIPMENT TO PROTECT FROM 100–YEAR FLOOD.
7. PUMP STATION SHALL BE FULLY OPERATIONAL AND ACCESSIBLE DURING 25–YEAR FLOOD.
8. PROVIDE COMPACTED #57 LIMEROCK WITHIN FENCED IN AREA UP TO EDGE OF STRUCTURES AND FENCELINE. INCLUDE NON–WOVEN GEOTEXTILE MIRAFI 140 NL, OR APPROVED EQUAL.

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INDEX NUMBER	DESCRIPTION
LS-010-A	GENERAL LIFT STATION REQUIREMENTS

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	RAFAL CIESLAK, P.E.

CITY LIFT STATION REQUIREMENTS

GENERAL

1. CITY LIFT STATIONS ARE LIFT STATIONS BEING CONSTRUCTED AS PART OF A CITY CAPITAL PROJECT THAT WILL BE OWNED, OPERATED, AND MAINTAINED BY CITY PERSONNEL.
2. CITY LIFT STATION REQUIREMENTS ARE COMPLEMENTARY TO THE GENERAL LIFT STATION REQUIREMENTS. BOTH SETS OF REQUIREMENTS SHALL BE MET UNLESS OTHERWISE APPROVED.

PRECAST CONCRETE STRUCTURES

1. WET WELL AND VALVE VAULT (AS REQUIRED) STRUCTURES, INCLUDING ROOF AND FLOOR SECTIONS, SHALL BE CONSTRUCTED OF PRECAST CONCRETE, UNLESS OTHERWISE APPROVED.
2. PRECAST CONCRETE SHALL UTILIZE ASTM C-150 TYPE II CEMENT AND SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
3. PRECAST JOINTS SHALL BE TONGUE AND GROOVE TYPE. JOINT SURFACES SHALL BE PRE-PRIMED. PROVIDE TWO ROWS OF CONTINUOUS RAM-NEK PRE-MOLDED PLASTIC JOINT SEALER.
4. WRAP EXTERIOR JOINTS WITH 12" WIDE RUBBER HEAT-SHRINK WRAP.
5. ALL EXTERIOR PRECAST CONCRETE STRUCTURE SURFACES SHALL BE COATED WITH TWO COATS (MINIMUM 24 MILS TOTAL DFT) OF BLACK COLOR CARBOLINE BITUMASTIC 300M, OR APPROVED EQUAL.

PUMP DISCHARGE PIPING AND VALVES

1. WHERE RIGHT-OF-WAY / PERMANENT EASEMENT ALLOW, VALVES AND PUMP DISCHARGE PIPING SHALL BE INSTALLED AT GRADE ON A CAST-IN-PLACE CONCRETE SLAB/APRON SIZED AND LOCATED TO SUIT THE PIPING ARRANGEMENT, AS DETAILED.
2. WHERE SITE CONSTRAINTS ARE PRESENT A VALVE VAULT SHALL BE ACCEPTABLE IN LIEU OF THE ABOVEGROUND PIPE AND VALVE ARRANGEMENT.
   A. SHALL BE CONSTRUCTED OF PRECAST CONCRETE.
   B. SIZE TO ACCOMMODATE ALL VALVES, FITTINGS, PIPING, AND PUMP CONNECTIONS WITH A MINIMUM 24" VERTICAL CLEARANCE BETWEEN PIPING AND HIGH POINT OF FLOOR AND A MINIMUM LATERAL CLEARANCE BETWEEN PIPING AND INSIDE FACE OF STRUCTURE WALL OF 24 INCHES.
   C. VALVE VAULT SHALL DRAIN TO WET WELL USING A MINIMUM 4" DIAMETER GRAVITY DRAIN PIPE CONSTRUCTED OF SCH. 80 PVC AND INCORPORATING A P-TRAP.
   D. VALVE VAULT STRUCTURES SHALL BE SET ON A MINIMUM 8-INCH LAYER OF WASHED ROCK WRAPPED IN FILTER FABRIC, AS DETAILED.

VALVES

1. ISOLATION VALVES SHALL BE FULL PORT ECCENTRIC PLUG VALVES. EXPOSED VALVES SHALL INCLUDE FLANGED END CONNECTIONS AND BURIED VALVES SHALL INCLUDE MECHANICAL JOINT END CONNECTIONS. PLUG VALVES SHALL BE AS MANUFACTURED BY DEZURIK, PRATT, MILLIKEN, OR EQUAL.
2. CHECK VALVES SHALL BE RUBBER FLAPPER SWING TYPE WITH FLANGED END CONNECTIONS. CHECK VALVES SHALL BE AS MANUFACTURED BY DEZURIK/APCO OR APPROVED EQUAL.

PIPING

1. PUMP DISCHARGE PIPING SHALL BE SPECIAL THICKNESS CLASS 53 DUCTILE IRON PIPE HAVING A MINIMUM DIAMETER OF 4 INCHES.
2. PIPING SHALL BE LINED WITH CERAMIC QUART-FILLED, AMINE-CURED NOVALAC EPOXY LINER SUCH AS PROTECTO 401, OR APPROVED EQUAL.
3. BURIED PIPING SHALL INCLUDE MECHANICAL JOINT END CONNECTIONS AND RECEIVE EXTERIOR ASPHALTIC COATING. EXPOSED PIPING SHALL INCLUDE FLANGED END CONNECTIONS AND RECEIVE EXTERIOR EPOXY COATING SYSTEM.
4. ALL EXPOSED PIPING, INCLUDING PIPING INSTALLED WITHIN A VAULT (WHERE APPLICABLE) AND PIPING WITHIN WET WELL SHALL BE PREPARED, PRIMED, AND PAINTED USING AN APPROVED EPOXY COATING SYSTEM. COLOR SHALL BE WASTEWATER GREEN. COATING SYSTEM AND COLOR SHALL BE APPROVED BY CITY.
5. PROVIDE TYPE 316 STAINLESS STEEL PIPE SUPPORTS. INCLUDE PROVISIONS FOR ISOLATION OF DISSIMILAR METALS.

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INDEX NUMBER	DESCRIPTION
LS-010-B	**CITY LIFT STATION REQUIREMENTS (1 OF 4)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

CITY LIFT STATION REQUIREMENTS

HARDWARE

1. ALL HARDWARE, FASTENERS, ANCHORAGE, AND MISCELLANEOUS METAL FABRICATIONS SHALL BE TYPE 316 STAINLESS STEEL.

WET WELL

1. WET WELL SHALL BE CONSTRUCTED OF PRECAST CONCRETE.
2. CIRCULAR WET WELL SHALL HAVE A MINIMUM INSIDE DIAMETER OF 6 FEET.
3. WET WELL SHALL INCLUDE A SINGLE INCOMING GRAVITY PIPE CONNECTION HAVING A NOMINAL DIAMETER OF 8" MINIMUM ARRANGED TO PREVENT AIR ENTRAPMENT AS FLOW ENTERS THE WET WELL.
4. THE SUMP BELOW THE INFLUENT LINE INVERT SHALL BE A MINIMUM OF 4' DEEP.
5. INCOMING GRAVITY SEWER PIPE CONNECTION SHALL INCLUDE FLEXIBLE RUBBER BOOT ASSEMBLY.
6. PROVIDE A SUCTION RISER IN WET WELL TO SERVE AS TEMPORARY BYPASS PUMP SUCTION CONNECTION.
7. PROVIDE A BYPASS CONNECTION ON THE DOWNSTREAM SIDE OF THE PUMP STATION DISCHARGE VALVES TO ACCOMMODATE THE BYPASS OF THE WET WELL.

WET WELL LINER

1. NEW WET WELLS SHALL INCLUDE SHOP-APPLIED HDPE LINER SYSTEM COMPRISED OF EXTRUDED HDPE LINER SHEET AND ANCHORING STUDS. LINER SYSTEM SHALL BE AGRU SURE-GRIP, OR APPROVED EQUAL. INTERIOR SURFACES TO BE LINED INCLUDE WET WELL WALLS, UNDERSIDE OF TOP SLAB, AND PIPE ENTRIES. LINER THICKNESS SHALL BE MINIMUM 3 MM. ALL JOINTS SHALL BE SEALED USING THERMAL WELDING. PIPE PENETRATIONS SHALL HAVE HDPE SLEEVE WELDED TO THE LINER AND CAST INTO STRUCTURE. LINER SYSTEM SHALL HAVE A MINIMUM LONGTERM BACKPRESSURE RESISTANCE OF 21 PSI.
2. REHABILITATION OF EXISTING WET WELLS SHALL UTILIZE A SPRAY-APPLIED, 100% SOLIDS STRUCTURAL LINER SYSTEM. INTERIOR SURFACES TO BE COATED INCLUDE WET WELLS WALLS AND FLOOR. LINER SYSTEM SHALL BE GREEN MONSTER, AS MANUFACTURED BY GML COATINGS, OR APPROVED EQUAL. REPAIR AND RESURFACE SUBSTRATE USING LINER SYSTEM MANUFACTURER-APPROVED CEMENTITIOUS MORTAR PRODUCT PRIOR TO APPLYING LINER. LINER THICKNESS SHALL BE MINIMUM 125 MILS.

FLOOR ACCESS DOORS

1. FLOOR ACCESS DOORS SHALL BE OF ALUMINUM CONSTRUCTION WITH TYPE 316 STAINLESS STEEL HARDWARE.
2. INCLUDE HASP ARRANGEMENT TO ACCEPT A KEYED PADLOCK.
3. DOORS SHALL BE SPRING-LOADED AND EQUIPPED WITH A HOLD-OPEN SAFETY ARM.
4. ALL FLOOR ACCESS DOORS SHALL INCLUDE A GASKETED SEAL.
5. FLOOR ACCESS DOORS SHALL BE REINFORCED FOR AASHTO H-20 TRAFFIC LOADING.
6. CLEAR OPENINGS SHALL ALLOW FOR EACH PUMP UNIT TO BE REMOVED WITHOUT SWINGING OFF OF THE PUMP'S CENTERLINE. FLOOR ACCESS DOOR SIZE SHALL BE SUBJECT TO CITY APPROVAL BASED ON A REVIEW OF THE ACTUAL PUMPS BEING PROVIDED.
7. PROVIDE WITH REMOVABLE, OSHA-APPROVED, SAFETY FALL PREVENTION GRATING.
8. FLOOR ACCESS DOORS SHALL BE AS MANUFACTURED BY BILCO, HALLIDAY PRODUCTS, OR APPROVED EQUAL.
9. DOOR ORIENTATION, LEAF QUANTITY, AND DIRECTION OF LEAF SWING SHALL NOT IMPEDE WET WELL ACCESS OR PUMP REMOVAL.
10. FRAME SHALL BE EXTRUDED ALUMINUM WITH DRAIN COUPLING AND BITUMINOUS COATING OF SURFACES THAT WILL COME IN CONTACT WITH CONCRETE.
11. COVER SHALL HAVE MILL FINISH AND DIAMOND PATTERN TREAD.

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INDEX NUMBER	DESCRIPTION
LS-010-C	CITY LIFT STATION REQUIREMENTS (2 OF 4)

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	RAFAL CIESLAK, P.E.

CITY LIFT STATION REQUIREMENTS

WATER SERVICE CONNECTION

1. PROVIDE MINIMUM ¾" WATER SERVICE WITH REDUCED PRESSURE ZONE BACKFLOW PREVENTION DEVICE, CUT-OFF VALVE WITH BOX, AND A METER ACCEPTABLE TO AND APPROVED BY PINELLAS COUNTY UTILITIES.
2. PROVIDE, AS DETAILED, A MINIMUM ¾" HOSE BIBB CONNECTION WITHIN 3 FEET OF EDGE OF WET WELL OPENING AND AT LEAST 3 FEET FROM ANY ELECTRICAL COMPONENTS, INCLUDING ELECTRICAL EQUIPMENT MOUNTING RACK.

RAINFALL GAUGE

1. WHERE A RAINFALL GAUGE IS CALLED FOR, IT SHALL BE INSTALLED ON A CONTROL PANEL MOUNTING RACK ROOF CANOPY SUPPORT AND LOCATED AWAY FROM ANY OVERHEAD OBSTRUCTIONS.
2. RAINFALL GAUGE SHALL BE COMPATIBLE WITH CITY'S EXISTING SCADA SYSTEM AND SETTINGS AND SHALL BE SUBJECT TO APPROVAL BY CITY ENVIRONMENTAL SERVICES DEPARTMENT.

PUMP REMOVAL GUIDES/SLIDE RAILS

1. PROVIDE PERMANENTLY INSTALLED SLIDE RAIL MOUNTING AND PUMP REMOVAL SYSTEM FOR EACH PUMP. PUMP LIFTING SYSTEM SHALL BE PROVIDED AS PART OF PUMP MANUFACTURER'S SCOPE OF SUPPLY.
2. PUMP REMOVAL SYSTEM SHALL INCLUDE FIXED BASE DISCHARGE ELBOW CONNECTIONS, UPPER GUIDE RAIL SUPPORT BRACKET, INTERMEDIATE SUPPORT BRACKETS (WHERE WET WELL DEPTH DICTATES THE NEED), AND GUIDE BARS.
3. ALL COMPONENTS SHALL BE CONSTRUCTED OF TYPE 316 STAINLESS STEEL, EXCEPT FOR BASE DISCHARGE ELBOW CONNECTION FITTINGS, WHICH SHALL BE OF CAST IRON CONSTRUCTION.
4. ALL GUIDE RAILS SHALL BE ONE CONTINUOUS LENGTH, WELDED AS NECESSARY AND GROUND SMOOTH SO AS NOT TO IMPEDE PUMP INSTALLATION/REMOVAL.
5. GUIDES SHALL BE ONE DIAMETER OVERSIZED.
6. BASE ELBOW FITTINGS SHALL BE MOUNTED SECURELY TO A BASEPLATE THAT IS ATTACHED TO THE WET WELL FLOOR. ALL ANCHORAGE, FASTENERS, AND HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

ELECTRIC SUBMERSIBLE NON-CLOG PUMPS

1. PUMPING EQUIPMENT SHALL BE AS MANUFACTURED BY FLYGT. NO SUBSTITUTIONS.
2. A MINIMUM OF TWO PUMPS SHALL BE INSTALLED IN EACH WET WELL, WITH EACH PUMP SIZED TO HANDLE THE PEAK DESIGN FLOWRATE WITH THE OTHER UNIT OUT OF SERVICE.
3. PUMPS SHALL BE SUPPLIED WITH PROTECTIVE DEVICES INCLUDING MOISTURE/SEAL FAIL AND OVER-TEMPERATURE PROTECTIVE RELAY TO PREVENT MOTOR FROM DRAWING MORE THAN THE RATED FULL LOAD AMERAGE.
4. PROVIDE EACH PUMP WITH TYPE 316 STAINLESS STEEL WIRE ROPE MOUNTED TO PUMP LIFTING EYE FOR USE DURING PUMP REMOVAL. WIRE ROPE SHALL BE MINIMUM 5/16" DIAMETER AND A SWL OF NO LESS THAN 2,200 LBS.
5. ALL PUMP AND INSTRUMENT CABLES SHALL BE PROVIDED WITH SUFFICIENT SLACK TO ACCOMODATE PUMP REMOVAL. FIELD VERIFY LENGTHS OF ALL REQUIRED MANUFACTURER-PROVIDED CABLE PRIOR TO PLACEMENT OF EQUIPMENT ORDER.
6. PROVIDE PVC STRAIN RELIEF CONNECTORS FOR ALL PUMP CABLES.

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INDEX NUMBER	DESCRIPTION
LS-010-D	**CITY LIFT STATION REQUIREMENTS (3 OF 4)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**	

CITY LIFT STATION REQUIREMENTS

PRIMARY LIQUID LEVEL SENSING SYSTEM

1. PROVIDE SUBMERSIBLE, LOOP–POWERED, HYDROSTATIC LEVEL TRANSDUCER.
2. TRANSDUCER SHALL BE MANUFACTURED BY ENDRESS AND HAUSER, DRUCK, KPSI, OR APPROVED EQUAL.
3. TRANSDUCER SHALL BE AN INTRINSICALLY SAFE DEVICE WITH FM APPROVAL.
4. PROVIDE PVC STILLING WELL TO PROTECT AGAINST FOULING.

SECONDARY LIQUID LEVEL SENSING SYSTEM

1. IN ADDITION TO PRIMARY LIQUID LEVEL SENSING SYSTEM, CITY STATIONS SHALL INCLUDE SECONDARY HYDROSTATIC LEVEL TRANSDUCER TO ALERT OF A HIGH HIGH WET WELL LEVEL.

FLOW METER

1. FLOW METER SHALL BE ELECTROMAGNETIC TYPE WITH FLANGED ENDS, GROUNDING RINGS ON EACH FLANGE, AND REMOTE NEMA 4X TRANSMITTER WITH SUNSHIELD.
2. FLOW METER SHALL BE ENDRESS+HAUSER PROLINE PROMAG W 500 OR APPROVED EQUAL.
3. FLOW METER LINER SHALL BE COMPATIBLE WITH RAW WASTEWATER SERVICE. PROVIDE POLYURETHANE OR EBONITE LINER.
4. LOCATE FLOW METER AS REQUIRED TO SATISFY THE FLOW METER'S UPSTREAM AND DOWNSTREAM STRAIGHT PIPE LENGTH REQUIREMENTS.
5. PROVIDE ONE FL X FL SPOOL PIPE EQUAL IN LAY LENGTH TO THE FLOW TUBE TO ACCOMMODATE METER SERVICING.
6. FLOW METER SHALL BE SIZED BASED ON EXPECTED LIFT STATION DISCHARGE FLOW RANGE. WHERE LINE SIZE FLOW METER IS NOT APPROPRIATE, PROVIDE REDUCER FITTINGS AS REQUIRED TO REDUCE DOWN AND INCREASE UP.

SITE PRIVACY FENCE

1. PROVIDE 6 FOOT HIGH, VINYL, FULL SITE PERIMETER/PRIVACY FENCE. COLOR SHALL BE SELECTED TO MATCH EXISTING AREA (TROPICAL FENCE). COLOR SHALL BE APPROVED BY CITY. FENCE SHALL INCLUDE GATES OF THE SIZES AND AT THE LOCATIONS DETAILED.

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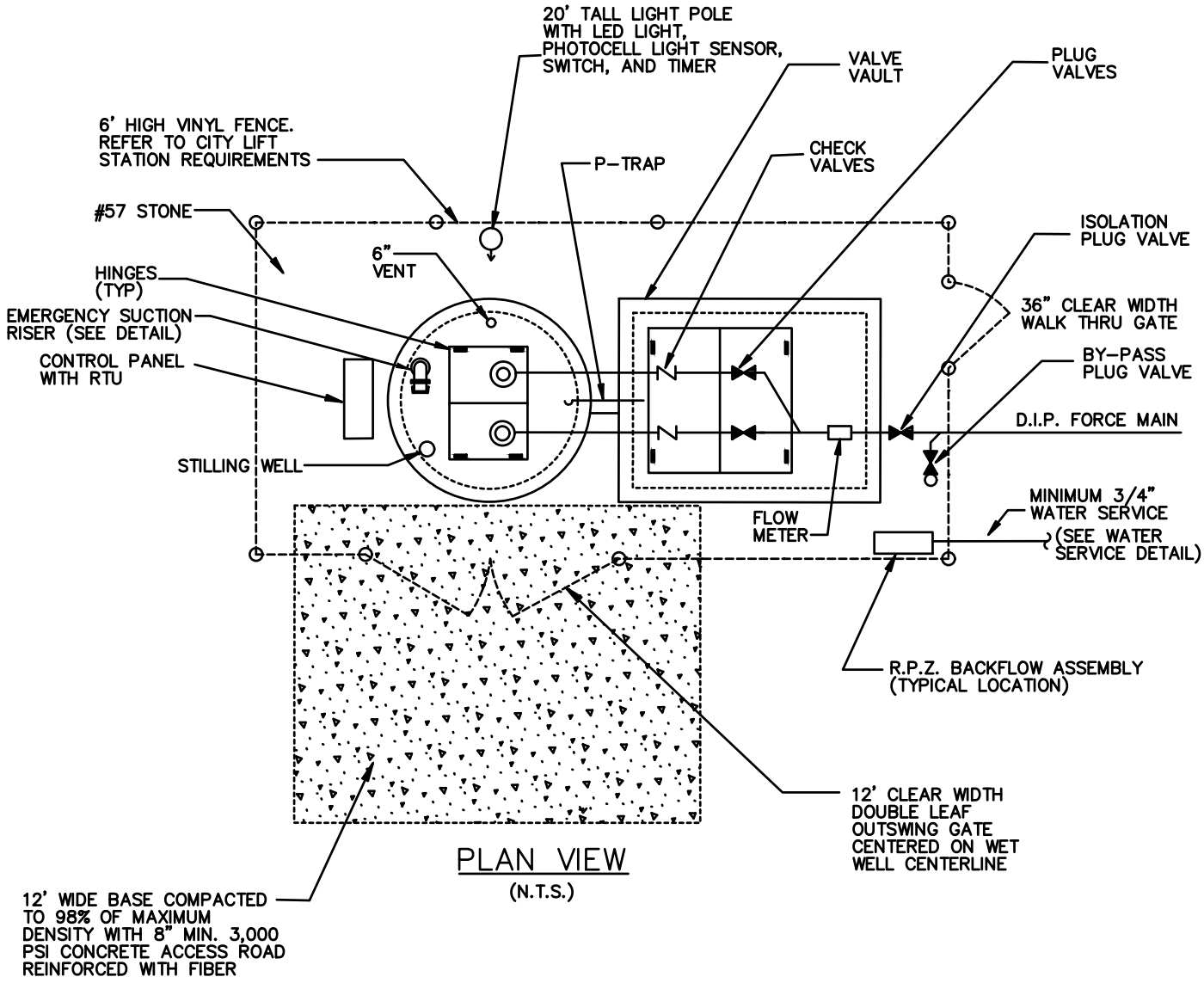
INDEX NUMBER	DESCRIPTION
LS-010-E	**CITY LIFT STATION REQUIREMENTS (4 OF 4)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**	



PLAN VIEW
(N.T.S.)

NOTES:

ENGINEER TO DESIGN SITE PLAN USING THE ABOVE EXAMPLE. DESIGN CRITERIA "SITE PLAN LOCATION" DETAIL SHALL BE DRAWN TO SCALE WITH:

1. INDICATE NORTH ARROW.
2. FENCE LIMITS AND LOCATION OF GATES.
3. INFLUENT LINE ENTRY LOCATION, SIZE, AND INVERT ELEVATION.
4. FLOOR ACCESS DOOR LEAF QUANTITY, HINGE LOCATION, CLEAR OPENING DIMENSIONS (ACCOUNTING FOR SAFETY GRATING), AND DIRECTION OF LEAF SWING
5. SHOW POWER SERVICE FEED (WITH "AS BUILTS").
6. REFER TO GENERAL LIFT STATION NOTES FOR MINIMUM SEPERATION BETWEEN CONTROL PANEL AND VENT AND WET WELL FLOOR OPENING.
7. EMERGENCY PUMP OUT LOCATION (SHALL BE SAME SIZE AS PUMP DISCHARGE).

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INDEX NUMBER	DESCRIPTION
LS-020	**LIFT STATION LAYOUT (VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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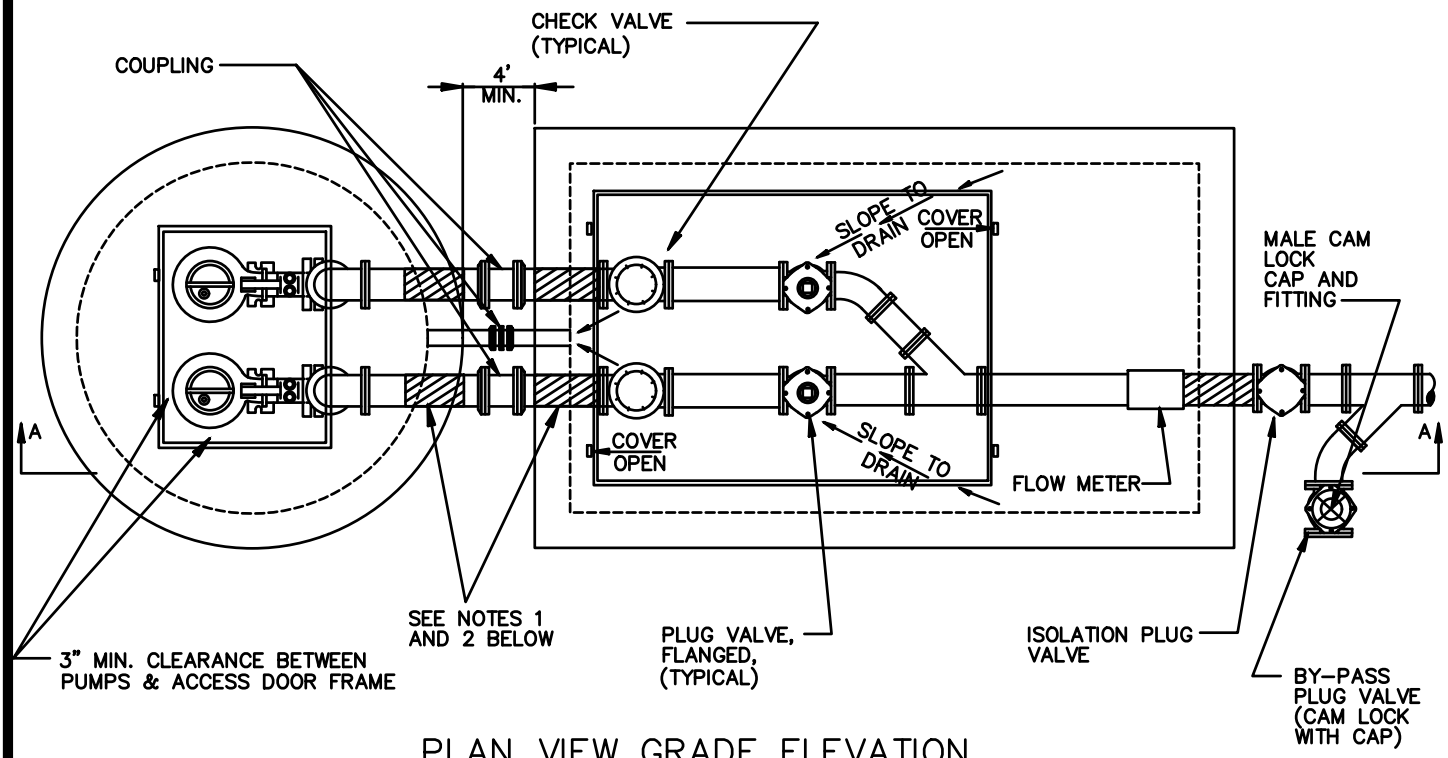
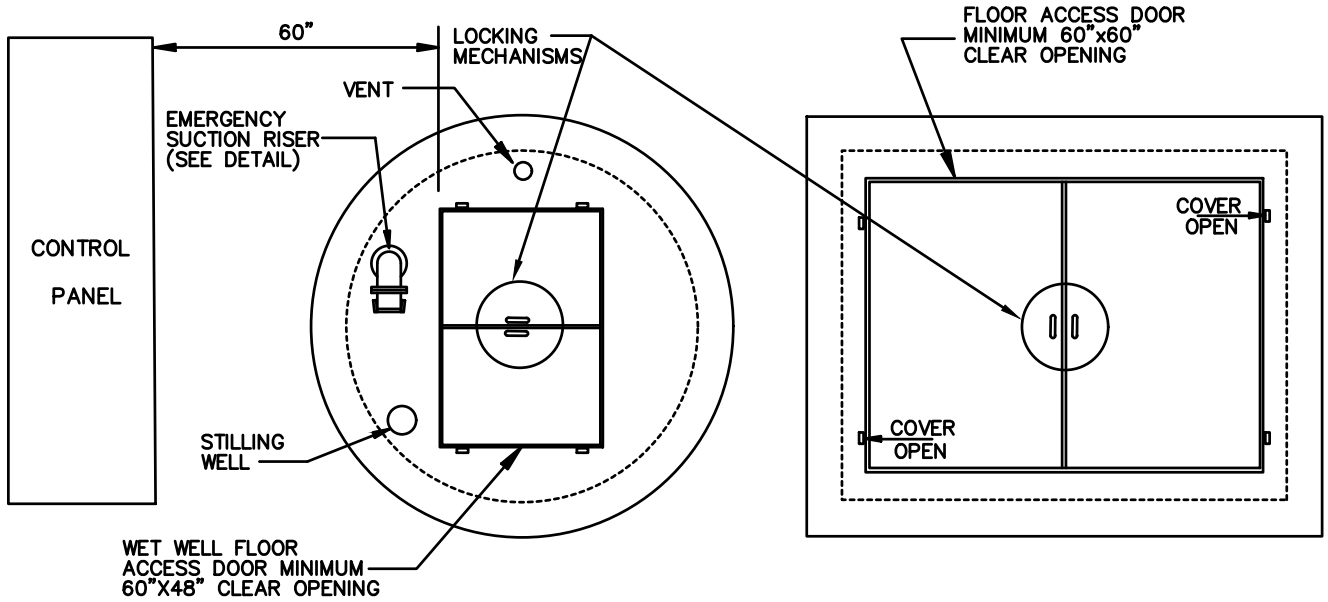


PLAN VIEW GRADE ELEVATION



TOP SLAB – PLAN

NOTE:

1. ALL PIPE HOLES SHALL BE PRECAST. CORES SHALL ONLY BE ACCEPTED WITH PRIOR WRITTEN CITY APPROVAL.
2. FLEXIBLE PIPE-TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER E.P.D.M., OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C-923 WITH A 316 STAINLESS STEEL EXPANSION RING.

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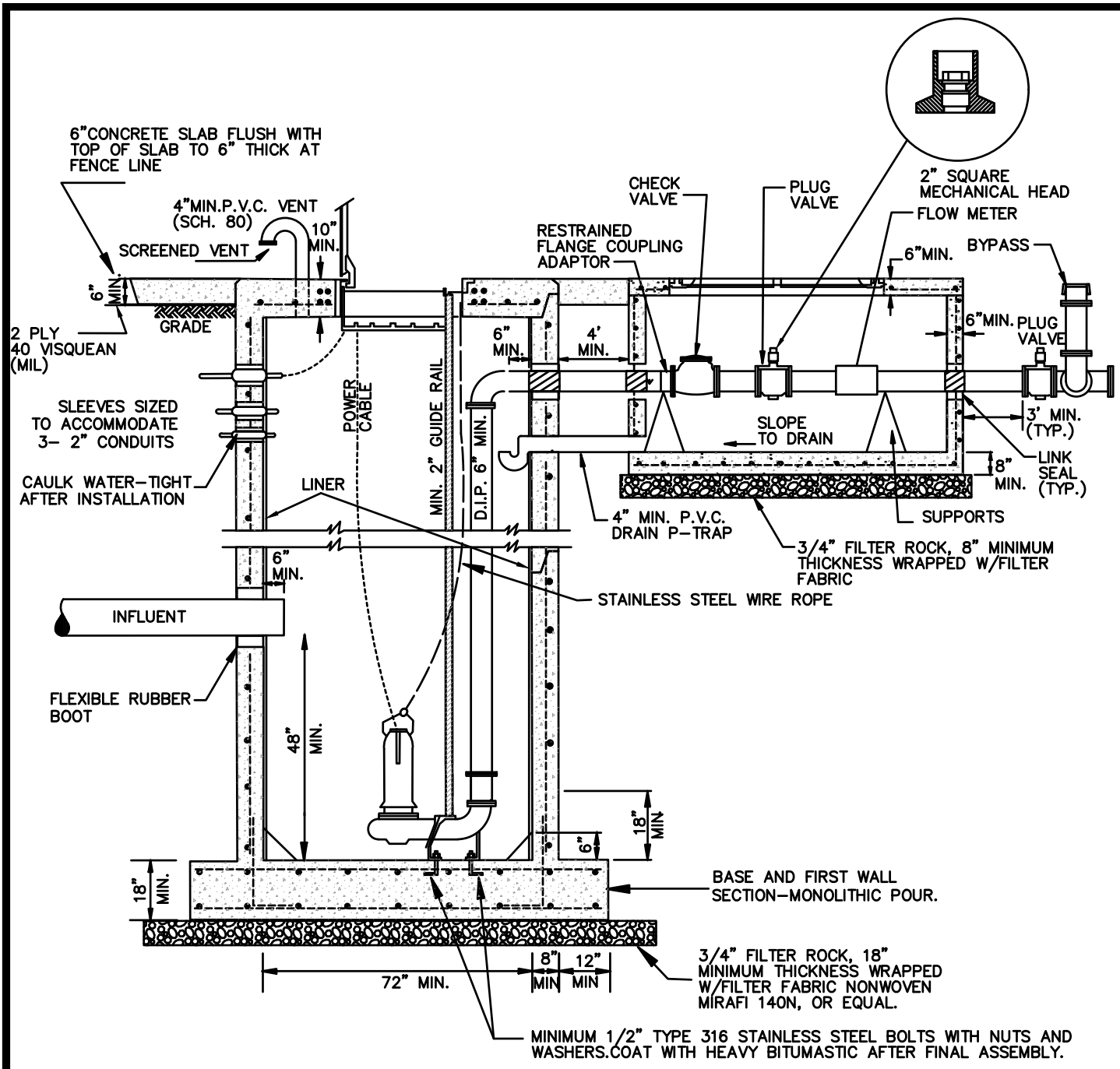
INDEX NUMBER	DESCRIPTION
LS-030	**LIFT STATION PLAN (VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



SECTION A–A

City of Largo - Engineering Services Department
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INDEX NUMBER	DESCRIPTION
LS-040	**LIFT STATION SECTION (VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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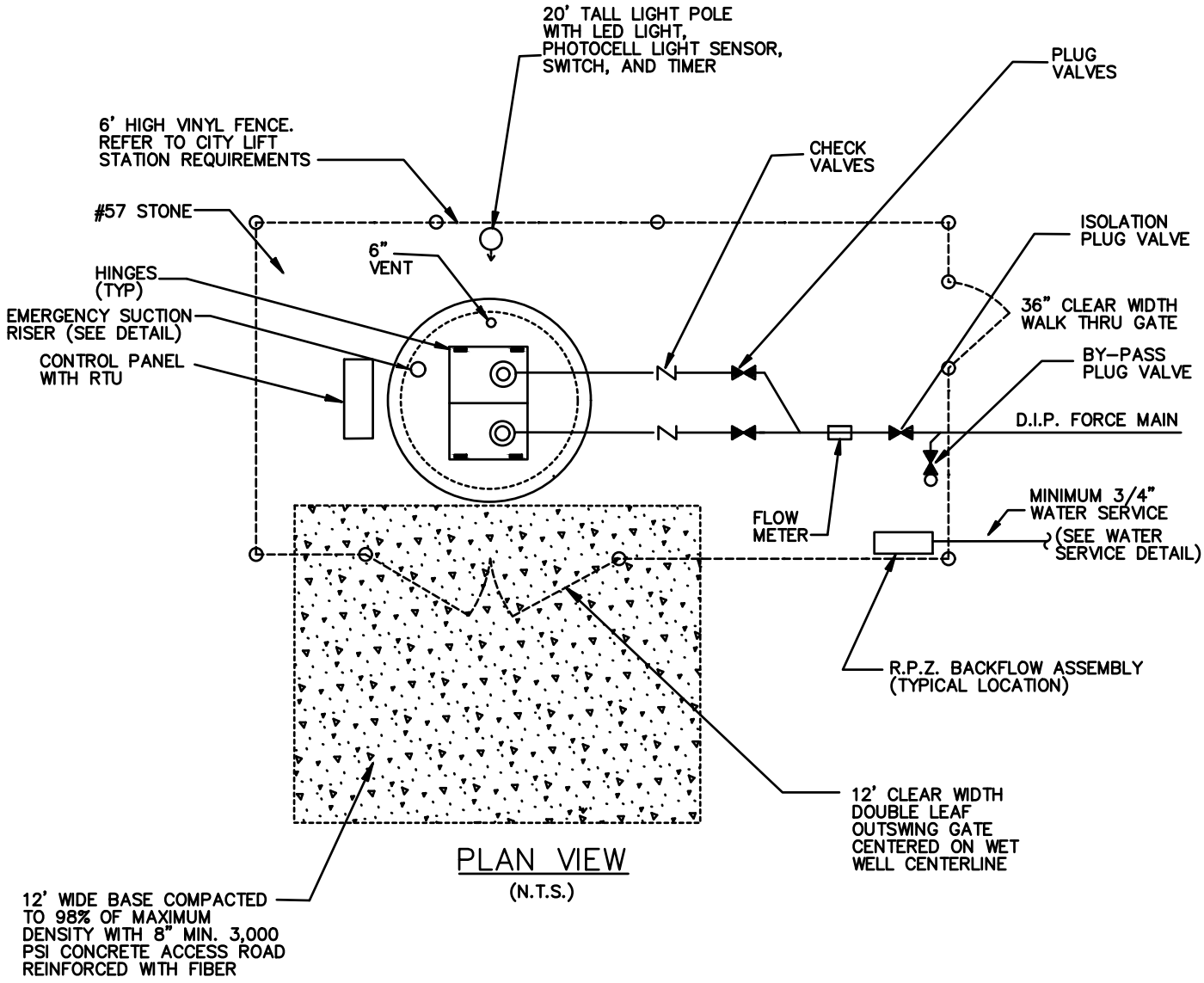

PLAN VIEW
(N.T.S.)

NOTES:

ENGINEER TO DESIGN SITE PLAN USING THE ABOVE EXAMPLE. DESIGN CRITERIA "SITE PLAN LOCATION" DETAIL SHALL BE DRAWN TO SCALE WITH:

1. INDICATE NORTH ARROW.
2. FENCE LIMITS AND LOCATION OF GATES.
3. INFLUENT LINE ENTRY LOCATION, SIZE, AND INVERT ELEVATION.
4. FLOOR ACCESS DOOR LEAF QUANTITY, HINGE LOCATION, CLEAR OPENING DIMENSIONS (ACCOUNTING FOR SAFETY GRATING), AND DIRECTION OF LEAF SWING
5. SHOW POWER SERVICE FEED (WITH "AS BUILTS").
6. EMERGENCY PUMP OUT LOCATION (SHALL BE SAME SIZE AS PUMP DISCHARGE).

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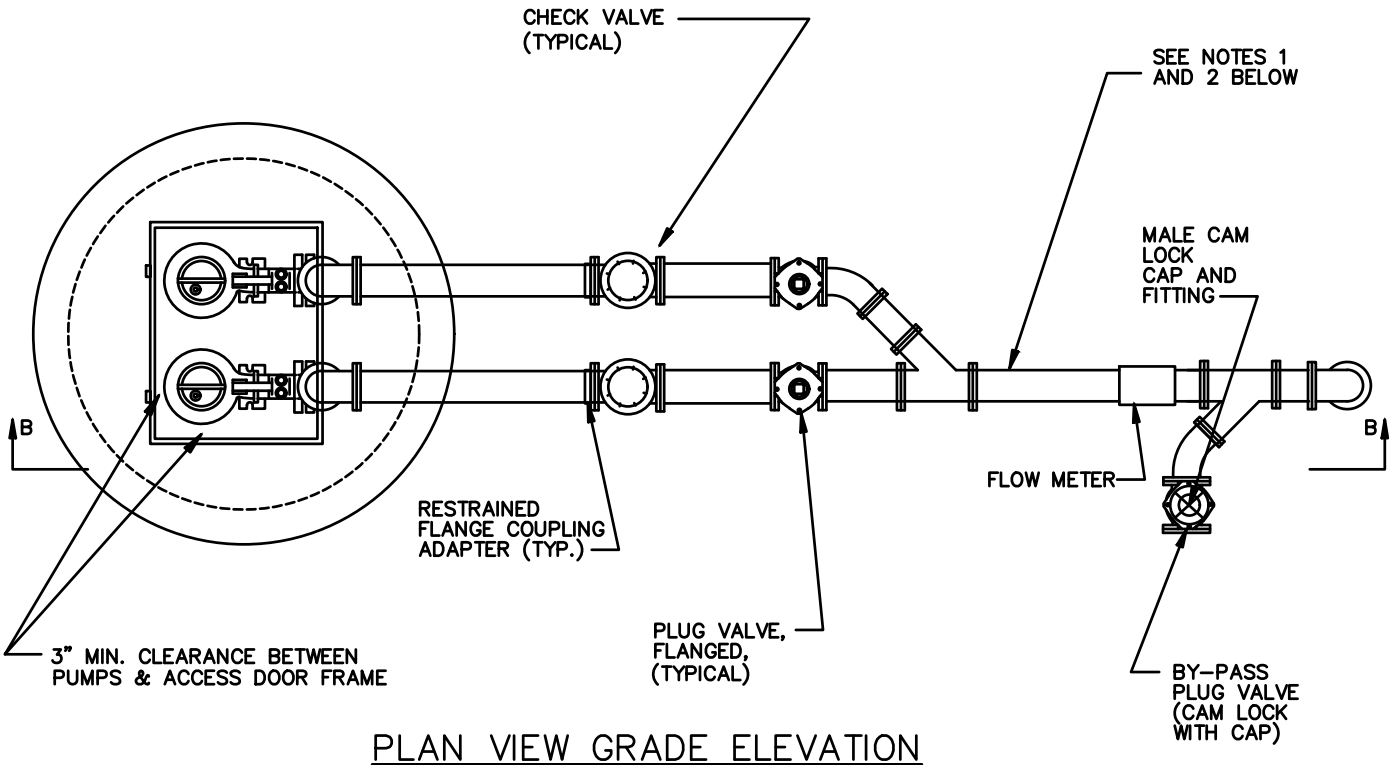
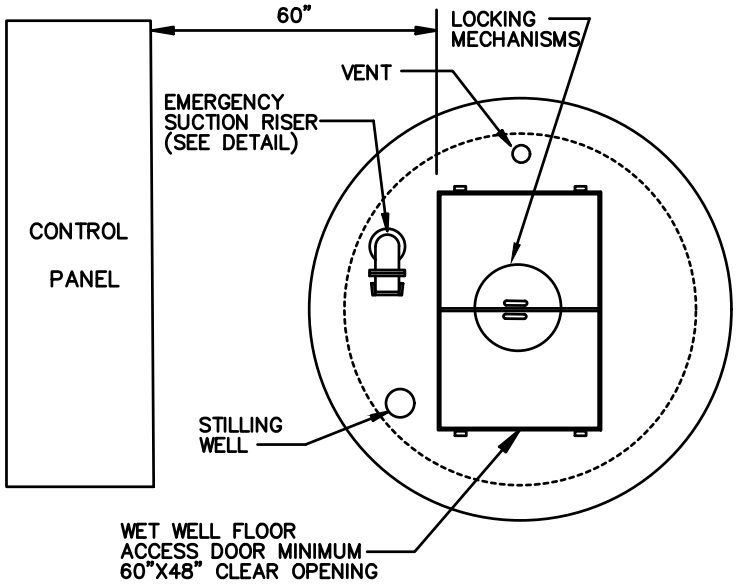
INDEX NUMBER	DESCRIPTION
LS-050	**LIFT STATION LAYOUT (WITHOUT VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



PLAN VIEW GRADE ELEVATION



TOP SLAB – PLAN

NOTE:

1. ALL PIPE HOLES SHALL BE PRECAST. CORES SHALL ONLY BE ACCEPTED WITH PRIOR WRITTEN CITY APPROVAL.
2. FLEXIBLE PIPE–TO MANHOLE CONNECTOR SHALL BE CAST IN PLACE LOCK JOINT FLEXIBLE SLEEVE ELASTOMER E.P.D.M., OR CORED RUBBER GASKET CONFORMING TO A.S.T.M. C–923 WITH A 316 STAINLESS STEEL EXPANSION RING.

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INDEX NUMBER	DESCRIPTION
LS-060	**LIFT STATION PLAN (WITHOUT VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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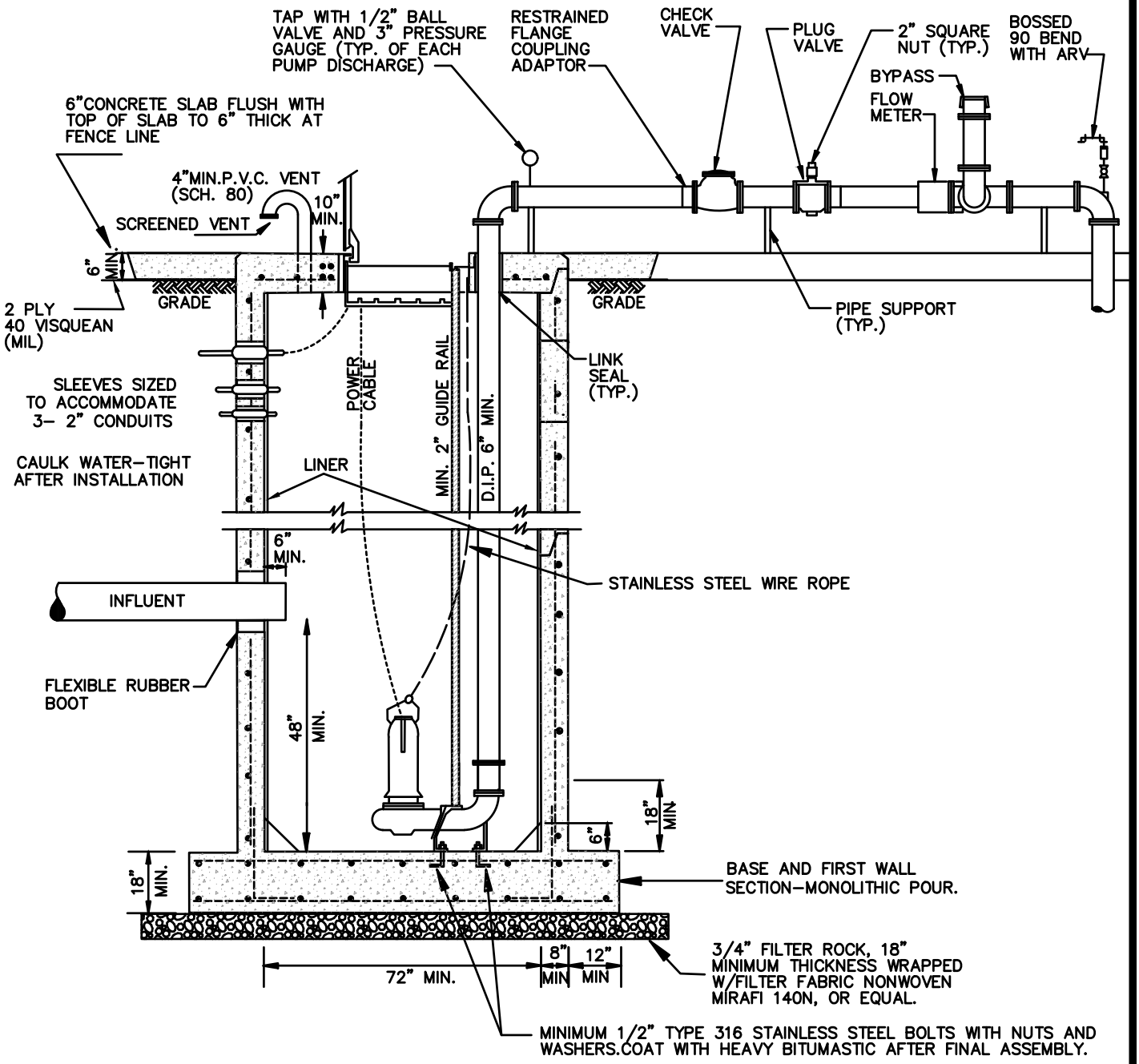

SECTION B–B

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
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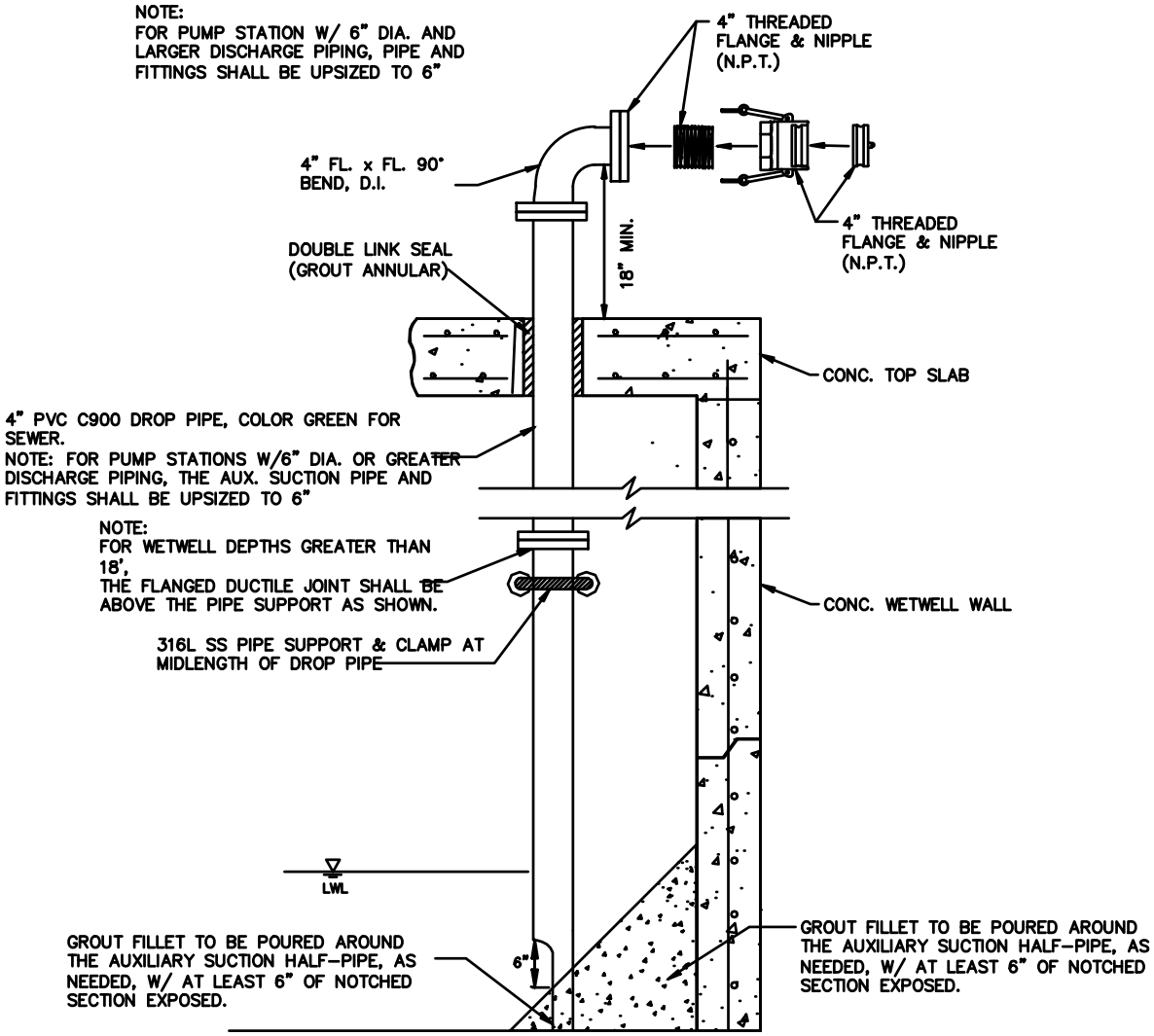
INDEX NUMBER	DESCRIPTION
LS-070	**LIFT STATION SECTION (WITHOUT VALVE VAULT)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

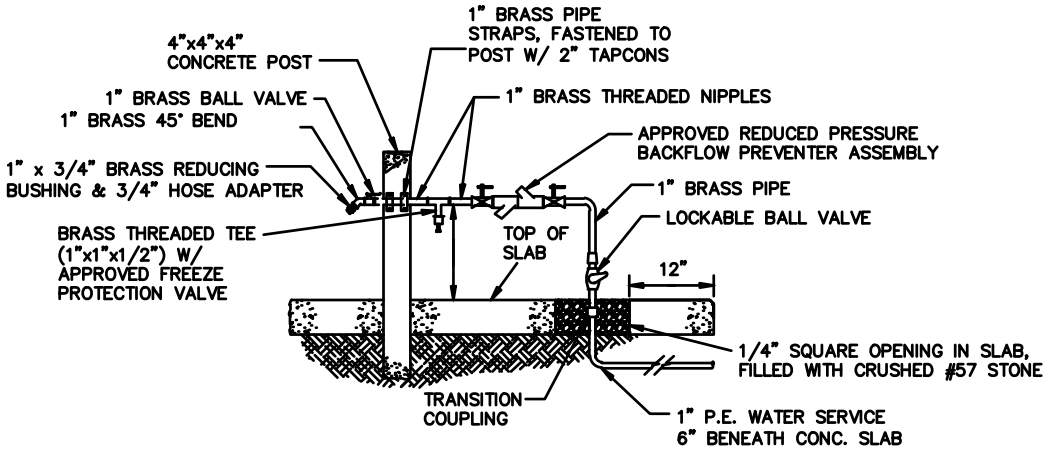
CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



NOTES:
1. LOCATE SUCTION RISER SO AS NOT TO INTERFERE WITH PUMP ACCESS VIA THE SITE ACCESS GATE OR PUMP INSTALLATION/REMOVAL ACTIVITIES.

EMERGENCY SUCTION PIPE DETAIL

N.T.S.



WATER SERVICE DETAIL

N.T.S.

City of Largo - Engineering Services Department
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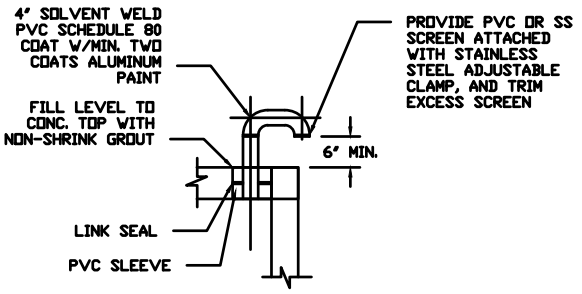
INDEX NUMBER	DESCRIPTION
LS-080-A	**LIFT STATION MECHANICAL DETAILS (1 OF 2)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



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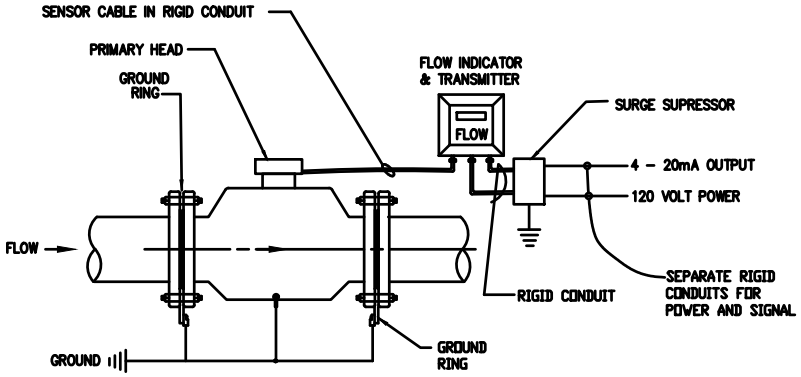
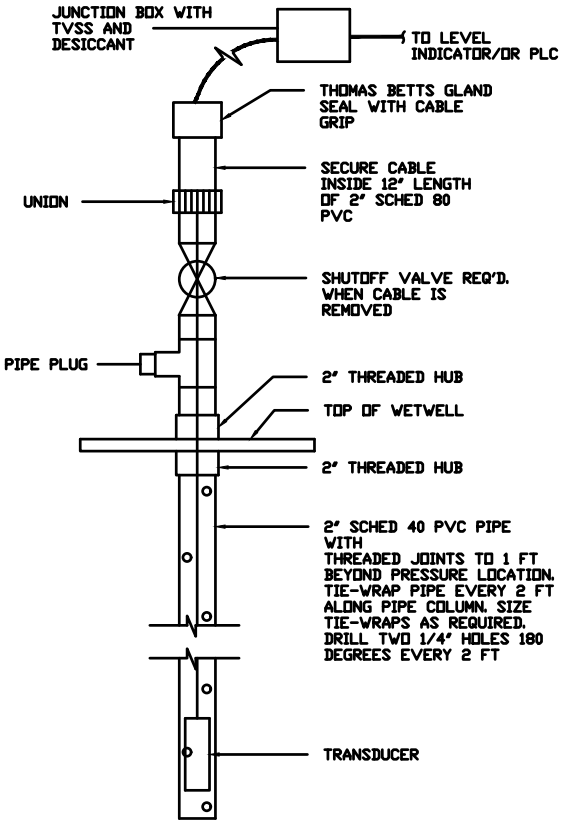


NOTE:
STRAIGHT INLET RUN MINIMUM OF 5x DIAMETER AND OUTLET RUN MINIMUM OF 2x DIAMETER FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS

ELECTROMAGNETIC FLOW METER DETAIL
N.T.S.



SUBMERSIBLE LEVEL TRANSDUCER DETAIL
N.T.S.

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INDEX NUMBER	DESCRIPTION
LS-080-B	**LIFT STATION MECHANICAL DETAILS (2 OF 2)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

REMOTE WIRELESS RAINFALL MONITOR

FUNCTION:
COLLECTS RAINFALL IN .01 INCH INCREMENTS, AND TRANSMITS TO AN EXISTING PC BASE STATION. (SCADA)

OPERATIONAL REQUIREMENTS:
THE SYSTEM SHALL INCLUDE TIPPING SPOON RAIN COLLECTOR WITH A SCALE FACTOR OF .01 INCH PER TIP. THE TIP SHALL BE STORED BY A MICROCONTROLLER INTERFACE UNIT. THE INTERFACE UNIT SHALL PROVIDE STORAGE FOR UP TO 8" OF RAIN AND SHALL RE-SET AUTOMATICALLY WHEN 8" IS REACHED. THE INTERFACE UNIT MUST AUTOMATICALLY ENCODE THE RAIN DATA. UNIT TO BE MOUNTED ON CONTROL PANEL RACK CLEAR OF TREES AND CANOPY OVERHANG. THE INTERFACE UNIT SHALL TRANSMIT DATA THROUGH SCADA SYSTEM.

POWER REQUIREMENTS:
THE MONITOR SHALL UTILIZE LESS THAN 0.5 WATTS OF POWER AT 12VDC AND SHALL INCLUDE A 8AH SEALED LEAD ACID BATTERY, POWER TO THE UNIT SHALL BE SUPPLIED THROUGH THE CONTROL PANEL OR BATTERY.

GENERAL SYSTEM REQUIREMENTS:
THE REMOTE MONITOR SHALL BE DESIGNED TO BE SOFTWARE AND PROTOCOL COMPATIBLE WITH AN EXISTING PC BASE STATION INSTALLED AT THE LARGO ENVIRONMENTAL SERVICES SCADA.

City of Largo - Engineering Services Department
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INDEX NUMBER	DESCRIPTION
LS-090	**REMOTE WIRELESS RAINFALL MONITOR REQUIREMENT**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

LIFT STATION GENERAL ELECTRICAL REQUIREMENTS

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES. COMPONENTS SHALL BE APPROVED AND LISTED BY UNDERWRITER'S LABS, AND SHALL BE SO LABELED FOR THE SERVICE INTENDED.

   A. ALL PANELS ARE TO BE MANUFACTURED PER DRAWING AND WRITTEN SPECIFICATIONS.

2. THE PUMP CONTROL PANEL SHALL BE FURNISHED COMPLETELY ASSEMBLED AND WIRED, WITH THE FOLLOWING MINIMUM FEATURES:

   A. STAINLESS STEEL ENCLOSURE, MINIMUM 14 GAUGE, TYPE 316 STAINLESS STEEL, WELDED SEAM, WITH WHITE POWDER COATED FINISH. ALL HARDWARE TYPE 316 STAINLESS STEEL, WITH CONTINUOUS PIANO HINGE, NEOPRENE GASKET, 3-POINT LATCH WITH PADLOCK HARDWARE AND DRIP SHIELD FOR NEMA 4X CONSTRUCTION. OUTSIDE DOOR SHALL BE BLANK WITH MINIMUM 7" HMI MOUNTED ON OR PROJECTING THROUGH DEAD FRONT HINGED INNER PANEL. HEAVY COMPONENTS SHALL BE MOUNTED ON AN ALUMINUM BACK-MOUNTING PANEL. INNER PANELS SHALL BE ALUMINUM. OUTER DOOR SHALL HAVE 9" X 11" STAINLESS STEEL POCKET FOR LOG BOOK, AND LATCH TO SECURE THE OUTER DOOR AND DEAD FRONT IN AN OPEN POSITION. THE TOP OF PANEL SHALL BE 5'-6" TO 6'-0" ABOVE THE WET WELL COVER. ALL PANELS, METER BOXES AND TELEMETRY BOXES ARE TO BE MOUNTED ON 316 STAINLESS STEEL STRUTS WITH 316 STAINLESS STEEL FASTENING DEVICES AND SHALL BE SUPPORTED BY AT LEAST 6" X 6" PRESTRESSED CONCRETE POSTS
   B. MAIN AND EMERGENCY CIRCUIT BREAKERS SHALL BE 3-POLE MECHANICALLY INTERLOCKED SUCH THAT BOTH CANNOT BE ENGAGED AT THE SAME TIME, AND SHALL BE THE SAME SIZE SQUARE D COMPONENTS.
   C. SERVICE RATED OUTSIDE FUSED DISCONNECT SWITCH ON REAR OF PANEL, NEMA 4X, STAINLESS STEEL, WITH AIC RATING EQUAL TO THE INCOMING SERVICE.
   D. GENERATOR RECEPTACLE SHALL BE PROVIDED.
   E. TWO (2) SEPARATE SINGLE POLE CIRCUIT BREAKERS FOR CONTROL CIRCUIT AND TELEMETRY.
   F. 20A DUPLEX RECEPTACLE GROUND FAULT INTERRUPTER TYPE WITH CIRCUIT BREAKER.
   G. SURGE/LIGHTING ARRESTOR ON INCOMING LINE TO BE ONE JOSLYN 9200-9A FOR 3 PHASE.
   H. CONTROLLER WITH OVERCURRENT PROTECTION, SHORT CIRCUIT PROTECTION AND DISCONNECT FOR EACH MOTOR, SQUARE D, OR "MAG GUARD".
   I. HAND, OFF, AUTOMATIC (HOA) SWITCH AND PUMP RUN LIGHT.
   J. 20/24V CONTROL TRANSFORMER FOR OPERATION OF LEVEL INSTRUMENTS.
   K. CABLES TO BE SEALED AT PANEL WITH A P.V.C. STRAIN RELIEF CONNECTOR. ALL ENTRIES INTO THE PANEL FROM WET WELL SHALL BE SEALED WITH GAS TIGHT CONDUIT SEAL OFFS.
   L. MINIMUM 8-1/2" X 11" SCHEMATIC AND PUMP DATA SHEET SHALL BE PERMANENTLY AFFIXED TO THE INTERIOR OF THE ENCLOSURE DOOR. THE DATA SHEET SHALL BE EXTRUDED VINYL HOMOPOLYMER LAMINATE.
   M. ALL CONDUITS TO WET WELL SHALL BE SCHEDULE 80 P.V.C. WITH 90 DEGREE ELECTRICAL SWEEP BENDS.
   N. ALL PANEL WIRING SHALL BE COLOR CODED AND NUMBERED TO CORRESPOND TO DRAWINGS. STANDARD COLORS SHALL BE BLACK FOR 120V SUPPLY, WHITE FOR NEUTRAL, GREEN FOR GROUND, AND RED FOR CONTROL USING 120V WITH BLUE FOR 24V CONTROL WIRING OR APPROVED EQUAL. MINIMUM SIZE #14 AWG COPPER. ALL EXTERNAL WIRING SHALL BE BROUGHT TO NUMBERED TERMINALS. ALL WIRING SHALL BE FRONT ACCESSIBLE. ALL RELAY BASES TO BE FRONT-MOUNTED AND WIRED WITH SCREW TERMINALS. NO SOLDERED CONNECTIONS PERMITTED. A VINYL PLASTIC LAMINATED 11" X 17" SCHEMATIC DRAWING SHALL BE PERMANENTLY FIXED INSIDE THE OUTER DOOR. A SEPARATE STICK ON PLASTIC LABEL SHALL SHOW THE MOTOR DATA; HP; R.P.M.; FULL LOAD AMPS; SERIAL NUMBERS; PUMP SIZE; IMPELLER NUMBER AND SIZE; DESIGN GPM AND TDH.
   O. ALL SERVICE ENTRANCE CONDUCTORS TO BE COPPER.
   P. SEE DRAWING FOR SEAL FAIL AND THERMALS, RTU POINTS, RELAYS, TIME DELAY RESET. (HIGH VOLTAGE CONTROL, LOW VOLTAGE CONTROL, PANEL LAYOUT).
   Q. THERMALS AND SEAL FAIL SHALL NOT INTERFERE WITH STATION OPERATION. R.T.U. BREAKER AND CONTROL BREAKER SHALL BE ON THE SAME PHASE TO AVOID A POSSIBLE DEAD SHORT CONDITION.
   R. PROVIDE PROSOFT CELL MODEM WITH CELL ANTENNA AND NECESSARY SOFTWARE FOR COMMUNICATIONS WITH SCADA.

LIFT STATION GENERAL ELECTRICAL PANEL REQUIREMENTS

1. PANEL TO BE EQUIPPED WITH FLUORESCENT LIGHT INSIDE.
2. NEMA RATED CLASS 8536 STARTERS TO BE SQUARE D.
3. STARTERS/CONTROL CIRCUITS SHALL BE 120V AC.
4. LEVEL INSTRUMENTS SHALL BE 24V AC ONLY WITH UNSPLICED CABLES INSTALLED IN A 2" CONDUIT (S.C.H. 80 P.V.C.).
5. CABLES/WIRES FOR EACH PUMP MOTOR SHALL BE UNSPLICED, INSTALLED IN A SEPARATE 2" CONDUIT (SCH 80 P.V.C.).
6. G.F.I. TO BE INSTALLED IN ENCLOSURE ON A SEPARATE BREAKER.
7. THE REMOTE TELEMETRY UNIT (RTU) SHALL BE ON A DEDICATED BREAKER.
8. CONTROL VOLTAGE SHALL BE ON A DEDICATED BREAKER.
9. POWER DISTRIBUTION BLOCKS TO BE USED.
10. TERMINAL STRIPS (30 POINTS MINIMUM) SHALL BE USED FOR INTERFACE BETWEEN RTU AND CONTROL CABINET.
11. AN INTERLOCK SHALL BE INSTALLED BETWEEN MAIN/EMERGENCY BREAKER.
12. EACH MOTOR SHALL HAVE A SEPARATE BREAKER.
13. PANEL TO INCLUDE MANUAL OVERRIDE OF SYSTEM IF TELEMETRY FAILS.
14. ALARM LEVEL INSTRUMENT SHALL BE POWERED OFF OF TELEMETRY STAND-BY BATTERY AND CAPABLE OF OPERATING OFF A 24V AC TRANSFORMER.
15. PUMP BREAKERS MUST PROVIDE THE ABILITY TO BE LOCKED AND TAGGED OUT.
16. A STAINLESS STEEL FUSED ELECTRICAL DISCONNECT SHALL BE PROVIDED BETWEEN THE DUKE METER AND THE CONTROL BOX.
17. A LIGHTNING AND SURGE ARRESTOR SHALL BE PROVIDED. IN ADDITION, ONE SPARE SHALL BE INCLUDED.
18. INSTALLATION MUST MEET ALL NEC AND CITY CODES.
19. CONTROL CABINET SHALL BE GROUNDED TO A SEPARATE 5/8 " X 20' COPPER GROUND ROD.
20. BREAKERS SHALL BE SQUARE D.
21. NEUTRAL BLOCK TO BE ISOLATED FROM CABINET AND SIZED PER CABINET WITH A MINIMUM OF 8 LUGS.
22. ALL CONDUITS ENTERING CONTROL PANEL, JUNCTION BOX, METER BASE AND MAIN SWITCH TO HAVE "O" RING SEAL WASHERS
23. SURGE SUPPRESSOR MUST AVE INDICATOR LIGHTS FOR EACH PHASE. 1 PHASE – 1 LIGHT, 3 PHASE – 3 LIGHTS

ELECTRICAL EQUIPMENT MOUNTING RACK ROOF CANOPY

1. PROVIDE A CANOPY INSTALLED OVER THE CONTROL PANEL AND APPURTENANT ELECTRICAL EQUIPMENT.
2. CANOPY SHALL BE SIZED TO PROJECT A MINIMUM OF 2' BEYOND THE PANEL'S SIDE AND REAR FACES AND A MINIMUM OF 6' BEYOND THE PANEL'S FRONT FACE.
3. LOW POINT OF ROOF CANOPY SHALL BE A MINIMUM OF 8' ABOVE THE TOP OF EQUIPMENT MOUNTING RACK SLAB ELEVATION.
4. CANOPY SHALL BE SLOPED TO THE REAR OF CONTROL PANEL ASSEMBLY. CANOPY SHALL BE INSTALLED IN ACCORDANCE WITH FLORIDA STATE BUILDING CODES AND CITY OF LARGO SET BACKS AND ORDINANCES.

LIFT STATION CONTROL PANEL AND COMPONENTS

1. RTU SHALL REMAIN OUTSIDE OF CONTROL CABINET AT EXISTING STATIONS DUE TO HIGH AMBIENT TEMPERATURE.
2. CONTROL PANEL STROBE LIGHT SHALL BE LED.
3. EQUIPMENT MOUNTING RACK SHALL INCLUDE MINIMUM 6" BY 6" CONCRETE POSTS. POSTS SHALL BE INSTALLED MINIMUM 4 FEET BELOW GROUND SURFACE AND SHALL PROJECT A MINIMUM OF 6 FEET ABOVE GRADE.
4. CONTROL PANEL UNISTRUT AND HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.
5. CONTROL PANEL SHALL BE LOCATED OUTSIDE OF THE NFPA-820 CLASS 1, DIVISION 1/2 ELECTRICALLY CLASSIFIED ENVELOPE AND SHALL INCLUDE A NEMA 4X, TYPE 316 STAINLESS STEEL ENCLOSURE.
6. EMERGENCY GENERATOR RECEPTACLE SHALL BE 200A, 250VDC, 600VAC RATED RUSSELLSTOLL J-LINE SYSTEM CONSISTING OF RECEPTACLE, HOUSING WITH 20 DEGREE ANGLE ADAPTER, WATERTIGHT SCREW COVER, GROUNDING STYLE 4P4W. PROVIDE MODEL JRS2044FR (MALE) RECEPTACLE WITH JB20 MOUTING BOX FOR 3" CONDUIT ENTRY, AND JAA20 ANGLE ADAPTER. TEST USING PORTABLE GENERATOR UNIT FROM CITY'S FLEET.
7. PUMP CONTROL PANEL CAN BE A COMBINATION PANEL THAT INCLUDES MOTOR STARTERS AND REQUIRES PRIOR APPROVAL FROM THE CITY.
8. CELL MODEM SHALL BE PROSOFT ICX35-HWC-A CELL GATEWAY WITH VERIZON SOFTWARE (ICX35-VZW).

PUMP STATION INSTALLATION

1. CONDUITS TO DUKE ENERGY SERVICE POINT SHALL BE RIGID ALUMINUM CONDUIT (RAC). ALL OTHER CONDUIT SHALL BE SCHEDULE 80 PVC.
2. MINIMUM CONDUIT SIZE FOR CABLES AND CONDUCTORS SHALL BE 2-INCH DIAMETER.
3. PROVIDE SEPARATE CONDUITS FOR EACH OF THE FOLLOWING: EACH PUMP UNIT'S POWER/CONTROL CABLE, LIQUID LEVEL SENSING INSTRUMENT CABLES, AND SPARE. ELECTRICAL CONDUIT PENETRATIONS THROUGH WET WELL WALL SHALL BE LOCATED ABOVE THE PUMPS WHICH THEY SERVICE TO PROMOTE EASE OF MAINTENANCE.

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INDEX NUMBER	DESCRIPTION
LS-100-B	**LIFT STATION GENERAL ELECTRICAL REQUIREMENTS (2 OF 2)**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

REMOTE TERMINAL UNIT REQUIREMENTS

1. REMOTE TERMINAL UNIT THE REMOTE TERMINAL UNIT (RTU) SHALL BE A MICROCOMPUTER–BASED DATA COLLECTION AND DISSEMINATION SUBSYSTEM. THE RTU SHALL BE ALLEN BRADLEY MICROLOGIX 1400 PLC AND MUST BE FULLY COMPATIBLE WITH THE EXISTING HYPERTAC 3 SOFTWARE AND VT SOFTWARE, AND MUST NOT REQUIRE ANY CHANGES IN THE HMI SOFTWARE.THE RTU SHALL COMMUNICATE WITH THE CENTRAL SITE VIA A CELLULAR MODEM LINK. THE RTU SHALL BE DESIGNED TO ACCOMMODATE PLUG–IN FUNCTION MODULES. THE SYSTEM SHALL BE CAPABLE OF BEING OUTFITTED, AT ANY TIME, WITH RTUS CAPABLE OF BEING CONFIGURED WITH UP TO FIFTEEN (15) FUNCTION MODULES PER RTU, WITH NO SOFTWARE OF FIRMWARE CHANGES TO THE SYSTEM. ALL SHEET METAL UTILIZED INSIDE THE ENCLOSURE MUST BE ANODIZED.
2. FUNCTION MODULES THE FUNCTION MODULES SHALL BE DESIGNED SO THEY DO NOT HAVE CONFIGURATION SWITCHES OR STRAPS AND MAY BE EASILY ADDED IN THE FUTURE. THE FUNCTION MODULES MUST BE DESIGNED WITH SURGE SUPPRESSION ON ALL INPUTS AND OUTPUTS. REPLACEMENT OF A FUNCTION MODULE SHALL NOT REQUIRE THE USE OF TOOLS OR THE REMOVAL OF ANY INTERFACE WIRES. THERE SHALL BE NO COMPONENTS ASSOCIATED WITH THE FUNCTION MODULE MOUNTED TO THE MOTHERBOARD (PASSIVE BACKPLANE). AN INTERLOCK SYSTEM SHALL BE PROVIDED TO PREVENT THE REMOVAL OF FUNCTION MODULES WITH THE POWER APPLIED. THE REMOTE TERMINAL UNIT SHALL SUPPORT A LOCAL SERIAL INTERFACE. THE LOCAL SERIAL INTERFACE SHALL PROVIDE LOCAL ACCESS TO ALL FUNCTIONS OF THE REMOTE TERMINAL UNIT. THE LOCAL SERIAL INTERFACE SHALL SUPPORT THE MONITORING OF THE RADIO COMMUNICATIONS LINK. THE RTUS SHALL BE ENCLOSED IN A NEMA 4X 316 STAINLESS STEEL ENCLOSURE PAINTED WHITE. THE RTUS SHALL MEET OR EXCEED THE QUALITY, RELIABILITY, PERFORMANCE AND VERSATILITY OF THOSE MANUFACTURED BY ALLEN BRADLEY –MICROLOGIX 1400 PLC.
3. CELL INTERFACE MODULE EACH REMOTE TERMINAL UNIT SHALL REQUIRE ONE CELL INTERFACE MODULE. THIS MODULE SHALL CONTROL THE THE POLLING SEQUENCE. IN THE EVENT OF TRANSMISSIONS OF MORE THAN TEN SECONDS THIS MODULE SHALL SHUT DOWN THE TRANSMITTER. THIS PROTECTION FUNCTION SHALL BE IMPLEMENTED IN HARDWARE. FIRMWARE IMPLEMENTATION WILL NOT BE ACCEPTABLE. THE CELL INTERFACE MODULE SHALL HAVE A SERVICE PORT TO PROVIDE COMMUNICATIONS LINK MONITORING. THE SERVICE PORT SHALL ALSO PROVIDE THE CAPABILITY TO DIRECTLY MONITOR AND/OR CONTROL EACH MODULE IN THE REMOTE TERMINAL UNIT. THE CELL INTERFACE MODULE UTILIZED AT THE REMOTE TERMINAL UNITS SHALL BE INTERCHANGEABLE WITH THE CELL INTERFACE MODULE AT THE CENTRAL SITE. THE SYSTEM SHALL BE CAPABLE OF UTILIZING UP TO 250 CELL INTERFACE MODULES PER COMMUNICATIONS LINK AND UP TO 15 FUNCTIONS PER CELL INTERFACE MODULE. ALL COMMUNICATIONS SHALL BE IN ASCII AND UTILIZE AN ERROR DETECTING AND CORRECTION DATA TRANSFER PROTOCOL. COMMUNICATIONS BETWEEN THE CENTRAL SITE AND THE REMOTE TERMINAL UNITS SHALL HAVE A MINIMUM SPEED OF 1200 BITS/SECOND. EACH CELL INTERFACE MODULE SHALL HAVE AN CELL ANTENNA MOUNTED TO IT.

REMOTE TERMINAL UNIT REQUIREMENTS

1.1 PUMP CONTROL MODULE (IF REQUIRED)
THE PUMP CONTROL MODULE SHALL BE A MICROPROCESSOR-BASED MULTI-PUMP CONTROLLER MODULE DESIGNED FOR USE WITH THE TELEMETRY SYSTEM. AS A MINIMUM, THE PUMP CONTROL MODULE SHALL HAVE THE FOLLOWING FEATURES:

1. LOCAL AUTOMATIC CONTROL FROM LEVEL TRANSDUCERS.
2. LOCAL MANUAL CONTROL PROVIDED BY HOA SWITCHES. THE HOA SWITCHES SHALL FUNCTION WITH THE LEVEL TRANSDUCER TO PROVIDE EXTRA OPERATIONAL FLEXIBILITY, FOR INSTANCE, ONE PUMP CAN BE TAKEN OUT OF SERVICE FOR REPAIR BY THE HOA SWITCH, AND THE LEVEL TRANSDUCER WILL CONTROL THE REMAINING PUMP(S).
3. REMOTE CONTROL FROM THE CENTRAL SITE COMPUTER SHALL PROVIDE INDIVIDUAL PUMP OVERRIDES, STATION AND ALARM DISABLERS.
4. TRIPLEX/DUPLEX/SIMPLEX CONFIGURABLE. THE MODULE SHALL AUTOMATICALLY SENSE THE STATION TYPE AND CONFIGURE ITSELF.
5. TRIPLEX CONFIGURATION SHALL USE EMERGENCY HIGH, LAG 2, LAG 1, OFF AND EMERGENCY LEVEL TRANSDUCER INPUTS.
6. DUPLEX AND SIMPLEX CONFIGURATIONS SHALL USE EMERGENCY HIGH, LEAD, OFF AND EMERGENCY LOW LEVEL ALARM.
7. THE ALTERNATOR FUNCTION SHALL ALTERNATE AROUND PUMPS THAT DON'T ALTERNATE WHEN CALLED. THE ALTERNATOR SHALL ALLOW THE OPERATOR TO OVERRIDE A PUMP ON OR OFF WITH THE HOA SWITCHES AND THE ALTERNATOR WILL STILL PROVIDE ALTERNATOR CONTROL OVER THE REMAINING PUMP(S).
8. THE PHASE MONITOR FUNCTIONS SHALL:
   a) PROVIDE TRANSFORMER ISOLATION
   b) DETECT LOSS OF PHASE, PHASE REVERSAL, AND LOW LEG PHASE PROBLEMS;
   c) PROVIDE AUTOMATIC CALIBRATION FOR 220 OR 440V AC THREE PHASE POWER INPUTS.
9. ALARM LIGHT AND BELL OUTPUTS CAPABLE OF DRIVING 120V AC LOADS TO 1 AMP.
10. LOCAL INPUT FOR ALARM SILENCE SWITCH.
11. PUMPS/STARTER/BREAKER FAULT ALARMS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER. THE ALARMS SHALL BE ACTIVATED WHEN A PUMP IS CALLED TO RUN BUT FAILS TO RUN, OR IF THE PUMP IS TURNED OFF BY THE PCM BUT CONTINUES TO RUN.
12. HOA SWITCH ALARMS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER. ALARMS SHALL INDICATE THAT AN HOA SWITCH HAS BEEN LEFT IN THE HAND OR OFF POSITION.
13. PUMP RUN STATUS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER.
14. RTU POWER STATUS SHALL BE REPORTED BACK TO THE CENTRAL SITE COMPUTER.
15. LED INDICATORS SHALL BE PROVIDED FOR:
    a) RTU POWER
    b) ALARM BELL
    c) USER-DEFINED INPUT
    d) MODULE POWER
    e) TRANSMIT AND RECEIVE DATA
    f) PHASE ALARM/CALIBRATION
    g) PROCESSOR FAULT
    h) 1 LEVEL TRANSDUCER INPUT
       1 BACKUP LEVEL TRANSDUCER INPUT
    i) PUMPS ON/OFF
16. ALL INPUTS AND OUTPUTS SHALL BE OPTICALLY OR MAGNETICALLY ISOLATED AND SURGE SUPPRESSED WITHOUT ADDITIONAL RELAYS.

1.2 POWER SUPPLY
ALL FUNCTION MODULES IN THE REMOTE TERMINAL UNIT SHALL RUN OFF DC VOLTAGE FROM +7.5 VOLTS TO +13 VOLTS. THE POWER SUPPLY MODULE SHALL SUPPLY +12 VOLTS. A BATTERY BACKUP SHALL BE PROVIDED TO OPERATE THE SYSTEM FOR A MINIMUM OF 120 MINUTES IN THE EVENT OF POWER FAILURE. THE POWER SUPPLY SHALL BE SURGE PROTECTED. THE POWER SUPPLY SHALL BE SHORT CIRCUIT PROTECTED BY CURRENT LIMITING. NORMAL OPERATION SHALL AUTOMATICALLY RESUME WHEN THE SHORT CIRCUIT OVERLOAD IS REMOVED. THE POWER SUPPLY SHALL BE SIZED TO OPERATE THE SYSTEM WITH THE BATTERY REMOVED. THE POWER SUPPLY MODULE SHALL PROVIDE A BATTERY BACKED, ISOLATED BIAS VOLTAGE SOURCE. THE CIRCUIT BREAKER FOR THE POWER SUPPLY MODULE SHALL BE PART OF THE POWER SUPPLY MODULE. NEITHER THE USE OF TOOLS NOR THE DISCONNECTION OF ANY WIRES SHALL BE REQUIRED TO REMOVE THE POWER SUPPLY MODULE.

1.3 BATTERIES
THE REMOTE TERMINAL SHALL HAVE THE UNINTERRUPTABLE POWER SOURCE FUNCTION BUILT IN. THE POWER SUPPLY WILL KEEP THE BATTERIES AT A FLOAT CHARGE. THE BATTERIES SHALL NOT BE DAMAGED BY DEEP DISCHARGE.

1.4 ENCLOSURES
RTUS SHALL BE HOUSED IN NEMA 4X 316 STAINLESS STEEL ENCLOSURES, ACID-DIPPED WITH WHITE POWDER COAT FINISH. ENCLOSURE SHALL ACCOMMODATE THE PLUG-IN MODULES TO MEET THE REQUIREMENTS PLUS AT LEAST ONE ADDITIONAL MODULE FOR EXPANSION. ENCLOSURE SHALL BE CAPABLE OF BEING LOCKED.

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INDEX NUMBER	DESCRIPTION
LS-110-B	**REMOTE TERMINAL UNIT REQUIREMENTS (2 OF 2)**

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April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

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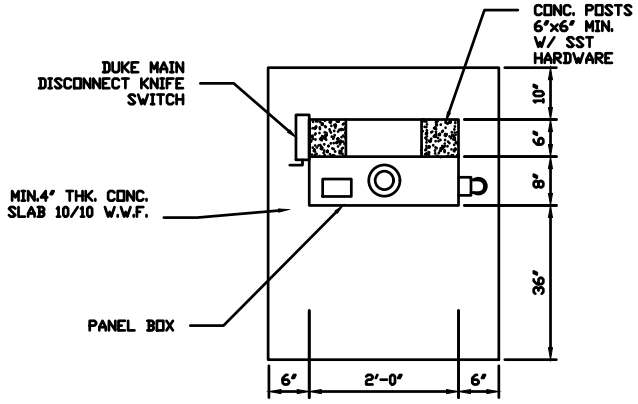
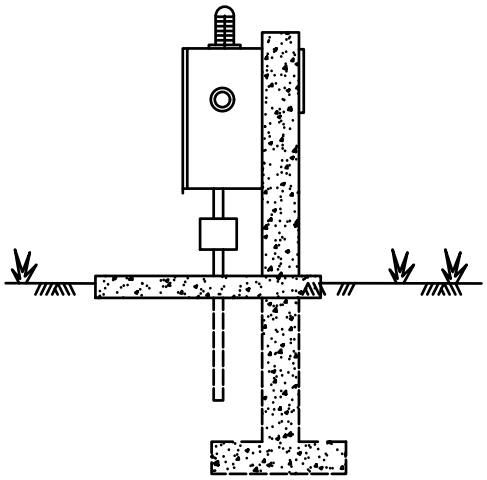
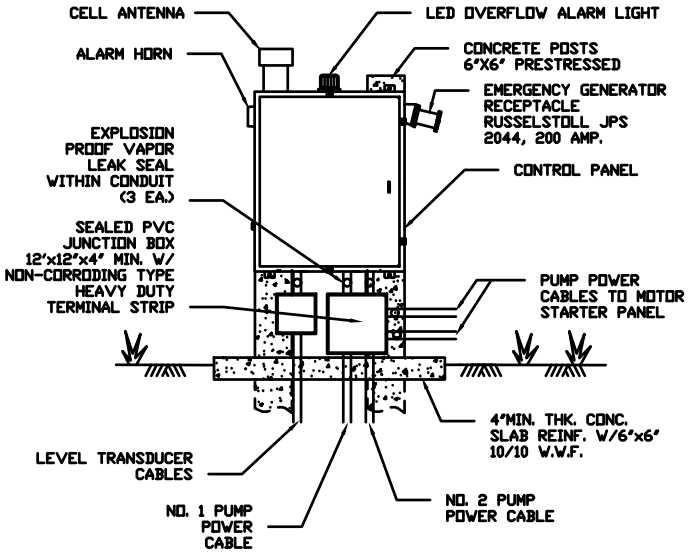
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



PLAN



SIDE ELEVATION



FRONT ELEVATION

DRAWING NOTES:

1. MOUNT BOTTOM OF PANEL ENCLOSURE A MINIMUM OF 36" ABOVE CROWN OF ADJACENT ROADWAY.
2. CANOPY NOT SHOWN.
3. LOCATE CONTROL PANEL SUCH THAT POWER METER DIALS ARE VISIBLE FROM OUTSIDE OF FENCED AREA.
4. PITCH SLAB TO SLOPE AWAY FROM WET WELL.
5. ALL ELECTRICAL COMPONENTS SHALL BE SIZED TO SUIT MOTOR LOADS.
6. PANEL SHALL INCLUDE SIGNAGE AND LABELING AS REQUIRED.
7. GROUNDING NOT SHOWN. PROVIDE MINIMUM 5/8" X 20' COPPERCLAD GROUND ROD WITH BRONZE CONNECTOR. LEAVE TOP OF ROD CONNECTION VISIBLE ABOVE SLAB.

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INDEX NUMBER	DESCRIPTION
LS-120	**LIFT STATION CONTROL PANEL MOUNTING DETAIL**

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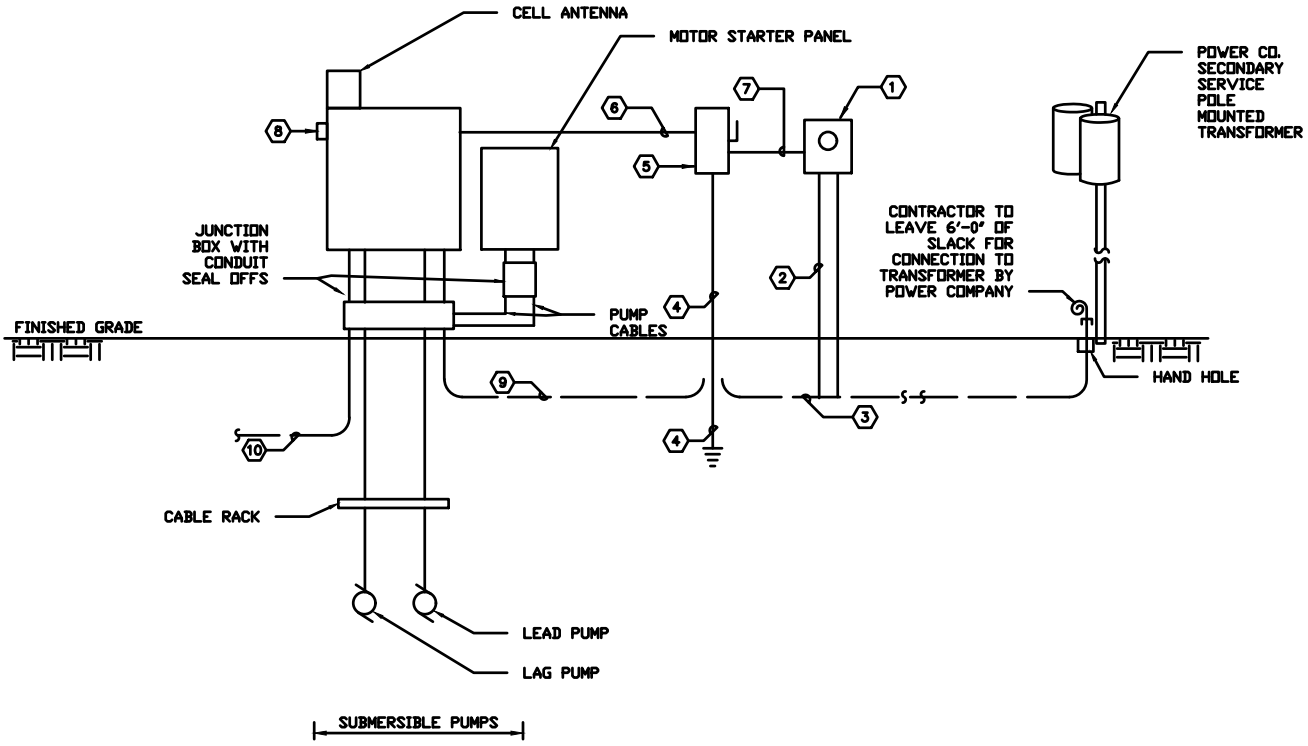

DRAWING NOTES:

1. FURNISH AND INSTALL FEED-THRU METER SOCKET/CABINET. INSTALL AT MINIMUM HEIGHT ALLOWED BY DUKE ENERGY.
2. PROVIDE COPPER (CU) BARE GROUND CONDUCTOR MIN. 1 1/4" SCHEDULE 80PVC CONDUIT FOR METER CABINET BONDING IN ACCORDANCE WITH DUKE REQUIREMENTS.
3. UNDERGROUND SECONDARY SERVICE: PROVIDE CU (THWN) MIN. 1/2" SCHEDULE 80 PVC CONDUIT UNDERGROUND AND STUB-UP AT TRANSFORMER FOR CONNECTION TO SERVICE BY POWER COMPANY MAINTAIN 36" MINIMUM COVER AND CALL FOR DUKE ENERGY INSPECTION AND ACCEPTANCE PRIOR TO BACKFILLING OF TRENCH. COORDINATE EXACT LOCATION OF POWER POLE WITH DUKE ENERGY FOR DISTANCE TO SERVICE MAIN. SERVICE RUN DESIGNED FOR DISTANCE NO GREATER THAN 300'. CONTRACTOR TO PROVIDE LARGER CONDUIT AND CONDUCTORS TO LIMIT VOLTAGE DROP TO 3% MAXIMUM.
4. PROVIDE CU BARE GROUNDING CONDUCTOR IN MIN. 1 1/2" SCHEDULE 80 PVC CONDUIT TO METALLIC COLD WATER PIPE. TWO DRIVEN COPPERWELD GROUND RODS.
5. PROVIDE "MAIN SERVICE" STAINLESS STEEL HEAVY DUTY SERVICE ENTRANCE RATED FUSED DISCONNECT SWITCH: NEMA4X ENCLOSURE. INSTALL AT MINIMUM/PRACTICAL HEIGHT ALLOWED BY LOCAL BUILDING DEPARTMENT.
6. PROVIDE THWN CU EQUIPMENT GR MIN 1 1/2" CONDUIT FROM LOAD SIDE OF MAIN DISCONNECT SWITCH TO CONTROL PANEL. ROUTE CONDUIT FROM REAR OF DISCONNECT SWITCH TO REAR OF CONTROL PANEL.
7. PROVIDE THWN CU MIN 1" CONDUIT FROM METER TO LINE SIDE OF MAIN DISCONNECT SWITCH.
8. PROVIDE SURGE SUPPRESSOR. PROVIDE FUSING, AND CONNECT TO LINESIDE OF MAIN CIRCUIT BREAKER WITH MINIMUM LENGTH OF CONDUCTORS, IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS.
9. PROVIDE CU BARE GROUND CONDUCTOR MIN 1" SCHEDULE 80 PVC CONDUIT FOR CONTROL PANEL GROUNDING. PROVIDE BURNDY TYPE GB GROUND CONNECTION, OR EQUIVALENT, AT CONTROL PANEL.
10. TSP 3/4" CONDUIT FROM CONTROL PANEL TO FLOW METER.

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INDEX NUMBER	DESCRIPTION
LS-130	**TYPICAL POWER RISER DIAGRAM**

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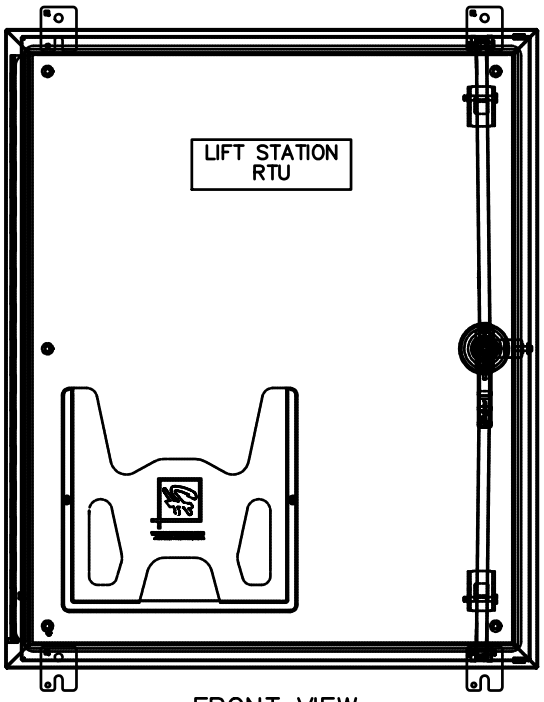
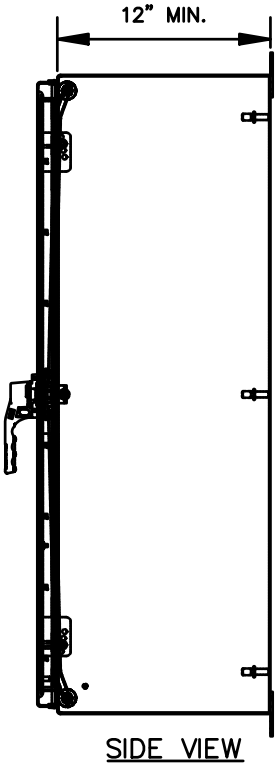
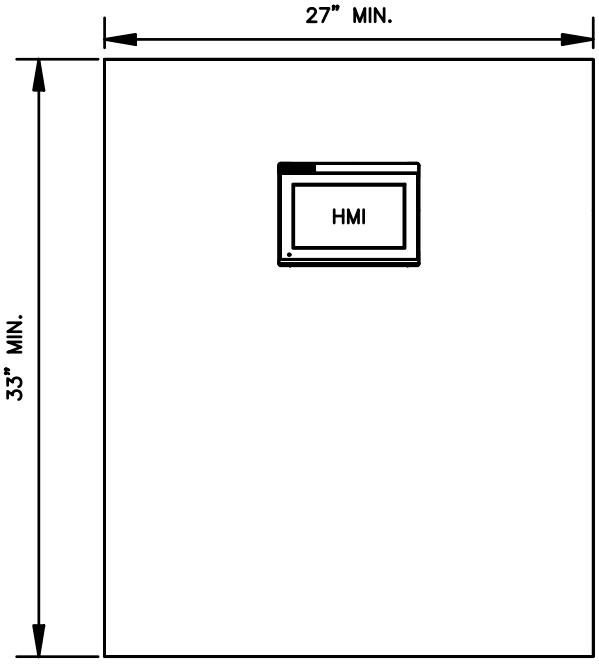


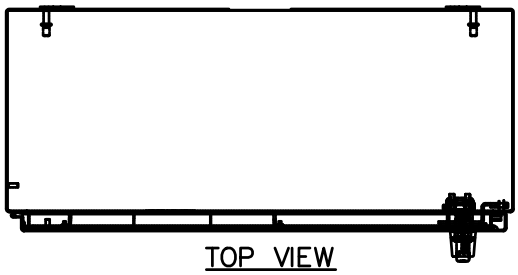
FRONT VIEW



SIDE VIEW



BACK VIEW



TOP VIEW

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INDEX NUMBER	DESCRIPTION
LS-140	**TYPICAL LIFT STATION CONTROL PANEL ELEVATION**

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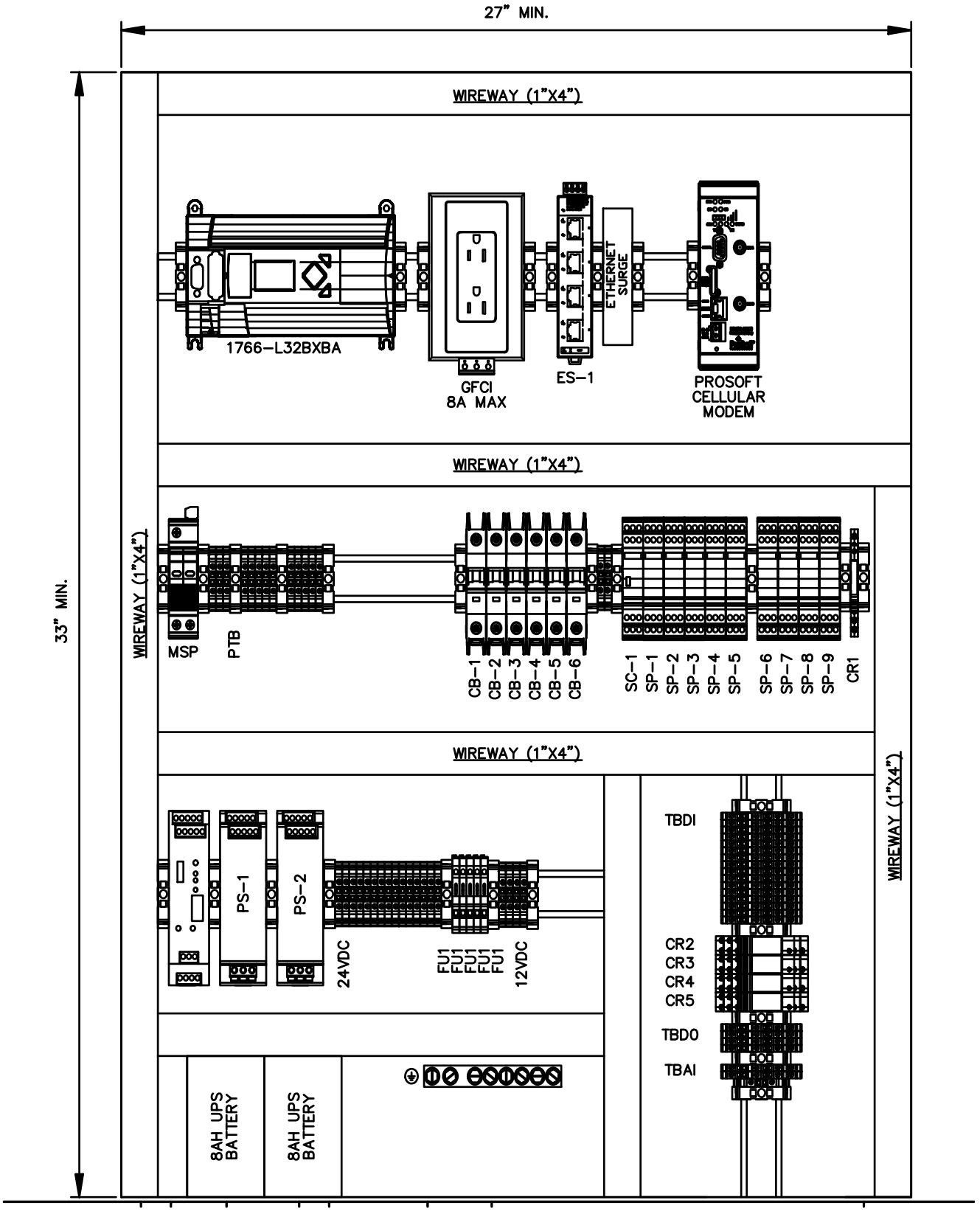

RTU PANEL INTERIOR DETAILS

(N.T.S.)

City of Largo - Engineering Services Department 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER **LS-150**	DESCRIPTION **TYPICAL LIFT STATION CONTROL PANEL INTERIOR LAYOUT**
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LIFT STATION RTU - BILL OF MATERIALS

MANUFACTURER	CATALOG NUMBER	DESCRIPTION
HOFFMAN	A36H3012SS6LP3PT	MINIMUM 36"H X 30"W X 12"D NEMA 4X 316SS POWDER COATED WHITE 3PT LATCH PADLOCKABLE, CONTINUOUS HINGE
HOFFMAN	A36P30AL	MINIMUM 33" X 27" BACK-PANEL ALUMINUM
HOFFMAN	ANADFK	WALL MOUNT ENCLOSURE SWING OUT PANEL KIT
ALLEN BRADLEY	1766-L32BXBA	MICROLOGIX 1400 CONTROLLER, 20 INPUTS, 12 OUTPUTS, 24VDC, DIGITAL AND ANALOG
ALLEN BRADLEY	1489-M1C200	20 AMP BREAKER SINGLE POLE
ALLEN BRADLEY	1489-M1C100	10 AMP BREAKER SINGLE POLE
ALLEN BRADLEY	1489-M1C050	5 AMP BREAKER SINGLE POLE
ALLEN BRADLEY	1489-M1C020	2 AMP BREAKER SINGLE POLE
ALLEN BRADLEY	2711R-T7T	7" PANELVIEW 800 GRAPHIC TERMINAL 800X480 WVGA LCD TOUCHSCREEN. 24VDC POWER 256 MC OF RAM AND INTERNAL STORAGE.
PHOENIX CONTACT	2800768	SUPPLY AND REMOTE MODULE FOR SURGE PROTECTOR
PHOENIX CONTACT	2800983	4-CHANNEL 24VDC SURGE SUPRESSOR BASE ELEMENT AND PLUG WITH STATUS INDICATOR (DISCRETE)
PHOENIX CONTACT	2800980	2-CHANNEL 2WIRE 24VDC SURGE SUPRESSOR BASE ELEMENT AND PLUG WITH STATUS INDICATOR FOR 2 WIRE FLOATING SIGNALS (ANALOG)
PHOENIX CONTACT	2839185	PT 2X1VA-120AC-ST 2 CHANNEL SURGE PLUG 120VAC
PHOENIX CONTACT	2839282	PT-BE/FM BASE ELEMENT FOR SURGE
PHOENIX CONTACT	2859479	TYPE 2 SINGLE PHASE SURGE ARRESTOR FOR MAIN POWER
PHOENIX CONTACT	2320212	24VDC INPUT/ 24VDC 5A OUTPUT UNINTERRUPTIBLE POWER SUPPLY WITH IQ TECHNOLOGY
PHOENIX CONTACT	2967604	24VDC MINIATURE RELAY MODULE 1NO CONTACT FOR HIGH SWITCH ON CURRENTS UP TO 130A
PHOENIX CONTACT	2966197	120VAC/110VDC MINIATURE RELAY MODULE SPDT
PHOENIX CONTACT	2866750	QUINT 24VDC 5A POWER SUPPLY 1-PHASE
PHOENIX CONTACT	2866475	TRIO 12VDC 5A POWER SUPPLY 1-PHASE
PHOENIX CONTACT	2891152	5 PORT RJ45 NETWORK SWITCH 10/100
PHOENIX CONTACT	2800021	COAXIAL ANTENNA SURGE LAMBDA/4 TECHNOLOGY N CONNECTORS SOCKET-SOCKET
PHOENIX CONTACT	3044102	TERMINAL BLOCK
PHOENIX CONTACT	3047028	TERMINAL BLOCK END BARRIER
PHOENIX CONTACT	3030271	TERMINAL BLOCK JUMPERS
PHOENIX CONTACT	3044636	2 TIER TERMINAL BLOCK
PHOENIX CONTACT	3047293	2 TIER TERMINAL BLOCK END BARRIER
PHOENIX CONTACT	3030213	2 TIER TERMINAL BLOCK JUMPERS
PHOENIX CONTACT	5600462	DIN RAIL MOUNT DUPLEX GFCI RECEPTACLE 15A
PHOENIX CONTACT	3000540	FUSED TERMINAL W/ 24VDC INDICATOR
PHOENIX CONTACT	3000543	FUSED TERMINAL END COVER
PHOENIX CONTACT	3044128	GROUND TERMINAL BLOCK, UT 4-PE
PHOENIX CONTACT	2881007	DT-LAN-CAT.6+ ETHERNET SURGE PROTECTOR
SEIFERT	400100	LED ENCLOSURE LIGHT 24-265V WITH ON/OFF SWITCH
SEIFERT	400711	3 METER POWER CABLE LED CABINET LIGHT
PROSOFT	ICX35-HWC-A	INDUSTRIAL CELLULAR GATEWAY 4G LTE AND 3GE
PROSOFT	A072703S-0BH	3 DBI OMNI RP SMA AT END OF 5' PIGTAIL
PROSOFT	ICX35-VZW	FACTORY INSTALLED VERIZON INTERNAL RADIO SOFTWARE
MERSEN	GSB2	2 AMP FAST ACTING FUSE 5 X 20 MM
MERSEN	GSB1	1 AMP FAST ACTING FUSE 5 X 20 MM
MERSEN	GSB1/2	0.5 AMP FAST ACTING FUSE 5 X 20 MM
GIGAMEDIA	CAT5E025FTBBLU	5 FT CAT5E ETHERNET CABLE BLUE

NOTE: ANY CHANGE IN MATERIALS

REQUIRES PRIOR APPROVAL OF CITY.

City of Largo - Engineering Services Department
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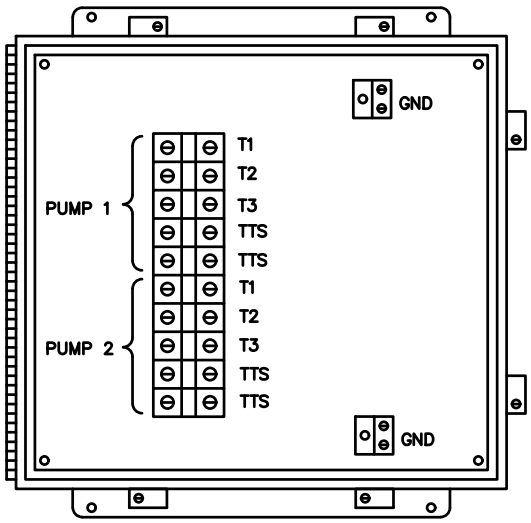
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
LS-160	TYPICAL LIFT STATION CONTROL PANEL BOM

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards
CITY ENGINEERING DIRECTOR: JERALD WOLOSZYNSKI, P.E.	ASST. ENGINEERING DIRECTOR: RAFAL CIESLAK, P.E.	

RTU TERMINAL STRIP (TB2)

T1	
T2	
T3	
T4	M1 INPUT LEAD
T5	M2 INPUT LEAD
T6	M1 START
T7	M2 START
T8	MS POWER
T9	ALARM SILENCE
T10	ALARM POWER
T11	ALARM HORN
T12	ALARM LIGHT
T13	
T14	
T15	
T16	
T17	
T18	24Vac POWER
T19	24Vac NEUTRAL
T20	HIGH LEVEL
T21	LAG PUMP ON
T22	LEAD PUMP ON
T23	PUMPS OFF



JUNCTION BOX, NEMA 4X S.S.
DOOR REMOVED TO SHOW INSIDE LAYOUT

LEGEND

AH _ ALARM HORN
AL _ ALARM LIGHT
ASB _ ALARM SILENCE BUTTON
CCB _ CONTROL CIRCUIT BREAKER
DPDT _ DOUBLE POLE DOUBLE THROW
DRB _ DUPLEX RECEPTACLE BREAKER
ETM _ ELAPSED TIME METER
F _ FUSE
FB _ FUSE BLOCK
FL _ FLASHER
GFDR _ GROUND FAULT DUPLEX RECEPTACLE
GND _ GROUND
GR _ GENERATOR RECEPTACLE
HOA _ HAND-OFF-AUTO SELECTOR SWITCH
MB _ MOTOR BREAKER
MCB _ MAIN CIRCUIT BREAKER
MS _ MOTOR STARTER
OL _ OVERLOAD
PB _ PUSH BUTTON
PDB _ POWER DISTRIBUTION BLOCK
PCU _ PUMP CONTROL MODULE
PL _ PILOT LIGHT
PM _ PHASE MONITOR
R _ RELAY
RL _ RUNNING LIGHT
RTU _ REMOTE TELEMETRY UNIT
T _ TERMINAL
TB _ TERMINAL BLOCK
TLS _ TROUBLE LIGHT SWITCH
TTS _ THERMAL TERMINAL STRIP
XDUCER TRANSDUCER
XFMR _ TRANSFORMER

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INDEX NUMBER
LS-170

DESCRIPTION
TYPICAL LIFT STATION RTU TERMINAL STRIP

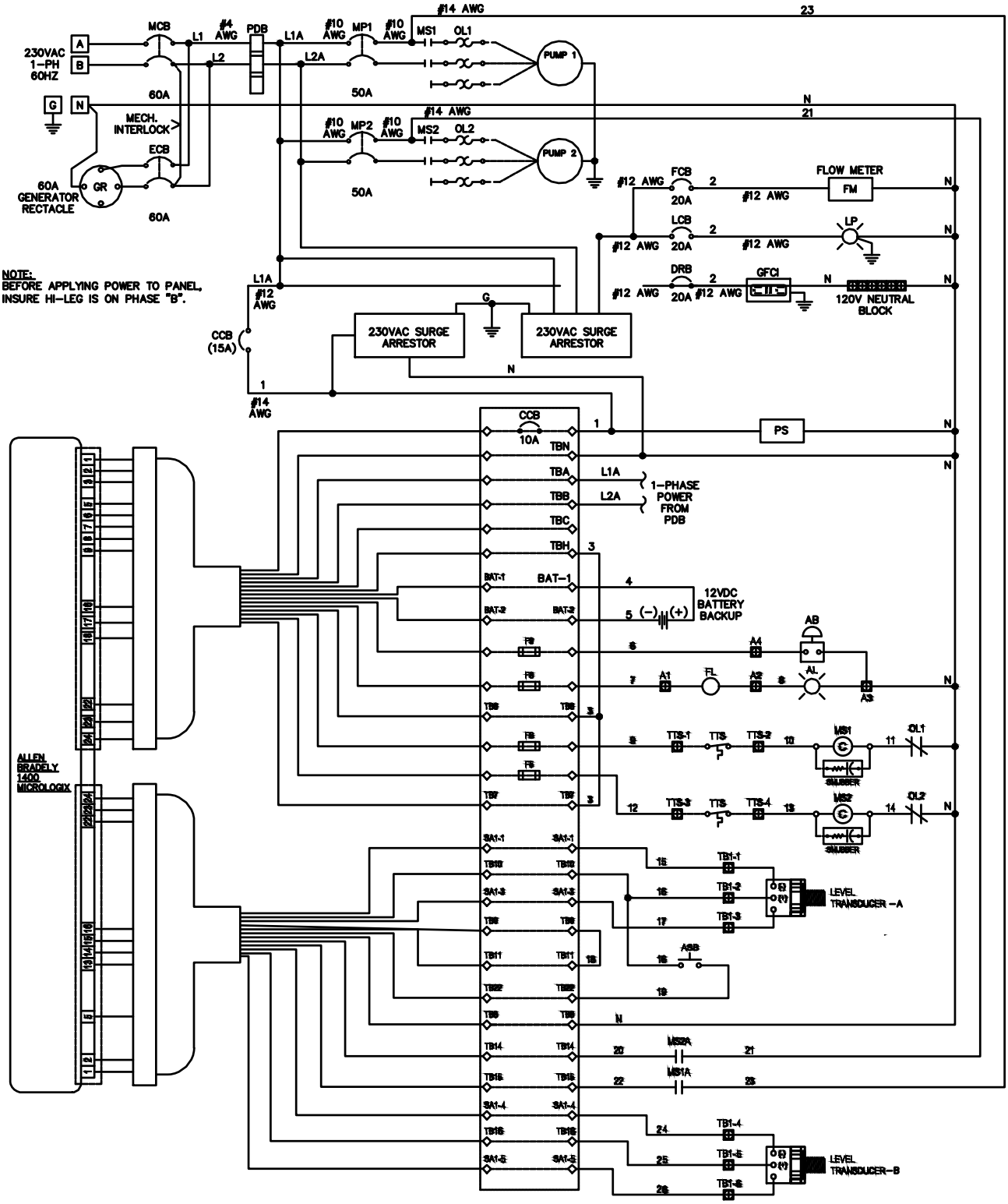
PUBLICATION DATE
April 18, 2023

DRAWING SCALE
N.T.S.

TITLE
Engineering Design and Construction Standards

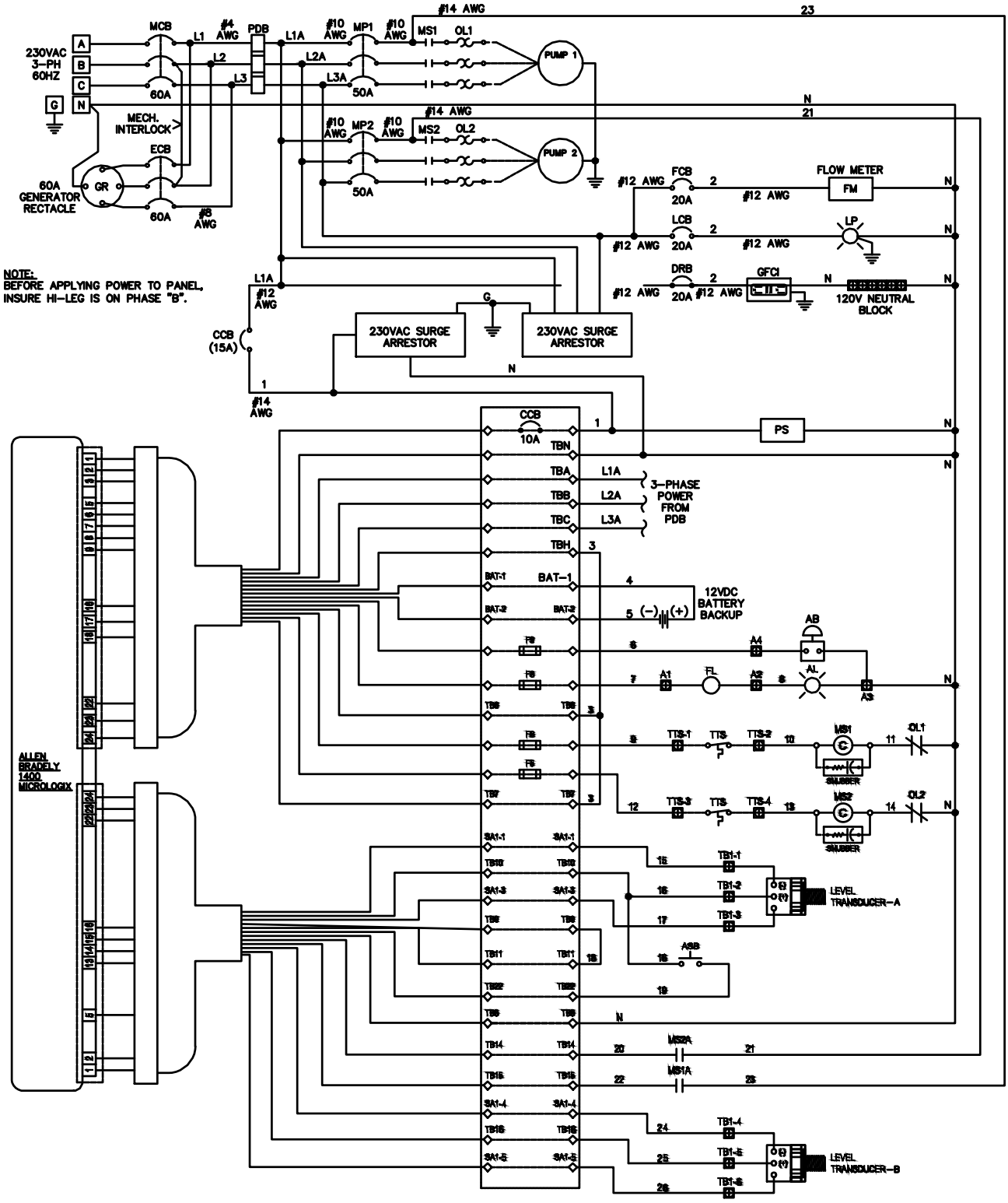
CITY ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.

ASST. ENGINEERING DIRECTOR
RAFAL CIESLAK, P.E.



STANDARD LIFT STATION WIRING DIAGRAM

City of Largo - Engineering Services Department 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER **LS-180**	DESCRIPTION **230V/1PH PANEL WIRING DIAGRAM**
PUBLICATION DATE April 18, 2023	DRAWING SCALE N.T.S.		TITLE **Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**		



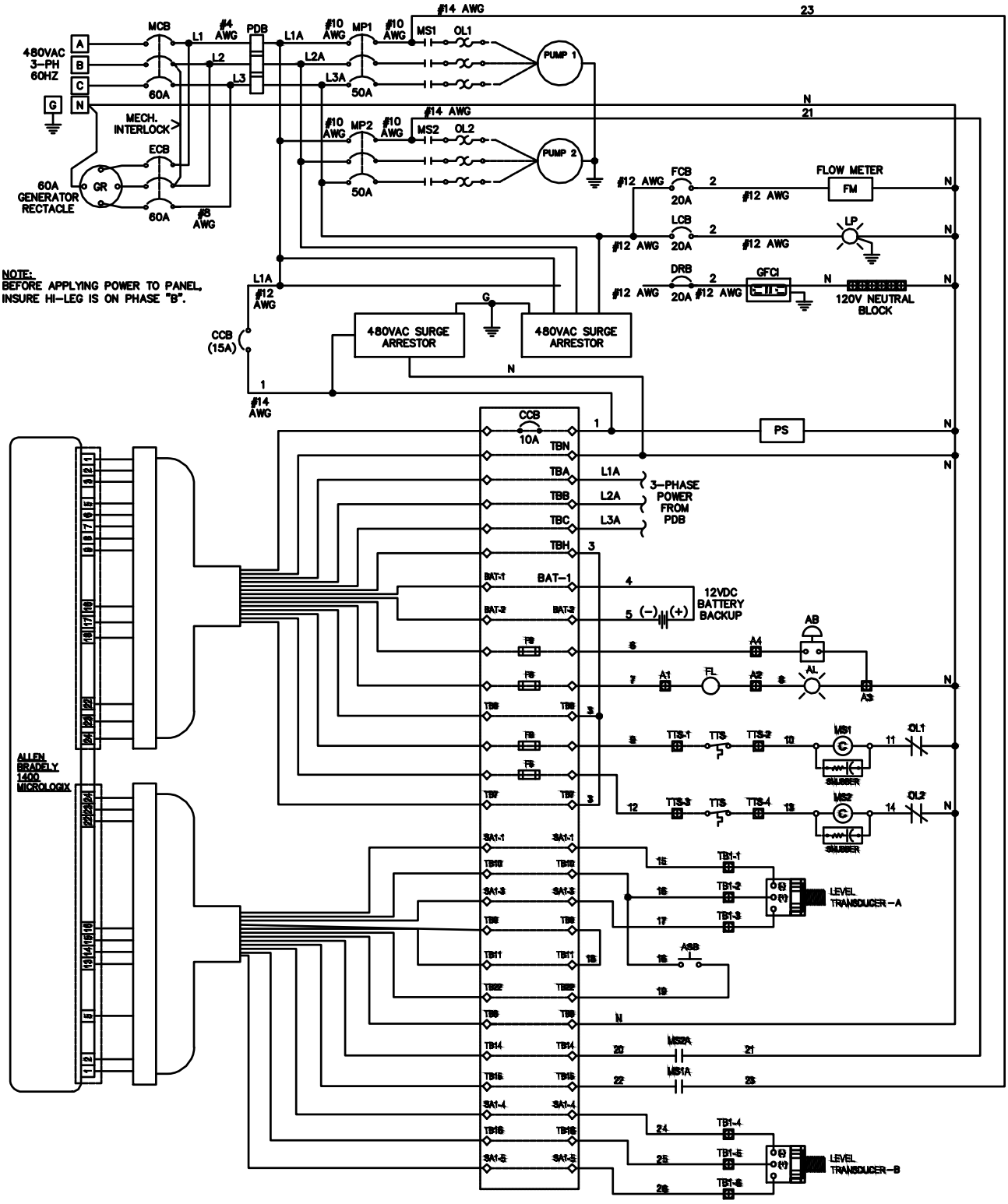
STANDARD LIFT STATION WIRING DIAGRAM

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
LS-190	**230V/3PH PANEL WIRING DIAGRAM**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



STANDARD LIFT STATION WIRING DIAGRAM

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
LS-200	**480V/3PH PANEL WIRING DIAGRAM**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

PRIVATE LIFT STATION REQUIREMENTS

GENERAL

1. PRIVATE LIFT STATIONS ARE LIFT STATIONS BEING CONSTRUCTED BY PRIVATE ENTITIES THAT ARE WITHIN THE CITY'S SERVICE AREA AND SUBJECT TO OWNER ACCEPTANCE.
2. PRIVATE LIFT STATIONS SHALL BE PRE-FABRICATED PACKAGE SYSTEMS.
3. PRIVATE LIFT STATIONS AND CONTROLS SHALL BE BASED ON A PACKAGE SYSTEM SUPPLIED BY TECHNICAL SALES CORPORATION, 4621 N. HALE AVENUE, TAMPA, FL 33614; OR APPROVED EQUAL.

WET WELL

1. WET WELL SHALL BE CONSTRUCTED OF FIBERGLASS, HDPE, OR PRECAST CONCRETE.
2. WET WELL STRUCTURE SHALL BE RATED FOR H-20 TRAFFIC LOADING.
3. FIBERGLASS OR HDPE WET WELLS SHALL BE ONE PIECE CONSTRUCTION WITH INTEGRAL BOTTOM, WALLS, AND UPPER FLANGE.
4. WET WELL UPPER FLANGE SHALL INCLUDE DOUBLE LEAF ALUMINUM FLOOR ACCESS DOOR, WITH A MINIMUM 36" X 48" CLEAR OPENING. FLOOR ACCESS DOORS SHALL INCLUDE HASP LOCKING DEVICE AND HOLD OPEN SAFETY ARM. ALL HARDWARE SHALL BE TYPE 304 STAINLESS STEEL.

VALVE VAULT

1. VALVE VAULT SHALL BE CONSTRUCTED OF FIBERGLASS, HDPE, OR PRECAST CONCRETE.
2. VALVE VAULT STRUCTURE SHALL BE RATED FOR H-20 TRAFFIC LOADING.
3. FIBERGLASS OR HDPE VALVE VAULT SHALL INCLUDE INTEGRAL BOTTOM AND WALLS.
4. VALVE VAULT INTERIOR SHALL BE A MINIMUM OF 48"X48"X36".
5. PROVIDE ALUMINUM FLOOR ACCESS DOOR, WITH A MINIMUM 48" X 48" CLEAR OPENING. FLOOR ACCESS DOORS SHALL INCLUDE HASP LOCKING DEVICE AND HOLD OPEN SAFETY ARM. ALL HARDWARE SHALL BE TYPE 304 STAINLESS STEEL.

ACCESSORIES

1. GUIDE RAILS, UPPER GUIDE RAIL BRACKETS, CABLE HOLDER, ANCHOR BOLTS, AND PUMP LIFTING CHAINS SHALL BE PROVIDED AS TYPE 304 STAINLESS STEEL.

VALVES

1. ISOLATION VALVES SHALL BE PLUG VALVES OR RESILIENT SEAT GATE VALVES.
2. CHECK VALVES SHALL BE LEVER AND WEIGHT TYPE SWING CHECK VALVES

PIPING

1. PUMP DISCHARGE PIPING SHALL BE SCHEDULE 80 PVC MINIMUM 4" DIAMETER.

PUMPS

1. PROVIDE SUBMERSIBLE, NON-CLOG, SOLIDS HANDLING WASTEWATER PUMPING EQUIPMENT.
2. PUMPS SHALL BE MANUFACTURED BY FLYGT, EBARA, OR EQUAL.
3. PUMP MOTOR SHALL BE RATED FOR NO LESS THAN 20 STARTS PER HOUR.
4. AIR FILLED MOTOR SHALL INCLUDE CLASS H INSULATION.
5. PUMP SHAFT HORSEPOWER (BHP) SHALL NOT EXCEED RATED MOTOR HORSEPOWER THROUGHOUT THE ENTIRE OPERATING RANGE OF THE PUMP PERFORMANCE CURVE.

FLOAT SWITCHES

1. FLOAT SWITCHES SHALL BE AS MANUFACTURED BY SJE-RHOMBUS OR APPROVED EQUAL.
2. PROVIDE FLOATS WITH MINIMUM 30 FEET OF MANUFACTURER SUPPLIED CABLE.
3. FLOATS SHALL BE UL LISTED AND INTRINSICALLY SAFE WITH FM APPROVAL.
4. EACH FLOAT SHALL BE TAGGED APPROPRIATELY FOR EASE OF IDENTIFICATION. PROVIDE NYLON STRIPS FOR HANGING ON THE RACK HOOKS. TERMINATION/JUNCTION BOX SHALL BE PROVIDED, AS REQUIRED.

CONTROL PANEL

1. PROVIDE FIBERGLASS NEMA 4X ENCLOSURE.
2. PANEL MANUFACTURER SHALL BE A UL LISTED SHOP.

City of Largo - Engineering Services Department
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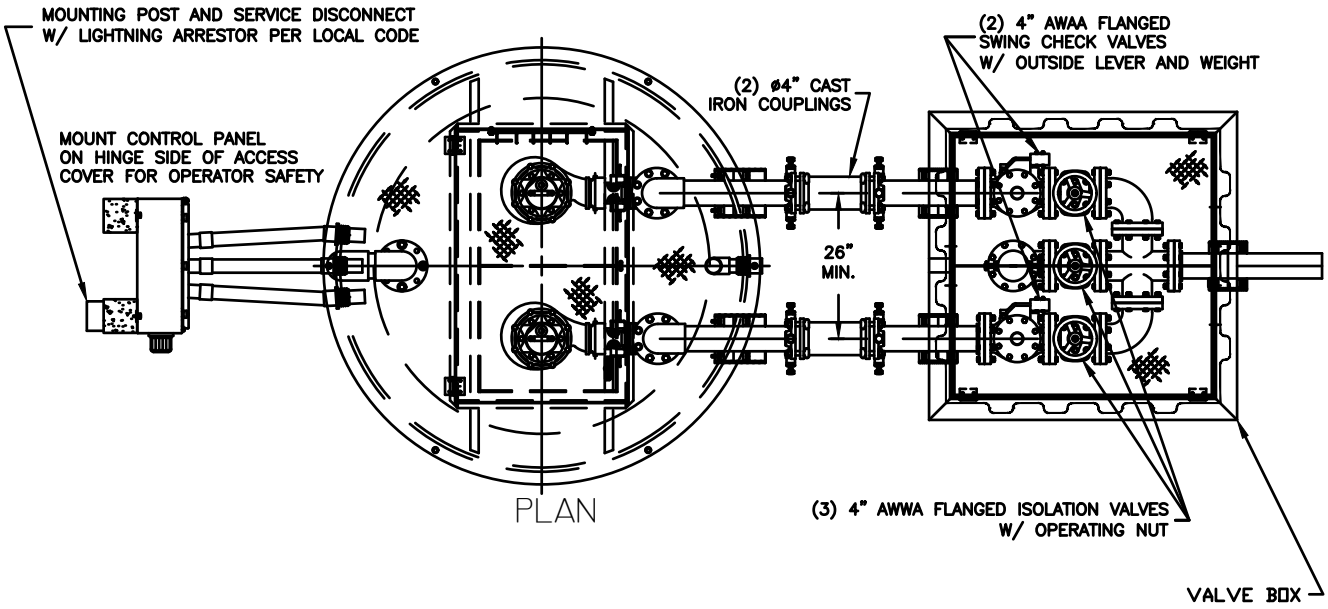
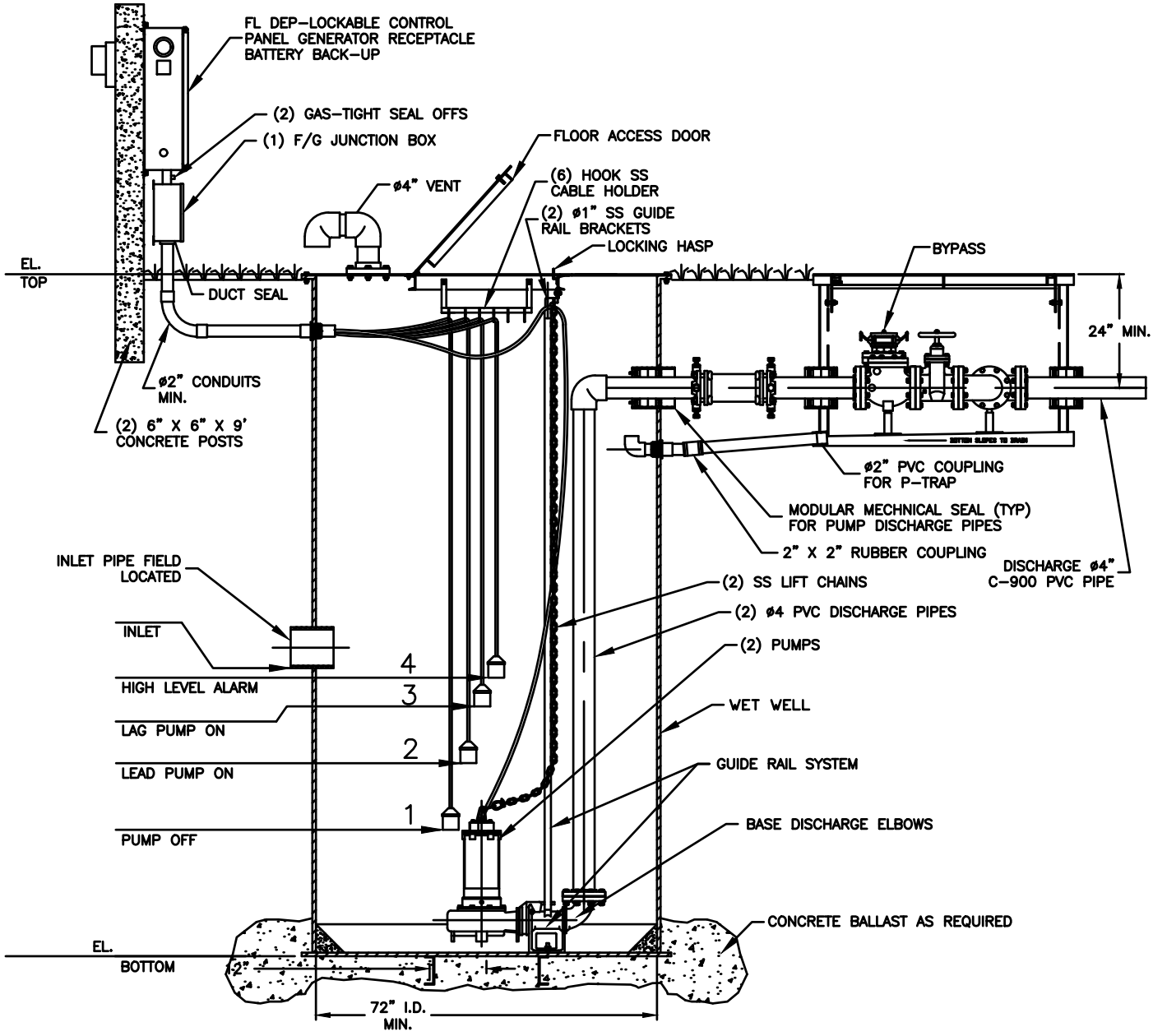
INDEX NUMBER	DESCRIPTION
LS-210	**PRIVATE LIFT STATION REQUIREMENTS**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



City of Largo - Engineering Services Department 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER **LS-220**	DESCRIPTION **PRIVATE LIFT STATION PLAN**
PUBLICATION DATE **April 18, 2023**	DRAWING SCALE **N.T.S.**	TITLE **Engineering Design and Construction Standards**	
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**		



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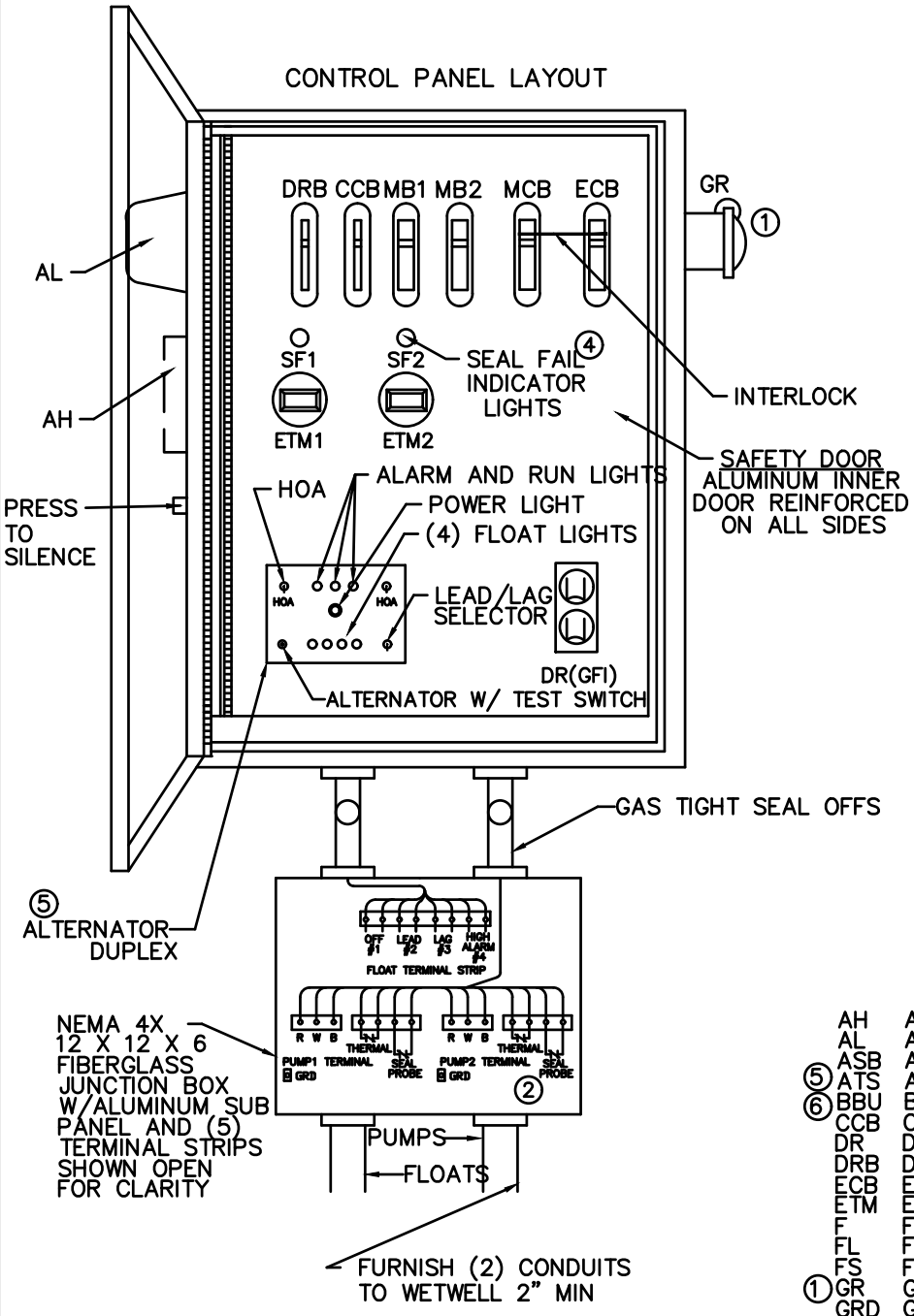
INDEX NUMBER	DESCRIPTION
LS-230	**PRIVATE LIFT STATION SECTION**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



LEGEND

	AH	ALARM HORN
	AL	ALARM LIGHT
	ASB	ALARM SILENCE BUTTON
5	ATS	ALTERNATOR W/TEST SWITCH
6	BBU	BATTERY (BACK-UP UNIT INTERNAL)
	CCB	CONTROL CIRCUIT BREAKER
	DR	DUPLEX RECEPTACLE
	DRB	DUPLEX RECEPTACLE BREAKER
	ECB	EMERGENCY CIRCUIT BREAKER
	ETM	ELAPSED TIME METER
	F	FUSE
	FL	FLASHER
	FS	FLOAT SWITCH (REGULATOR)
1	GR	GENERATOR RECEPTACLE
	GRD	GROUND
	HOA	HAND-OFF-AUTOMATIC SELECTOR
	LA	LIGHTNING ARRESTOR
	MB	MOTOR BREAKER
	MCB	MAIN CIRCUIT BREAKER
	MS	MOTOR STARTER
	N	NEUTRAL
	OL'S	OVERLOAD HEATERS
3	PM	PHASE MONITOR (INTERNAL)
	PTS	PUMP TERMINAL STRIP
	R	RELAY
	RC	RUN CAPACITOR
	RD	DISCHARGE RESISTOR
	RL	PUMP RUN INDICATORS
	RTS	REGULATOR TERMINAL STRIP
	SC	START CAPACITOR
4	SF	SEAL FAIL (SHAFT)
	SR	START RELAY
2	SP	SURGE PROTECTOR
	TTS	THERMAL TERMINAL STRIP

City of Largo - Engineering Services Department
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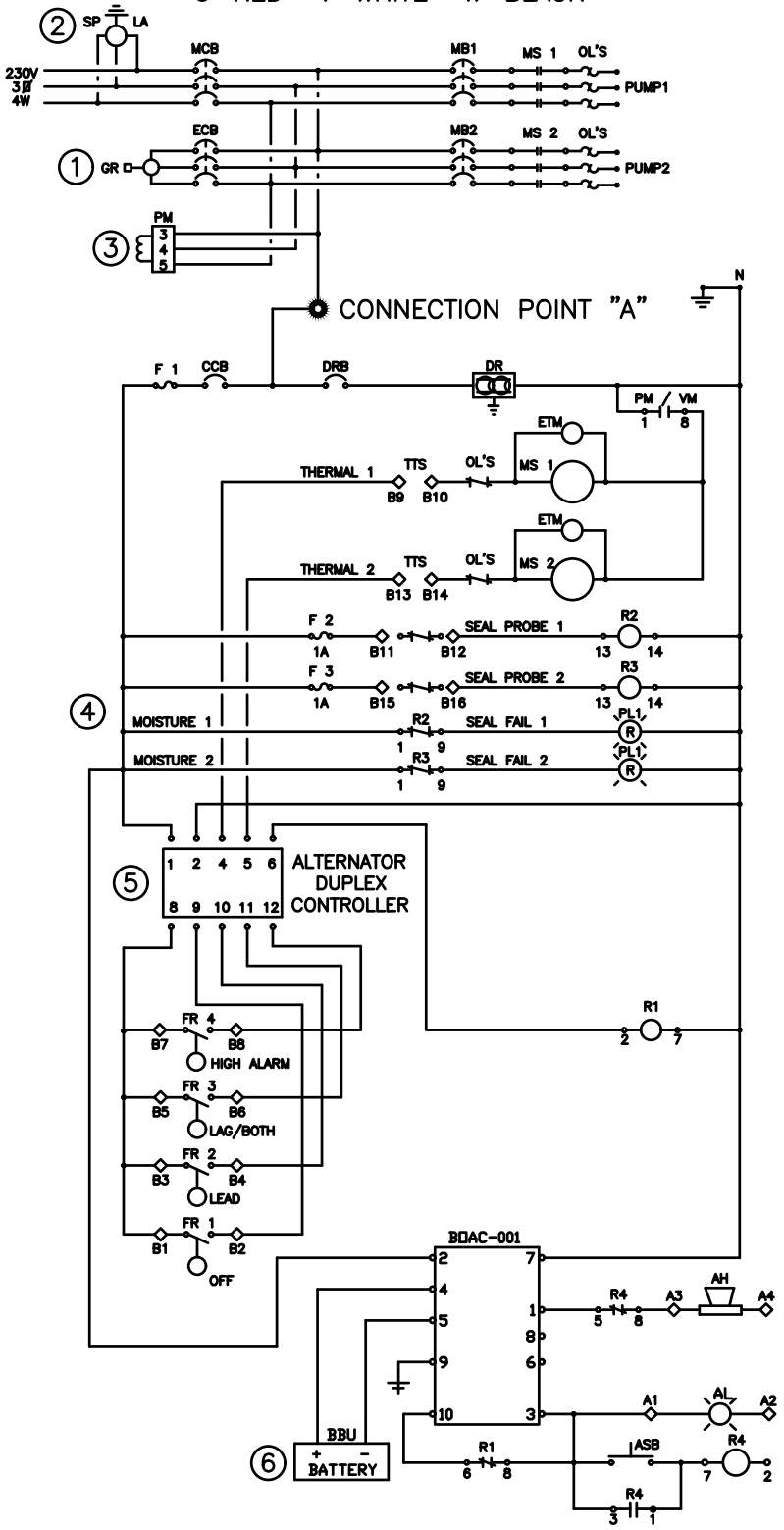
INDEX NUMBER	DESCRIPTION
LS-240	**PRIVATE LIFT STATION CONTROL PANEL LAYOUT AND LEGEND**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

THREE PHASE WIRING DIAGRAM

U–RED V–WHITE W–BLACK



① GENERATOR RECEPTACLE FOR EMERGENCY POWER CONNECTION WITH INTERLOCK

② SURGE PROTECTION AND LIGHTNING PROTECTION ON ALL INCOMING LEGS

③ PHASE PROTECTION SHALL BE PROVIDED

④ SHAFT SEAL FAIL DETECTION

⑤ ALTERNATOR W/TEST SWITCH

⑥ BATTERY BACK-UP UNIT

NOTES:

1. DETAIL ARE BASED ON 230V, 3 PHASE SERVICE. MODIFY WIRING AS REQUIRED FOR OTHER TYPE OF ELECTRICAL SERVICES.

City of Largo - Engineering Services Department
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INDEX NUMBER	DESCRIPTION
LS-250	**PRIVATE LIFT STATION CONTROL PANEL WIRING DIAGRAM**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

City of Largo
2012 Engineering Design and Construction
Standards Reclaimed Water (RW) Section 2023
Updates Revision Log

2012 Index Number	2022 Index Number	2022 Index Title	Description of Changes
RW-01	RW-010	RESIDENTIAL RECLAIMED WATER SINGLE SERVICE LAY-OUT	-Renamed sheet -Updated manufacturer and model numbers for components
RW-02	RW-020	RECLAIMED WATER VALVE SETTING	-Improved valve box presentation -Added tracer wire note
RW-03	RW-030	RECLAIMED WATER GATE VALVE SETTING	-Renamed sheet -Updated indicator plate requirements -Changed to fiber reinforced concrete
RW-04	RW-040	RECLAIMED WATER VALVE SETTING WITH RISER	-Updated indicator plate requirements -Changed to fiber reinforced concrete -Clarified dimensions -Added bedding stone requirement
RW-05	RW-050	RECLAIMED WATER VALVE BOX	-Added notes field
RW-06	RW-060	PERMANENT RECLAIMED WATER BLOW-OFF ASSEMBLY	-Added notes field -Updated underground box specs -Changed valve to curb stop type -Added additional dimensions
RW-07	RW-070	RECLAIMED WATER TEMPORARY BLOW-OFF	-Renamed sheet -Deleted materials of construction for temporary components -Added notes field -Changed orientation of tap
RW-08	RW-080	RECLAIMED WATER SAMPLE POINT	-Added concrete post and concrete encasement -Added a dimension -Updated materials of construction
RW-09	RW-090	RECLAIMED WATER UNDERGROUND AIR RELEASE VALVE AND VAULT	-Updated dimensions -Updated materials of construction -Added concrete coating -Added requirement for stone up to springline -Deleted bolts in brick grade adjustment -Updated component model numbers -Added note for sealing of lift holes

	City of Largo **2012 Engineering Design and Construction** **Standards Reclaimed Water (RW) Section 2023** **Updates Revision Log**

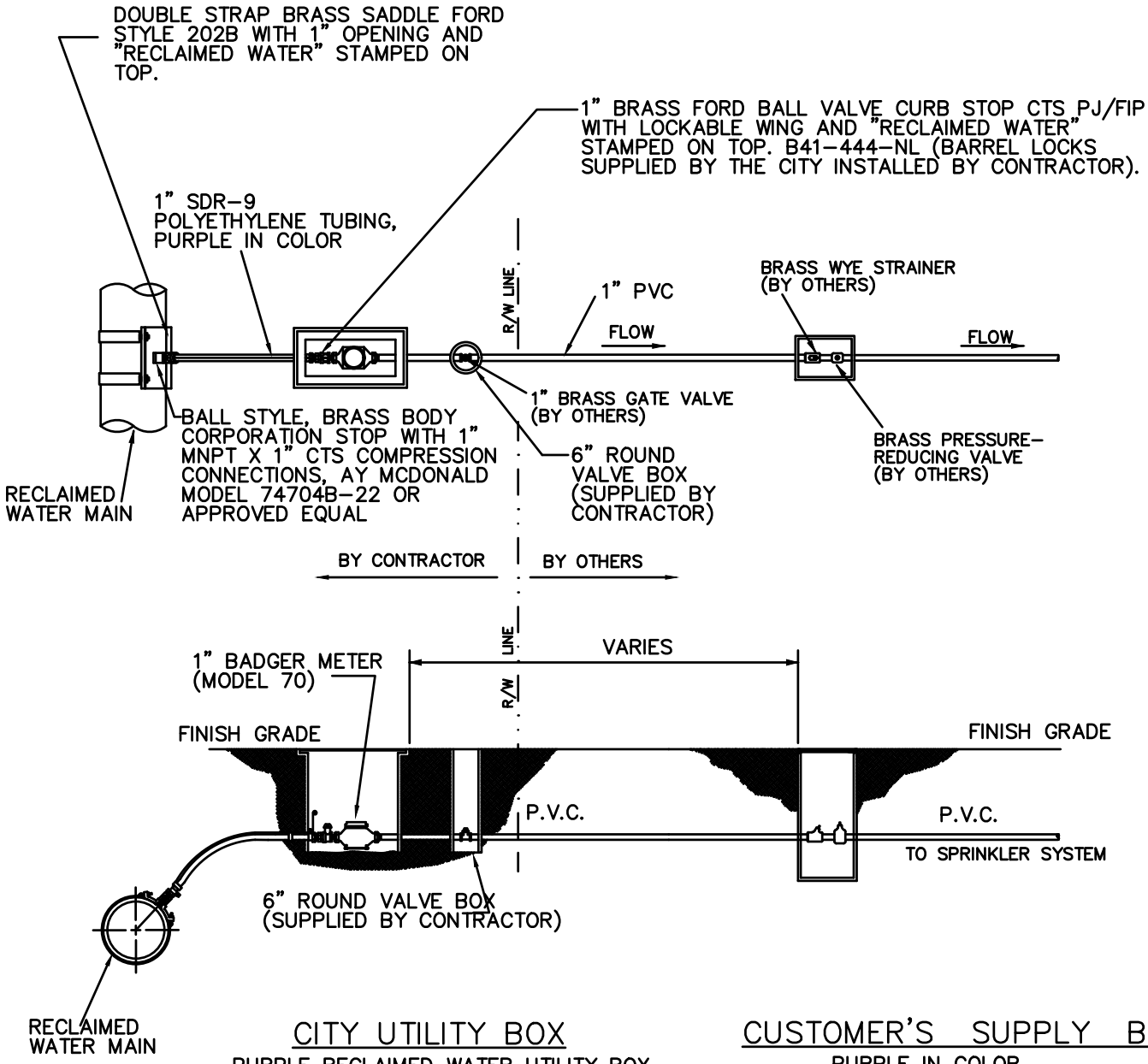
RW-10	RW-100	RECLAIMED WATER JACK AND BORE REQUIREMENTS	-Changed 36" minimum dimension to be as measured from top of casing to top of road structure at edge of pavement -Updated manufacture information and component model numbers -Clarified casing as welded -Updated notes field -Added additional note nos. 5 and 6
RW-11	RW-110	RECLAIMED WATER PIPE THRUST RESTRAINT	-Updated joint restraint table and application listing -Corrected typos -Renamed sheet -Updated restraint call outs -Added source for restrained length determination and included the assumptions that the length calculations were based upon
RW-12	RW-120	RECLAIMED WATER MAIN AND SANITARY SEWER LINE CONFLICT	-Minor clarifications to call outs and dimensions
RW-13	RW-130	RECLAIMED WATER PARALLEL INSTALLATION AND CROSSING REQUIREMENTS	-Renamed sheet -Minor clarifications -Typo corrections
RW-14	RW-140	COMMERCIAL ABOVE GROUND RECLAIMED WATER METER DETAIL	-Renamed sheet -Added note nos. 3 through 5 -Updated meter straight pipe length requirements -Added restrained flange coupling adapter -Changed concrete to fiber reinforced type -Added call out to clarify pipe materials of construction
RW-15	RW-150	COMMERCIAL BELOW GROUND RECLAIMED WATER METER DETAIL	-Renamed sheet -Added note nos. 3 through 7 -Updated meter straight pipe length requirements -Changed concrete to fiber reinforced type

	City of Largo **2012 Engineering Design and Construction** **Standards Reclaimed Water (RW) Section 2023** **Updates Revision Log**

RW-16	RW-160	RECLAIMED WATER HYDRANT	-Renamed sheet -Removed references of "fire" -Added notes field -Clarified pumper nozzle orientation -Added callout for breakaway flange -Updated dimensions -Added call out for drain hole plugs
RW-17	RW-170	RECLAIMED WATER MAIN PIPE CROSSING CONFLICT	-Improved pipe presentation -Added minimum vertical clearance dimensions
RW-18	RW-180	RECLAIMED WATER MAIN PIPE CROSSING CONFLICT (NOTES)	-Updated notes 4 through 6 to clarify joint restraint and deflection requirements -Updated note 8 to include tracer wire
RW-19	RW-190	RECLAIMED WATER MAIN TYPICAL CANAL CROSSING	-Added isolation valves on either side of bridge -Clarified air valve requirements -Updated notes field -Added notes 11 through 13
RW-20	RW-200	FAN GUARD	-Addressed typos -Updated dimensions -Added pile callouts -Added notes 3 through 5 to clarify fan guard requirements
RW-21	RW-210	RECLAIMED WATER PRESSURE PIPE NOTES	-Clarified fitting requirements in note 4 -Deleted disinfection requirement -Deleted pigging requirement
RW-22	RW-220	RECLAIMED WATER MAIN GENERAL SPECIFICATIONS	-Updated notes -Deleted pigging and disinfection requirements -Updated component model numbers
RW-23	RW-230	RECLAIMED WATER MAIN GENERAL SPECIFICATIONS	-Updated to reflect City's current list of approved meters
RW-24	RW-240	RECLAIMED WATER HYDRANT	-Renamed sheet -Updated notes -Deleted references to "fire -Updated component model numbers -Corrected typos
RW-25	-	-	-Merged with sheet RW-23 and deleted

	City of Largo **2012 Engineering Design and Construction Standards** **Reclaimed Water (RW) Section 2022 Updates** **Revision Log**

Note: The description of revisions is intended to provide a general summary of substantive changes to the previous standards. The revision descriptions should not be taken as all-inclusive and shall not relieve the Contractor of the responsibility to review the updated standards in their entirety.



CITY UTILITY BOX

PURPLE RECLAIMED WATER UTILITY BOX, LABELED "CITY OF LARGO", AND "RECLAIMED WATER" CONSTRUCTED OF FRP, BY HUBBELL INC., OR APPROVED EQUAL

(FURNISHED AND INSTALLED BY CONTRACTOR)

CUSTOMER'S SUPPLY BOX

PURPLE IN COLOR

(FURNISHED AND INSTALLED BY CUSTOMER OR OTHERS)

PROFILE

NOTES:

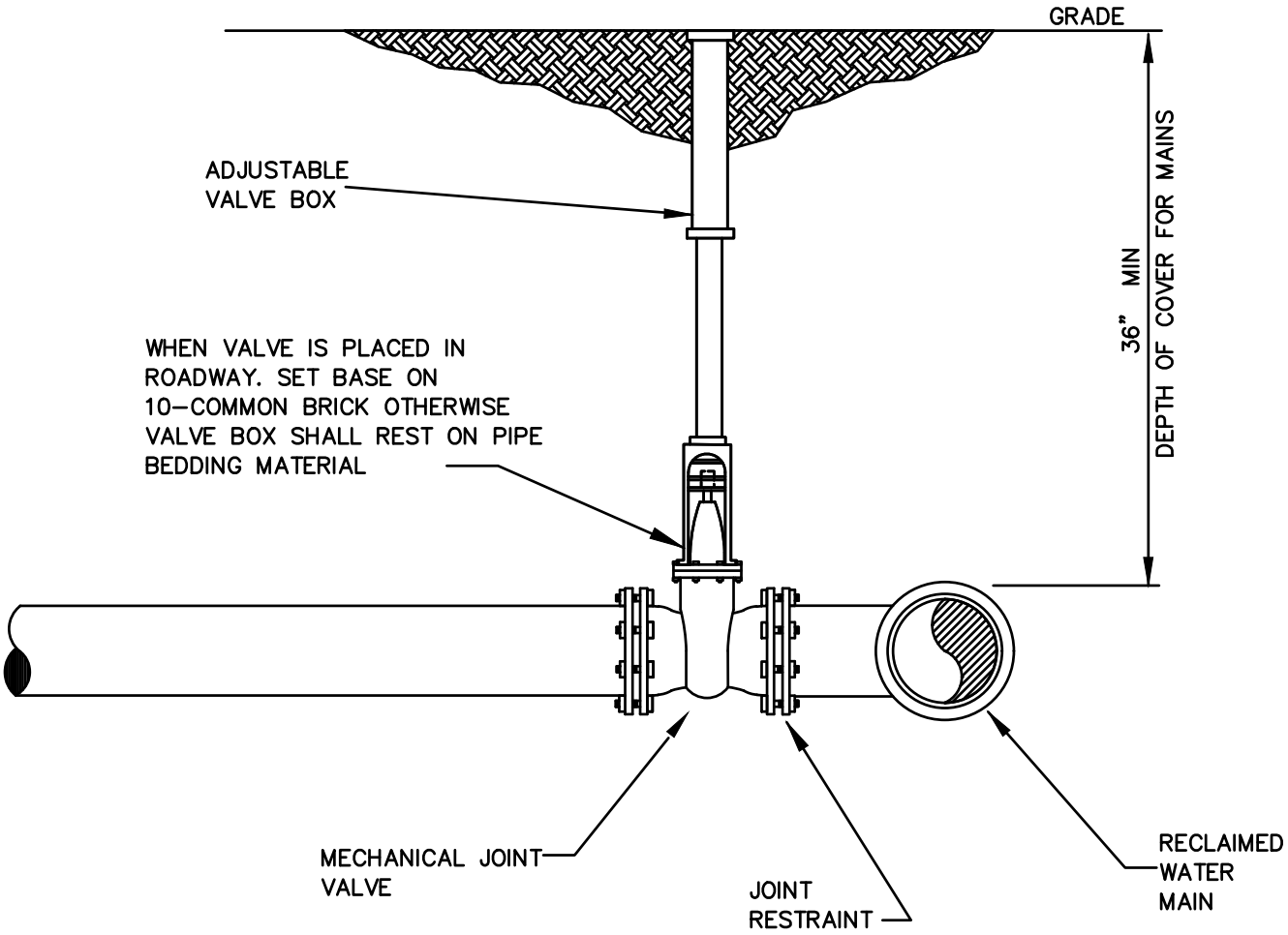
1. ALL EQUIPMENT FROM MAIN TO ROUND VALVE BOX FURNISHED AND INSTALLED BY CONTRACTOR.
2. CUSTOMER SUPPLY BOX AND ALL ASSOCIATED ITEMS ARE OPTIONAL. THESE ITEMS ARE RECOMMENDED TO REDUCE PRESSURE FROM THE CITY'S MAIN, TO A PRESSURE THAT IS COMPATIBLE WITH THE SPRINKLER SYSTEM.

City of Largo - Engineering Services Department
201 Highland Avenue NE, Largo, Florida 33770-2512
(727) 587-6713 FAX (727) 586-7413

INDEX NUMBER	DESCRIPTION
RW-010	Residential Reclaimed Water Single Service Lay-Out

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	RAFAL CIESLAK, P.E.



TYPICAL VALVE SETTING

NOTES:

1. PROVIDE TRACER WIRE FOR ALL BURIED RECLAIMED WATERMAIN REGARDLESS OF PIPE MATERIAL OF CONSTRUCTION. PROVIDE (2) #14 AWG SOLID COPPER CONDUCTOR INSULATED WITH APWA PURPLE COLOR HIGH MOLECULAR WEIGHT POLYETHYLENE. ATTACH TO PIPE USING CABLE TIES.
2. PROVIDE POLYETHYLENE ENCASEMENT OF ALL RECLAIMED WATERMAIN. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

City of Largo - Engineering Services Department
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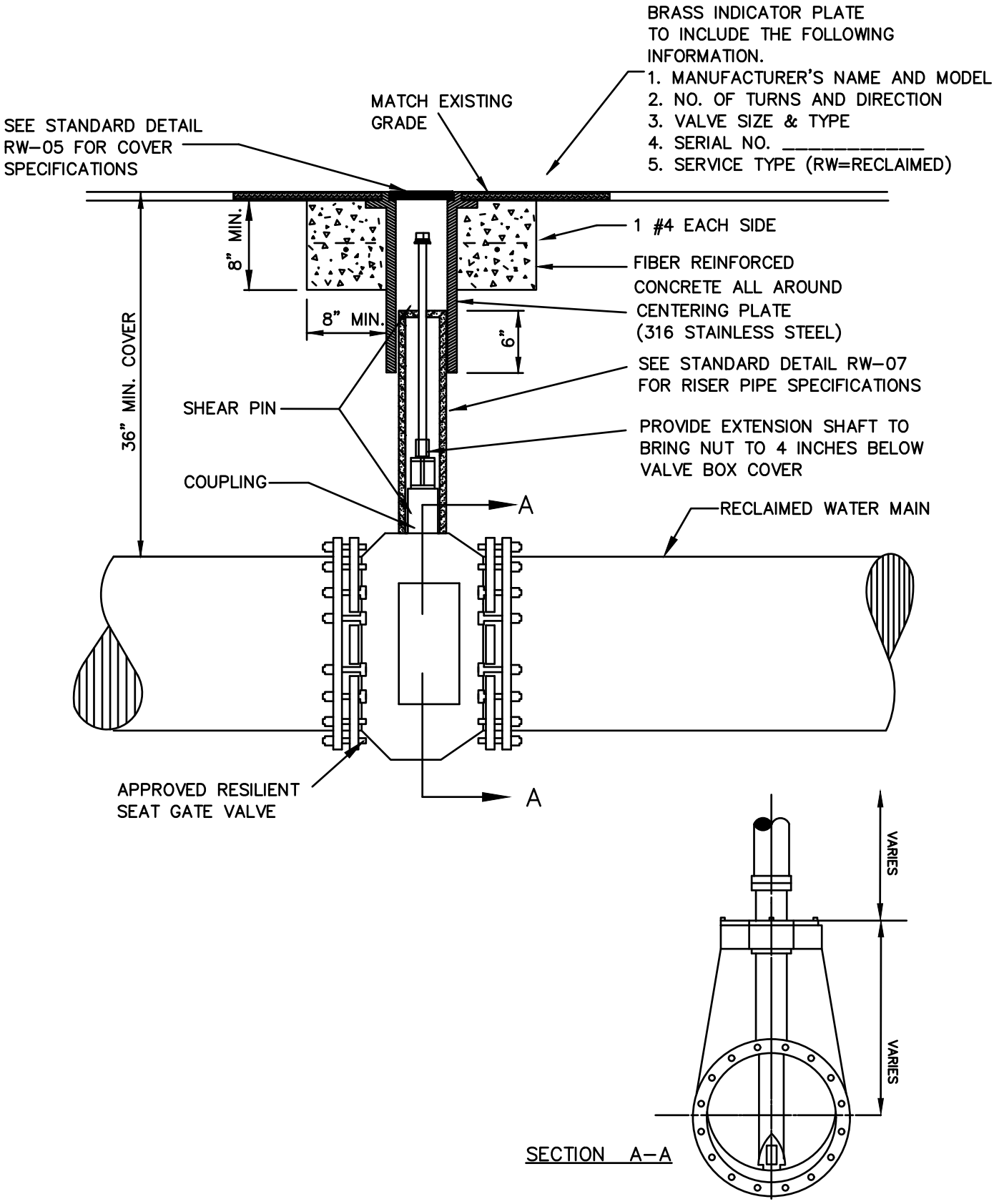
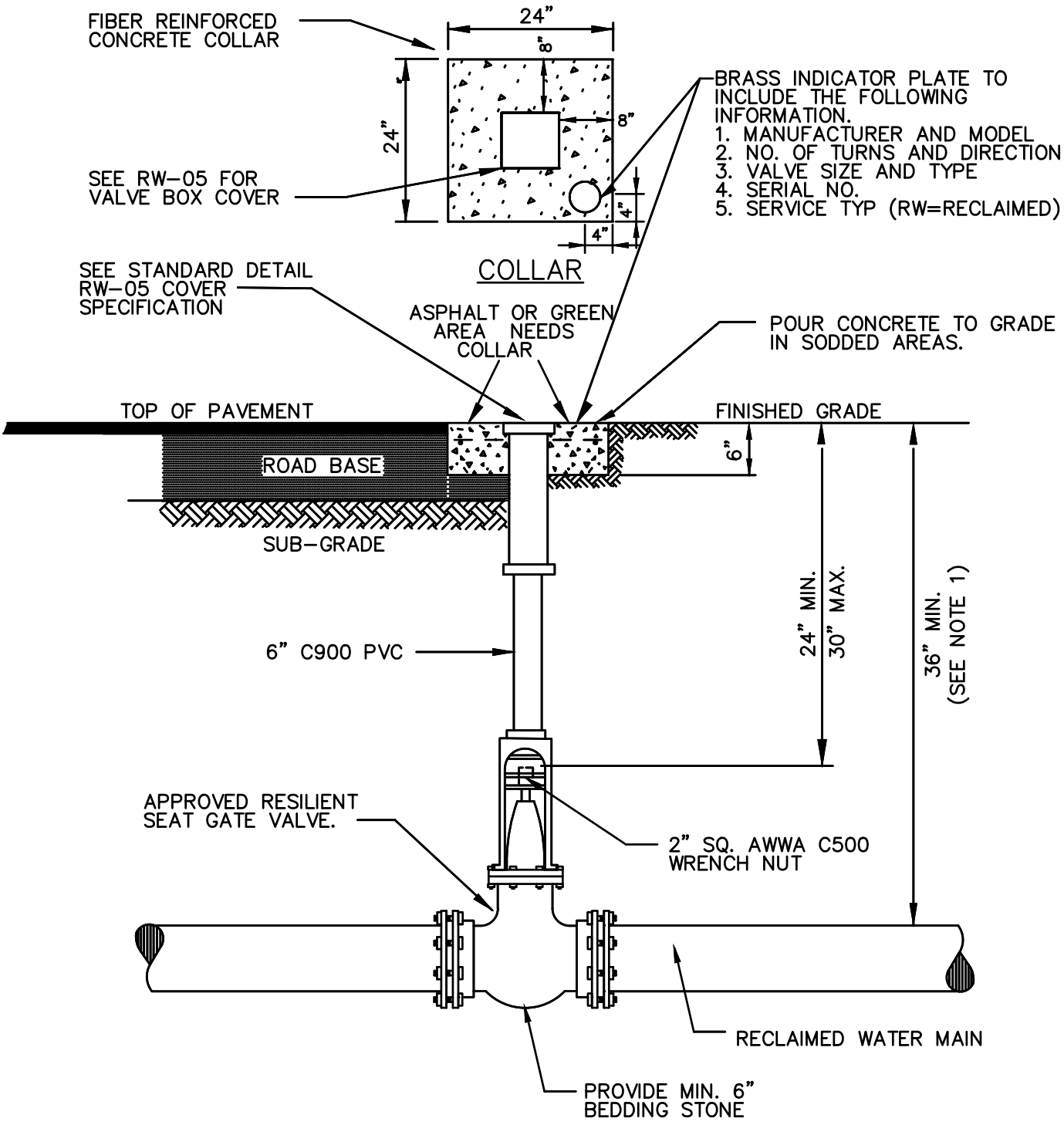
INDEX NUMBER	DESCRIPTION
RW-020	**Reclaimed Water Valve Setting**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**



City of Largo - Engineering Services Department 201 Highland Avenue NE, Largo, Florida 33770-2512 (727) 587-6713 FAX (727) 586-7413		INDEX NUMBER **RW-030**	DESCRIPTION **Reclaimed Water Gate Valve Setting**
PUBLICATION DATE April 18, 2023	DRAWING SCALE N.T.S.		TITLE **Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR JERALD WOLOSZYNSKI, P.E.	ASST. ENGINEERING DIRECTOR RAFAL CIESLAK, P.E.		



NOTES:

1. WHEN VALVE IS DEEPER THAN 36" AN EXTENSION WITH UNIVERSAL JOINT WILL BE REQUIRED TO BRING OPERATING NUT 24"-30" BELOW FINISHED GRADE. EXTENSION BOLTS & NUTS ARE TO BE 316 STAINLESS STEEL. A 316 STAINLESS STEEL CENTERING PLATE IS ALSO REQUIRED.

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INDEX NUMBER	DESCRIPTION
RW-040	**Reclaimed Water Valve Setting with Riser**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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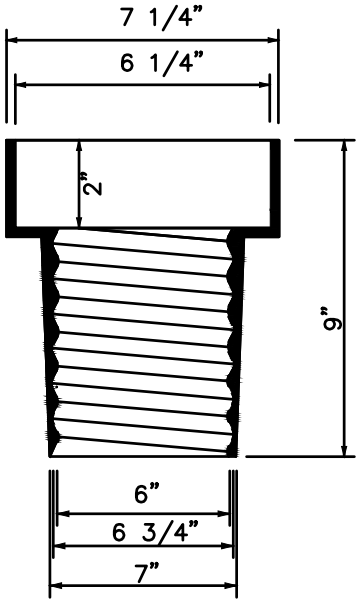
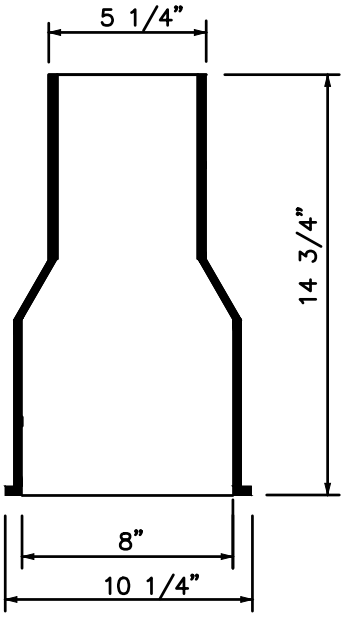


TOP SECTION



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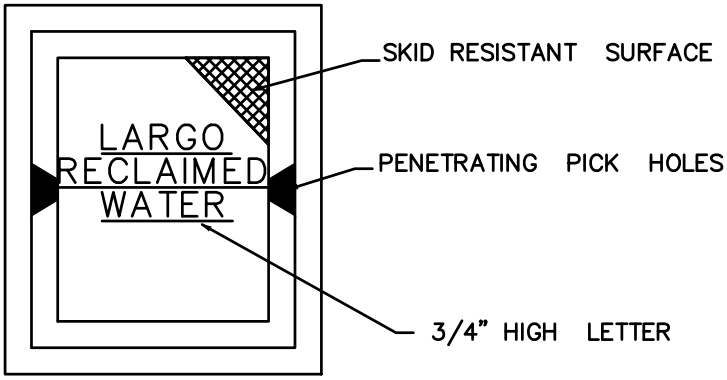
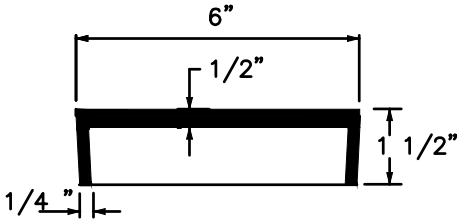


COVER



LID

NOTES:
1. ALL DIMENSIONS ARE MINIMUMS. ACTUAL DIMENSIONS OF VALVE BOX COMPONENTS MAY VARY BY MANUFACTURER.
2. SEE RW–04 FOR VALVE BOX COLLAR INSTALLATION DETAILS.
3. VALVE BOX COVER SHALL BE PURPLE IN COLOR.

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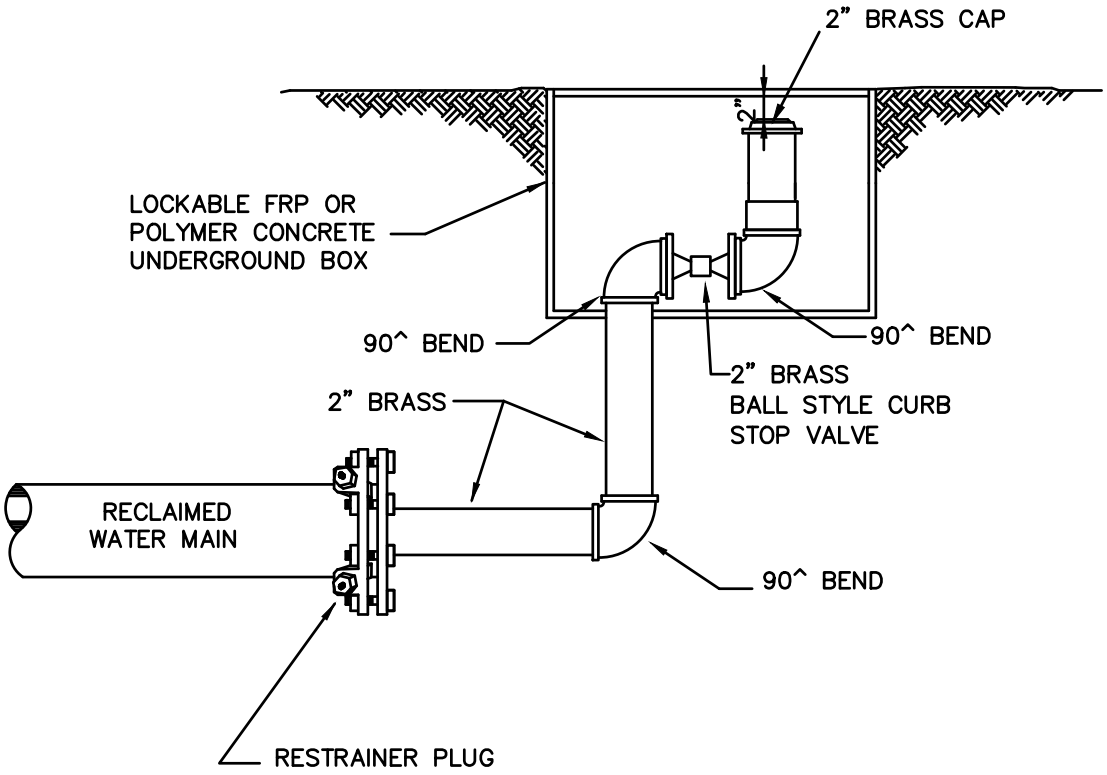
INDEX NUMBER	DESCRIPTION
RW-050	**Reclaimed Water Valve Box**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



PERMANENT BLOWOFF DETAIL

NOTES:

1. ALL JOINTS SHALL BE RESTAINED TO PREVENT PULL OUT.

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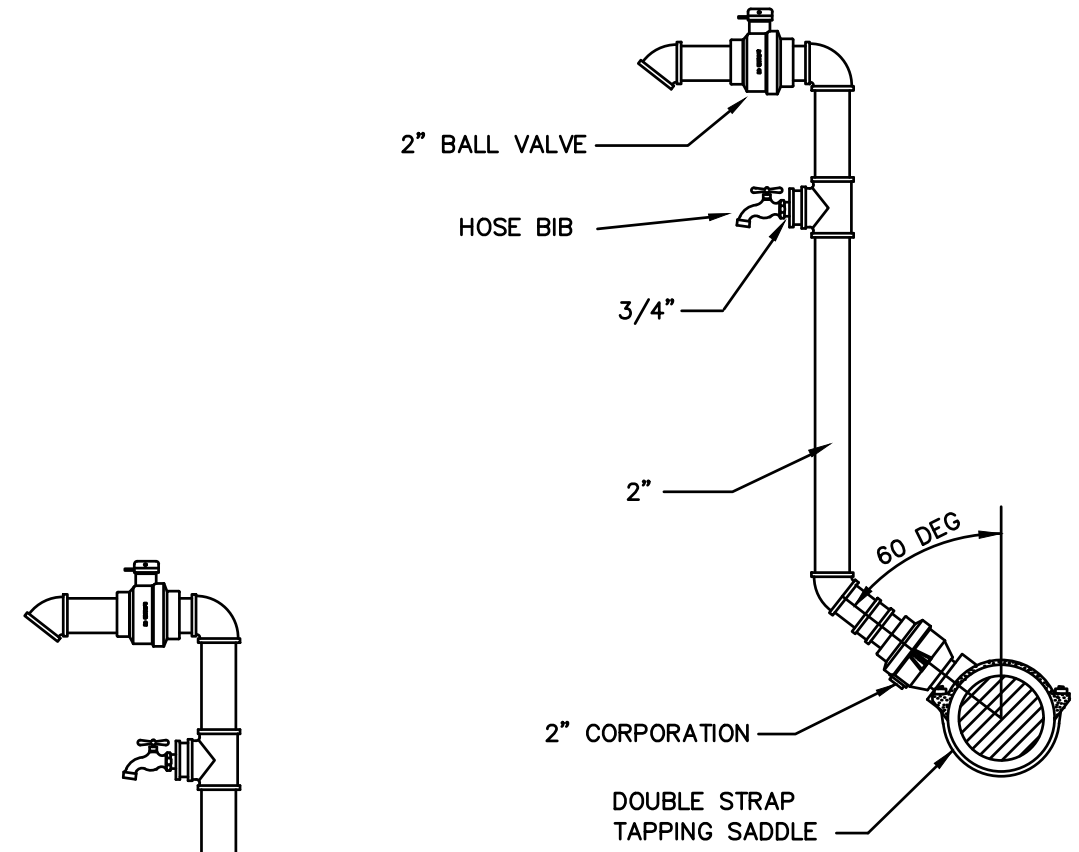
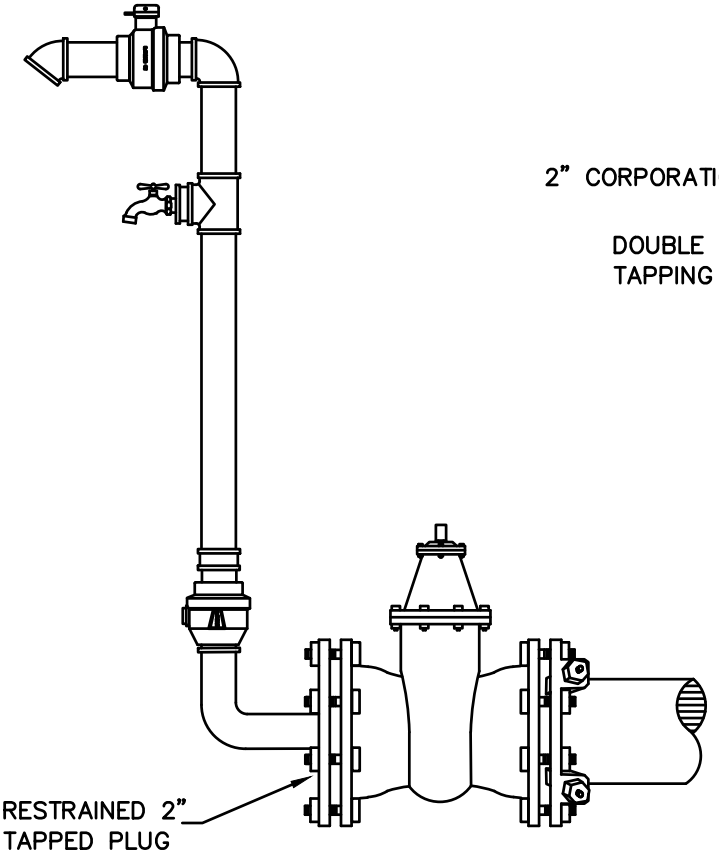
PUBLICATION DATE April 18, 2023	DRAWING SCALE N.T.S.	INDEX NUMBER **RW-060**	DESCRIPTION **Permanent Reclaimed Water Blow-Off Assembly**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**	TITLE **Engineering Design and Construction Standards**	



TOP CONNECTION



END CONNECTION

NOTES:

1. AFTER TESTING IS COMPLETE, CLOSE CORPORATION STOP AND REMOVE RISER PIPE. FOR END CONNECTION PROVIDE 2" PLUG/CAP AT THE VALVE'S TAPPED PLUG. FOR TOP CONNECTION, INSTALL 2" PLUG/CAP AT THE 2" CORPORATION VALVE OUTLET.

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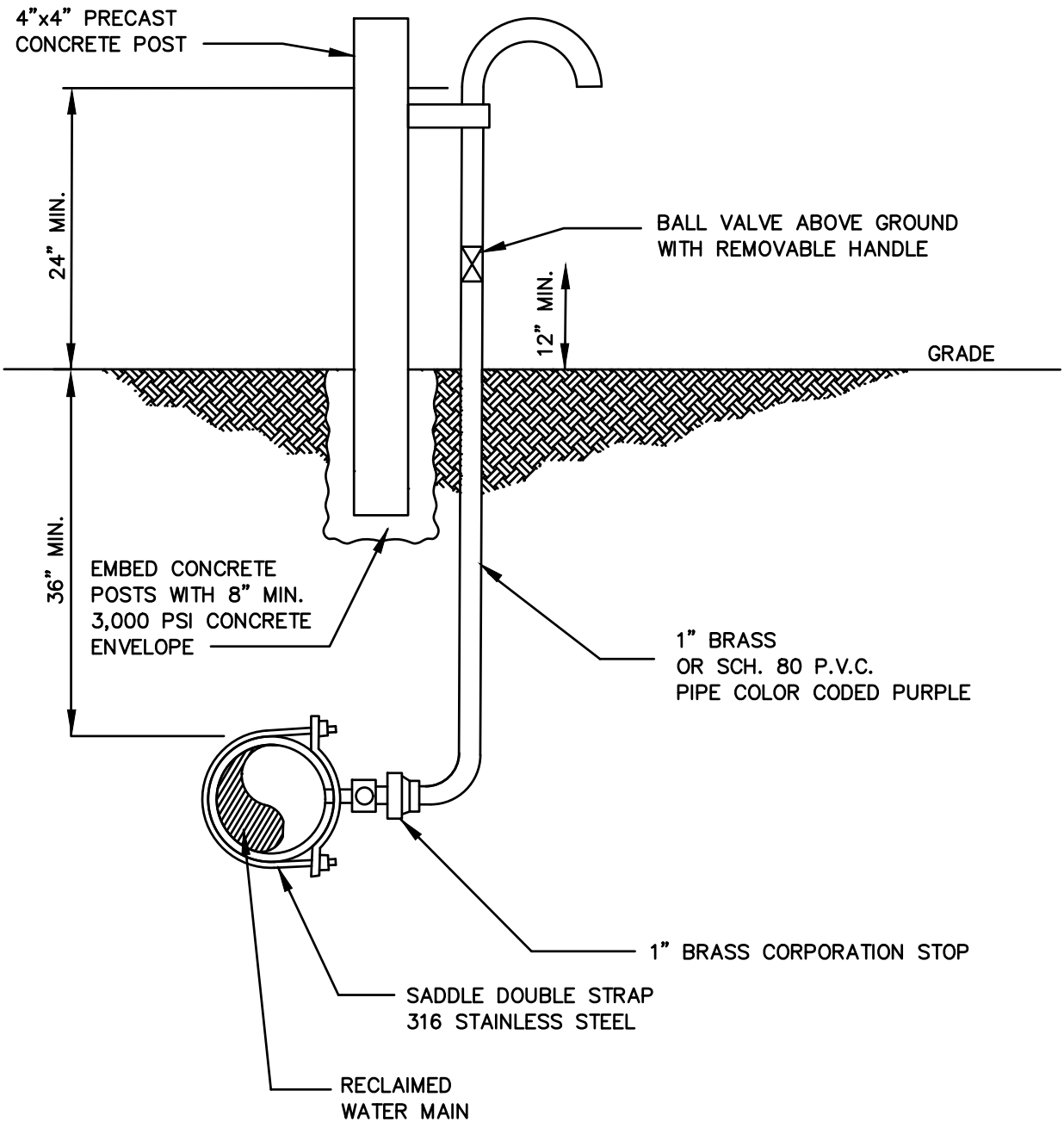
PUBLICATION DATE April 18, 2023	DRAWING SCALE N.T.S.		TITLE **Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR JERALD WOLOSZYNSKI, P.E.	ASST. ENGINEERING DIRECTOR RAFAL CIESLAK, P.E.		



NOTES:

1. SAMPLE POINT SHOULD BE A SERVICE LINE OR FIRE HYDRANT IF POSSIBLE.
2. IF SAMPLE POINT IS NOT A SERVICE LINE OR FIRE HYDRANT, CORP STOP SHALL BE SHUT OFF AT MAIN AND ALL TUBING SHALL BE REMOVED AFTER SATISFACTORY BACTERIOLOGICAL TESTING.
3. IN NO CASE SHALL ANY SAMPLE POINT BE LOCATED IN A TRAFFIC AREA.

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INDEX NUMBER	DESCRIPTION
RW-080	**Reclaimed Water Sample Point**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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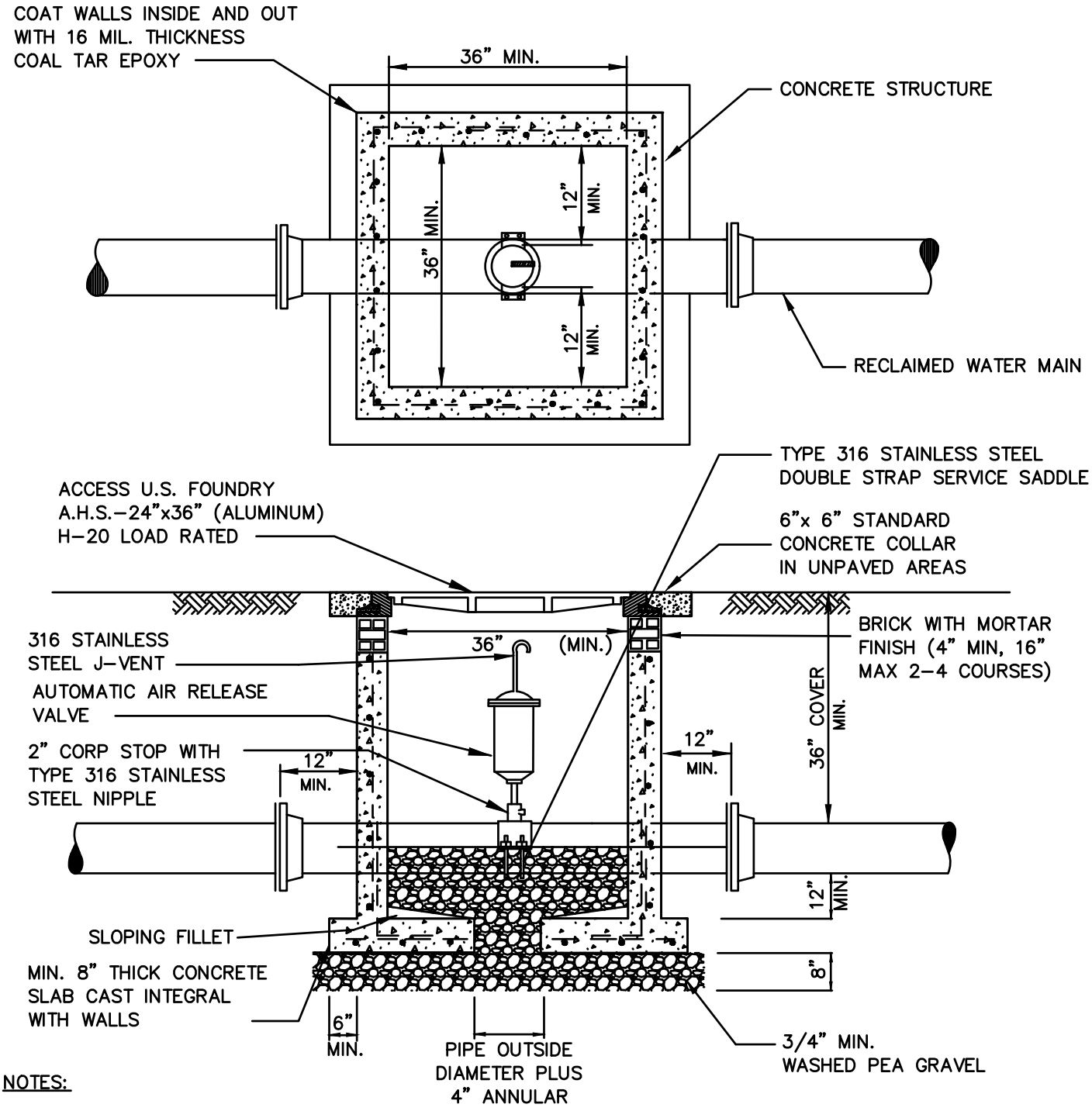

NOTES:

1. 4000 P.S.I. CONCRETE
2. VAULT SHALL BE PRECAST OR POURED IN PLACE CONCRETE WITH STEEL REINFORCING.
3. AIR RELEASE VALVE SHALL BE APCO MODEL 200A OR EQUAL.
4. ALL OPENINGS SHALL BE SEALED WITH WATERPROOF NON -SHRINKING GROUT.
5. OTHER VAULT AND COVER DESIGNS MAY BE USED UPON SUBMITTAL AND APPROVAL OF SHOP DRAWINGS.
6. BEDDING TO CONFORM TO THE REQUIREMENTS OF SECTION 125, F.D.O.T. STANDARD SPECIFICATIONS.
7. CORPORATION STOP TO BE MUELLER H9968N, OR FORD FB500.
8. HATCH COVER TO BE LABELED "CITY OF LARGO" AND "RECLAIMED WATER" AND SHALL BE PAINTED PURPLE.
9. LIFT HOLES TO BE SEALED INSIDE AND OUTSIDE AFTER INSTALLATION. SEE NOTE NO. 4.

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INDEX NUMBER	DESCRIPTION
RW-090	Reclaimed Water Underground Air Release Valve and Vault

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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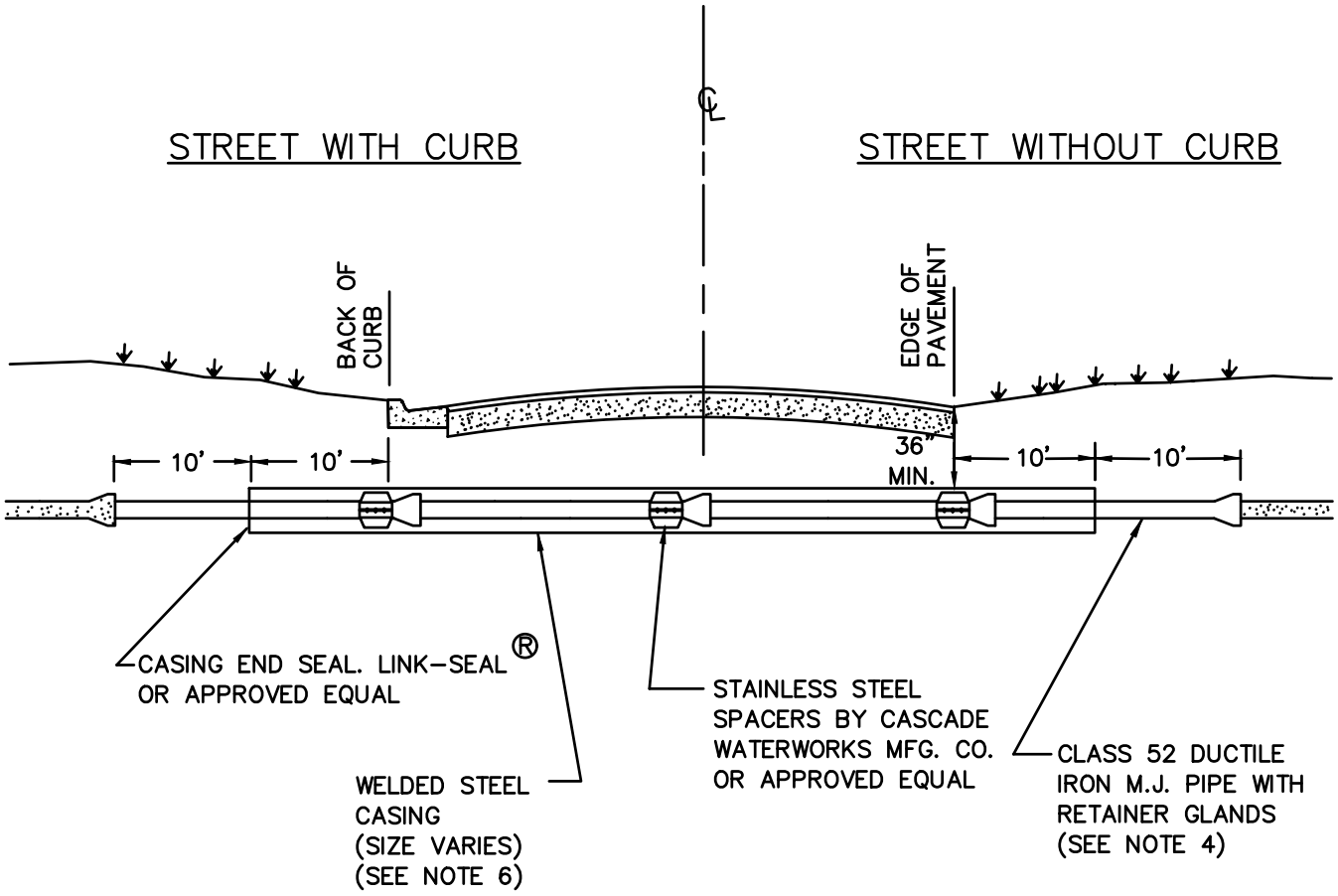

NOTES:

1. DUCTILE IRON PIPE TO EXTEND 10' BEYOND CASING.
2. STEEL CASING TO EXTEND 10' BEYOND PAVEMENT OR CURB.
3. SPACING OF SPACERS TO BE PER MANUFACTURERS RECOMMENDATION.
4. ALL JOINTS INSIDE CASING SHALL BE INTERNALLY RESTRAINED. OUTSIDE OF CASING TRANSITION TO MECHANICAL JOINTS.
5. WHERE POSSIBLE, CARRIER PIPE SHALL BE CENTERED IN THE CASING PIPE. PROVIDE ADJUSTABLE SPACER LEGS IN INSTANCES WHERE CASING PIPE CENTERLINE IS NOT COLLINEAR WITH CARRIER PIPE CENTERLINE.
6. ENGINEER OF RECORD SHALL DETERMINE MINIMUM CASING SIZE, PIPE SPECIFICATION/GRADE, PIPE CLASS/WALL THICKNESS, AND WORKING AND TEST PRESSURES.

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INDEX NUMBER	DESCRIPTION
RW-100	**Reclaimed Water Jack And Bore Requirements**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
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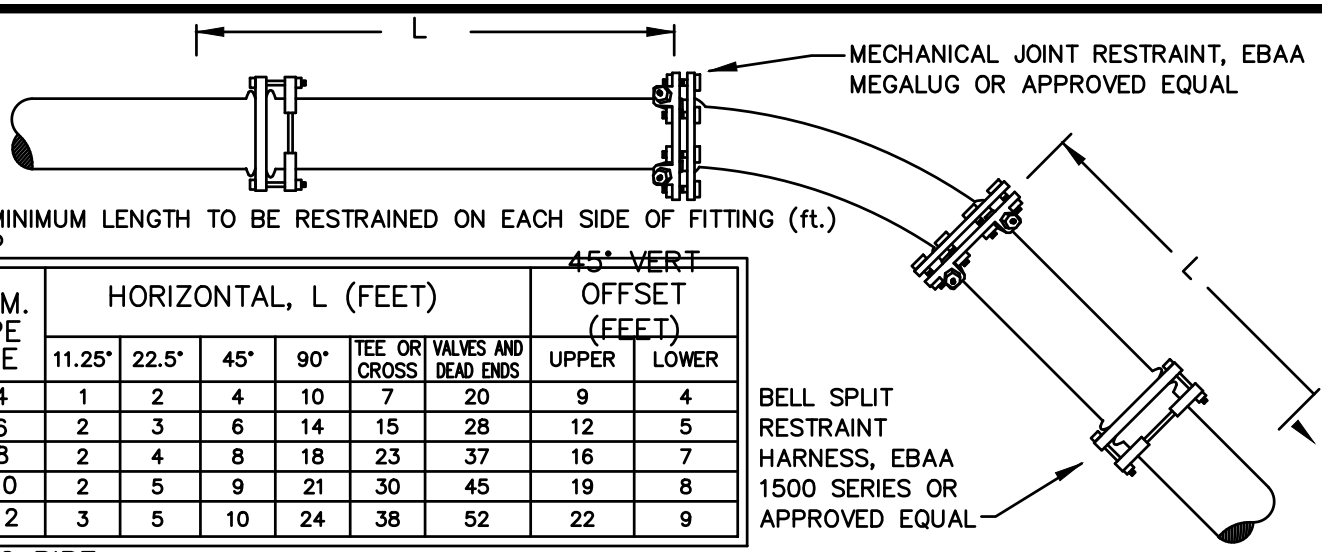

L = MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (ft.)

DIP

NOM. PIPE SIZE	HORIZONTAL, L (FEET)						45° VERT OFFSET (FEET)	
	11.25°	22.5°	45°	90°	TEE OR CROSS	VALVES AND DEAD ENDS	UPPER	LOWER
4	1	2	4	10	7	20	9	4
6	2	3	6	14	15	28	12	5
8	2	4	8	18	23	37	16	7
10	2	5	9	21	30	45	19	8
12	3	5	10	24	38	52	22	9

PVC PIPE

NOM. PIPE SIZE	HORIZONTAL, L (FEET)						45° VERT OFFSET (FEET)	
	11.25°	22.5°	45°	90°	TEE OR CROSS	VALVES AND DEAD ENDS	UPPER	LOWER
4	2	3	5	12	11	32	14	5
6	2	4	7	16	23	45	19	6
8	3	5	9	21	37	59	25	8
10	3	5	11	25	48	71	30	9
12	3	6	12	29	61	83	35	11

1. THE NOTED REQUIREMENTS WERE CALCULATED IN ACCORDANCE WITH THRUST RESTRAINT CALCULATOR V7.1.3 BY EBAA IRON WITH THE FOLLOWING:
   - A. SOIL TYPE: SW.
   - B. TRENCH TYPE: 4. SAND BEDDING AND >80% BACKFILL COMPACTION.
   - C. MINIMUM DEPTH OF BURY: 3 FEET.
   - D. SAFETY FACTOR: 1.5.
   - E. TEST PRESSURE: 150 PSI.
   - F. BRANCH SIZE EQUALS NOMINAL PIPE SIZE.
   - G. LENGTH ALONG RUN: 4 FEET.
   - H. VERTICAL LOW SIDE DEPTH: 3.5 FEET.
   - I. BARE PIPE (NO POLYETHYLENE ENCASEMENT)
2. IF FIELD CONDITIONS DIFFER FROM THE ABOVE, CONTRACTOR SHALL NOTIFY CITY FOR PIPE LARGER THAN INCLUDED IN THE ABOVE TABLES, FOR REDUCING FITTINGS, AND FOR POLY WRAPPED PIPE, ENGINEER OF RECORD SHALL SUBMIT CALCULATIONS FOR EACH JOINT REQUIRING RESTRAINT.

VALUES TO BE VERIFIED BY CONTRACTOR ACCORDING TO SPECIFIC SITE CONDITIONS. FOR NOMINAL PIPE DIAMETERS GREATER THAN 12", DESIGN CALCULATIONS SHALL BE SUBMITTED

THE FOLLOWING JOINTS MUST BE RESTRAINED IN ALL APPLICATIONS:

1. BEND – INLET AND OUTLET
2. TEE OR TAPPING SLEEVE – OUTLET BRANCH
3. OFFSETS – INLET AND OUTLET
4. CAPS
5. PLUGS
6. LAST TWO(2) JOINTS ON A DEAD END RUN (min. 36')
7. LAST TWO(2) JOINTS ON A HYDRANT RUNOUT (min. 36')
8. CROSS

PIPE RESTRAINT

D.I.P.

SHALL BE U.S. PIPE FIELD LOCK GASKETS FOR TYTON JOINT PIPE or AMERICAN FAST-GRIP GASKETS FOR AMERICAN FASTITE PIPE. THRUST RESTRAINT ON DUCTILE IRON FITTINGS AND MECHANICAL JOINT FITTINGS. THRUST RESTRAINT ON SLIPJOINT DUCTILE IRON PIPE SHALL BE PROVIDED BY THE USE OF MEGALUG RESTRAINERS

P.V.C.

THRUST RESTRAINT AT FITTINGS AND VALVES SHALL BE BY USE OF EBAA IRON MEGALUG RESTRAINERS. THRUST RESTRAINT BETWEEN PIPE JOINTS SHALL BE BY EBAA IRON SERIES 1500 RESTRAINERS

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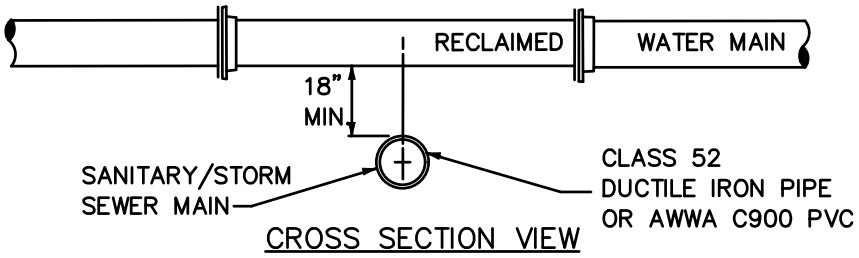
INDEX NUMBER	DESCRIPTION
RW-110	**Reclaimed Water Pipe Thrust Restraint**

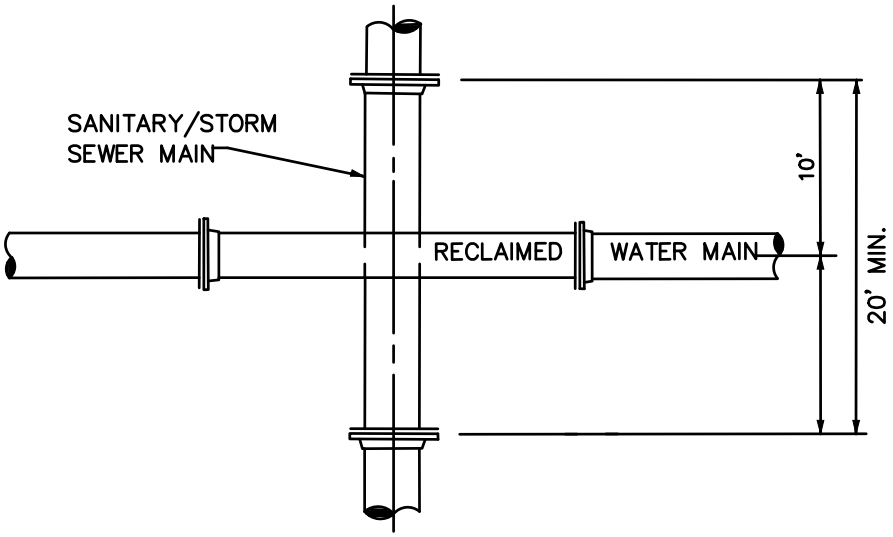
PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

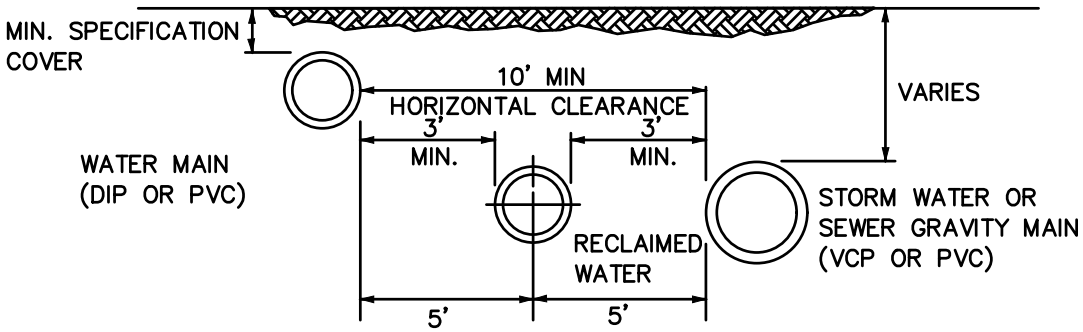
REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPAR



CROSS SECTION VIEW



PLAN VIEW



HORIZONTAL CLEARANCE

SEE NOTES PAGE RW–13

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INDEX NUMBER	DESCRIPTION
RW-120	**Reclaimed Water Main and Sanitary Sewer Line Conflict**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

REQUIREMENTS FOR CROSSINGS WITH LESS THAN AN 18" VERTICAL SEPARATION

PARALLEL INSTALLATION

1. POTABLE WATER, WASTEWATER GRAVITY/FORCEMAIN AND RECLAIMED WATER LINES SHALL NOT BE PLACED IN THE SAME TRENCH. A MINIMUM OF HORIZONTAL DISTANCE OF 10' SHALL BE MAINTAINED BETWEEN POTABLE WATER AND ANY TYPE OF WASTEWATER LINE WHENEVER POSSIBLE. THE DISTANCE SHALL BE MEASURED OUTSIDE EDGE TO OUTSIDE EDGE. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A TEN–FOOT SEPARATION, THE WATER MAIN MUST BE LAID IN A SEPARATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE WASTEWATER LINE AND AT AN ELEVATION SO THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE WASTEWATER LINE.

2. IF IT IS IMPOSSIBLE TO MAINTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE, THE WATER MAIN SHALL BE CONSTRUCTED OF D.I.P. AND THE WASTEWATER LINE SHALL BE C900 P.V.C. AND PRESSURE TESTED TO ONE–HUNDRED AND FIFTY (150) P.S.I. TO ENSURE WATER TIGHTNESS BEFORE BACK FILLING. THE PIPELINE JOINTS SHALL BE STAGGERED SO THAT THE WATER MAIN JOINTS SHALL BE AS FAR APART AS POSSIBLE FROM THE JOINTS ON THE WASTEWATER LINE

3. A MINIMUM HORIZONTAL SEPARATION OF FIVE (5) FEET CENTER TO CENTER THREE (3) FEET OUTSIDE EDGE TO OUTSIDE EDGE SHALL BE MAINTAINED BETWEEN RECLAIMED WATER MAINS AND POTABLE WATER OR WASTEWATER GRAVITY OR FORCE MAINS.

CROSSINGS

1. WASTEWATER MAINS SHALL CROSS UNDER RECLAIMED WATER MAINS. WASTEWATER AND RECLAIMED MAINS SHALL CROSS UNDER POTABLE WATER MAINS, WHEREVER POSSIBLE. THE MINIMUM VERTICAL DISTANCE BETWEEN MAINS AT A CROSSING IS EIGHTEEN (18) INCHES. THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER/RECLAIMED MAIN JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS.
2. WHERE WASTEWATER OR RECLAIMED MAINS MUST CROSS A WATER MAIN WITH LESS THAN EIGHTEEN (18) INCHES OF VERTICAL CLEARANCE, THE RECLAIMED AND POTABLE WATER MAIN MUST BE CONSTRUCTED OF DUCTILE IRON PIPE AT THE CROSSING. WASTEWATER GRAVITY OR FORCE MAIN SHALL BE CONSTRUCTED OF C900 P.V.C. AT THE CROSSING. ALTERNATIVELY, ONE OF THE CROSSING MAINS SHALL BE ENCLOSED WITHIN A MINIMUM TWENTY (20) FOOT LONG STEEL OR P.V.C. CASING CENTERED ON THE CROSSING.
3. WHERE A WATER MAIN MUST CROSS UNDER A WASTEWATER GRAVITY MAIN, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED FOR THE GRAVITY MAIN TO MAINTAIN LINE AND GRADE

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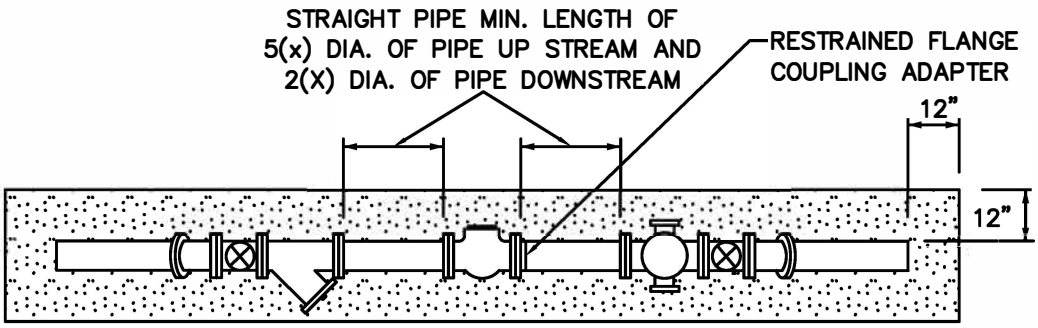
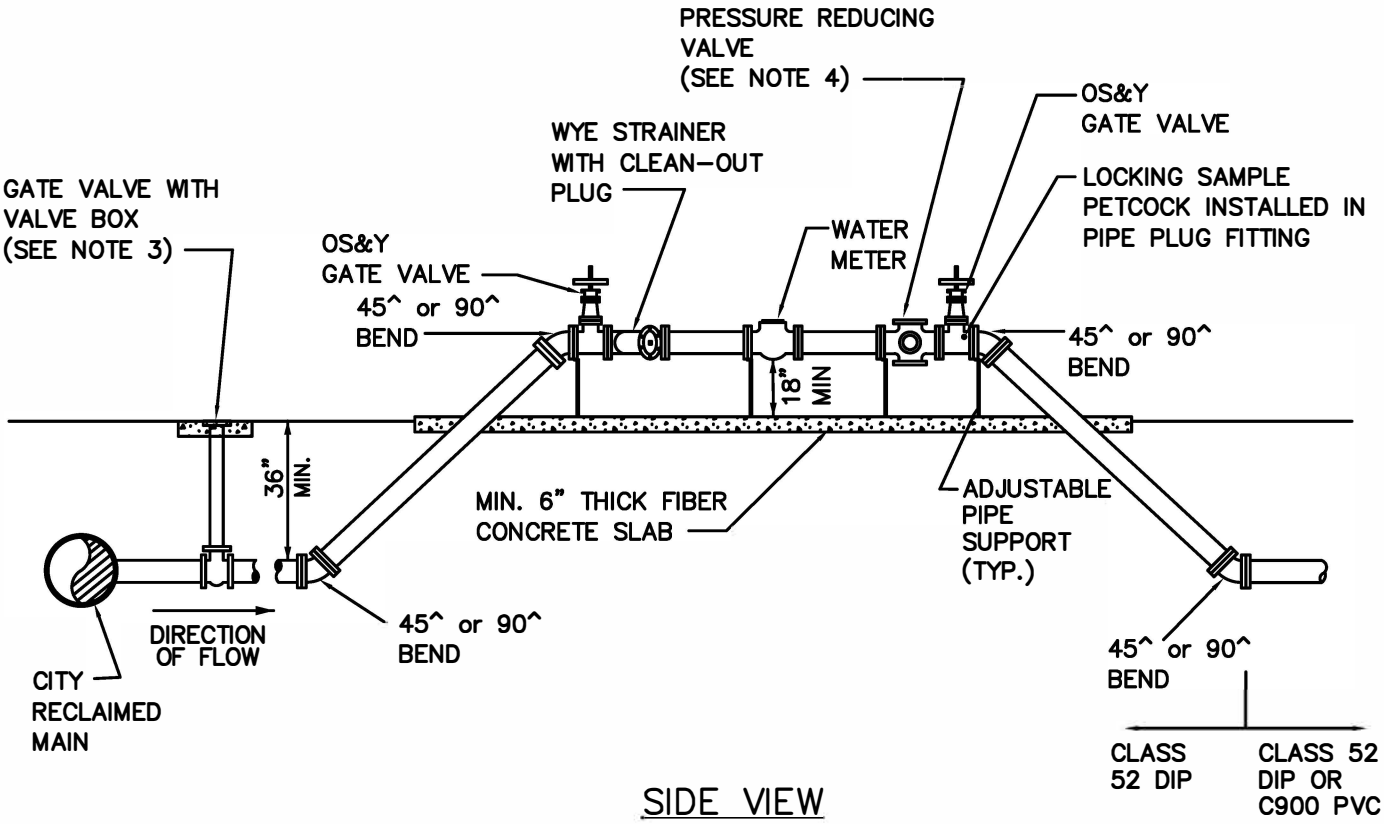
INDEX NUMBER	DESCRIPTION
RW-130	**Reclaimed Water Parallel Installation and Crossing Requirements**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	**N.T.S.**	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR **RAFAL CIESLAK, P.E.**	



ENLARGED TOP VIEW



SIDE VIEW

NOTE:

1. ALL PIPE BETWEEN CITY MAIN AND LAST BEND TO BE DUCTILE IRON PIPE.
2. ALL JOINTS ABOVE GROUND SHALL BE FLANGED.
3. REFER TO RW-02 THROUGH RW-05.
4. PROVIDE PRESSURE REDUCING VALVE UNLESS COMMERCIAL CUSTOMER WAIVES IN WRITING.
5. FOR RECLAIMED SERVICES 2-INCH OR GREATER PROVIDE ABOVE GROUND WATER METER.

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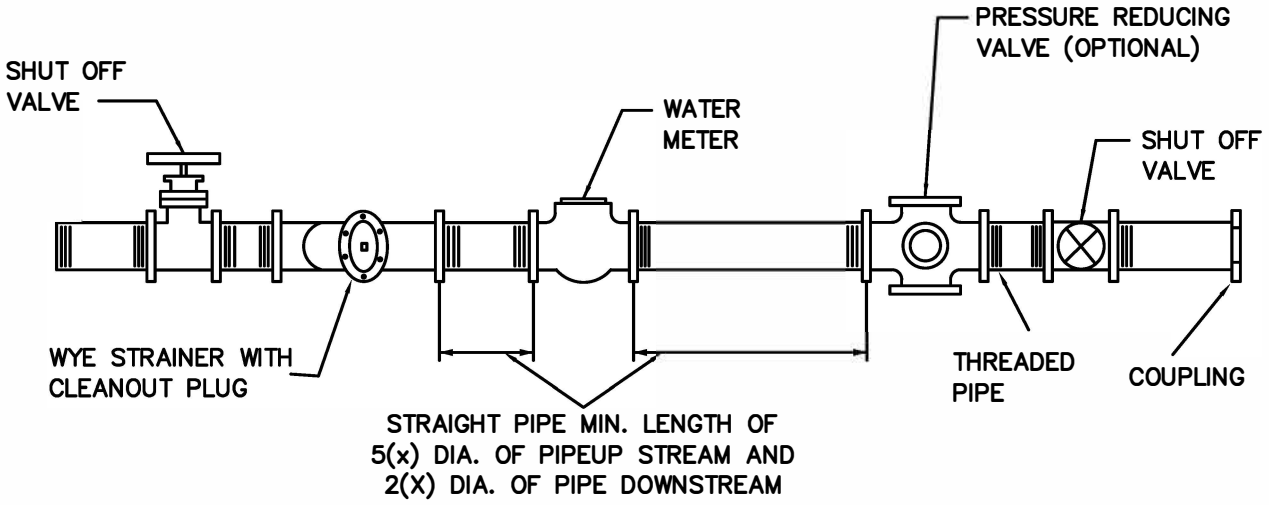
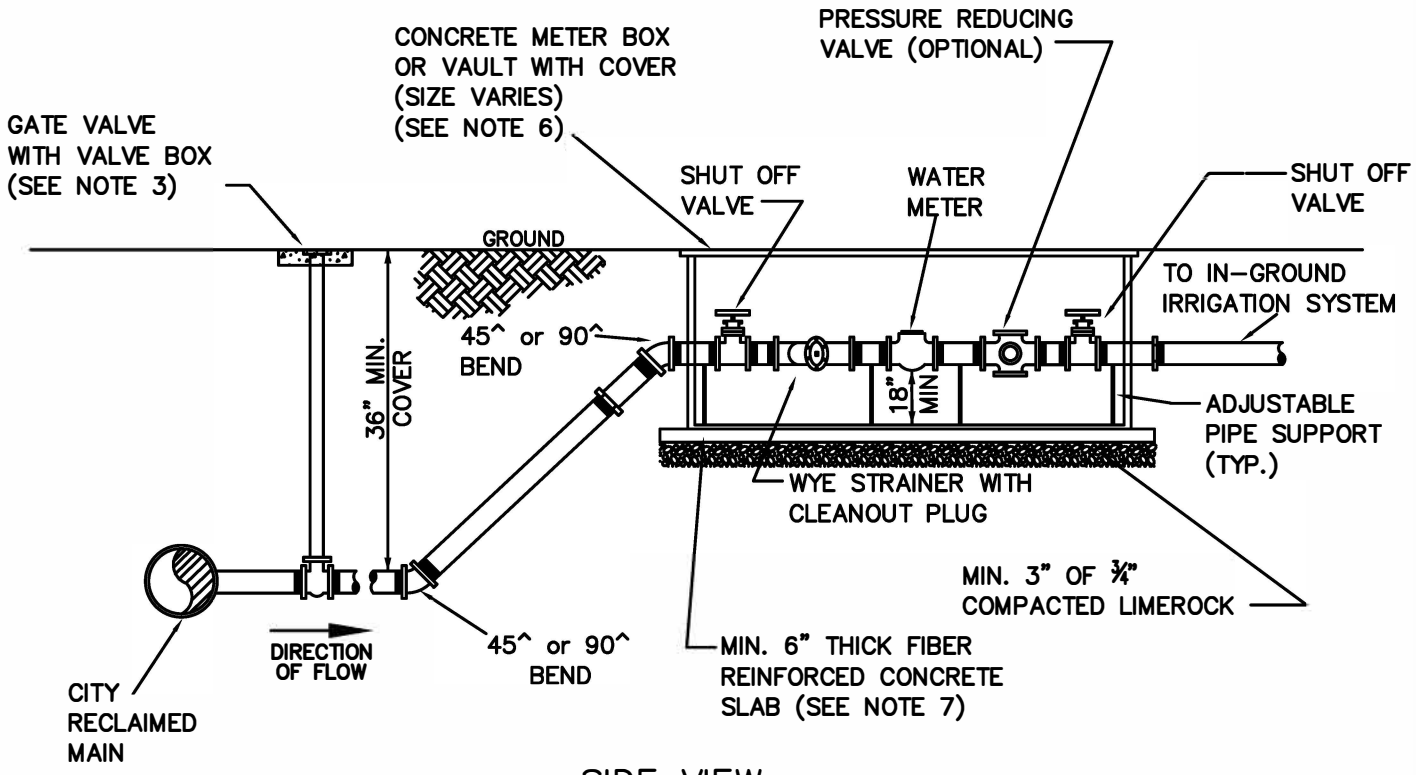
INDEX NUMBER	DESCRIPTION
RW-140	**Commercial Above Ground Reclaimed Water Meter Detail**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



ENLARGED TOP VIEW



SIDE VIEW

NOTE:

1. ALL FITTINGS BETWEEN CITY MAIN AND LAST GATE VALVE MUST BE DUCTILE IRON OR BRASS
2. IN ORDER TO ENCLOSE THE WATER METER AND ALL RELATED HARDWARE, TWO METER BOXES MAY BE REQUIRED.
3. REFER TO RW-02 THROUGH RW-05.
4. PROVIDE PRESSURE REDUCING VALVE UNLESS COMMERCIAL CUSTOMER WAIVES IN WRITING.
5. FOR RECLAIMED SERVICES SMALLER THAN 2-INCH PROVIDE BELOW GROUND WATER METER.
6. MULTIPLE BOXES INSTALLED ADJACENT TO ONE ANOTHER IS ACCEPTABLE IF IN-LINE COMPONENTS CANNOT BE MADE TO FIT WITHIN A SINGLE BOX.
7. ENGINEER OF RECORD SHALL DESIGN SLAB FOR PROTECTION AGAINST FLOTATION.

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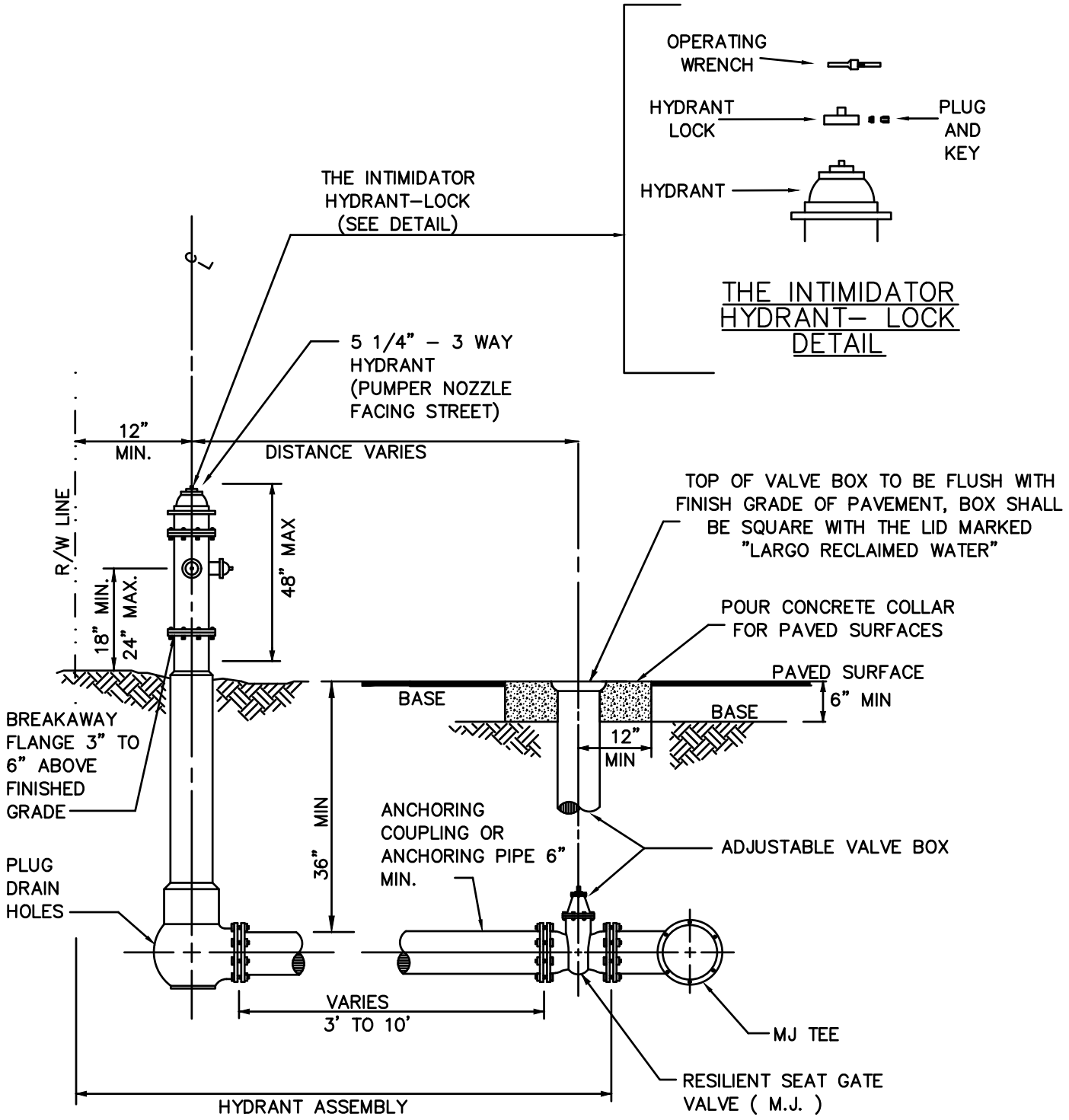
INDEX NUMBER	DESCRIPTION
RW-150	**Commercial Below Ground Reclaimed Water Meter Detail**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	



NOTES:

1. RECLAIMED HYDRANTS SHALL BE AMERICAN DARLING MODEL B84B–5 OR APPROVED EQUAL.
2. HYDRANT COLOR SHALL BE PANTONE 522C PURPLE.
3. RECLAIMED HYDRANTS SHALL ONLY BE INSTALLED WHEN AUTHORIZED BY CITY IN WRITING.

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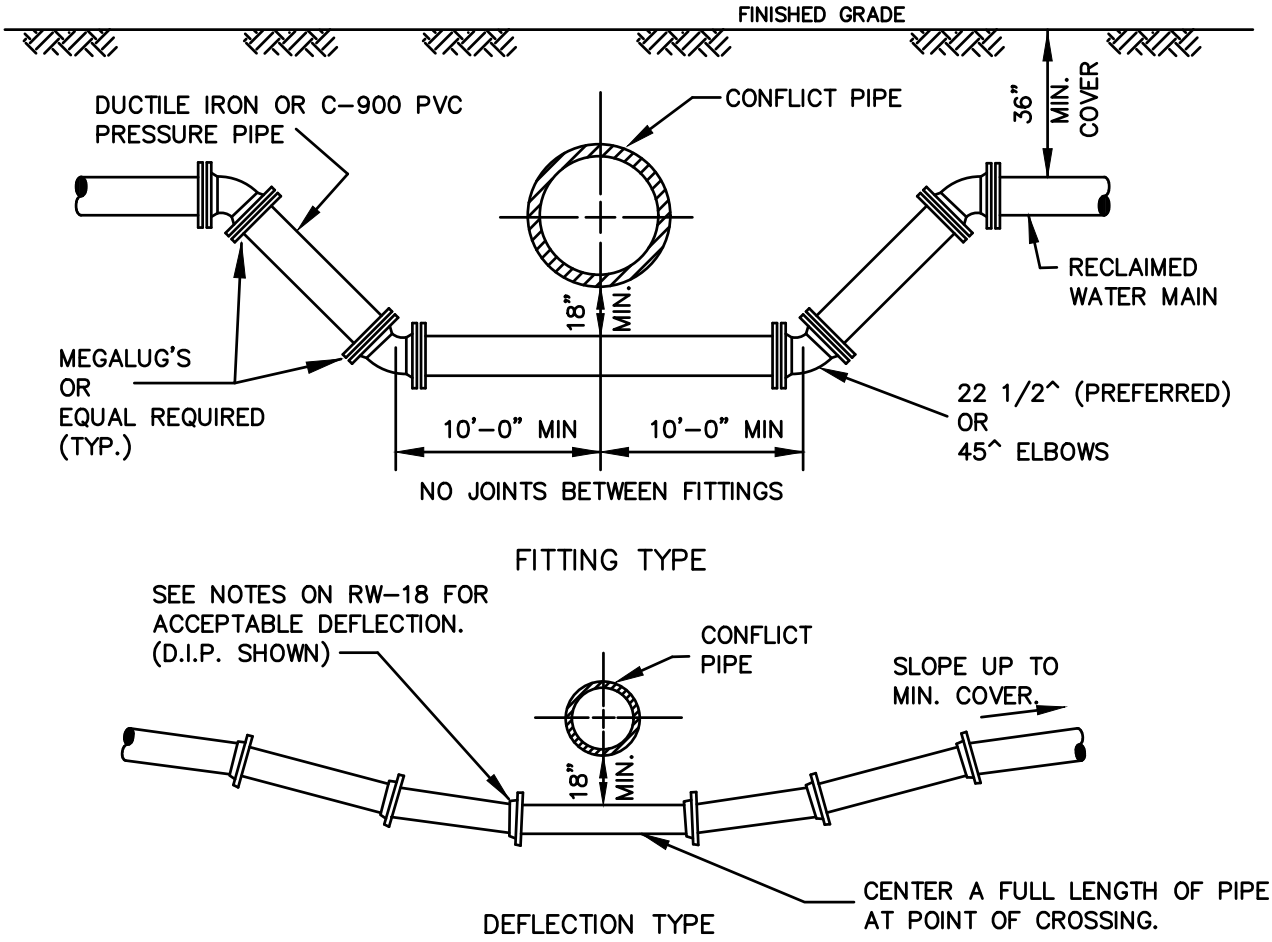
INDEX NUMBER	DESCRIPTION
RW-160	**Reclaimed Water Hydrant**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

RECLAIMED WATER CROSSING CONFLICT



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INDEX NUMBER	DESCRIPTION
RW-170	**Reclaimed Water Main Pipe Crossing Conflict**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

RECLAIMED WATER CROSSING CONFLICT

NOTES:

1. STORM SEWER, GRAVITY WASTEWATER AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE STORM/WASTEWATER/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN 10' BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6". WHERE THERE IS NO ALTERNATIVE TO STORM WATER, WASTEWATER, RECLAIMED WATER PIPES CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM SEPARATION BETWEEN LINES AND JOINTS IN THE ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.

2. MAINTAIN MIN. 10' HORIZONTAL DISTANCE BETWEEN POTABLE WATER MAIN AND STORM SEWER, WASTEWATER MAIN, OR FORCE MAIN. MAINTAIN MIN. 3' HORIZONTAL DISTANCE (WALL TO WALL) BETWEEN RECLAIMED WATER MAIN AND POTABLE WATER MAIN, STORM SEWER, WASTEWATER GRAVITY MAIN OR FORCE MAIN.

3. FORCE MAIN CROSSING POTABLE WATER MAIN OR RECLAIMED WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18" BETWEEN THE OUTSIDE OF THE FORCE MAIN AND OUTSIDE OF THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN WITH THE POTABLE WATER MAIN OR RECLAIMED WATER MAIN CROSSING OVER THE FORCE MAIN.

4. FITTINGS SHALL BE RESTRAINED USING EXTERNAL RESTRAINT SYSTEM PROVIDED IN ACCORDANCE WITH RW-11. WHERE DIRECTED BY CITY PROVIDE THRUST BLOCKS AT TEES, TAPPING SLEEVES, HYDRANTS, AND VERTICAL OFFSETS. BOTH EXTERNAL RESTRAINTS AND THRUST BLOCKS ARE REQUIRED FOR THE LOWER BEND IN A VERTICAL OFFSET CONFIGURATION.

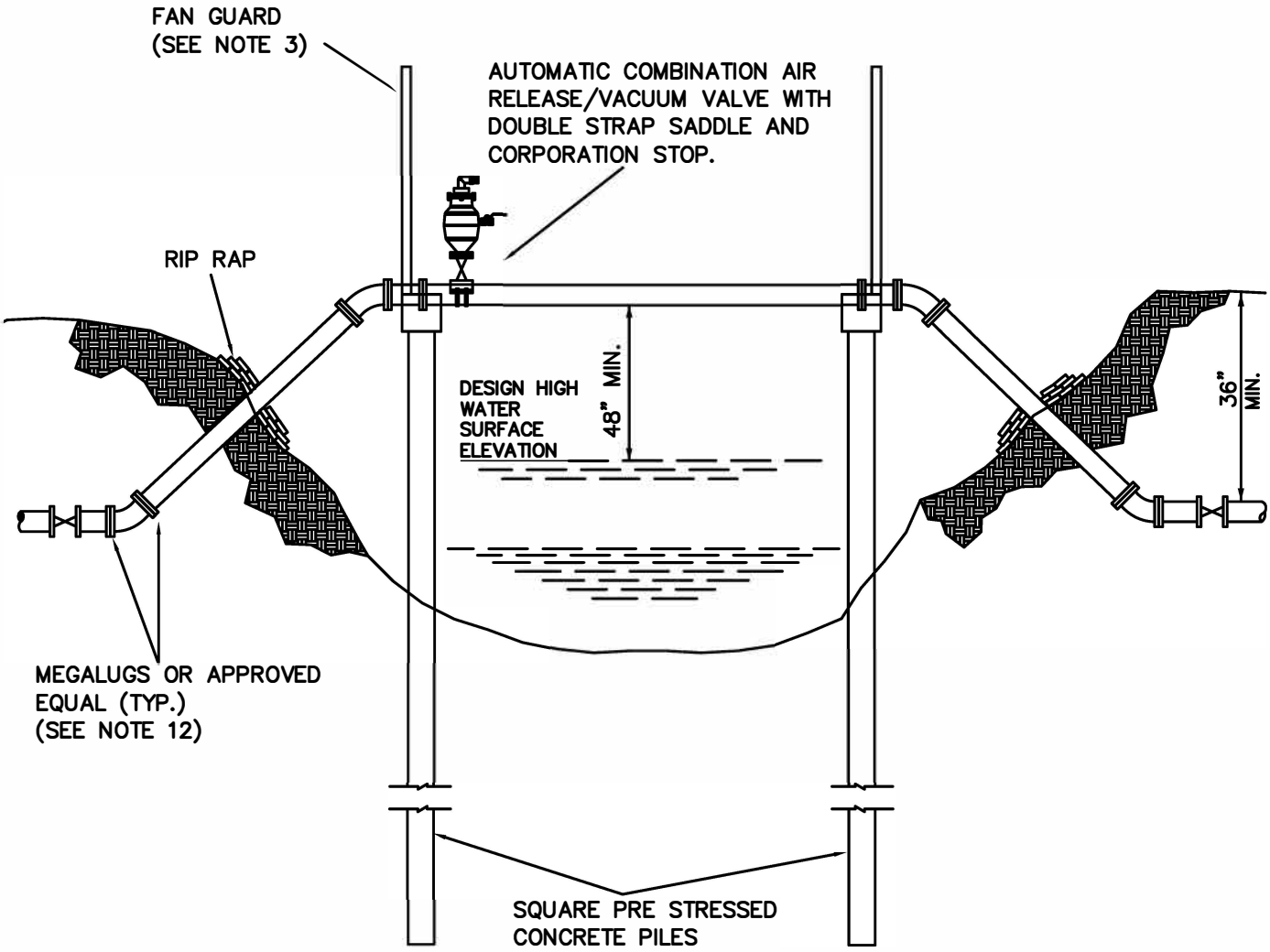
5. WHEREVER POSSIBLE DEFLECTION SHALL BE USED IN PLACE OF FITTINGS TO AVOID EXISTING OBSTRUCTIONS.

6. FOR DUCTILE IRON PIPE LIMIT DEFLECTION TO 75% OF MAXIMUM LIMIT AS SPECIFIED IN AWWA C600, OR THE MANUFACTURER'S RECOMMENDATION; WHICHEVER IS LESS. NO DEFLECTION AT THE JOINT IS ALLOWED FOR P.V.C. PIPE. BENDING OF P.V.C. PIPE SHALL NOT EXCEED THE FOLLOWING PARAMETERS:

P.V.C. PIPE SIZE	MIN. ALLOWED RADIUS (FT.)	MAX. DEFLECTION (IN INCHES) PER 20' OF LENGTH
6"	300'	8"
8"	400'	6"
10"	600'	4"
12"	800'	4"

7. ALL EXPOSED TIE STEEL SHALL BE COATED WITH COAL-TAR EPOXY.

8. RECLAIMED WATER SYSTEM PIPE SHALL BE IDENTIFIED USING TRACER WIRE. REFER TO NOTES ON RW-02.



NOTES:

1. ALL EXPOSED PIPE SHALL BE DUCTILE IRON WITH FLANGE FITTINGS. RETAINER GLANDS AND UNIFLANGED TYPE FITTING ARE NOT TO BE SUBSTITUTED FOR FLANGED FITTING.
2. SPAN LENGTHS AS REQUIRED BY PERMITTING AGENCY.
3. FAN GUARDS ARE REQUIRED. SEE DETAIL.
4. ALL HARDWARE SHALL BE PAINTED WITH COAL TAR EPOXY.
5. PIPE SHALL BE CRADLED ON NEOPRENE MIN. 1/2" THICK DUROMETER GRADE 50.
6. TIE–DOWN STRAPS MUST PROPERTY FIT AND SECURE PIPE IN CRADLE.
7. PIPE CRADLE IN CAP SHALL CONTACT 1/2 CIRCUMFERENCE OF PIPE. (SEE FAN GUARD DETAIL)
8. SUBMIT ULTIMATE CANAL SECTION AND RELEVANT ELEVATIONS AND DISTANCE ON A SCALED DRAWING.
9. PILE LIFT CABLE SHALL BE REMOVED BELOW SURFACE; HOLE SHALL BE FILED WITH EPOXY CEMENT.
10. RECLAIMED WATER SYSTEM PIPE SHALL BE PAINTED AS SPECIFIED IN THE APPROVED RECLAIMED WATER SYSTEM MATERIAL LIST.
11. SUBMIT SIGNED AND SEALED PILE DESIGN IN ACCORDANCE WITH FDOT STANDARDS.
12. WHERE POSSIBLE LOCATE BURIED FITTING ABOVE THE DESIGN HIGH WATER SURFACE ELEVATION.
13. PROVIDE PERMANENT SIGNAGE ON EITHER SIDE OF CROSSING. SUBMIT SIGN DETAIL FOR CITY REVIEW AND APPROVAL. WORDING SHALL BE SUBJECT TO CITY APPROVAL.

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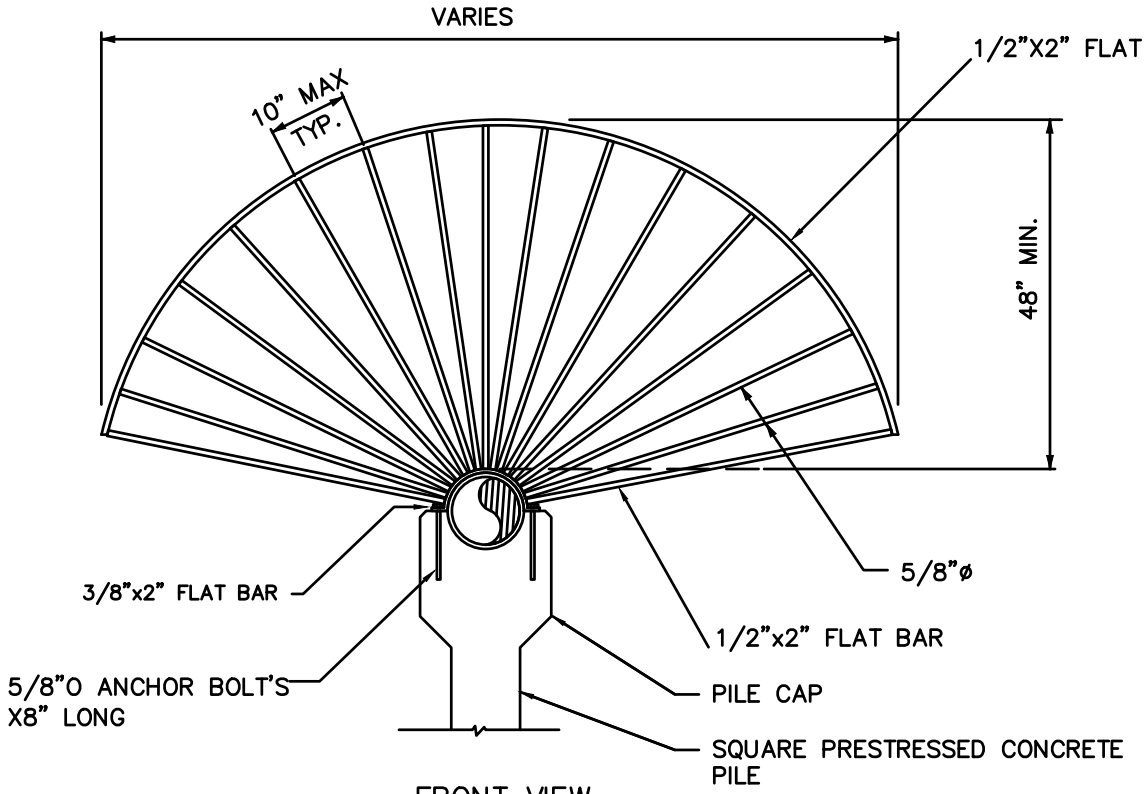
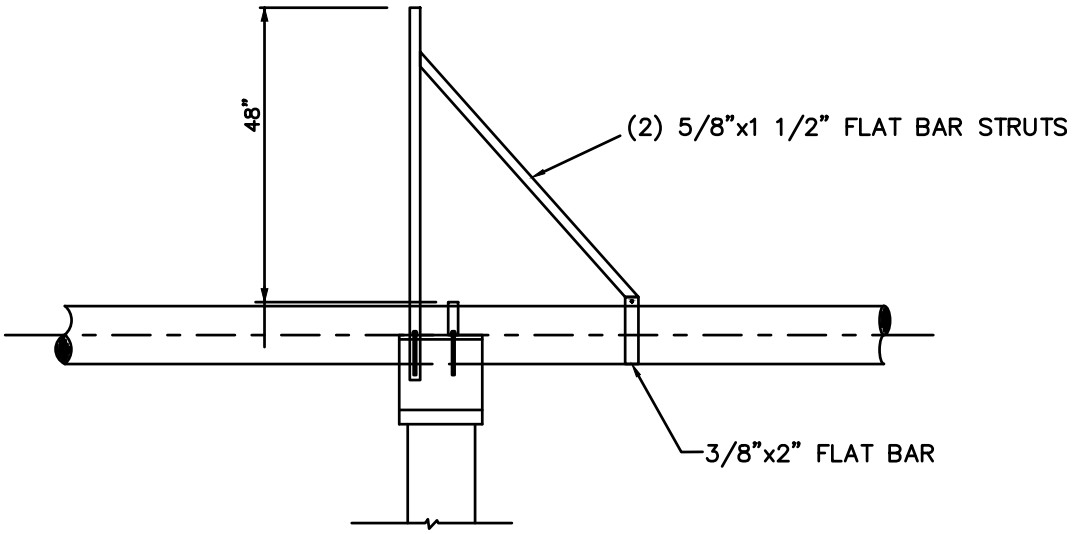
INDEX NUMBER	DESCRIPTION
RW-190	Reclaimed Water Main Typical Cananl Crossing

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	Engineering Design and Construction Standards

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	RAFAL CIESLAK, P.E.



FRONT VIEW



SIDE VIEW

NOTES:

1. FAN GUARDS SHALL BE PLACED AT EACH END OF CANAL CROSSING.
2. FAN GUARD AND HARDWARE SHALL BE PAINTED WITH COAL TAR EPOXY.
3. SUBMIT SIGNED AND SEALED FAN GUARD DESIGN.
4. PROVIDE FAN GUARD WITH LOCKABLE ACCESS DOOR AND SAFETY HARNESS ATTACHMENT TO FACILITATE AIR VALVE SERVICING.

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INDEX NUMBER	DESCRIPTION
RW-200	**Fan Guard**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

PRESSURE PIPE NOTES

1. THERE SHALL BE 36" MINIMUM COVER FROM FINISHED GRADE TO TOP OF PIPE.
2. DUCTILE IRON PIPE (D.I.P.) FOR RECLAIMED WATER MAINS SHALL BE CLASS 52 IN ACCORDANCE WITH A.W.W.A. C–151 (A.N.S.I. A21.51), AND SHALL HAVE AN INTERNAL LINING OF CEMENT MORTAR IN ACCORDANCE WITH A.W.W.A. C–104/ A21.4.
3. C–900 PRESSURE PIPE MAY BE USED. ALL OTHER PVC PRESSURE PIPE SHALL NOT BE USED, UNLESS APPROVED BY THE CITY DURING DESIGN.
4. ALL FITTINGS SHALL BE AWWA C–110, FULL BODY, CLASS 52 DUCTILE IRON WITH MECHANICAL JOINTS AND CEMENT MORTAR LINING
5. RECLAIMED WATER MAIN VALVES 12 INCHES AND SMALLER SHALL BE RESILIENT WEDGE GATE VALVES, IN ACCORDANCE WITH A.W.W.A. C–509.
6. ALL TRENCHING, PIPE–LAYING, BACK FILL AND PRESSURE TESTING MUST COMPLY WITH CITY STANDARDS.
7. RECLAIMED WATER MAINS SHALL BE PRESSURE TESTED, FOR A PERIOD OF NO LESS THAN TWO HOURS AT 150 P.S.I., IN ACCORDANCE WITH A.N.S.I./A.W.W.A. C–600 LATEST STANDARDS. NO LEAKAGE SHALL BE ALLOWED.
8. MECHANICAL RESTRAINTS SHALL BE PROVIDED AT ALL BENDS, UNLESS NOTED OTHERWISE ON PLANS. MECHANICAL RESTRAINTS SHALL BE INSTALLED IN ACCORDANCE WITH THE DESIGN STANDARDS SPECIFIED BY THE DUCTILE IRON PIPE RESEARCH ASSOCIATION (D.I.P.R.A.), LATEST EDITION.

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INDEX NUMBER	DESCRIPTION
RW-210	**Reclaimed Water Pressure Pipe Notes**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

RECLAIMED WATER MAIN REQUIREMENTS

1. THE CONTRACTOR SHALL PROVIDE AT LEAST 48 HOURS NOTICE TO THE UTILITY COMPANIES IN ORDER TO PERMIT THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES IN ADVANCE OF CONSTRUCTION, BY CALLING SUNSHINE STATE ONE-CALL, AT 1-800-432-4770 OR 811.
2. THE PROPOSED RECLAIMED WATER MAIN SHALL HAVE A MINIMUM COVER OF 36", UNLESS OTHERWISE SPECIFIED. IN ANY INSTANCE WHERE THE COVER IS LESS THAN 36", DUCTILE IRON PIPE MUST BE INSTALLED.
3. ALL P.V.C. PIPING PUSH-ON JOINTS, MEETING ALL REQUIREMENTS OF A.W.W.A. C-900, AND SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR-CODING. ALL DUCTILE IRON PIPING SHALL BE CLASS 52, AND SHALL BE PROPERLY IDENTIFIED WITH PURPLE TRACER TAPE 12" BELOW GRADE.
4. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL, AND SHALL BE PLACED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS", LATEST EDITION.
5. THE CONTRACTOR SHALL REPLACE ALL LAWN AND/OR LANDSCAPED AREAS THAT HAVE BEEN REMOVED OR DAMAGED DUE TO THE CONSTRUCTION OF RECLAIMED WATER MAINS. THE QUALITY OF WORKMANSHIP AND THE MATERIALS TO BE USED IN THE RESTORATION PROCESS SHALL PRODUCE AN END PRODUCT WHICH SHALL BE EQUAL TO, OR BETTER THAN, THE CONDITION OF THE AREAS PRIOR TO THE BEGINNING OF WORK IN THAT AREA.
6. UPON COMPLETION OF THE CONSTRUCTION OF A PROPOSED RECLAIMED WATER MAIN, A PRESSURE TEST SHALL BE PERFORMED AND WITNESSED BY A CERTIFIED REPRESENTATIVE FROM THE CITY OF LARGO, FLORIDA. (PLEASE CONTACT THE CITY OF LARGO). THE MINIMUM REQUIREMENTS OF THIS PRESSURE TEST ARE 150 P.S.I. FOR A DURATION OF TWO HOURS. NO LEAKAGE SHALL BE ALLOWED.
7. THE STANDARD OPERATING PRESSURE AND WATER SUPPLY VOLUME OF THE LARGO RECLAIMED WATER SYSTEM MAY FLUCTUATE DUE TO MANY VARIABLES, INCLUDING, BUT NOT LIMITED TO, LOCATION, DEMAND, WEATHER CONDITIONS, ELEVATION CHANGES, PIPE FRICTION LOSS, AND OTHERS. THEREFORE, IT IS THE RESPONSIBILITY OF THE CUSTOMER AND/OR THE PROPERTY OWNER TO DETERMINE IF THERE IS EITHER ADEQUATE PRESSURE AND/OR VOLUME AVAILABLE AT THE RECLAIMED WATER SERVICE CONNECTION FOR CUSTOMER. IF REQUIRED, A PRESSURE- REDUCING VALVE SHALL BE INSTALLED AT THE SITE SERVICE CONNECTION TO REDUCE THE OPERATING PRESSURE OF THE SYSTEM TO A LEVEL THAT IS COMPATIBLE WITH THE EXISTING IRRIGATION SYSTEM. APPROVED PRESSURE REDUCING VALVES ARE: WATTS SERIES 223, OR AN APPROVED EQUIVALENT.
8. ALL RECLAIMED WATER SYSTEM EQUIPMENT, INCLUDING PIPING, METER BOXES, VALVE BOXES, AND ANY APPURTENANCES SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR-CODING. THE APPROVED IDENTIFICATION STANDARDS FOR THE FOLLOWING TYPES OF PIPE MATERIAL ARE: DUCTILE IRON PIPE: SHALL BE IDENTIFIED BY WRAPPING ALL DUCTILE IRON PIPES WITH A PURPLE COLORED, POLYETHYLENE ENCASEMENT. PLASTIC PIPE: SHALL BE IDENTIFIED BY A PURPLE COLOR THAT HAS BEEN ADDED DURING THE MANUFACTURING OF THE PIP E BY THE INTRODUCTION OF A COLORING AGENT.
9. ALL RECLAIMED WATER VALVES AND OUTLETS SHALL BE APPROPRIATELY TAGGED OR LABELED TO WARN THE PUBLIC AND EMPLOYEES THAT THE WATER IS NOT INTENDED FOR DRINKING. ALL PIPING, PIPELINES, VALVES, AND OUTLETS SHALL BE COLOR -CODED, OR OTHERWISE MARKED, TO DIFFERENTIATE RECLAIMED WATER FROM DOMESTIC OR OTHER WATER. ALL VALVE BOX COVERS SHALL BE SQUARE, MARKED "LARGO RECLAIMED WATER", AND SHALL BE PAINTED PURPLE.
10. RECLAIMED WATER P.V.C. MAINS SHALL BE STRAPPED EVERY 10', OR SPIRAL -WRAPPED WITH TWO (2) NO. 14 GAUGE PURPLE IRRIGATION WIRES FOR FUTURE LOCATION PURPOSES. THE WIRES SHALL BE STUBBED OUT AT EACH VALVE BOX AND BLOW-OFF. THE TRACER WIRE SHALL BE TESTED BY THE CONTRACTOR, AND MUST BE APPROVED BY A CITY ENGINEERING REPRESENTATIVE.
11. NO SERVICE CONNECTIONS, WYES, SERVICES, OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS, EXCEPT UPON APPROVAL OF THE CITY ENGINEER.
12. TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER. ALL PIPE 4" DIAMETER AND LARGER SHALL BE LAID ON A 6" THICK TRENCH BED OF UNWASHED, CRUSHED CONCRETE.
13. BACKFILL MATERIAL FOR THE RECLAIMED WATER MAIN AND SERVICE LINES SHALL BE NON-COHESIVE, NON-PLASTIC MATERIAL FREE OF ALL DEBRIS, LUMPS AND ORGANIC MATTER. BACK FILL MATERIAL PLACED WITHIN ONE 1' OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN TWO 2" IN DIAMETER (1" FOR P.V.C. PIPE), AND NO STONE LARGER THAN 6" IN DIAMETER WILL BE PERMITTED IN ANY BACK FILL MATERIAL.
14. ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACK FILLED AND STABILIZED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO THE CONTRACTOR LEAVING THE CONSTRUCTION SITE.
15. COMPLETE "AS-BUILT" INFORMATION INCLUDING NORTHING, EASTING, AND ELEVATION RELATIVE TO VALVES, SERVICES FITTINGS, PIPE LENGTHS, ELEVATIONS AND SLOPES SHALL BE ACCURATELY RECORDED AND SUBMITTED TO THE CITY, AND MUST BE SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR.
16. PURPLE, 3" WIDE DETECT-A-TAPE LABELED " CAUTION RECLAIMED WATER BURIED BELOW" SHALL BE INSTALLED 12" BELOW FINISHED GRADE ABOVE ALL RECLAIMED WATER MAINS INSTALLED.

City of Largo - Engineering Services Department
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INDEX NUMBER	DESCRIPTION
RW-220	**Reclaimed Water Main General Specifications**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**
CITY ENGINEERING DIRECTOR: **JERALD WOLOSZYNSKI, P.E.**	ASST. ENGINEERING DIRECTOR: **RAFAL CIESLAK, P.E.**	

RECLAIMED WATER METER REQUIREMENTS

1. ALL RECLAIMED WATER VALVE BOXES, METER BOX COVERS, AND ALL ABOVE GROUND FITTINGS AND EQUIPMENT SHALL BE PAINTED PURPLE IN COLOR.
2. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL.
3. ALL RECLAIMED WATER METERS, SIZED LARGER THAN 2", SHALL BE INSTALLED ABOVE GROUND.
4. THE RECLAIMED WATER METER, AND ALL RELATED HARDWARE, SHALL BE ENCLOSED IN A METER BOX. IF DEEMED NECESSARY, TWO METER BOXES MAY BE USED.
5. ALL PIPE FITTINGS SHALL BE FLANGED.
6. ALL RECLAIMED WATER METER CASES SHALL BE MANUFACTURED FROM COPPER ALLOY (BRONZE). PROVIDE NUTATING DISC RESIDENTIAL METERS AND TURBINE COMMERCIAL METERS, IN ACCORDANCE WITH APPROVED METER LIST. COMPOUND METERS ARE NOT ACCEPTABLE.
7. THE FOLLOWING RECLAIMED WATER METERS HAVE BEEN APPROVED BY THE CITY OF LARGO:
   A. DISPLACEMENT TYPE – MAGNETICALLY DRIVEN SIZES 5/8" x 3/4", 1", 1 1/2", AND 2"
      1. NEPTUNE TRIDENT, MODEL T–10
      2. BTR – ROCKWELL SR – II
      3. KENT MODEL C–700
      4. BADGER MODELS 25, 70, AND 120
   B. TURBINE TYPE – CLASS I – SIZES 3/4", 1", 1 1/2", 2", 3", 4" AND 6"
      1. HERSEY MVR

   A SUITABLE ALTERNATIVE SUBSTITUTION FOR A PROPOSED RECLAIMED WATER METER MUST BE APPROVED BY THE CITY OF LARGO PRIOR TO INSTALLATION. IN ORDER TO APPLY FOR AN ALTERNATIVE SUBSTITUTION THE DEVELOPER AND/OR CONTRACTOR MUST SUBMIT ENGINEERING DRAWINGS, WHICH DEPICT THE INSTALLATION DETAILS OF THE WATER METER, ENGINEERING AND DESIGN DATA, AND ANY RELEVANT CALCULATIONS THEREUNTO APPERTAINING. ALL WATER METERS AND ANY APPURTENANCES SHALL BE INSTALLED IN A DEDICATED PUBLIC RIGHT–OF–WAY, OR A DEDICATED PUBLIC UTILITY EASEMENT.
8. METERS SHALL READ IN UNITS OF 1,000 GALLONS.

RECLAIMED WATER HYDRANT GENERAL SPECIFICATIONS

1. RECLAIMED WATER HYDRANTS SHALL ONLY BE PROVIDED WHERE AUTHORIZED BY CITY IN WRITING.

2. ALL RECLAIMED WATER HYDRANTS SHALL BE OF THE COMPRESSION TYPE, AND SHALL CONFORM TO A.W.W.A. STANDARD C-502, AND SHALL BE THE MANUFACTURER'S LATEST DESIGN. ALL HYDRANTS SHALL BE 5.25", AND SHALL BE DESIGNED FOR A WORKING PRESSURE OF 150 P.S.I., AND A HYDROSTATIC TEST PRESSURE OF 300 P.S.I. THE HYDRANT VALVE SHALL CLOSE WITH WATER PRESSURE. IN ADDITION, THE HYDRANT SHALL BE DESIGNED IN SUCH A MANNER SO THAT ALL OPERATING PARTS SHALL BE SIMPLE AND ECONOMICAL TO INSTALL AND MAINTAIN, AND SHALL BE REMOVABLE THROUGH THE BARREL WITHOUT EXCAVATION. ALL HYDRANTS SHALL HAVE "O" RING PACKING AND THE MAIN VALVE SEAT SHALL BE MADE OF A RUBBER COMPOUND SUCH AS NEOPRENE OR SOME OTHER SYNTHETIC RUBBER MATERIAL. ALL HYDRANT INLET CONNECTIONS SHALL BE A 6" MECHANICAL JOINT. ALL HYDRANTS SHALL HAVE AN APPROVED A.W.W.A. BREAKAWAY FEATURE OF THE "BREAK FLANGE" TYPE, IN ORDER TO MINIMIZE TRAFFIC IMPACT DAMAGE, AND SHALL BE OF THE THREE- WAY DESIGN, WITH ONE (1) 4.5" PUMPER CONNECTION, AND TWO (2) 2.5" HOSE CONNECTIONS. ALL CONNECTIONS SHALL BE AMERICAN NATIONAL STANDARD HOSE THREADS. THE OPERATING NUT SHALL BE A 1.5" PENTAGONAL POINT-TO-FLAT NUT, WITH A COUNTER- CLOCKWISE OPENING. ALL DRAIN HOLES SHALL BE PLUGGED WITH BRASS PLUGS, OR SHALL BE ELIMINATED DURING THE MANUFACTURING PROCESS. ALL SET SCREWS AND PINS SHALL BE CONSTRUCTED OF STAINLESS STEEL. IN ADDITION, ALL RECLAIMED WATER HYDRANTS SHALL HAVE A WEATHER CAP. APPROVED PRODUCTS ARE: AMERICAN DARLING, MODEL B84B-5, OR APPROVED EQUAL
3. ALL RECLAIMED WATER HYDRANTS SHALL BE SET PLUMB, AND THE NOZZLE CAP SHALL BE AT LEAST 18" ABOVE THE FINISHED GRADE. THE HYDRANT CONTROL VALVE SHALL BE CONNECTED TO THE MAIN BY A STANDARD HYDRANT TEE, OR ANOTHER APPROVED METHOD OF RESTRAINT. THE HYDRANT SHALL NOT BE TIED TO THE TEE, BUT SHALL BE RESTRAINED BETWEEN THE CONTROL VALVE AND THE HYDRANT BY MEANS OF RESTRAINED JOINTS.
4. ALL RECLAIMED WATER HYDRANTS, VALVE BOXES, AND ANY ABOVE-GROUND APPURTENANCES SHALL BE PROPERLY IDENTIFIED BY A PURPLE COLOR CODING.
5. ALL PROPOSED RECLAIMED WATER MAINS SHALL HAVE RESTRAINED JOINTS AT ALL BENDS, BOTH HORIZONTAL AND VERTICAL, AND SHALL BE PLACED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS". PLEASE REFER TO THE LATEST EDITION.
6. ALL RECLAIMED WATER HYDRANTS INSTALLED ON THE RECLAIMED WATER SYSTEM SHALL BE PROTECTED BY AN APPROVED HYDRANT LOCK. TWO (2) HYDRANT LOCK OPERATING WRENCHS SHALL BE SUPPLIED TO THE CITY OF LARGO FOR EACH HYDRANT LOCK WHICH IS INSTALLED. PROVIDE McGARD "INTIMIDATOR" OR APPROVED EQUAL.
7. ALL PIPING SHALL BE OF THE CLASS 52 TYPE, AND SHALL BE INSTALLED IN CONFORMANCE TO THE SPECIFICATIONS AS SET FORTH IN THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS"

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INDEX NUMBER	DESCRIPTION
RW-240	**Reclaimed Water Hydrant**

PUBLICATION DATE	DRAWING SCALE	TITLE
April 18, 2023	N.T.S.	**Engineering Design and Construction Standards**

CITY ENGINEERING DIRECTOR	ASST. ENGINEERING DIRECTOR
JERALD WOLOSZYNSKI, P.E.	**RAFAL CIESLAK, P.E.**

GENERAL POTABLE WATER NOTES

1. LARGO ENGINEERING SERVICES WILL WITNESS ALL PRESSURE TESTING OF ON SITE POTABLE WATER PIPING ONLY. TESTING OF SITE PIPING WILL BE FROM THE END OF THE PINELLAS COUNTY'S JURISDICTION, AT THE WATER METER AND BACK FLOW PREVENTOR, TO THE START OF CITY OF LARGO'S BUILDING DEPARTMENT INSPECTION AT THE BUILDING TIE-IN.

2. ALL PAPERWORK OR FORMS TO BE SIGNED BY THE INSPECTOR WILL BE PROVIDED BY THE CONTRACTOR.

3. ALL LINES, REGARDLESS OF DIAMETER OR LENGTH, WILL BE TESTED AT ONE- HUNDRED AND FIFTY (150) PSI FOR THE PERIOD OF ONE (1) HOUR

.4. STANDARD ALLOWABLE LOSS LEAKAGE FORMULA WILL BE USED, IF PROVIDED BY CONTRACTOR. IF NOT PROVIDED, NO LOSS WILL BE ALLOWED.

5. FOR PRESSURE TESTING PURPOSES, AN INLINE GATE VALVE SHALL BE PROVIDED AT BACK FLOW PREVENTER (BFP).

6. ANY LINE NOT PASSING WILL BE "RED TAGGED." RETESTING WILL NOT BE CONDUCTED UNTIL "RED TAG" FEE HAS BEEN PAID.

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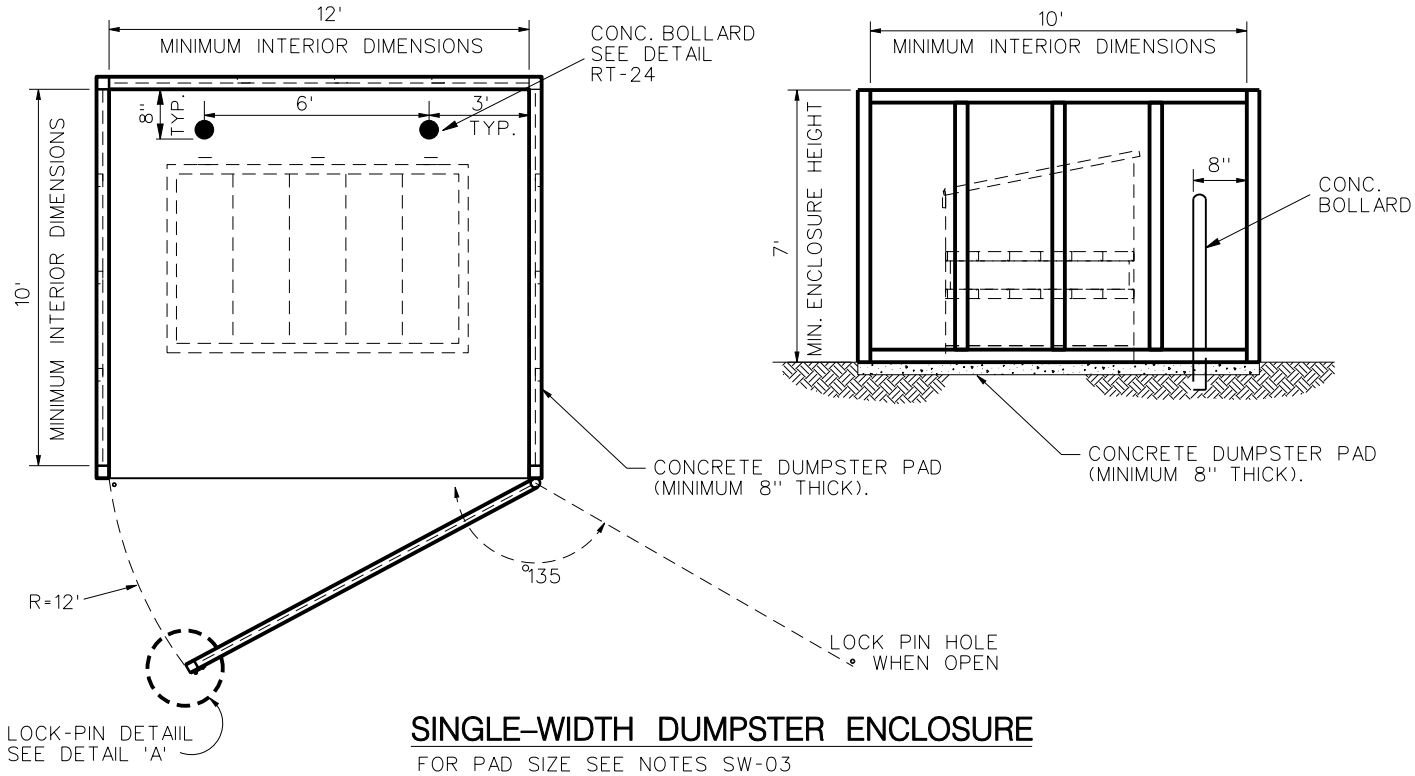
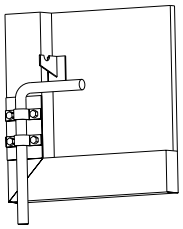
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	General Potable Water Notes	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: PW-01
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



SINGLE–WIDTH DUMPSTER ENCLOSURE

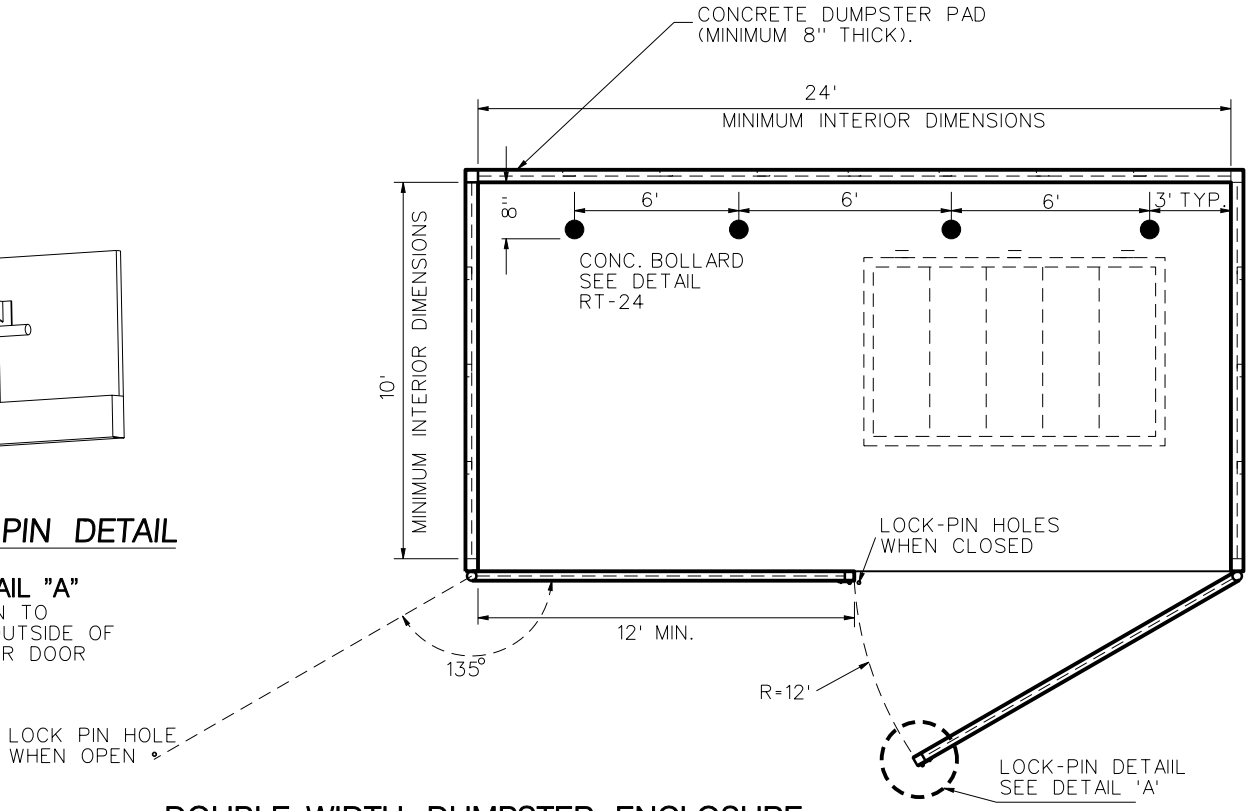
FOR PAD SIZE SEE NOTES SW-03



LOCK PIN DETAIL

DETAIL "A"

LOCK PIN TO
BE ON OUTSIDE OF
DUMPSTER DOOR



DOUBLE–WIDTH DUMPSTER ENCLOSURE

FOR MORE DETAILS SEE PAGES SW-04, SW-05.

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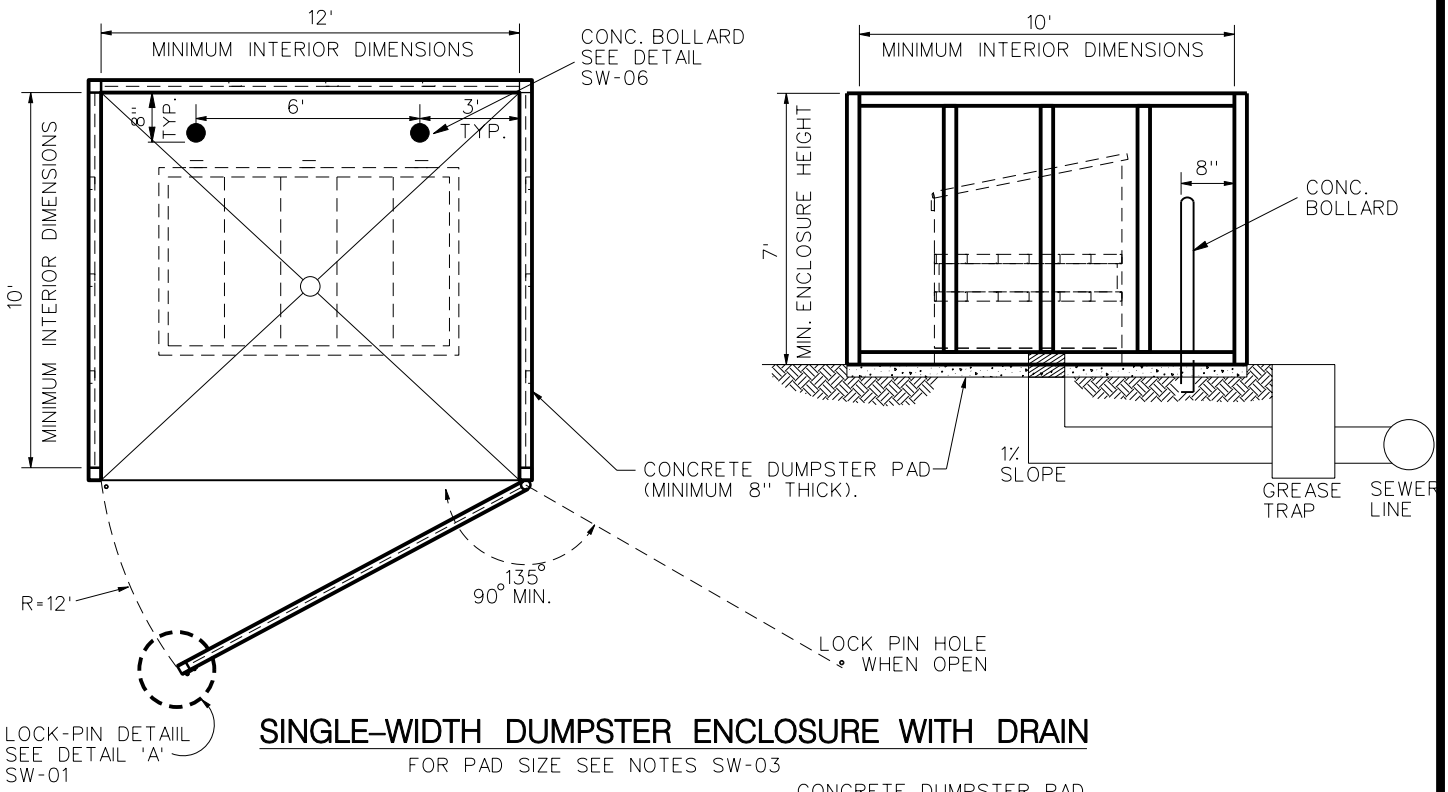
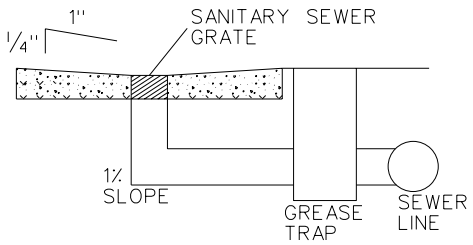
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Dumpster Pads and Enclosures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW–01
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	

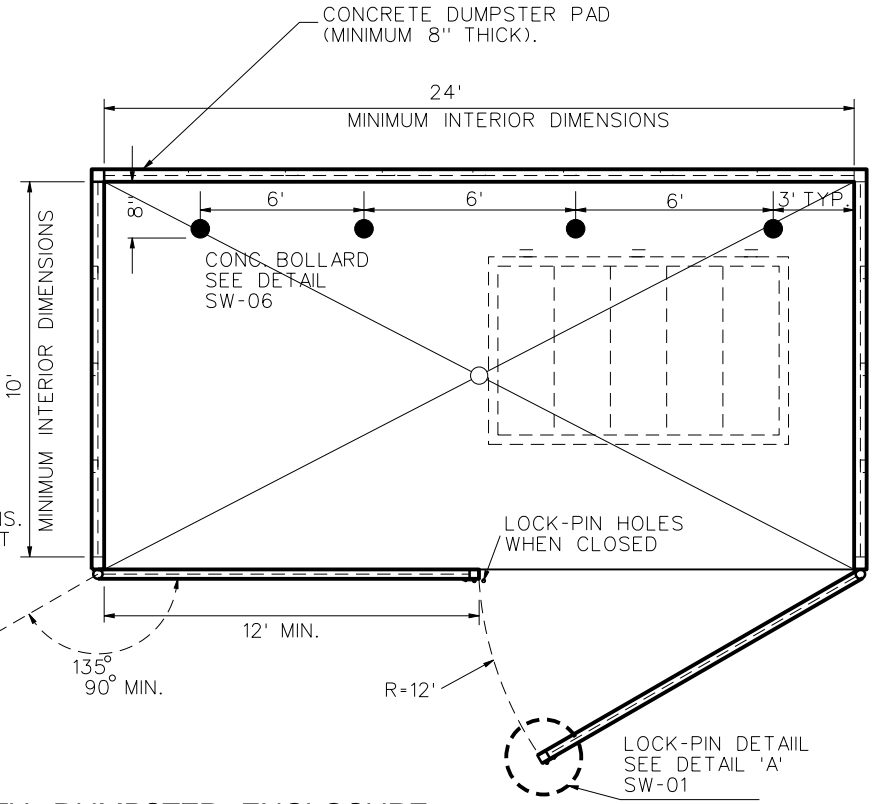


SINGLE–WIDTH DUMPSTER ENCLOSURE WITH DRAIN

FOR PAD SIZE SEE NOTES SW-03

TYPICAL CROSS SECTION
CONCRETE PAD





NOTES:

1. DRAIN TOWARDS CENTER OF PAD.
2. DRAIN MAY BE CONNECTED TO SANITARY SEWER SYSTEM.
3. 4" MAXIMUM PIPE DIAMETER.
4. GREASE TRAP TO BE MINIMUM 750 GALLONS.
5. TOP OF DRAIN ELEVATION TO BE AT LEAST 12" HIGHER THAN THE TOP OF THE POND OUTFALL STRUCTURE.

DOUBLE–WIDTH DUMPSTER ENCLOSURE

WITH DRAIN

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.

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TITLE:	DESCRIPTION:
Engineering Design and Construction Standards	Dumpster Pads and Enclosures With Drains

COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SW–02
CITY ENGINEER:	DRAWING SCALE:	
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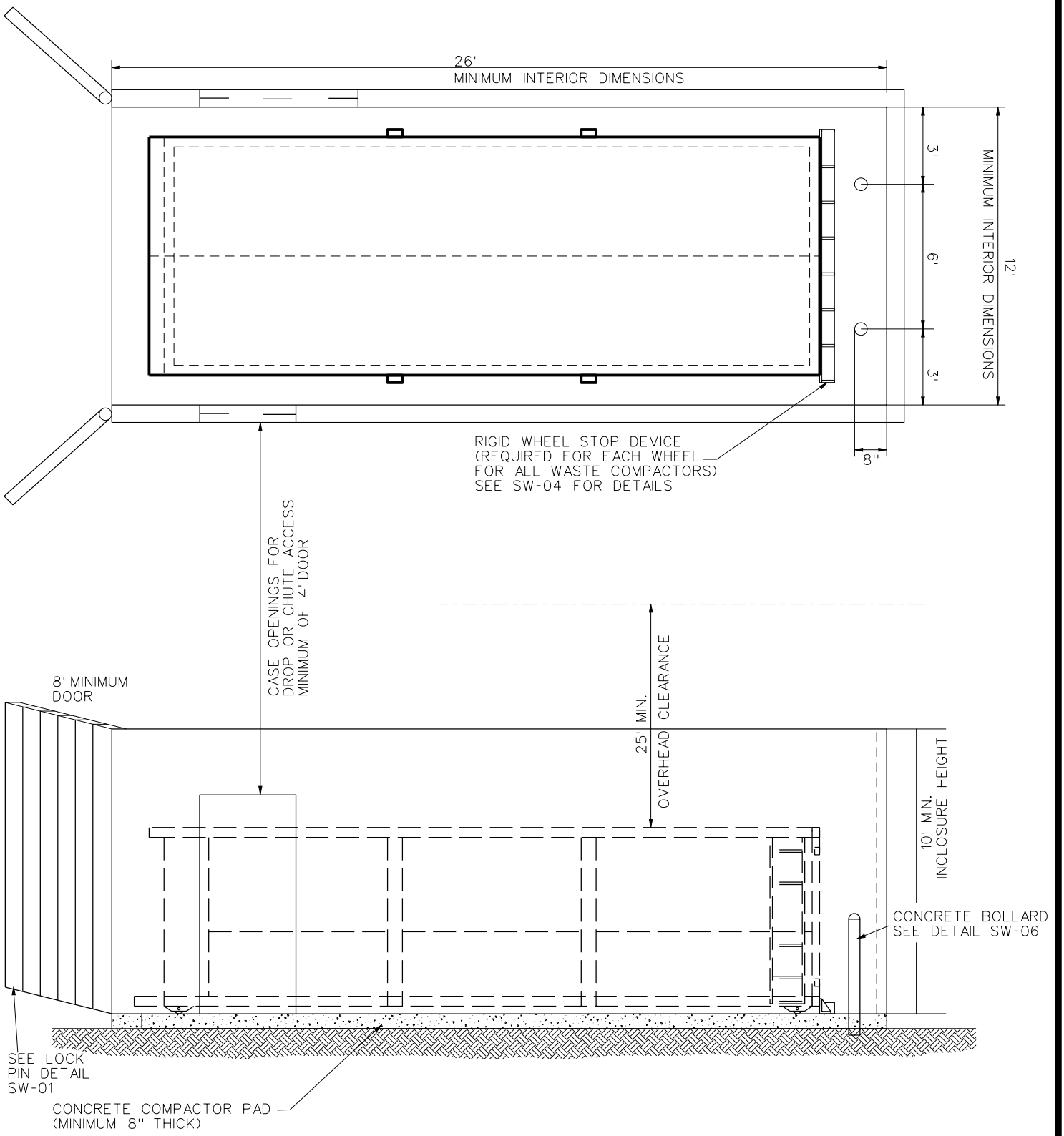

SELF CONTAINED WASTE COMPACTOR ENCLOSURE

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.

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TITLE:	DESCRIPTION:
Engineering Design and Construction Standards	Self-Contained Waste Compactors Pad and Enclosure

COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SW-03
CITY ENGINEER:	DRAWING SCALE:	
LELAND E. DICUS P.E.	NOT TO SCALE	

DUMPSTER PAD AND ENCLOSURE

1. ALL SIDES OF THE DUMPSTER SHALL BE ENCLOSED BY AN OPAQUE FENCE, I.E: WOODEN, PVC OR MASONRY BLOCK. NO CHAIN LINK, EVEN SLATTED WILL BE NOT ALLOWED. A MINIMUM 12' WIDE OPENING FOR SINGLE- WIDTH ENCLOSURES, AND 24' WIDE OPENING FOR DOUBLE- WIDTH ENCLOSURES, MUST BE PROVIDED. THE HEIGHT OF THE ENCLOSURE SHALL BE NO LESS THAN 7'.
2. A SINGLE- WIDTH DUMPSTER PAD SHALL MEASURE A MINIMUM OF 12' WIDE X 10' DEEP, AND SHALL BE CONSTRUCTED OF SLOPING TOWARDS GATE AT 2%, 8" THICK CONCRETE. A DOUBLE-WIDTH DUMPSTER PAD SHALL MEASURE A MINIMUM OF 24' WIDE X 10' DEEP, AND SHALL BE CONSTRUCTED OF SLOPING TOWARDS GATE AT 2 %, 8" THICK CONCRETE.
3. A FOUR-SIDED ENCLOSURE SHALL HAVE A 12' OPENING INSIDE OF THE GATE. DOUBLE- WIDTH DUMPSTER OPENINGS SHALL MEASURE 24' WIDE FROM INSIDE THE GATE(S). HOLDING PINS ATTACHED TO THE GATE MUST BE PROVIDED TO HOLD THE GATE OPEN WHILE BEING SERVICED. A DOUBLE-GATE ON A DOUBLE-WIDTH PAD NECESSITATES USING TWICE THE SINGLE-WIDTH STANDARD FOR A DUMPSTER GATE. WHEN A SLIDING GATE IS TO BE USED TO ENCLOSE A DOUBLE-WIDTH PAD, THE DOUBLE-WIDTH STANDARD SHALL BE USED (SEE SW-01 OR SW-02.)
4. IF RECYCLING CONTAINERS ARE TO BE INCLUDED INSIDE THE SOLID WASTE ENCLOSURE, THE ENCLOSURE WILL BE MINIMUM WIDTH OF 15' FOR A SINGLE AND 30' MINIMUM FOR A DOUBLE. IF THE DOOR IS >15', THE DOOR WILL BE REQUIRED TO HAVE A SUPPORT WHEEL WITH A SPRING. THE WHEEL MUST CONTACT THE GROUND AT ALL TIMES.
5. A DUMPSTER SHALL NOT BE LOCATED WITHIN THE MINIMUM PRESCRIBED BUFFER DISTANCE FOR THE PROPOSED DEVELOPMENT (REFER TO THE CITY OF LARGO COMPREHENSIVE DEVELOPMENT CODE, SECTION 5500).
6. A DUMPSTER SHALL NOT BE LOCATED WITHIN THE MINIMUM REQUIRED SETBACK AS MEASURED FROM THE CENTERLINE OF AN ABUTTING RIGHT-OF-WAY.
7. DUMPSTER'S SHALL BE LOCATED TO PROVIDE SAFE AND CONVENIENT ACCESS BY CITY SOLID WASTE VEHICLES FROM THE INTERIOR OF THE DEVELOPMENT. THE VEHICLES REQUIRE A MINIMUM VERTICAL CLEARANCE OF 25'. IN NO INSTANCE SHALL DUMPSTER LOCATIONS CAUSE BLOCKING OF THE RIGHT-OF-WAY BY SOLID WASTE VEHICLES DURING PICK -UP.
8. DUMPSTER ENCLOSURES ARE NOT TO BE USED FOR STORING ITEMS.
9. DUMPSTER'S SHALL NOT BE LOCATED WITHIN THE PROXIMITY OF ANY STORM WATER UTILITY OR DRAINAGE SYSTEM.
10. PROPOSED DUMPSTER LOCATIONS SHALL BE APPROVED BY THE SOLID WASTE MANAGER AND THE CITY ENGINEER ANY VARIATION TO THE "CITY OF LARGO ENGINEERING DESIGN AND CONSTRUCTION STANDARDS" MUST BE APPROVED BY THE SOLID WASTE MANAGER AND THE CITY ENGINEER. DRAINAGE FROM DUMPSTER AREA SHALL NOT IMPACT STORM WATER SYSTEM.
11. GATES SHALL HAVE "CANE" STYLE LOCKING PINS AND MUST LOCK OPEN AT 135 DEGREES IF POSSIBLE. IF NOT POSSIBLE 90 DEGREES MINIMUM WILL BE ACCEPTED AND MUST LOCK CLOSED.
12. LOCATION OF DUMPSTER ENCLOSURE WILL BE DEPICTED ON SIGNED AND STAMPED CIVIL DRAWINGS. NO CHANGES WILL BE MADE WITH OUT RE -SUBMITTING PLANS. ANY DIFFERENT OR CONFLICTING INFO, OR LOCATION ON ANY OTHER PRINT, SUCH AS ARCHITECTURAL'S, WILL NOT BE VALID.
13. IF THE ENCLOSURE IS TO BE C.M.U. (CONCRETE BLOCK WALL) THEN A STAMPED ARCHITECTURAL PRINT SHOWING FOOTERS, STEEL, ETC SHALL BE PROVIDED BY ENGINEER OF RECORD.

CLOSED AND OPEN-TOP COMPACTOR REQUIREMENTS

1. A CLOSED-TOP COMPACTOR PAD SHALL MEASURE A MINIMUM OF 12' WIDE X 26' DEEP, AND SHALL BE CONSTRUCTED OF LEVEL, 8" THICK CONCRETE.
2. METAL (OR LIKE SUBSTANCE) STOPPERS MUST BE PLANTED INTO PAD TO STOP EACH WHEEL OF THE COMPACTOR.
3. IF A COMPACTING RECYCLING CONTAINER IS TO BE INCLUDED ON SITE, THE MINIMUM WIDTH FOR THE DUMPSTER PAD WILL BE 24' WITH TWO SWING DOORS OR A ROLLER GATE. THE DOOR(S) ARE REQUIRED TO HAVE A WHEEL WITH A SPRING. THE WHEEL MUST CONTACT THE GROUND AT ALL TIMES.
4. BREAKAWAY BOXES ARE REQUIRED TO HAVE A GUIDE RAIL INSTALLED ON THE CONCRETE PAD FOR REALIGNING THE BOXES TO THE COMPACTOR AFTER THE BOX IS RETURNED.
5. BREAKAWAY BOXES ARE NOT TO BE USED WITH PUTRESCIBLE GARBAGE. THESE COMPACTORS MUST BE SELF-CONTAINED.
6. PRIOR TO INSTALLATION, THE DUMPSTER PAD AND COMPACTOR SITE MUST BE INSPECTED BY A LARGO SOLID WASTE OFFICIAL TO MAKE SURE ALL REQUIREMENTS ARE MET.
7. THE PROPERTY ON SITE IS RESPONSIBLE FOR MAINTAINING CLEANLINESS IN THE COMPACTOR AREA.
8. COMPACTOR MUST BE ENCLOSED ON 3 SIDES BY A CEMENTITIOUS WALL(C.M.U. OR CAST) A MINIMUM 10' HIGH. THE WALL WILL MEET ALL APPLICABLE BUILDING CODES.
9. THE OPEN SIDE WILL BE GATED FOR ACCESSIBILITY. GATES MY BE WOODEN STOCKADE A MINIMUM OF 8' HIGH AND HAVE CANE PINS TO PIN BOTH OPEN AND CLOSED. OPEN MUST BE 135 DEGREES IF POSSIBLE, AND 90 DEGREES MINIMUM.
10. 2 CASE OPENINGS WILL BE ALLOWED IN SIDEWALLS FOR USER ACCESS TO CHUTES, ETC FOR DROP OFFS.
11. A MINIMUM OF 25' OVERHEAD AND 40' FORWARD FROM THE GATES, FOR CLEARANCE WILL BE PROVIDED AND MAINTAINED AT ALL TIMES.
12. ANY VARIATIONS OR DEVIATIONS FROM THESE STANDARDS MUST BE SUBMITTED TO AND APPROVED BY BOTH THE SOLID WASTE DIVISION AND THE ENGINEERING DIVISION.

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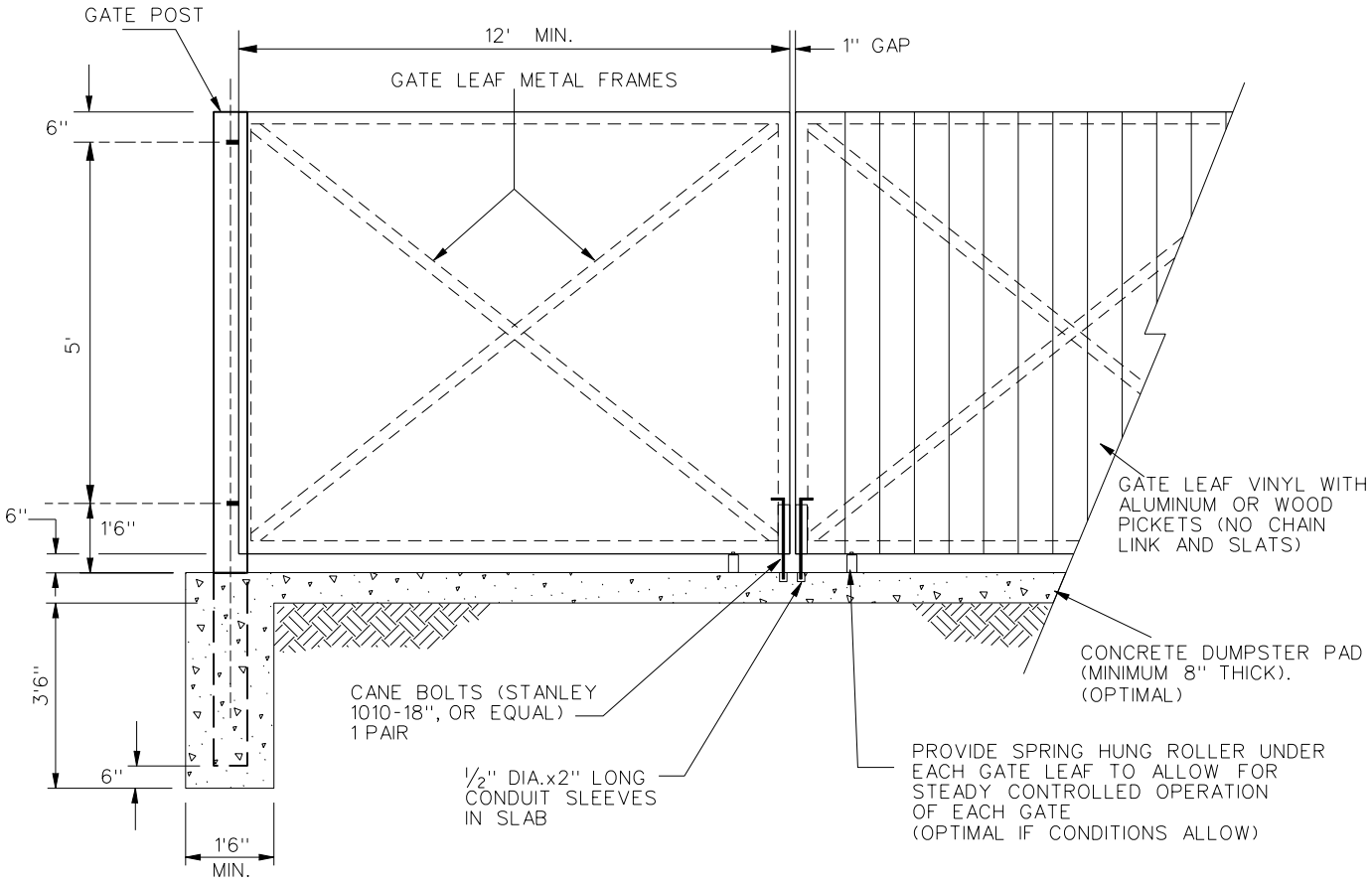
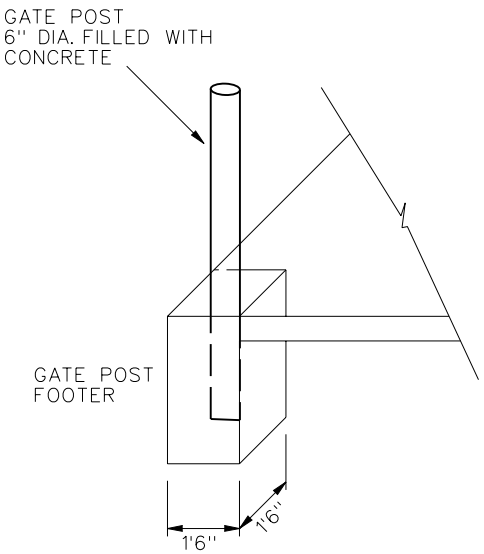
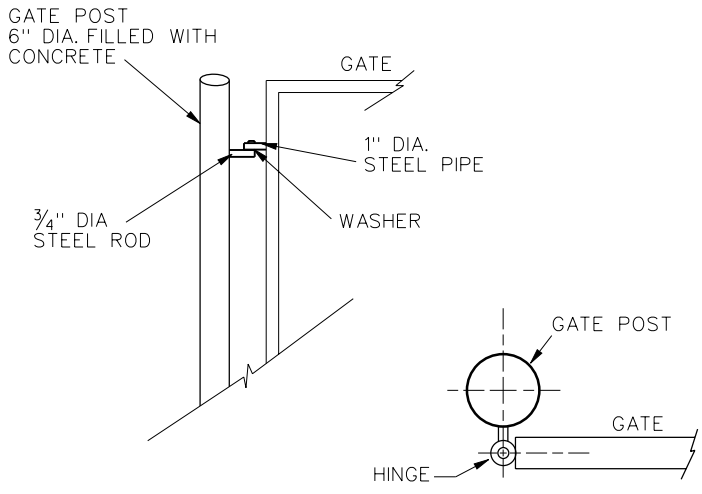
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Dumpster Pads, Compactor and Enclosures Requirements	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW-04
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	



DUMPSTER ENCLOSURE GATE ELEVATION



GATE POST DETAIL



HINGE DETAIL

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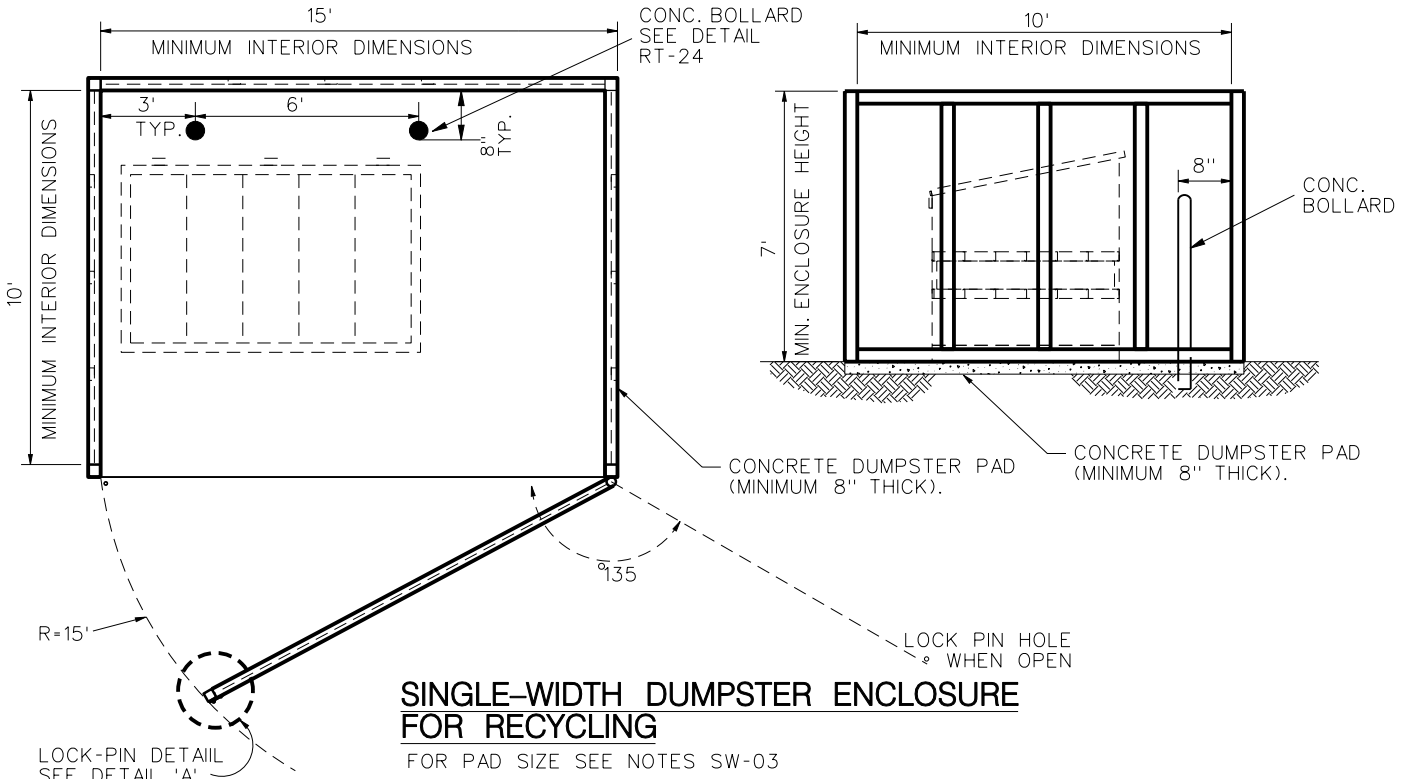
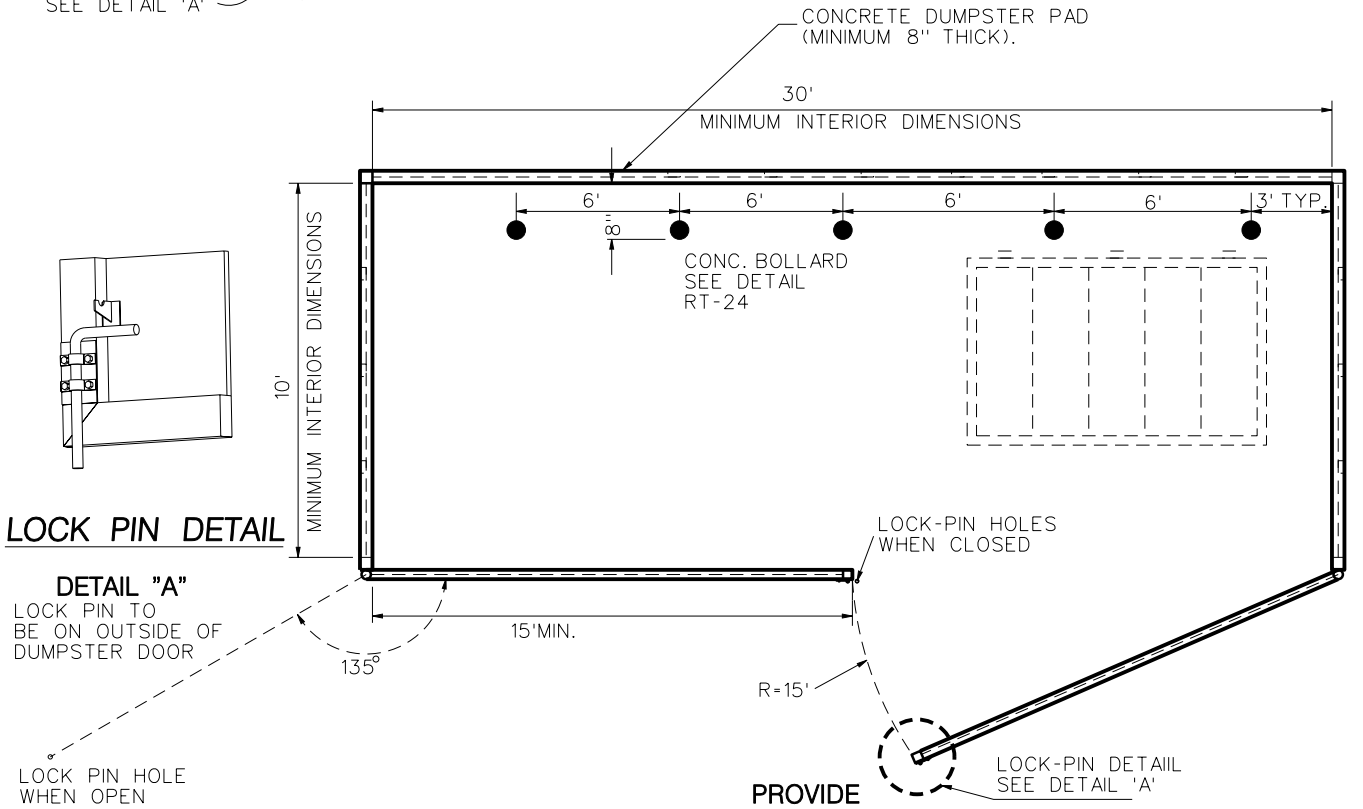
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Dumpster Pads and Enclosures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW-05
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	



SINGLE–WIDTH DUMPSTER ENCLOSURE FOR RECYCLING

FOR PAD SIZE SEE NOTES SW-03



LOCK PIN DETAIL

DETAIL "A"
LOCK PIN TO BE ON OUTSIDE OF DUMPSTER DOOR

PROVIDE
SUPPORT WHEEL WITH SPRING ON DOOR(S)

DOUBLE–WIDTH DUMPSTER ENCLOSURE FOR RECYCLING

FOR MORE DETAILS SEE PAGES SW-04, SW-05.

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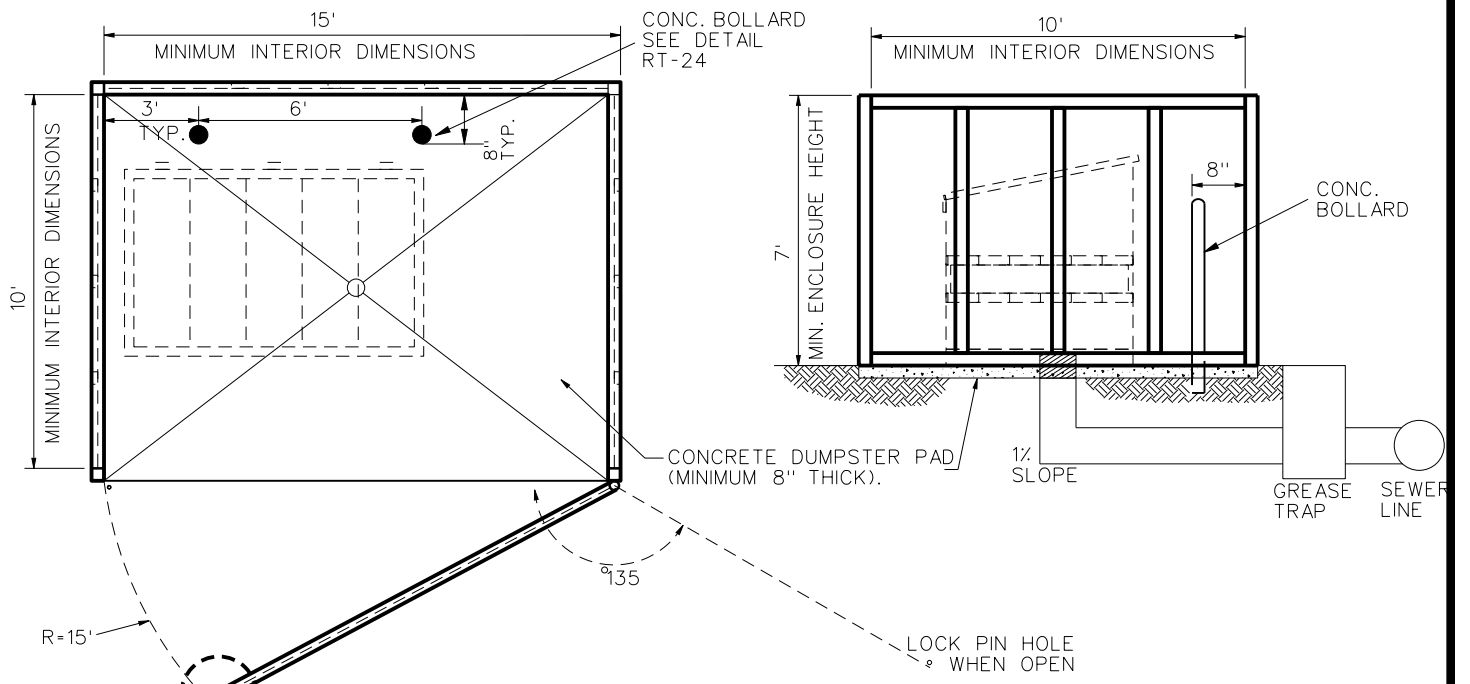
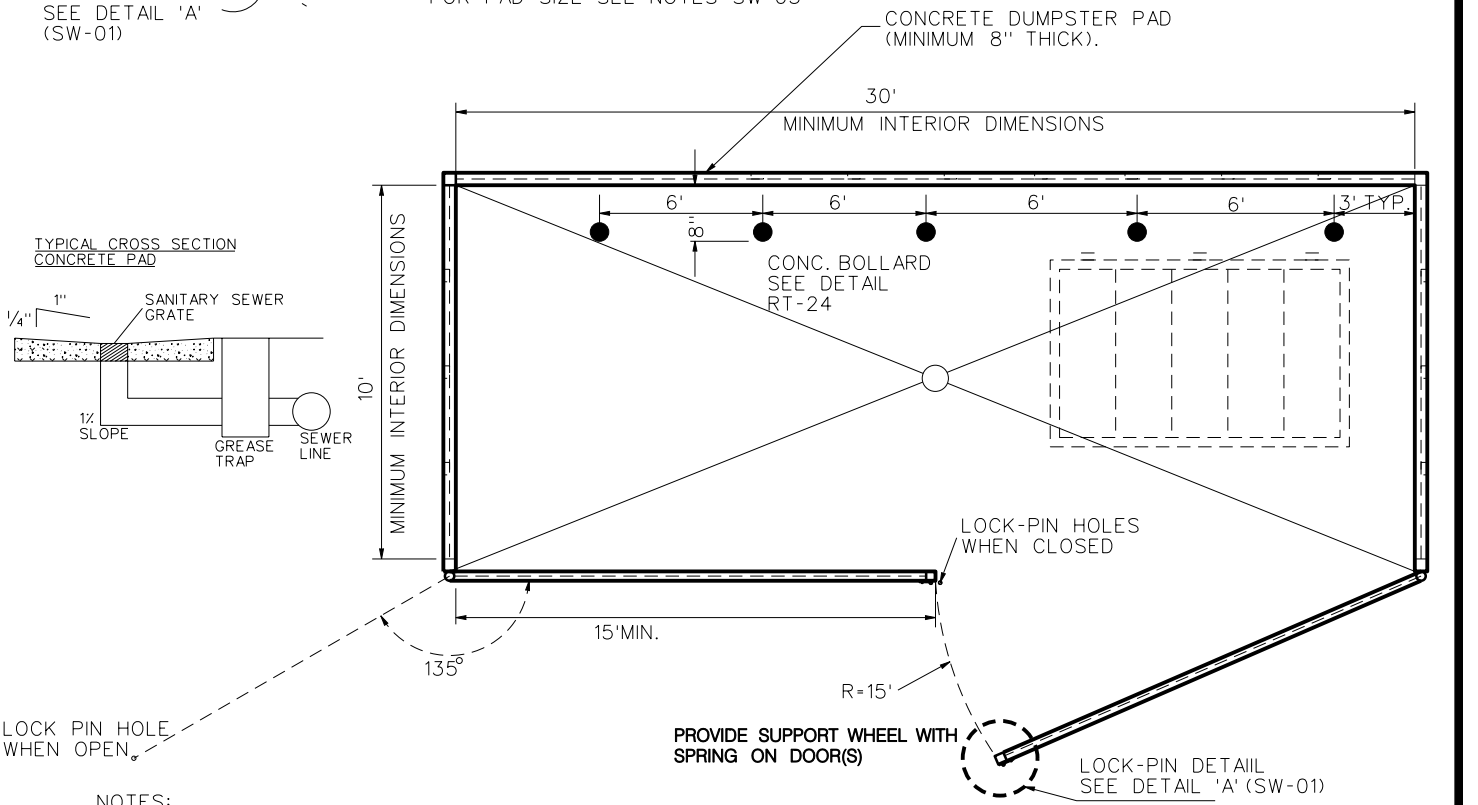
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Recycle Dumpster Pads and Enclosures	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW–06
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	



SINGLE-WIDTH DUMPSTER ENCLOSURE FOR RECYCLING WITH DRAIN

FOR PAD SIZE SEE NOTES SW-03

LOCK-PIN DETAIIL
SEE DETAIL 'A'
(SW-01)



DOUBLE-WIDTH DUMPSTER ENCLOSURE FOR RECYCLING WITH DRAIN

NOTES:

1. DRAIN TOWARDS CENTER OF PAD.
2. DRAIN MAY BE CONNECTED TO SANITARY SEWER SYSTEM.
3. 4" MAXIMUM PIPE DIAMETER.
4. GREASE TRAP TO BE MINIMUM 750 GALLONS.
5. TOP OF DRAIN ELEVATION TO BE AT LEAST 12" HIGHER THANTHE PONDS OUTFALL STRUCTURE.
6. DUMPSTER ENCLOSURE WITH DRAINS MUST BE LOCATED OR ELEVATED SO THAT SURROUNDING AREA RUNOFF FLOWS AWAY FROM THE DUMPSTER ENCLOSURE.

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.

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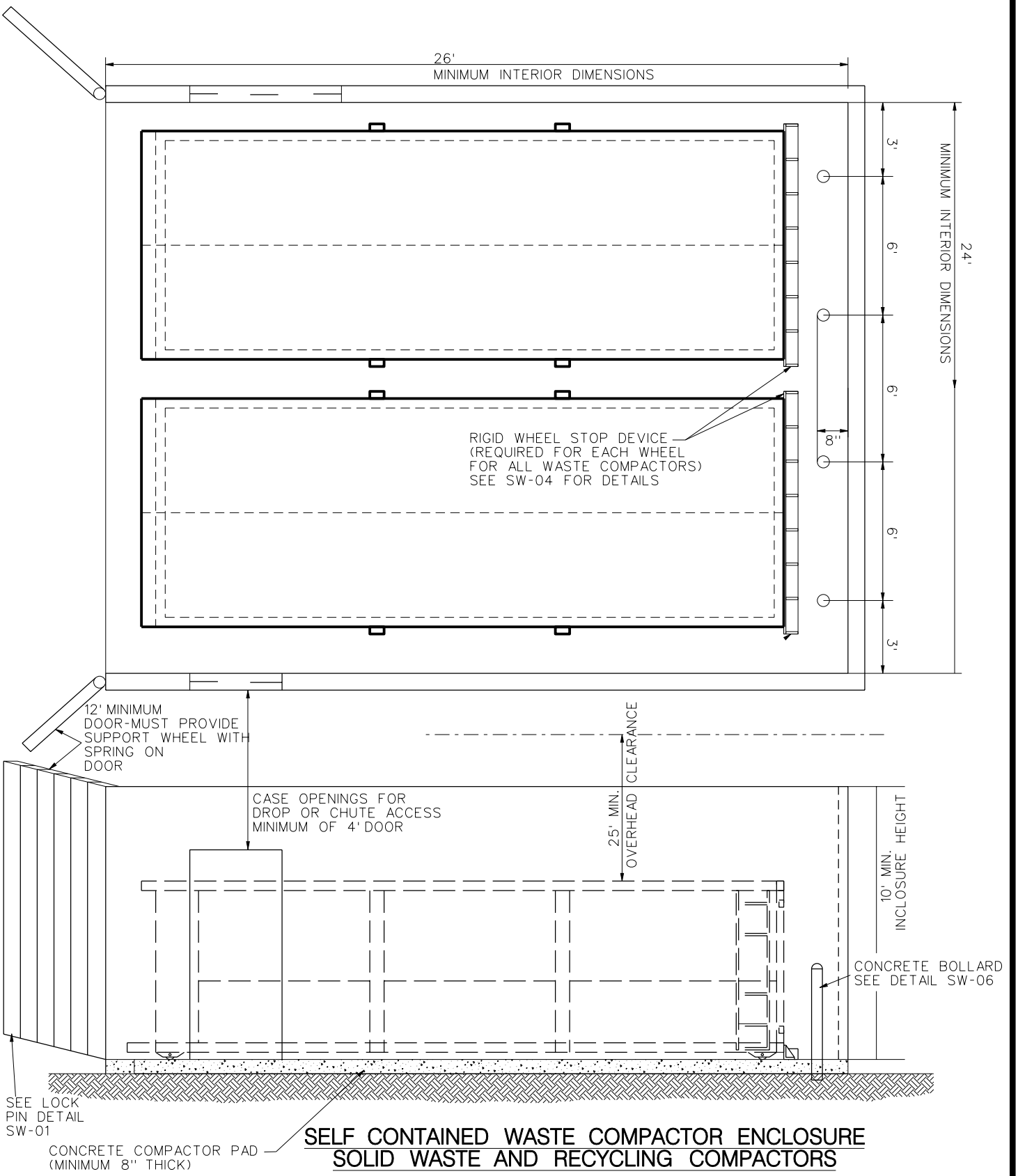
TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Dumpster Pads and Enclosures With Drains	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW-07
CITY ENGINEER: LELAND E. DICUS P.E.	DRAWING SCALE: NOT TO SCALE	



SELF CONTAINED WASTE COMPACTOR ENCLOSURE
SOLID WASTE AND RECYCLING COMPACTORS

FOR MORE DETAILS SEE PAGES SW-01, SW-04, SW-05 AND SW-06.

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TITLE:	DESCRIPTION:
Engineering Design and Construction Standards	Self-Contained Waste Compactors Pad and Enclosure

COMMUNITY DEVELOPMENT DIRECTOR:	PUBLICATION DATE:	INDEX NUMBER:
CAROL STRICKLIN A.I.C.P.	November 18, 2008	SW-08
CITY ENGINEER:	DRAWING SCALE:	
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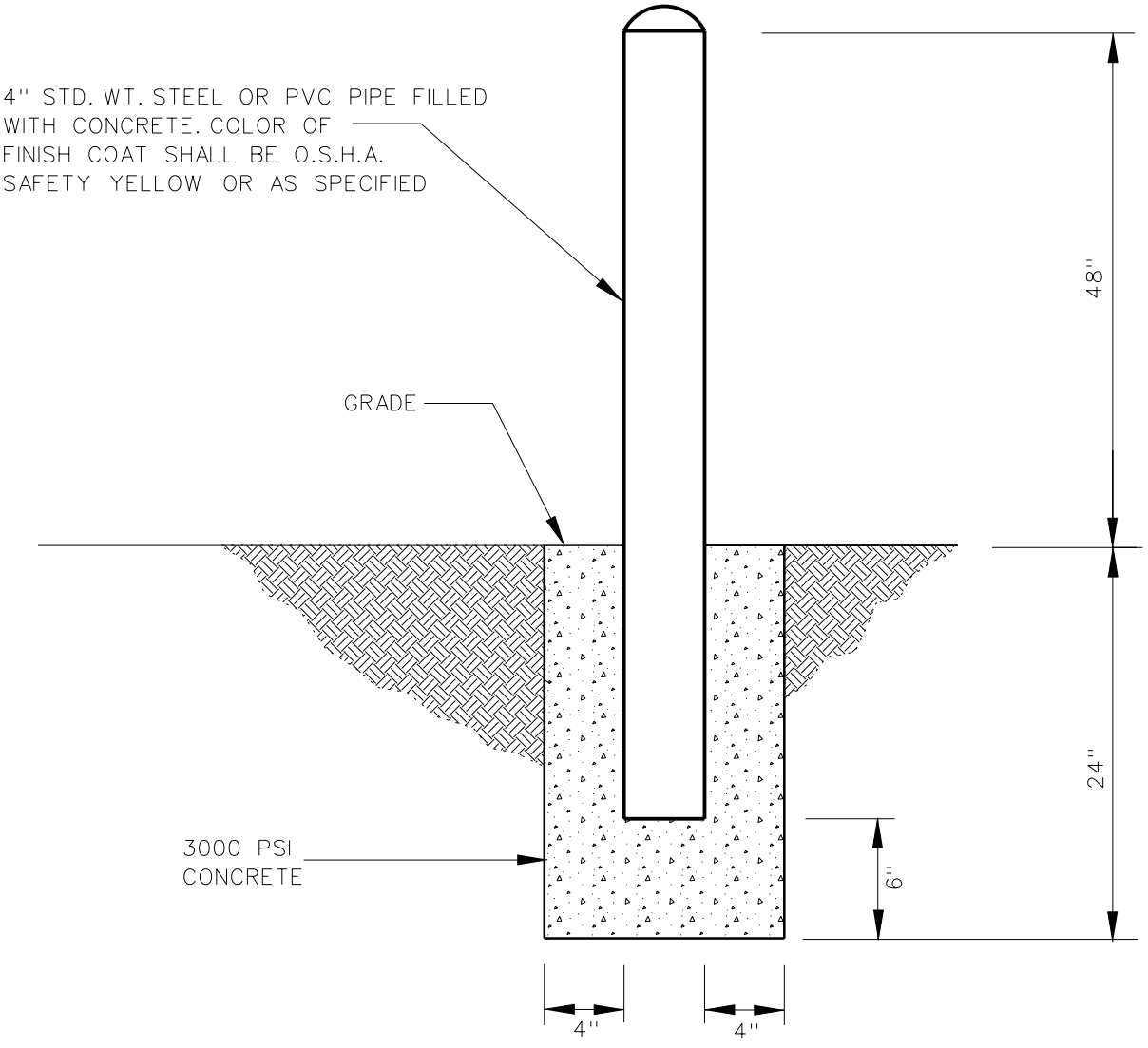

BOLLARD DETAIL

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TITLE:	DESCRIPTION:	
Engineering Design and Construction Standards	Bollard Detail	
COMMUNITY DEVELOPMENT DIRECTOR: CAROL STRICKLIN A.I.C.P.	PUBLICATION DATE: November 18, 2008	INDEX NUMBER: SW-09
CITY ENGINEER: LELAND E. DICUS, P.E.	DRAWING SCALE: NOT TO SCALE	