TABLE OF CONTENTS

DETAIL NUMBER	DETAIL NAME	LATEST REVISION
S-00	TABLE OF CONTENTS	07-01-15
S-01.1	WASTEWATER COLLECTION SPECIFICATIONS	06-25-15
S-01.2	WASTEWATER COLLECTION SPECIFICATIONS	06-25-15
S-01.3	WASTEWATER COLLECTION SPECIFICATIONS	06-25-15
S-01.4	WASTEWATER COLLECTION SPECIFICATIONS	11-10-14
S-01.5	WASTEWATER COLLECTION SPECIFICATIONS	11-17-14
S-02	SANITARY SEWER SINGLE SERVICE	11-10-14
S-03	SANITARY SEWER DOUBLE SERVICE	11-17-14
S-04	COMMERCIAL SANITARY SERVICE (6" AND SMALLER MAINS)	01-04-12
S-05	COMMERCIAL SANITARY CLEAN-OUT (8" MAINS)	11-17-14
S-06	SANITARY MANHOLE FRAME AND COVER	06-25-15
S-07	TYPICAL MANHOLE PLAN	11-10-14
S-08	CONNECTION TO EXISTING MANHOLE	11-10-14
S-09	STANDARD DROP MANHOLE CONNECTION	11-10-14
S-10	PRECAST CONCRETE MANHOLE	11-10-14
S-11	MANHOLE STUB-OUT	11-10-14
S-12	GATE VALVE AND BOX DETAIL	11-10-14
S-13	FORCE MAIN AIR RELEASE VALVE	09-21-15
S-14	GREASE OIL SEPARATOR	11-10-14
S-15	PRECAST CONCRETE MANHOLE JOINT CONSTRUCTION	11-10-14
S-16.1	TYPICAL DUPLEX LIFT STATION LAYOUT DETAIL	09-21-15
S-16.2	DUPLEX LIFT STATION SECTION VIEW	09-21-15
S-16.3	DUPLEX LIFT STATION PLAN VIEW	09-21-15
S-16.4	DUPLEX LIFT STATION FLOW METER PLAN VIEW	09-21-15
S-16.5	DUPLEX LIFT STATION CONTROL PANEL	09-21-15
S-16.6	DUPLEX LIFT STATION GENERAL NOTES	09-21-15
S-16.7	DUPLEX LIFT STATION PUMP SPECIFICATIONS	09-21-15
S-17.1	TYPICAL TRIPLEX LIFT STATION LAYOUT DETAIL	09-21-15
S-17.2	TRIPLEX LIFT STATION SECTION VIEW	09-21-15
S-17.3	TRIPLEX LIFT STATION PLAN VIEW	09-21-15
S-17.4	TRIPLEX LIFT STATION FLOW METER PLAN VIEW	09-21-15
S-17.5	TRIPLEX LIFT STATION CONTROL PANEL	09-21-15
S-17.6	TRIPLEX LIFT STATION GENERAL NOTES	09-21-15
S-17.7	TRIPLEX LIFT STATION PUMP SPECIFICATIONS	09-21-15

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

TABLE OF CONTENTS

DETAIL NUMBER: S-00

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-00 Table of Contents.dwg Model Sep 21, 2015 3:05pm by: Matt.Tebow

WASTEWATER COLLECTION SYSTEM

SCOPE

THE WORK UNDER THIS SECTION INCLUDES THE FURNISHING, INSTALLING AND/OR LAYING, JOINTING, AND TESTING OF ALL SEWER LINES, MANHOLES, FITTINGS AND APPURTENANCES, INCLUDING NECESSARY SERVICE CONNECTIONS, REQUIRED FOR A COMPLETE SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN. THE WORK SHALL ALSO INCLUDE SUCH CONNECTIONS, RECONNECTIONS, TEMPORARY SERVICE, AND ALL OTHER PROVISIONS IN REGARD TO EXISTING SEWER OPERATIONS AND MODIFICATIONS AS IS REQUIRED TO PERFORM THE NEW WORK.

GENERAL

ALL MATERIAL SHALL BE FREE FROM DEFECTS IMPAIRING STRENGTH AND DURABILITY AND BE OF THE BEST COMMERCIAL QUALITY FOR THE PURPOSE SPECIFIED. IT SHALL HAVE STRUCTURAL PROPERTIES SUFFICIENT TO SAFELY SUSTAIN OR WITHSTAND STRAINS AND STRESSES TO WHICH IT IS NORMALLY SUBJECTED AND BE TRUE TO DETAIL.

POLYVINYLCHLORIDE (PVC) PIPE & FITTINGS

PIPE AND FITTINGS FOR GRAVITY SEWER CONSTRUCTION SHALL BE MANUFACTURED FROM VIRGIN MATERIAL AND SHALL MEET THE REQUIREMENTS OF ASTM D3034 – LATEST. THE PIPE SHALL BE SDR 35 OR GREATER FOR DEPTHS LESS THAN 15'. THE PIPE SHALL BE SDR 26 FOR DEPTHS GREATER THAN 15'. ALL JOINTS SHALL BE COMPRESSION TYPE JOINTS MEETING THE REQUIREMENTS OF ASTM D3212 – LATEST.

MANHOLES

MANHOLES SHALL BE THE SIZE AND DEPTH SHOWN ON THE DRAWINGS AND SHALL BE PRECAST REINFORCED CONCRETE BARRELS AND CONES COATED AS SPECIFIED.

PRECAST CONCRETE SECTIONS SHALL CONFORM TO THE ASTM SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS DESIGNATION C478 – LATEST, WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

CEMENT SHALL MEET THE REQUIREMENTS OF ASTM C150 – LATEST, SPECIFICATIONS FOR PORTLAND CEMENT, TYPE II. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. MINIMUM WALL THICKNESS SHALL BE 5", OR 1/12 THE INSIDE DIAMETER AS SHOWN, WHICHEVER IS GREATER. RINGS SHALL BE CUSTOM MADE WITH OPENINGS TO MEET INDICATED PIPE ALIGNMENT CONDITIONS AND INVERT ELEVATIONS.

JOINT CONTACT SURFACES SHALL BE FORMED WITH MACHINED CASTINGS; THEY SHALL BE EXACTLY PARALLEL WITH A 2: 1 SLOPE AND NOMINAL 1/16" CLEARANCE WITH THE TONGUE EQUIPPED WITH A PROPER RECESS FOR THE INSTALLATION OF AN O–RING RUBBER GASKET, CONFORMING TO ASTM C443 –LATEST, JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKET OR RAMNEK PRE MOLDED PLASTIC JOINT SEALER WITH JOINTS PRE–PRIMED.

WITH THE EXCEPTION OF JOINT CONTACT SURFACES, AND THE INTERIOR SURFACES OF ALL OPENINGS TO RECEIVE THE SEWER PIPE AND A 1" ANNULAR RING AROUND THE EXTERIOR AND INTERIOR OF SAID OPENINGS, THE INTERIOR AND EXTERIOR SURFACES OF EACH MANHOLE SHALL BE GIVEN TWO COATS OF COAL–TAR EPOXY. TOTAL MINIMUM DRY FILM THICKNESS SHALL BE 12 MILS. EACH COAT SHALL BE APPLIED AT THE RATE OF ONE GALLON PER 100 S.F. THE WATERPROOFING MATERIALS SHALL BE APPLIED BY BRUSH OR SPRAY AND IN ACCORDANCE WITH THE INSTRUCTIONS OF THE MANUFACTURER. TIME SHALL BE ALLOWED BETWEEN COATS TO PERMIT SUFFICIENT DRYING SO THAT THE APPLICATION OF THE SECOND COAT HAS NO EFFECT ON THE FIRST COAT. THE COAL–TAR EPOXY SHALL BE APPLIED AT THE PLACE OF FABRICATION. ADDITIONAL COATING OR TOUCH UP WILL BE REQUIRED AFTER MANHOLE INSTALLATION IF SO DIRECTED BY THE ENGINEER.

MANHOLE FRAMES AND COVERS

FRAMES AND COVERS SHALL BE CAST IRON OF THE TYPE AND SIZE SHOWN ON THE DRAWINGS. CASTINGS SHALL BE MADE OF GOOD QUALITY, STRONG, TOUGH, EVEN GRAINED CAST IRON, AND SHALL BE SMOOTH, FREE FROM SCALE, LUMPS, BLISTERS, SANDHOLES AND DEFECTS OF ANY NATURE WHICH SHOULD RENDER THEM UNFIT FOR THE SERVICE FOR WHICH THEY ARE INTENDED. THEY SHALL BE THOROUGHLY CLEANED AND SUBJECTED TO A CAREFUL HAMMER INSPECTION. CASTINGS SHALL MEET THE REQUIREMENTS OF ASTM A48 – LATEST, SPECIFICATIONS FOR GRAY IRON CASTINGS, CLASS NO. 30, OR GRADE 65–45–12, DUCTILE IRON MEETING THE REQUIREMENTS OF ASTM A536 – LATEST, STANDARD SPECIFICATION FOR DUCTILE IRON CASTINGS. IN EITHER CASE, MANHOLE FRAME AND COVER SHALL BE DESIGNED TO WITHSTAND AN HS20–44 LOADING DEFINED IN THE AASHTO SPECIFICATIONS. FRAMES AND COVERS SHALL BE MACHINED OR GROUND AT TOUCHING SURFACES SO AS TO SEAT FIRMLY AND PREVENT ROCKING.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-01.1 Sewer Notes.dwg Model Jul 01, 2015 12:14pm by: Michael.Stanley

EXCAVATION AND BACKFILL

EXCAVATION AND BACKFILL CONSISTS OF EXCAVATING FOR SANITARY SEWER, AND ALL OTHER PIPELINES, MANHOLES, AND SIMILAR STRUCTURES WITH THE FOLLOWING AMENDMENTS TO SECTION 125 OF F.D.O.T. STANDARD SPECIFICATIONS.

WHEN SOIL BORINGS ARE PROVIDED BY THE ENGINEER OR OWNER, THEY SHALL BE CONSIDERED AS SUPPLEMENTAL INFORMATION AND SHALL NOT BE CONSIDERED AS DEFINITIVE OF THE SUBSOIL CONDITIONS. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ASSESSING SUBSOIL CONDITIONS FOR THE ENTIRE PROJECT.

SECT. 125.8 BACKFILLING – THE REQUIREMENTS SPECIFIED SHALL ALSO INCLUDE THE SANITARY SEWER, MANHOLES, FORCE MAIN AND RELATED FACILITIES.

SECT. 125.8.3.3 COMPACTION – THE BACKFILL FOR THE FIRST AND SECOND STAGES SHALL BE PLACED IN 12" LAYERS (COMPACTED THICKNESS) AND SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99.

WHERE PAVEMENT IS TO BE CONSTRUCTED OVER THE PIPE OR WITHIN 4' THEREOF, THE BACKFILL FOR THE THIRD STAGE (MIN. 4' BELOW FINISH GRADE) SHALL BE PLACED IN THE MANNER REQUIRED FOR THE FIRST AND SECOND STAGES AND COMPACTED TO 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180. WHERE THE CONSTRUCTION IS OUTSIDE THESE LIMITS, THE THIRD STAGE SHALL BE COMPACTED TO A FIRMNESS APPROXIMATELY EQUAL TO THAT OF THE ADJACENT SOIL AND NO TESTING WILL BE REQUIRED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TESTING OF THE BACKFILL COMPACTION. THE TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY. DENSITY TESTS SHALL BE TAKEN ON EACH 12" LAYER AT INTERVALS NOT TO EXCEED 300 L.F. AND AT EACH TRANSVERSE SECTION OF PIPELINE.

PIPE LAYING

PIPE LAYING SHALL BE DONE ONLY AFTER A CAREFUL INSPECTION OF EACH PIECE HAS BEEN CONDUCTED AND DEFECTIVE PIPE DISCARDED AND REPLACED IMMEDIATELY. THE PIPE GRADE MAY BE ESTABLISHED BY USE OF LASER BEAM EQUIPMENT, OR BY USE OF BATTER BOARDS PLACED AT NOT GREATER THAN 25' INTERVALS.

THE LAYING OF PIPE SHALL COMMENCE AT THE LOWEST POINT, WITH THE SPIGOT ENDS POINTED THE DIRECTION OF FLOW, AND PROCEED UPWARD IN GRADIENT WITH THE ENDS ABUTTING AND TRUE TO LINE AND GRADE.

UNDER NO CIRCUMSTANCES SHALL PIPE BE LAID IN WATER, AND NO PIPE SHALL BE LAID WHEN THE TRENCH CONDITIONS OR WEATHER IS UNSUITABLE FOR WORKING IN DRY CONDITIONS. AT ALL TIMES WHEN WORK IS NOT IN PROGRESS, ALL OPEN ENDS OF PIPE AND FITTINGS SHALL BE SECURELY CLOSED SO THAT NO TRENCH WATER, EARTH, OR OTHER SUBSTANCE CAN ENTER THE PIPE. ANY TRENCH DEWATERING (WELL POINT, ETC.) REQUIRED FOR PROPER ALIGNMENT OF PIPE SHALL BE DONE BY THE CONTRACTOR AT HIS OWN EXPENSE, AND NO PIPE SHALL BE LAID IN THE DEWATERED TRENCH UNTIL APPROVAL IS MADE BY THE ENGINEER.

OPENINGS SUCH AS STUBS, WYES, TEES OR OTHER SERVICES ALONG THE LINES SHALL BE SECURELY CLOSED BY MEANS OF AN APPROVED STOPPER THAT FITS INTO THE BELL OF THE PIPE AND IS RECOMMENDED BY THE PIPE MANUFACTURER. THIS STOPPER SHALL BE JOINTED IN SUCH A MANNER THAT IT MAY BE REMOVED AT SOME FUTURE TIME WITHOUT INJURY TO THE PIPE ITSELF. AT THE CLOSE OF EACH DAY'S WORK, AND AT OTHER TIMES WHEN PIPE IS NOT BEING LAID, THE END OF THE PIPE SHALL BE TEMPORARILY CLOSED WITH A CLOSE-FITTING STOPPER APPROVED BY THE ENGINEER.

ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PREVENT THE ENTRANCE OF MUD, SAND OR OTHER OBSTRUCTING MATERIAL INTO THE PIPELINES. AS THE WORK PROGRESSES, THE INTERIOR OF THE SEWER SHALL BE CLEANED OF ALL DIRT, JOINTING MATERIAL, AND SUPERFLUOUS MATERIALS OF EVERY DESCRIPTION. THE CONTRACTOR SHALL FLUSH ALL SEWER LINES CONSTRUCTED UNDER THIS CONTRACT WITH CLEAN WATER, PRIOR TO FINAL INSPECTION TO ASSURE COMPLETE REMOVAL OF ALL DEBRIS AND FOREIGN MATERIAL, AND TO THE SATISFACTION OF THE ENGINEER.

SEWER SERVICE CONNECTION

TYPES OF SERVICE CONNECTIONS SHALL BE SHOWN ON THE DRAWINGS. ALTHOUGH THE GENERAL LOCATION OF CONNECTIONS MAY BE SHOWN ON THE DRAWINGS, THE ACTUAL LOCATION SHALL BE DETERMINED BY THE CONTRACTOR, SUBJECT TO APPROVAL BY THE ENGINEER. EACH SERVICE CONNECTION SHALL BE ACCURATELY RECORDED BY STATIONING ON THE AS-BUILT DRAWINGS AND SHALL BE FURNISHED TO THE ENGINEER.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-01.2 Sewer Notes.dwg Model Jul 01, 2015 12:14pm by: Michael.Stanley

SERVICE LINES SHALL BE CONNECTED TO THE SEWER LINES BY MEANS OF A WYE FITTING WITH A BRANCH AS SHOWN ON THE STANDARD DRAWINGS. IN THE ABSENCE OF AN EXISTING WYE, CONNECTIONS OF NEW SERVICES TO EXISTING MAINS SHALL BE MADE BY INSTALLING A SADDLE TYPE FITTING OF THE SAME MANUFACTURER AS THE PIPE. THE BRANCH OF THE WYE FITTING WILL BE ELEVATED AS DIRECTED DEPENDING ON THE DEPTH OF THE SEWER AND THE ELEVATION OF THE PROPERTY TO BE SERVED. EIGHT BENDS WILL BE USED TO CONNECT SERVICE LINE AT THE WYE BRANCH.

SERVICE LINES SHALL EXTEND FROM THE SEWER TO THE PROPERTY LINE AND BE PLUGGED, UNLESS OTHERWISE SHOWN. ALL SERVICE LINES SHALL BE 4" IN DIAMETER UNLESS A DOUBLE SERVICE. MARKERS SHALL BE INSTALLED AT THE END OF EACH SERVICE OR OPPOSITE WYES AND THEIR LOCATIONS RECORDED.

INSTALLATION OF PLUGGED WYES WHERE INDICATED ON THE DRAWINGS WILL BE MADE AS DIRECTED. PLUGS SHALL BE OF THE TYPE AND SIZE REQUIRED TO MATCH THE PIPE AND SHALL BE WATER-TIGHT AND REMOVABLE WITHOUT BREAKING THE PIPE.

AN EMS SANITARY MARKER #1253 (GREEN) MANUFACTURED BY AUTOMATION PRODUCTS COMPANY, AUSTIN, TEXAS, SHALL BE INSTALLED OVER EACH SANITARY SEWER SERVICE LATERAL, IF SO REQUIRED BY THE CONSTRUCTION DETAILS OF THE DRAWINGS. THE CONSTRUCTION DETAILS SHALL INDICATE IF THESE MARKERS ARE REQUIRED, AND, IF SO, THE REQUIRED LOCATION AND DEPTH.

FIELD TESTING

ALL WORK CONSTRUCTED SHALL BE SUBJECT TO VISUAL INSPECTION FOR FAULTS OR DEFECTS AND ANY SUCH DEVIATION OR OMISSION SHALL BE CORRECTED AT ONCE. ALL TESTS SHALL BE MADE BY THE CONTRACTOR WHO SHALL PROVIDE NECESSARY EQUIPMENT FOR TESTING AND LAMPING THE SYSTEM IN THE PRESENCE OF, AND UNDER THE SUPERVISION AND INSTRUCTION OF THE ENGINEER. ALL COSTS FOR TESTING DEFINED BELOW SHALL BE BORNE BY THE CONTRACTOR. LAMP TESTS SHALL BE OBSERVED FIRST HAND BY THE ENGINEER. UPON COMPLETION, EACH SECTION OF SEWER LINE SHALL SHOW A FULL CIRCLE OF LIGHT WHEN LAMPED BETWEEN MANHOLES.

FOLLOWING PLACEMENT OF 1' OF TAMPED BACKFILL COVER, THE PIPE SHALL BE SIGHTED BETWEEN SUCCESSIVE MANHOLES TO INSURE PROPER GRADE AND ALIGNMENT. A FULL PIPE CIRCLE SHALL BE OBSERVED. DEFECTS NOTED SHALL BE IMMEDIATELY DUG UP AND CORRECTED AFTER WHICH BACKFILLING MAY PROCEED TO THE TOP OF THE TRENCH. THE CONTRACTOR IS REQUIRED TO MAINTAIN THIS CONDITION, ENSURING AGAINST DISPLACEMENT, FLOTATION, ETC., SO THAT FINAL INSPECTION OF COMPLETED SECTIONS WILL BE FACILITATED.

IF, IN THE OPINION OF THE ENGINEER, INFILTRATION APPEARS EXCESSIVE, THE CONTRACTOR SHALL VIDEO THE SECTIONS IN QUESTION.

FOLLOWING COMPLETION OF THE BACKFILL COVER, THE COMPLETE SEWER LINE SHALL BE TESTED UTILIZING A LOW-PRESSURE AIR TEST. ALL TEST REQUIREMENTS AND PROCEDURES SHALL BE IN STRICT ACCORDANCE WITH UNI-BELL PVC PIPE ASSOCIATION UNI-B-6-90 "RECOMMENDED PRACTICE FOR LOW-PRESSURE AIR TESTING OF INSTALLED SEWER PIPE". THE CONTRACTOR SHALL FURNISH SUITABLE TEMPORARY TESTING PLUGS OR CAPS, PRESSURE GAUGES, AIR PUMPS, ETC. AND ANY OTHER NECESSARY EQUIPMENT AND ALL LABOR REQUIRED, WITHOUT ADDITIONAL COMPENSATION. THE ENGINEER SHALL CALCULATE THE MINIMUM TIME REQUIRED FOR EACH TEST ON EACH SECTION OF LINE AND SHALL SO ADVISE THE CONTRACTOR PRIOR TO THE TEST. IF THE SECTION OF PIPE FAILS TO PASS THE TESTS, THE CONTRACTOR SHALL DO EVERYTHING NECESSARY TO LOCATE, UNCOVER (EVEN TO THE EXTENT OF UNCOVERING THE ENTIRE SECTION) AND REPAIR OR REPLACE THE DEFECTIVE PIPE FITTING, JOINT OR OTHER APPURTENANCE, AND RETEST THE REPAIRED SECTION WITHOUT ADDITIONAL COMPENSATION. UPON SATISFACTORY COMPLETION OF THE TESTS, THE CONTRACTOR SHALL REMOVE ALL TEMPORARY TEST PLUGS OR CAPS AND OTHER EQUIPMENT AND SHALL RESTORE THE PIPE TO A CONDITION READY FOR SERVICE. ALL TESTS SHALL BE PERFORMED IN THE PRESENCE OF AN AUTHORIZED REPRESENTATIVE OF THE ENGINEER.

ALL SANITARY SEWER AIR TESTING SHALL BE COMPLETED A MINIMUM OF 30 DAYS PRIOR TO THE PROJECT SUBSTANTIAL COMPLETION DATE.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-01.3 Sewer Notes.dwg Model Jul 01, 2015 12:15pm by: Michael.Stanley

THE CONTRACTOR IS ADVISED THAT THE OWNER RESERVES THE RIGHT TO USE WHATEVER ADDITIONAL INSPECTION AND TESTING METHODS IT DEEMS APPROPRIATE TO VERIFY THE CONDITION AND ACCEPTABILITY OF THE WORK. THE CONTRACTOR SHALL REPAIR ALL DEFECTS IN THE WORK MADE APPARENT BY ANY AND ALL INSPECTIONS AND TESTS EVEN IF THE WORK OR PARTS OF THE WORK MAY HAVE PASSED OTHER TESTS AND INSPECTIONS. SAID REPAIRS SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. THE OWNER SHALL WITHHOLD FROM PAYMENT DUE THE CONTRACTOR AN AMOUNT EQUAL TO THE COST OF PROVIDING SUCH ADDITIONAL TESTS OR INSPECTIONS. IF PAYMENT DUE CONTRACTOR IS INSUFFICIENT TO COVER SAID COST, THE CONTRACTOR SHALL PAY THE DIFFERENCE TO THE OWNER PRIOR TO FINAL ACCEPTANCE OF THE WORK.

MANHOLE INSTALLATION

PRECAST CONCRETE MANHOLES SHALL HAVE EACH SECTION SET SO AS TO BE VERTICAL AND IN TRUE ALIGNMENT. JOINT SURFACES OF THE SECTIONS SHALL BE SEALED WITH PRE MOLDED PLASTIC JOINT SEALER EQUAL TO "RAMNEK", OR HAVE AN O-RING GASKET INSTALLED IN THE PREFORMED RECESS. ALL HOLES IN THE SECTIONS REQUIRED FOR HANDLING AND THE ANNULAR SPACE BETWEEN THE WALLS OF THE MANHOLE AND THE ENTERING PIPES SHALL BE THOROUGHLY PLUGGED WITH NON-SHRINKING GROUT AND SHALL BE FINISHED SMOOTH, AND SHALL BE WATER-TIGHT.

FOR GRADE ADJUSTMENT IN SETTING THE MANHOLE FRAME, PRECAST GRADE ADJUSTMENT RINGS SHALL BE USED ON TOP OF MANHOLE SLABS AND PRECAST CONCRETE MANHOLE CONES IN ACCORDANCE WITH THE DRAWINGS. PRECAST ADJUSTMENT RINGS SHALL BE CONSTRUCTED OF CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI. MORTAR FOR JOINTS SHALL BE ONE PART CEMENT AND TWO PARTS SAND; LIME SHALL NOT BE USED. REINFORCEMENT SHALL BE PROVIDED AS NECESSARY TO PREVENT BREAKAGE DURING HANDLING. EACH ADJUSTMENT RING SHALL BE LAID IN A FULL BED AND JOINT OF MORTAR WITHOUT REQUIRING SUBSEQUENT GROUTING, FLUSHING, OR FILLING, AND SHALL BE THOROUGHLY BONDED AS DIRECTED.

MANHOLE FRAMES AND COVERS SHALL BE SET TO CONFORM ACCURATELY TO THE FINISHED PAVEMENT SURFACE. ALL ADJUSTMENTS REQUIRED FOR GRADE SHALL BE DONE WITH PRECAST GRADE ADJUSTMENT RINGS. TO ASSURE A SUFFICIENT BOND BETWEEN THE MANHOLE COVERS AND THE SURROUNDING ASPHALT SURFACE, THE MANHOLE COVER SHALL NOT BE SET UNTIL ALL BASE CONSTRUCTION HAS BEEN COMPLETED. THE MANHOLES SHALL BE PROTECTED DURING THE ROADWAY CONSTRUCTION BY COVERING WITH SUFFICIENT MATERIAL TO PREVENT THE ROADWAY MATERIAL FROM ENTERING THE MANHOLE AND TO SUPPORT THE CONSTRUCTION MACHINERY REQUIRED. IMMEDIATELY BEFORE THE PLACEMENT OF THE FINAL ASPHALT SURFACE COURSE, THE MANHOLE SHALL BE UNCOVERED AND THE RING AND COVER SO PLACED TO ACCURATELY MEET THE FINISH PAVEMENT GRADE. THE MANHOLE FRAME SHALL BE SET ON THIS CONCRETE SECTION IN A RING OF MORTAR AT LEAST 1" THICK AND SHAPED TO SHED WATER AWAY FROM THE FRAME. ADDITIONAL MORTAR SHALL BE ADDED TO EXTEND TO THE OUTER EDGE OF THE ADJUSTMENT RINGS AND SHALL BE FINISHED SMOOTH. THE AREA EXCAVATED IN THE IIMEROCK BASE COURSE TO ALLOW FOR ADJUSTMENT OF THE MANHOLE RING AND COVER TO GRADE SHALL BE BACKFILLED WITH LIMEROCK AND COMPACTED TO THE SAME DENSITY AS THE LIME ROCK BASE COURSE.

ALL MANHOLE COVERS SHALL BE CLEANED TO REMOVE ASPHALT AND DEBRIS, THEN PAINTED WITH BLACK RUST-INHIBITING PAINT. IF THE MANHOLE IS LOCATED IN A PAVED AREA, CLEANING AND PAINTING SHALL OCCUR AFTER THE FINAL ASPHALT SURFACE IS PLACED.

FLOW CHANNELS IN MANHOLE BASE SHALL BE FORMED OF 2500 PSI CONCRETE AND/OR BRICK RUBBLE AND MORTAR WHILE THE MANHOLES ARE UNDER CONSTRUCTION. CUT OFF PIPES AT INSIDE FACE OF THE MANHOLE AND CONSTRUCT THE INVERT TO THE SHAPE AND SIZES OF PIPE INDICATED. ALL INVERTS SHALL FOLLOW THE GRADES OF THE PIPE ENTERING THE MANHOLES. CHANGES IN DIRECTION OF THE SEWER AND ENTERING BRANCH OR BRANCHES SHALL BE LAID OUT IN SMOOTH CURVES OF THE LONGEST POSSIBLE RADIUS WHICH IS TANGENT TO THE CENTERLINES OF ADJOINING PIPELINES.

CONNECTIONS TO EXISTING STRUCTURES

WHERE SHOWN ON THE DRAWINGS STUB LINES SHALL BE PROVIDED FOR THE CONNECTION OF FUTURE SEWER LINES TO MANHOLES. THE END OF EACH STUB LINE SHALL BE PROVIDED WITH A BELL END WHICH SHALL BE CLOSED BY AN APPROVED STOPPER AS SPECIFIED HEREINBEFORE. EACH STUB LINE SHALL BE ACCURATELY REFERENCED TO THE CENTER OF THE MANHOLE, AND THE ACTUAL INVERT ELEVATION OF EACH OF THE STUB LINE SHALL BE ACCURATELY RECORDED ON THE AS-BUILT DRAWINGS.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-01.4 Sewer Notes.dwg Model Jul 01, 2015 12:15pm by: Michael.Stanley

A FLEXIBLE PIPE TO MANHOLE CONNECTOR SHALL BE EMPLOYED IN THE CONNECTION OF THE SANITARY SEWER PIPE TO PRECAST MANHOLES. THE CONNECTOR SHALL BE THE SALE ELEMENT RELIED ON TO ASSURE A FLEXIBLE WATER-TIGHT SEAL OF THE PIPE TO THE MANHOLE. NO ADHESIVES OR LUBRICANTS SHALL BE EMPLOYED IN THE INSTALLATION OF THE CONNECTOR INTO THE MANHOLE. THE RUBBER FOR THE CONNECTOR SHALL COMPLY WITH ASTM C443 AND ASTM C923 AND CONSIST OF EPDM AND ELASTOMERS DESIGNED TO BE RESISTANT TO OZONE, WEATHER ELEMENTS, AND CHEMICALS, INCLUDING ACIDS, ALKALIS, ANIMAL AND VEGETABLE FATS, OILS AND PETROLEUM PRODUCTS FROM SPILLS. ALL STAINLESS STEEL ELEMENT OF THE CONNECTOR SHALL BE TOTALLY NONMAGNETIC SERIES 304 STAINLESS, EXCLUDING THE WORM SCREW FOR TIGHTENING THE STEEL BAND AROUND THE PIPE WHICH SHALL BE SERIES 305 STAINLESS. THE WORM SCREW FOR TIGHTENING THE STEEL BAND SHALL BE TORQUED BY A BREAKAWAY TORQUE WRENCH AVAILABLE FROM THE PRECAST MANHOLE SUPPLIER, AND SET FOR 60"/LBS. THE CONNECTOR SHALL BE INSTALLED IN THE MANHOLE WALL BY ACTIVATING THE EXPANDING MECHANISM IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE CONNECTOR MANUFACTURER.

WHERE SHOWN ON THE DRAWINGS NEW LINES SHALL BE CONNECTED INTO EXISTING MANHOLES OR STRUCTURES. UNLESS STUBS OF CORRECT SIZE ARE FOUND TO EXIST, THE CONTRACTOR SHALL CUT SUITABLE OPENINGS INTO THE EXISTING STRUCTURE (WALL AND FLOOR SLAB AS REQUIRED) OR REMOVE THE EXISTING PIPE TO ACCOMMODATE THE PIPELINES AS INDICATED ON THE DRAWINGS AND AS HEREIN SPECIFIED. THE PORTION OF EACH EXISTING STRUCTURE REMOVED FOR NEW INSTALLATION SHALL BE CONFINED TO THE SMALLEST OPENING POSSIBLE, CONSISTENT WITH THE WORK TO BE DONE.

AFTER THE PIPE IS INSTALLED, CONTRACTOR SHALL CAREFULLY CLOSE UP THE OPENINGS AROUND THE PIPE TO MAKE A WATER-TIGHT JOINT USING "CONSTRUCTION GROUT" OR "SET GROUT" AS MANUFACTURED BY MASTER BUILDERS, INC., "NS GROUT" AS MANUFACTURED BY THE EUCLID CHEMICAL COMPANY, OR APPROVED EQUAL, AND REPAIR THE EXISTING MANHOLE INVERT IN A MANNER SATISFACTORY TO THE ENGINEER. THE FLOOR SHALL BE REFORMED AND FINISHED TO PROVIDE FLOW CHANNELS AS SPECIFIED FOR NEW MANHOLES. ALL SUCH WORK SHALL BE DONE WITH THE PROPER TOOLS, AND BY CAREFUL WORKMEN COMPETENT TO DO SUCH WORK.

ADJUSTING EXISTING STRUCTURES

EXISTING MANHOLES, WITHIN THE LIMITS OF THE PROPOSED WORK, THAT DO NOT CONFORM TO THE FINISHED GRADE DESIGNATED ON THE DRAWINGS FOR SUCH STRUCTURES, SHALL BE CUT DOWN OR EXTENDED, AND MADE TO CONFORM TO THE GRADE OF THE NEW PAVEMENT, OR TO THE DESIGNATED GRADE OF THE STRUCTURE IF OUTSIDE OF THE PROPOSED PAVEMENT AREA. THE MATERIALS AND CONSTRUCTION METHODS FOR THIS WORK SHALL CONFORM TO THE REQUIREMENTS SPECIFIED ABOVE.

MISCELLANEOUS CONCRETE IN SEWER TRENCH

WHERE DIRECTED BY THE ENGINEER AND WHERE THE DEPTH OF PIPE TRENCH IS 10' AND OVER, CONCRETE ENCASEMENT SHALL ALSO BE PLACED AROUND SERVICE WYES TO THE DIMENSIONS SHOWN ON THE DRAWINGS.

PAVEMENT REPLACEMENT

WHERE EXISTING PAVEMENT, CURB, CURB AND GUTTER, SIDEWALK OR DRIVEWAY PAVING IS REMOVED ONLY FOR THE PURPOSE OF CONSTRUCTING, REPLACING, OR REMOVING SEWER PIPE, SERVICE LATERALS, MANHOLES, ETC., SUCH PAVEMENT, ETC., SHALL BE REPLACED AND RESTORED TO AS GOOD CONDITION, AS DETERMINED BY THE ENGINEER AS BEFORE REMOVAL. THE REPLACED PAVEMENT SHALL BE OF THE SAME OR SIMILAR TYPE AS THAT REMOVED, EXCEPT WHERE PERMISSION IS GIVEN BY THE ENGINEER FOR THE USE OF ANOTHER TYPE. ROUGH CUTS FOR PAVEMENT CURB AND GUTTER, SIDEWALK, DRIVEWAYS, ETC. SHALL BE TRIMMED BACK WITH A STRAIGHT SAW CUT IN A MANNER SO AS TO PRODUCE AS NEAR AS PRACTICAL A CUT OF UNIFORM WIDTH HAVING PARALLEL SIDES. SPECIFIC REQUIREMENTS FOR THE REPLACEMENT OF PAVEMENT ON PUBLIC ROADWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL GOVERNMENTAL ENTITY HAVING JURISDICTION AND IN ACCORDANCE WITH THE DETAILS AS SHOWN ON THE CONSTRUCTION DRAWINGS.

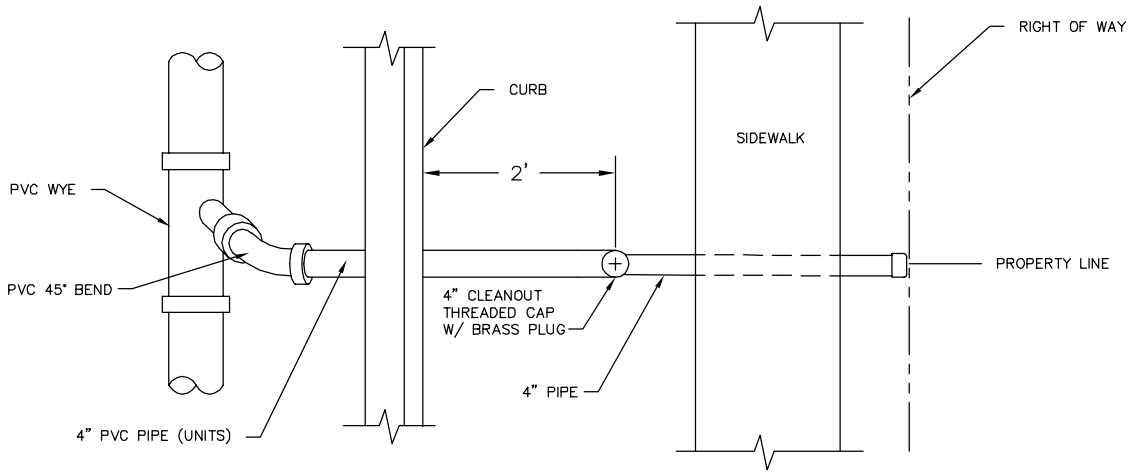
CLEARANCE REQUIREMENTS

MINIMUM SEPARATION REQUIREMENTS ARE SPECIFIED UNDER POTABLE WATER.

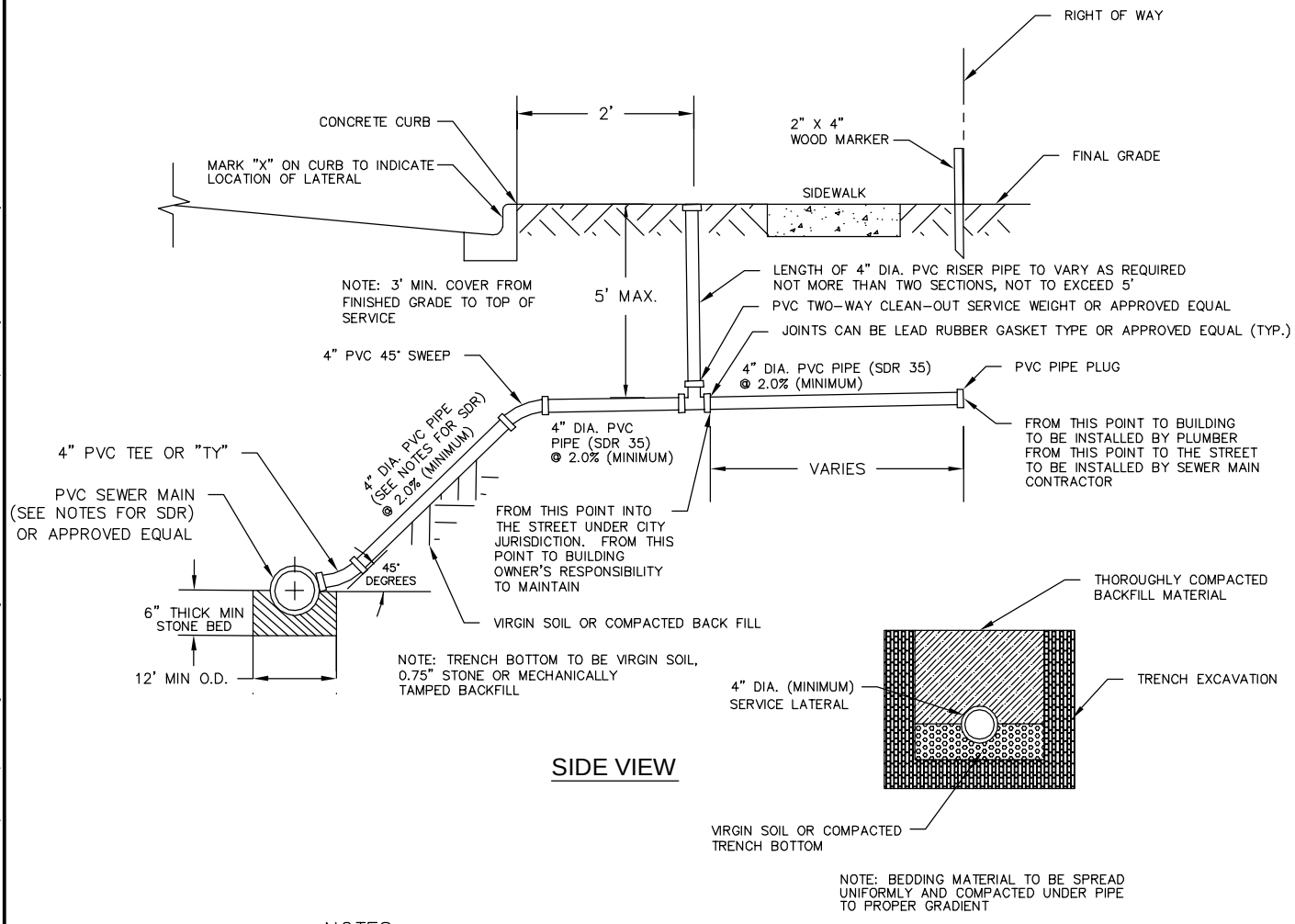
GENERAL DESIGN

1. MANHOLES SHALL BE LOCATED IN THE CENTERLINE OR "CROWN" OF THE STREET TO MINIMIZE INFILTRATION.
2. MANHOLE PIPING SHALL MATCH CROWN TO CROWN. INVERTS OVER 2 FEET FROM THE BOTTOM OF MANHOLES SHALL REQUIRE AN EXTERNAL DROP CONNECTION.
3. SANITARY LATERALS SHALL BE INSTALLED AT 90 DEGREES WITH THE RIGHT-OF-WAY TO THE GREATEST EXTENT POSSIBLE.
4. UNLESS OTHERWISE APPROVED, NO LATERALS SHALL CONNECT DIRECTLY TO A MANHOLE.
5. DEAD END MANHOLES SHALL BE EXTENDED PAST THE LAST CONNECTING PROPERTY LINE TO MINIMIZE LATERAL LENGTH.
6. ALL MANHOLES SHALL BE WATER TIGHT WITH A COLD TAR EXTERIOR COATING.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-01.5 Sewer Notes.dwg Model Jul 01, 2015 12:15pm by: Michael.Stanley



PLAN VIEW



SIDE VIEW

NOTES:

1. ALL LATERAL CONNECTIONS SHALL BE TO MAINS.
   NO LATERAL CONNECTIONS CAN BE TIED TO MANHOLES.
2. LATERAL DEPTH 4' TO 10' = SDR 35
   LATERAL DEPTH GREATER THAN 10' = SDR 26
3. SANITARY SEWER SINGLE SERVICE IS THE PREFERRED CONNECTION.

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

LATEST REVISION: 11-10-14

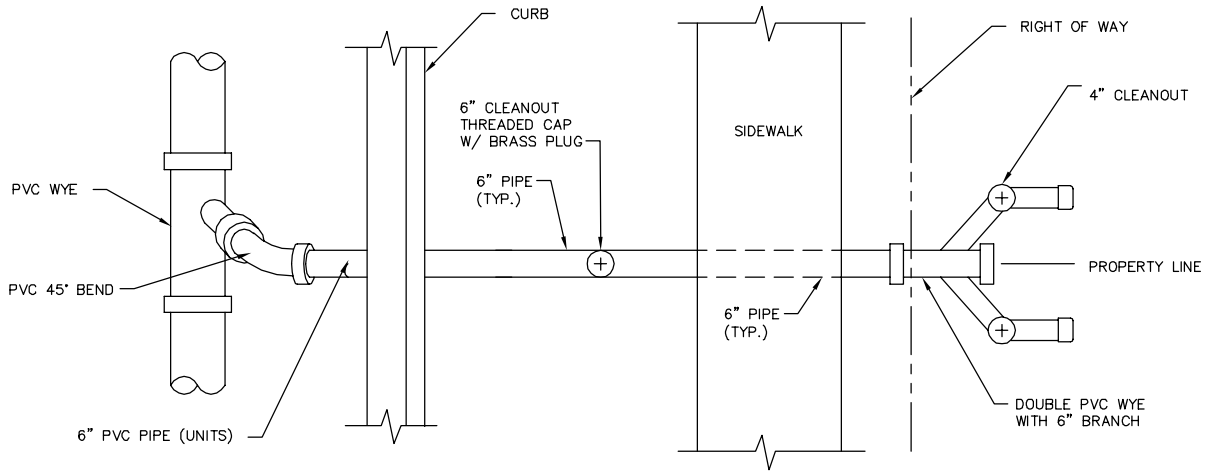
CITY OF WILDWOOD SEWER DETAIL

SANITARY SEWER SINGLE SERVICE

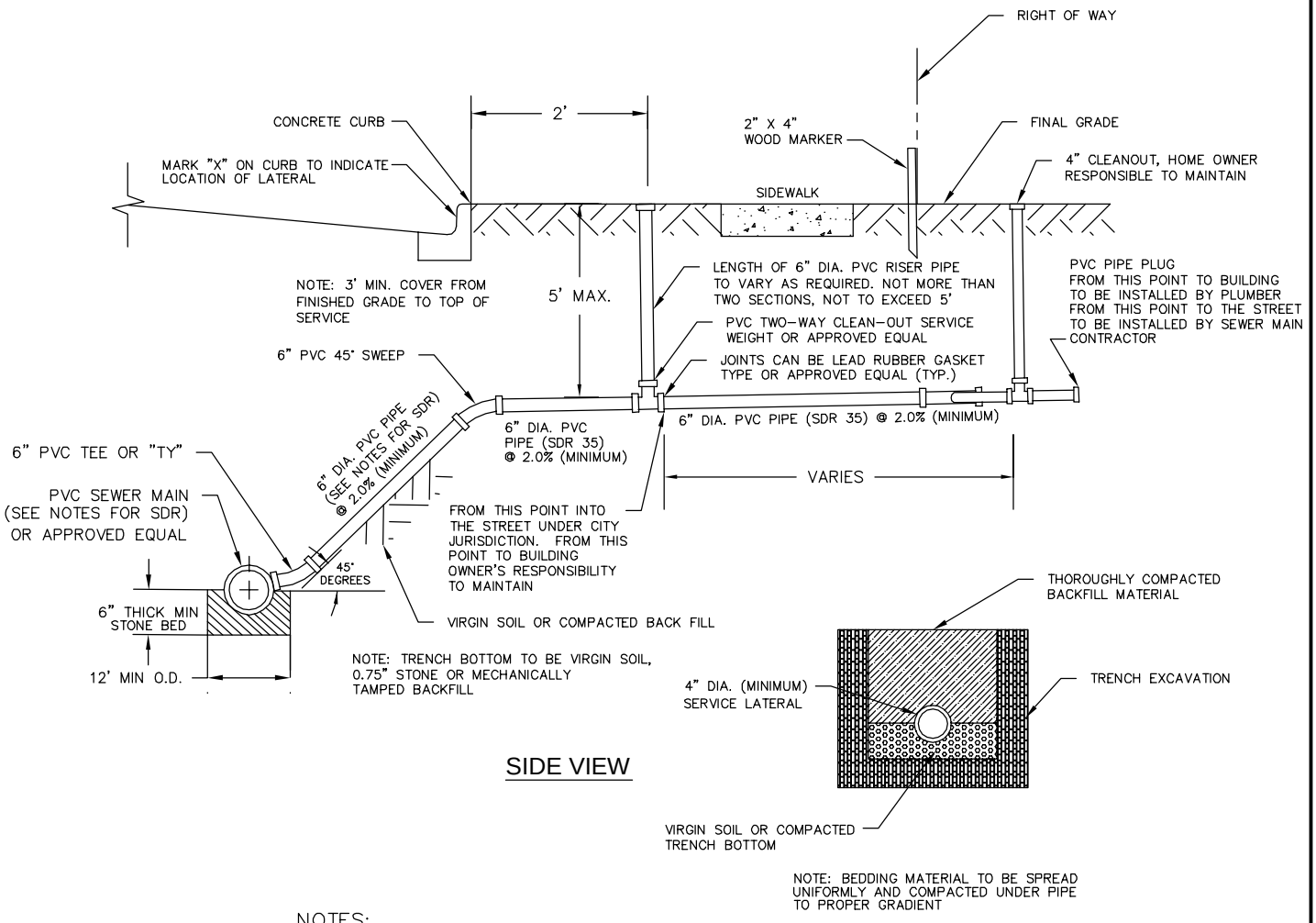
DETAIL NUMBER: S-02

1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-02 Single Service.dwg Model Jul 01, 2015 12:23pm by: Michael.Stanley



PLAN VIEW



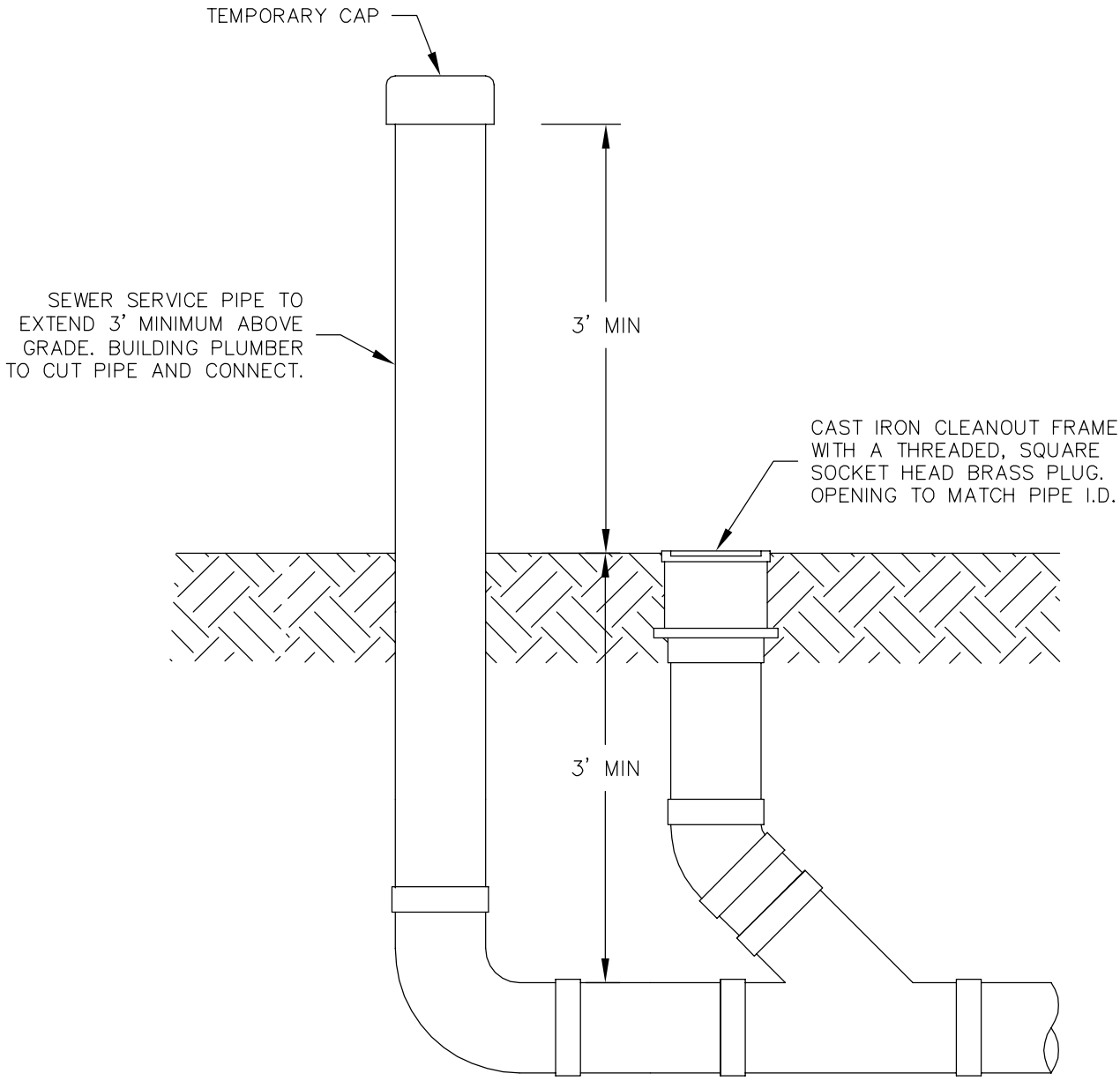
SIDE VIEW

NOTES:

1. ALL LATERAL CONNECTIONS SHALL BE TO MAINS. NO LATERAL CONNECTIONS CAN BE TIED TO MANHOLES.
2. LATERAL DEPTH 4' TO 10' = SDR 35
   LATERAL DEPTH GREATER THAN 10' = SDR 26
3. SANITARY SINGLE SERVICE CONNECTION IS PREFERRED.
   SANITARY DOUBLE SERVICE IS A SPECIAL CONNECTION AND REQUIRES APPROVAL BY CITY.

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 11-10-14	CITY OF WILDWOOD SEWER DETAIL SANITARY SEWER DOUBLE SERVICE	DETAIL NUMBER S-03 1 OF 1	

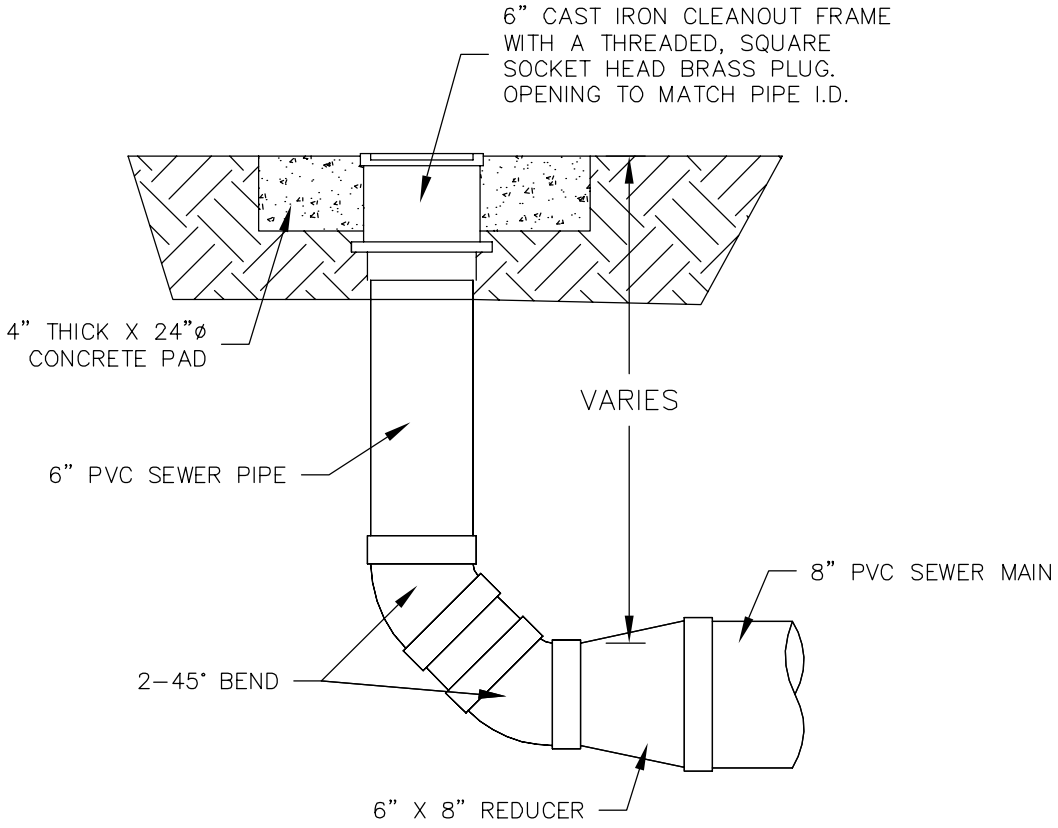
Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-03 Double Service.dwg Model Jul 01, 2015 12:24pm by: Michael.Stanley



NOTE:
IN PAVED AREAS INSTALL 24" ROUND 4" THICK CONCRETE PAD.

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 01-04-12	CITY OF WILDWOOD SEWER DETAIL COMMERCIAL SANITARY SERVICE (6" AND SMALLER MAINS)	DETAIL NUMBER S-04 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-04 Commercial Service.dwg Model Jul 01, 2015 12:24pm by: Michael.Stanley



CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

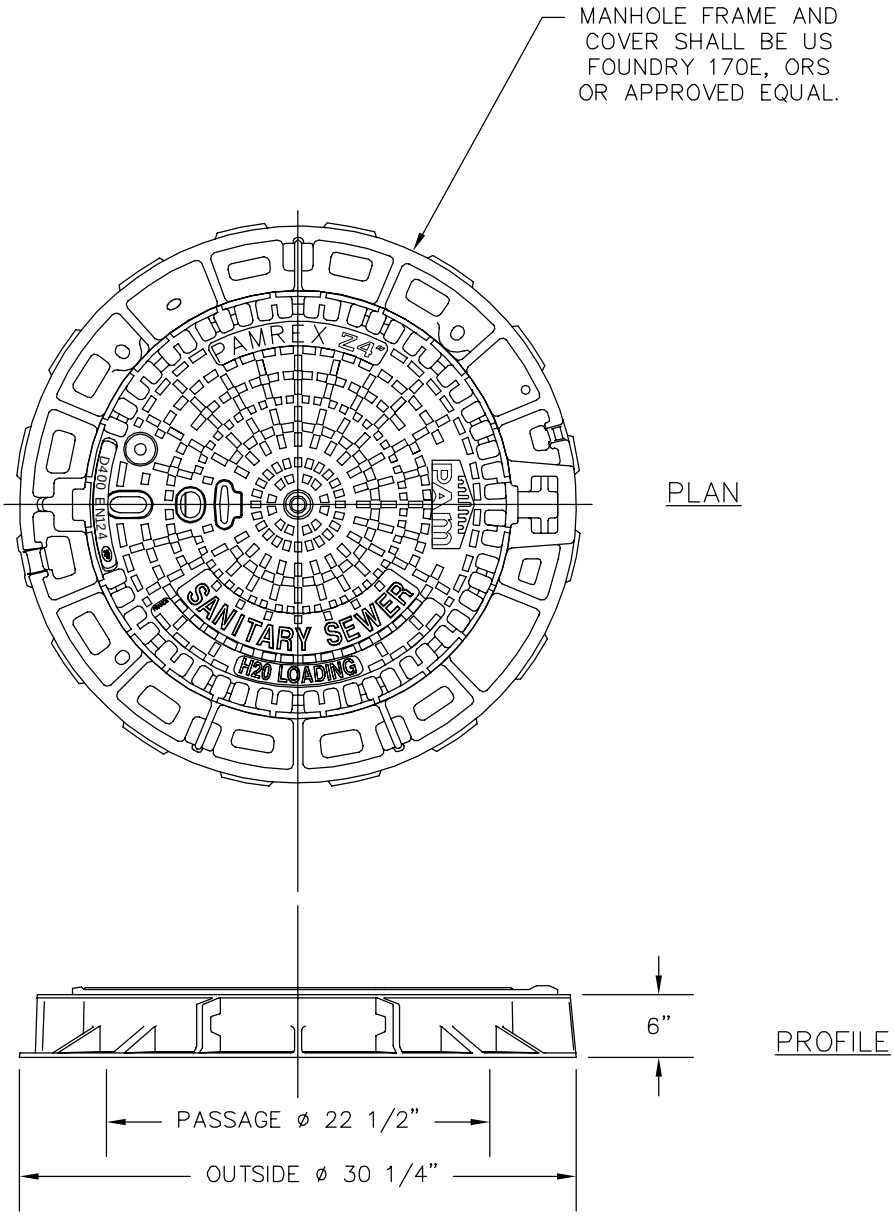
LATEST REVISION
11-17-14

CITY OF WILDWOOD SEWER DETAIL

COMMERCIAL SANITARY CLEAN-OUT (8" MAIN)

DETAIL NUMBER
S-05
1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-05 Cleanout-8.dwg Model Jul 01, 2015 12:24pm by: Michael.Stanley



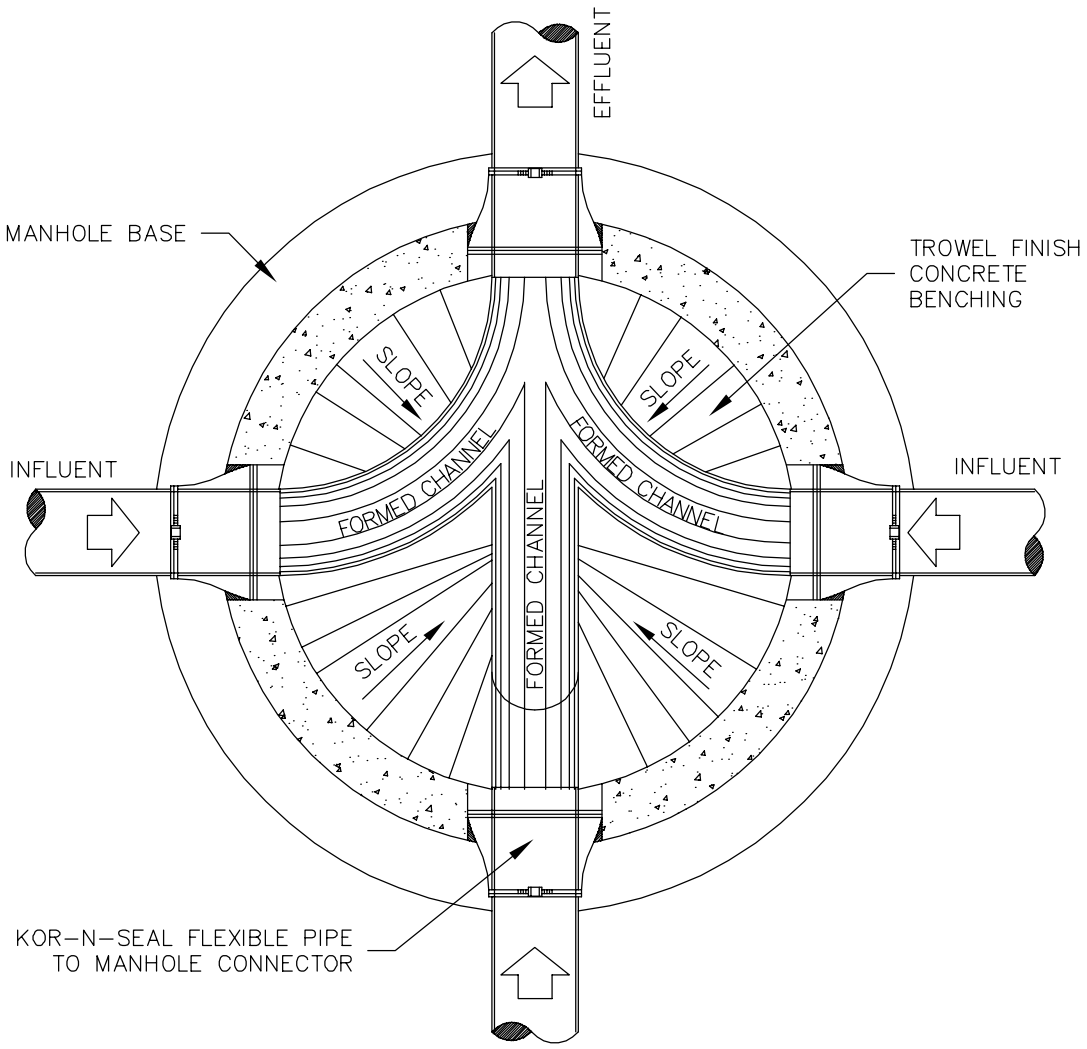
PRECAST MANHOLE TOPS

1. TWO COURSES OF ADJUSTMENT BRICK (MIN.) WITH FOUR COURSES (MAX.) SHALL BE REQUIRED BETWEEN ALL PRECAST MANHOLE TOPS AND COVER FRAMES.

2. MANHOLE COVER SHALL BE LETTERED WITH THE WORD, "CITY OF WILDWOOD" ACROSS THE TOP, "SANITARY SEWER" ACROSS THE BOTTOM AND THE YEAR OF THE MANUFACTURE IN CENTER.

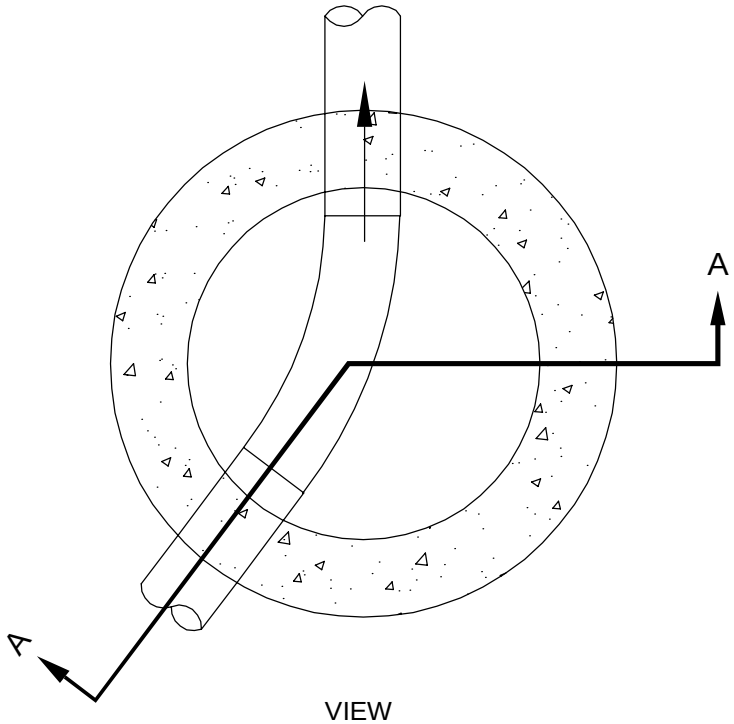
CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 6-24-15	CITY OF WILDWOOD SEWER DETAIL STANDARD MANHOLE FRAME AND COVER	DETAIL NUMBER S-06 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-06 Sanitary Manhole Frame and Cover.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley

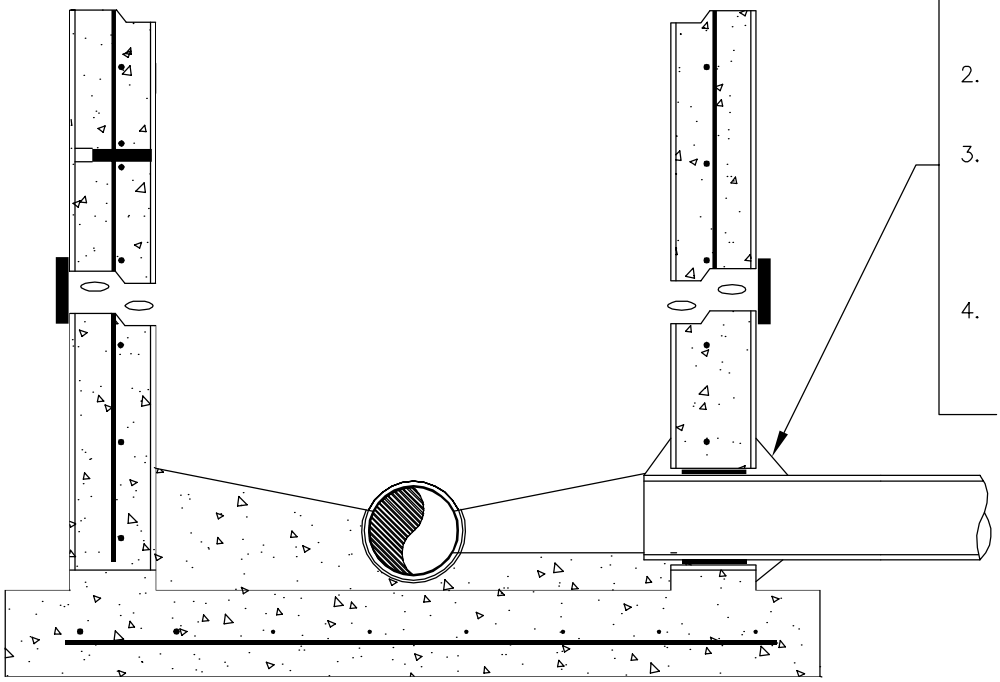


CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 11-10-14	CITY OF WILDWOOD SEWER DETAIL TYPICAL MANHOLE PLAN	DETAIL NUMBER S-07 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-07 Manhole Flow Channel.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley



VIEW



1. CORE AND CONNECT WITH "KORE N SEAL" BOOT OR OTHER APPROVED WATER TIGHT CONNECTION.
2. MORTAR ALL AROUND WITH NON-SHRINK GROUT.
3. RE-CONSTRUCT BENCH W/ 3000 PSI CONCRETE TO PROVIDE SMOOTH TRANSITION OF FLOW FROM NEW INCOMING PIPE TO OUTGOING MAIN.
4. PROVIDE MINIMUM OF 0.1' FALL ACROSS MANHOLE. IF PIPES ARE NOT SAME DIAMETER MATCH CROWN OF EXITING PIPE.

TYPICAL SECTION A-A

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

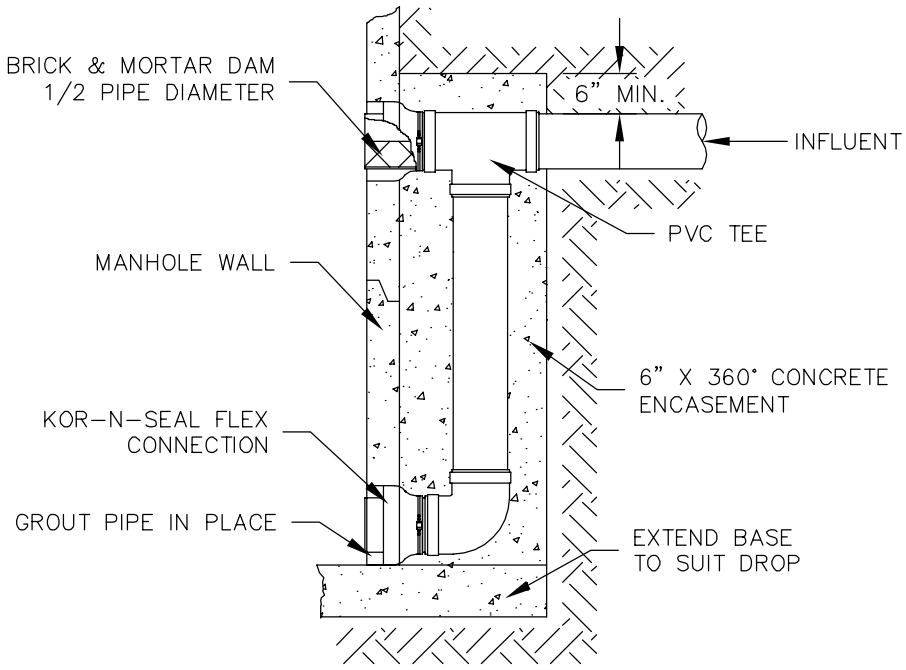
LATEST REVISION
11-10-14

CITY OF WILDWOOD SEWER DETAIL

CONNECTION TO EXISTING MANHOLE

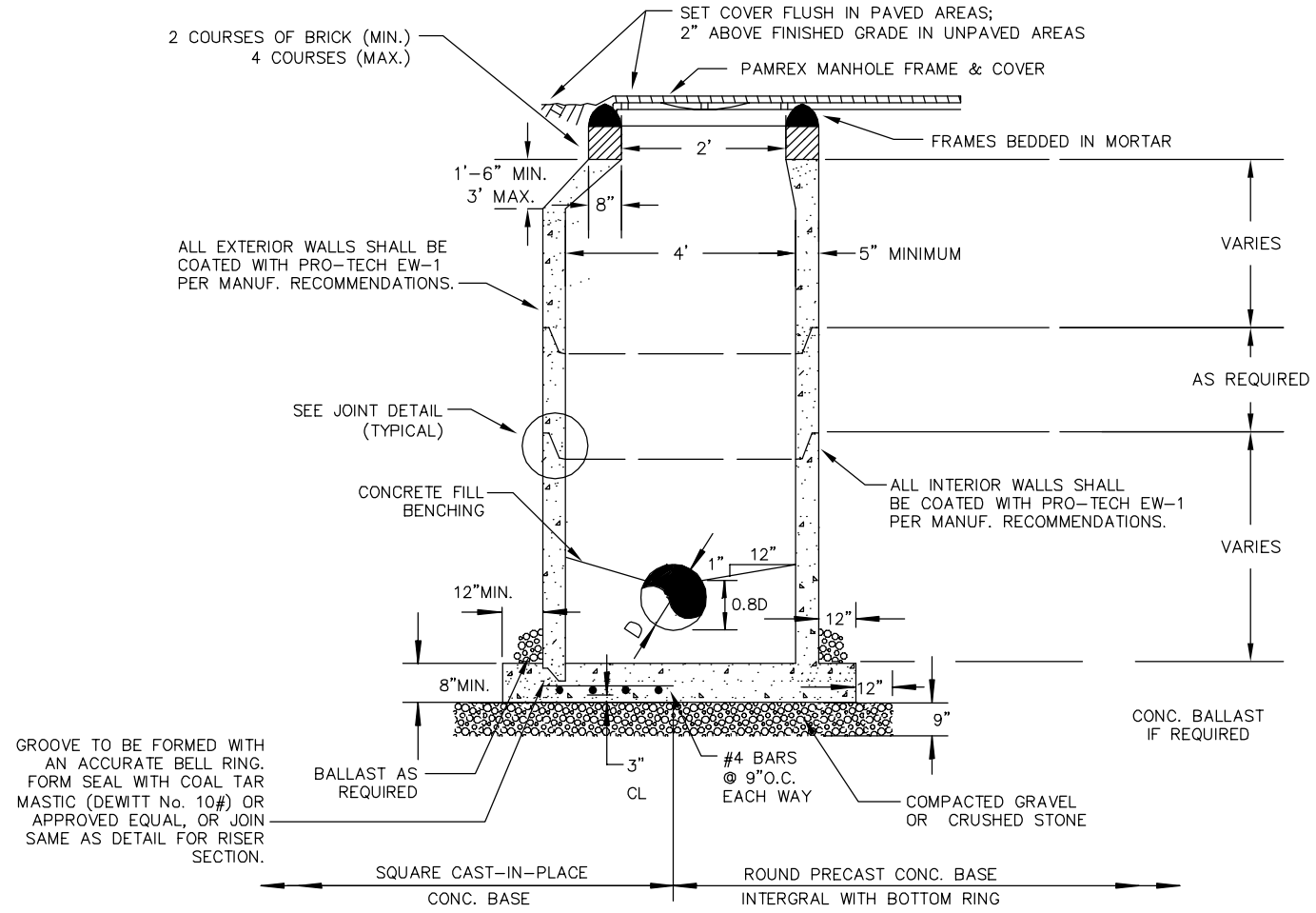
DETAIL NUMBER
S-08
1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-08 Ex Manhole Conn.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley



CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 11-10-14	CITY OF WILDWOOD SEWER DETAIL STANDARD DROP MANHOLE CONNECTION	DETAIL NUMBER S-09 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-09 Drop Manhole Conn.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley



PRECAST CONC. MANHOLE

NOTES

1. MINIMUM WALL THICKNESS SHALL BE FIVE INCHES (5") OR 1/12 THE INSIDE DIAMETER, WHICHEVER IS GREATER.
2. THE INTERIOR, EXTERIOR, JOINTS AND GROUTED AREAS SHALL BE COATED WITH TWO (2) COATS OF BITUMASTIC SEALER.
3. MANHOLES SHALL BE FURNISHED WITH FACTORY INSTALLED BOOTS TO CONNECT SEWER PIPES TO MANHOLES.
4. MANHOLE TO BE INSTALLED WITH 24" PAMREX HINGED RING AND COVER. MANHOLES 12' DEEP AND GREATER SHALL HAVE A 32" HINGED RING AND COVER.
5. FILL ANNULAR VOID BETWEEN PIPE AND RUBBER BOOT WITH GROUT AND FLUSH WITH MANHOLE WALLS.
6. MANHOLES SHOWN ARE FOR SEWER SIZE 6" THRU 24". FOR LARGER SEWER SIZES SPECIALLY DESIGNED MANHOLES SHALL BE PROVIDED.
7. SEAL ALL PIPE OPENINGS IN PRECAST MANHOLE WITH "EMBECO" GROUT OR APPROVED EQUAL.
8. DROP PIPE AND FITTINGS SHALL BE EQUAL IN SIZE TO THE INFLUENT PIPE.
9. DROP CONNECTIONS ARE REQUIRED WHENEVER INVERT OF INFLUENT SEWER IS 24" OR MORE ABOVE THE INVERT OF THE MANHOLE. CONNECTION PIPES TO MANHOLES HAVE BEEN DETAILED AS P.V.C. PIPE AND SHALL BE MODIFIED AS REQUIRED FOR OTHER APPROVED MATERIAL.
10. THE CITY OF WILDWOOD MAY DETERMINE THAT CERTAIN MANHOLES WILL BE CONSIDERED TURBULENT AND MAY REQUIRE SPECIAL COATINGS OR LINERS

MANHOLE STRUCTURAL DATA	
	BOTTOM SLAB THICKNESS
MANHOLE DEPTH IN FEET	THICKNESS IN INCHES BETWEEN DEPTHS SHOWN
0' TO 10'	8"
10' TO 15'	10"
15' TO 20'	14"
BELOW 20'	AS APPROVED

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

LATEST REVISION: 11-10-14

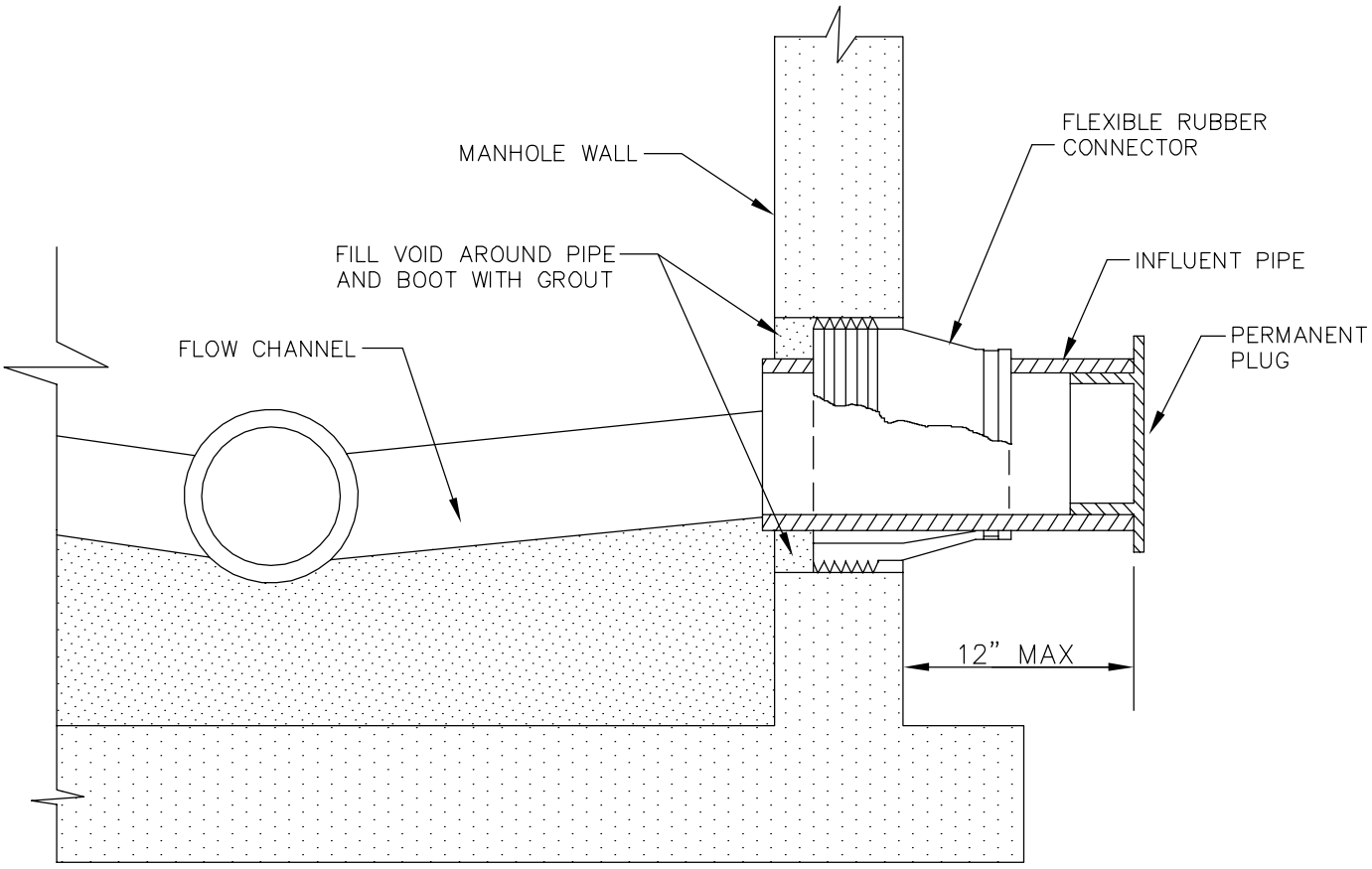
CITY OF WILDWOOD SEWER DETAIL

PRECAST CONCRETE MANHOLE

DETAIL NUMBER: S-10

1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-10 Standard Manhole.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley

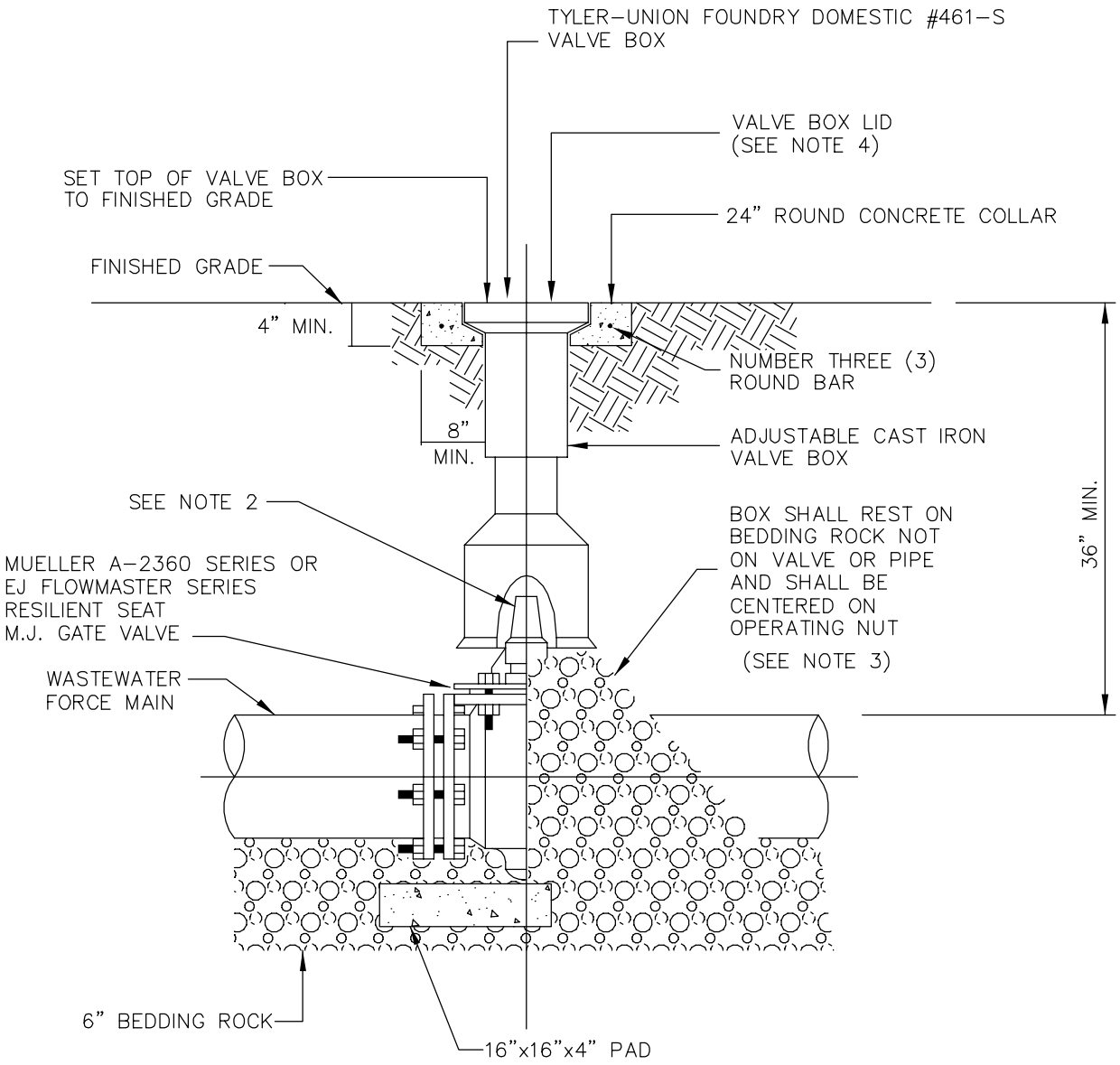


NOTES

BOOTS SHALL BE INSTALLED BY THE MANUFACTURER OF THE PRECAST MANHOLE IN ACCORDANCE WITH THE BOOT MANUFACTURERS INSTRUCTIONS.

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 11-10-14	CITY OF WILDWOOD SEWER DETAIL MANHOLE STUBOUT	DETAIL NUMBER S-11 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-11 Manhole Stubout.dwg Model Jul 01, 2015 12:25pm by: Michael.Stanley



NOTES

1. PVC EXTENSIONS SHALL NOT BE USED ON VALVE BOX INSTALLATION.
2. THE ACTUATING NUT FOR DEEPER VALVES SHALL BE EXTENDED TO COME UP TO 4 FOOT DEPTH BELOW FINISHED GRADE.
3. WHEN VALVE BOX IS TO BE INSTALLED IN ROADWAY OR OTHER TRAFFIC AREAS SET VALVE BOX ON FIVE (5) SOLID BRICKS.
4. VALVE BOX LID TO BE LETTERED WITH THE WORD "SEWER".

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330–1330

SCALE
NONE

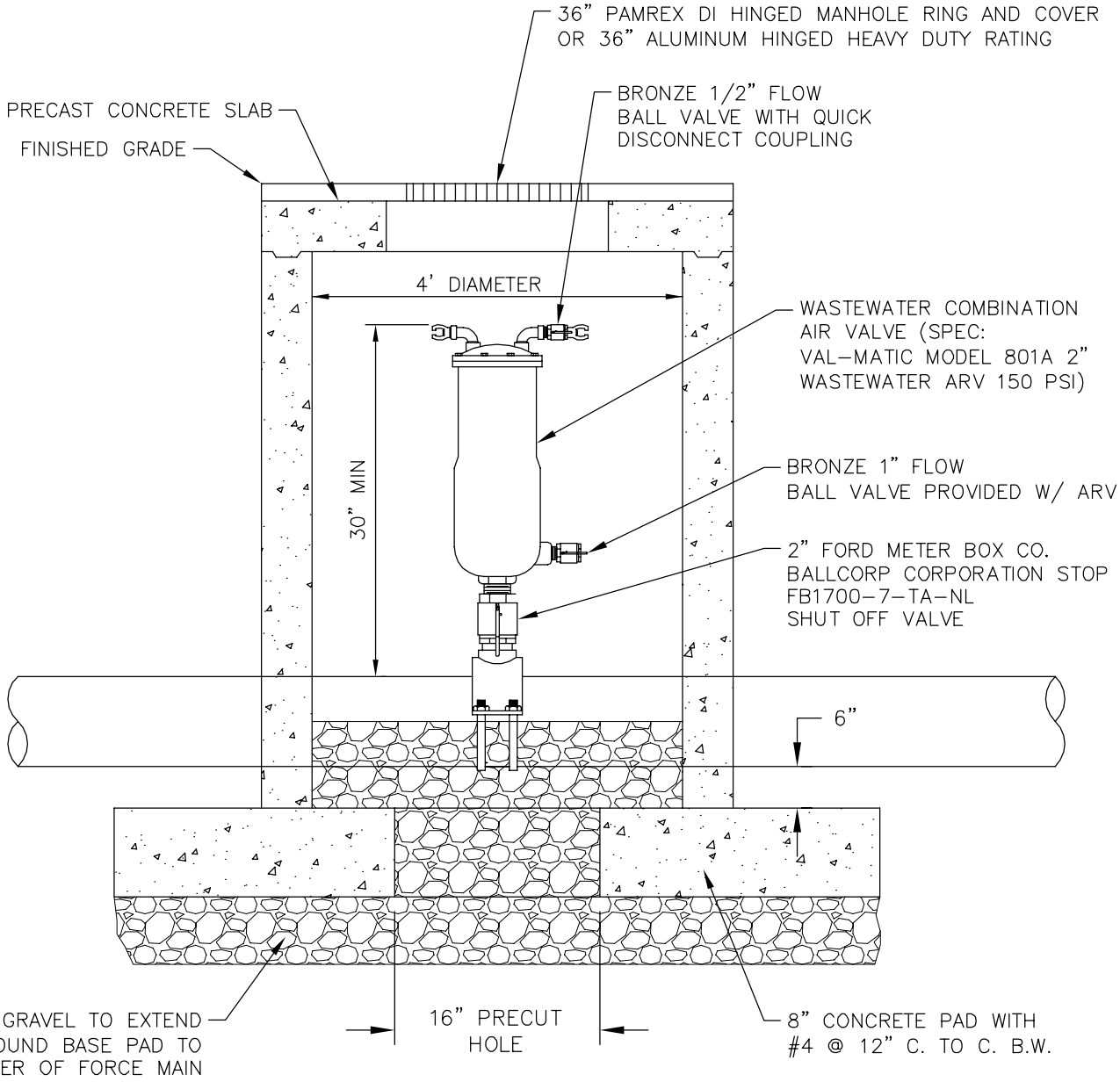
LATEST REVISION
11–10–14

CITY OF WILDWOOD SEWER DETAIL

GATE VALVE AND
BOX DETAIL

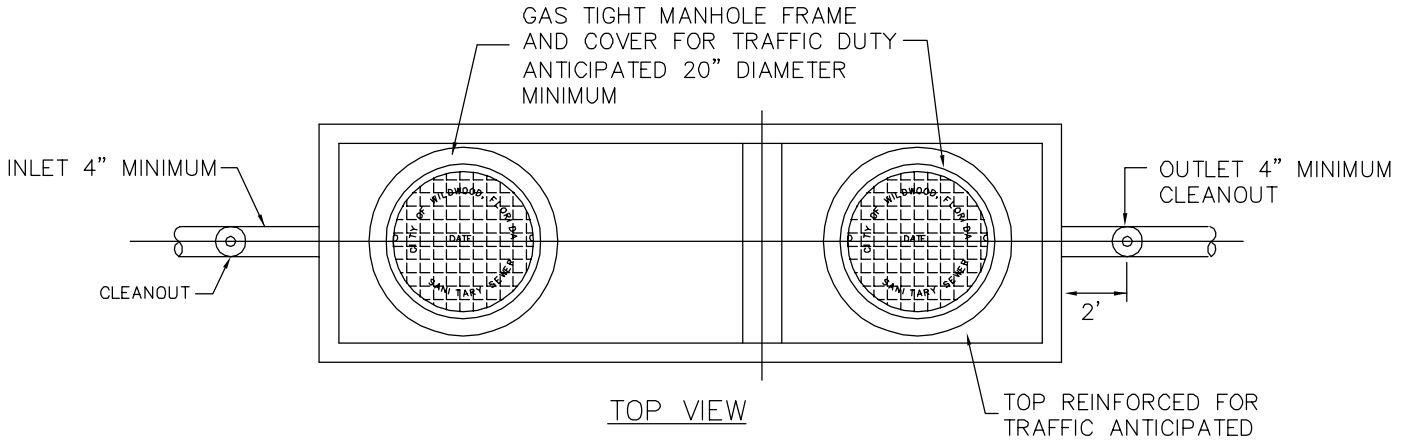
DETAIL NUMBER
S-12
1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-12 Gate Valve.dwg Model Jul 01, 2015 1:14pm by: Michael.Stanley



Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-13 Air Release Valve.dwg Model Sep 21, 2015 3:03pm by: Matt.Tebow

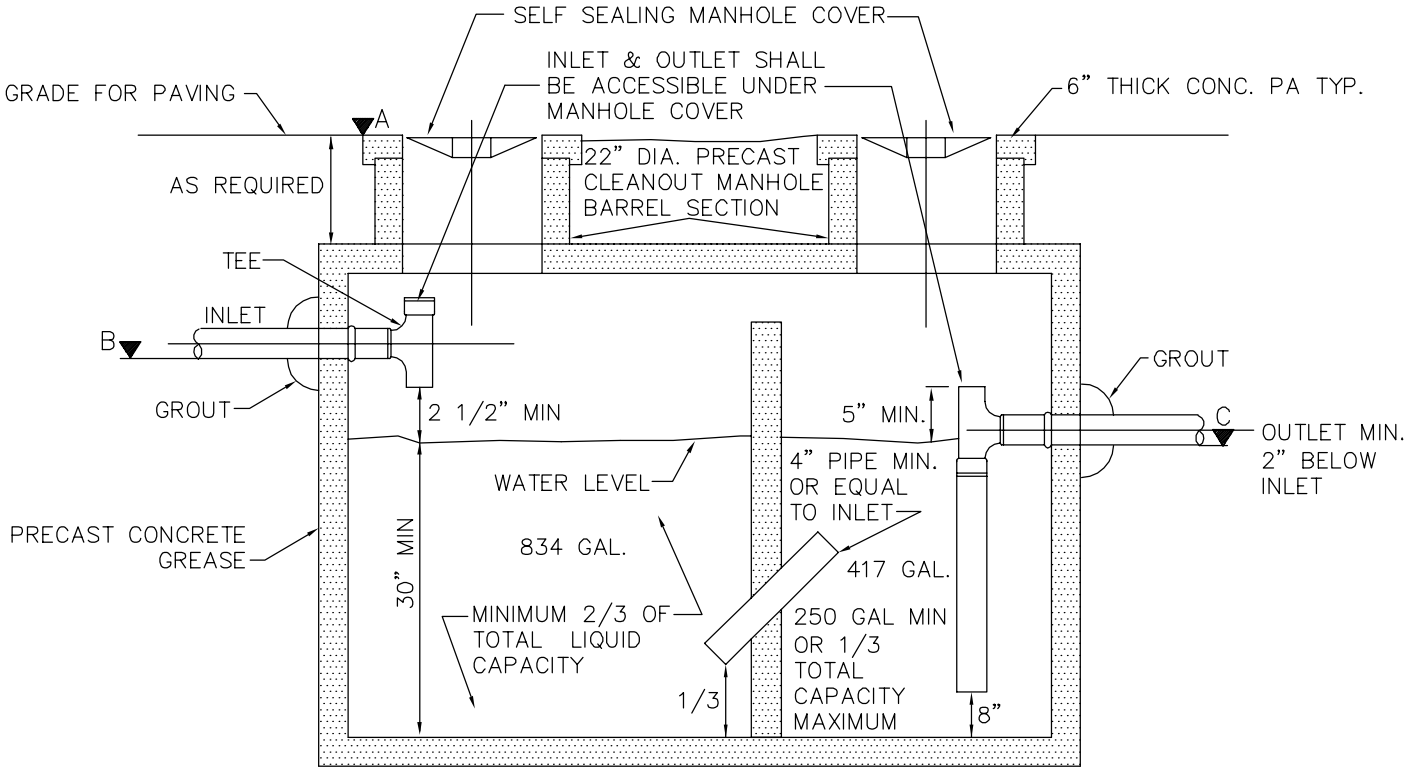
CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 9-21-2015	CITY OF WILDWOOD SEWER DETAIL FORCE MAIN AIR RELEASE VALVE	DETAIL NUMBER S-13 1 OF 1



TOP VIEW

GREASE TRAP ELEVATIONS

A	B	C



SECTION

NOTE

ACCESS FOR MONITORING THE INLET AND OUTLET PIPE FITTINGS OR BAFFLES SHALL BE PROVIDED FROM MANHOLES. CLEANOUTS SHALL BE INSTALLED BEFORE THE FIRST GREASE INTERCEPTOR AND WITHIN TWO FEET AFTER THE LAST INTERCEPTOR IN THE SERIES.

DESIGN CALCULATIONS

(S)x(GS)x(HR/12)x(LF) = EFFECTIVE CAPACITY OF GREASE TRAP IN GALLONS

(S) = NUMBER OF SEATS IN DINING AREA

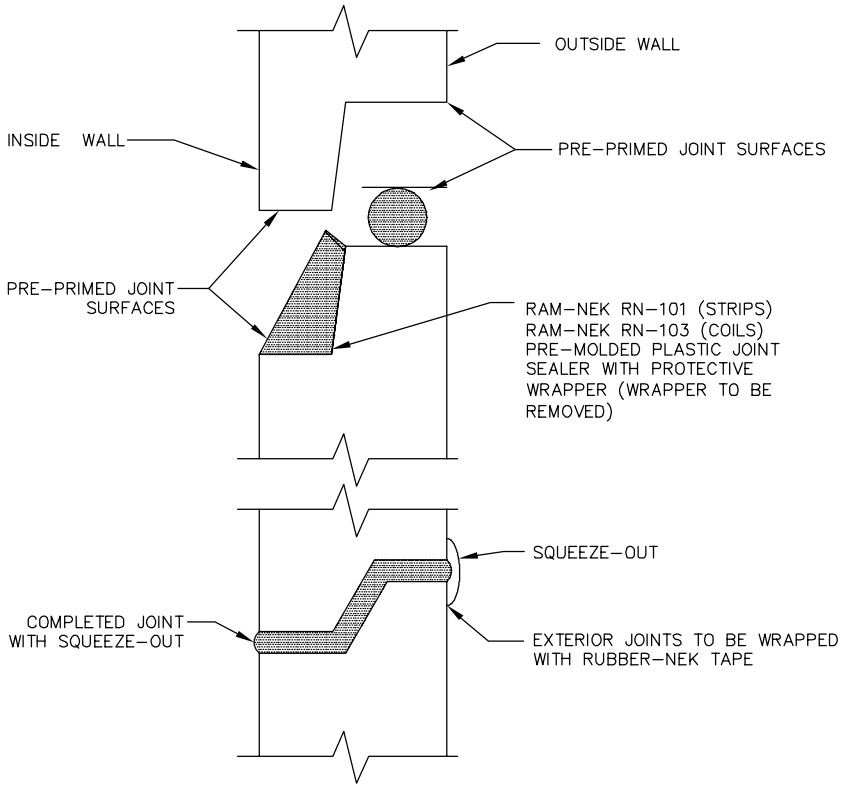
(GS) = GALLONS OF WASTE WATER PER SEAT (USE 25 GALLONS)

(HR) = NUMBER OF HOURS ESTABLISHMENT IS OPEN

(LF) = LOADING FACTIOR–(2.0 WITH INTERSTATE HIGHWAYS, 1.5 OTHER FREEWAYS, 1.25 RECREATIONAL AREAS, 1.0 MAIN HIGHWAYS AND 0.75 OTHER HIGHWAYS)

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330–1330	SCALE NONE LATEST REVISION 11–10–14	CITY OF WILDWOOD SEWER DETAIL GREASE OIL SEPARATOR	DETAIL NUMBER S-14 1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-14 Grease Oil Separator.dwg Model Jul 01, 2015 1:15pm by: Michael.Stanley



CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

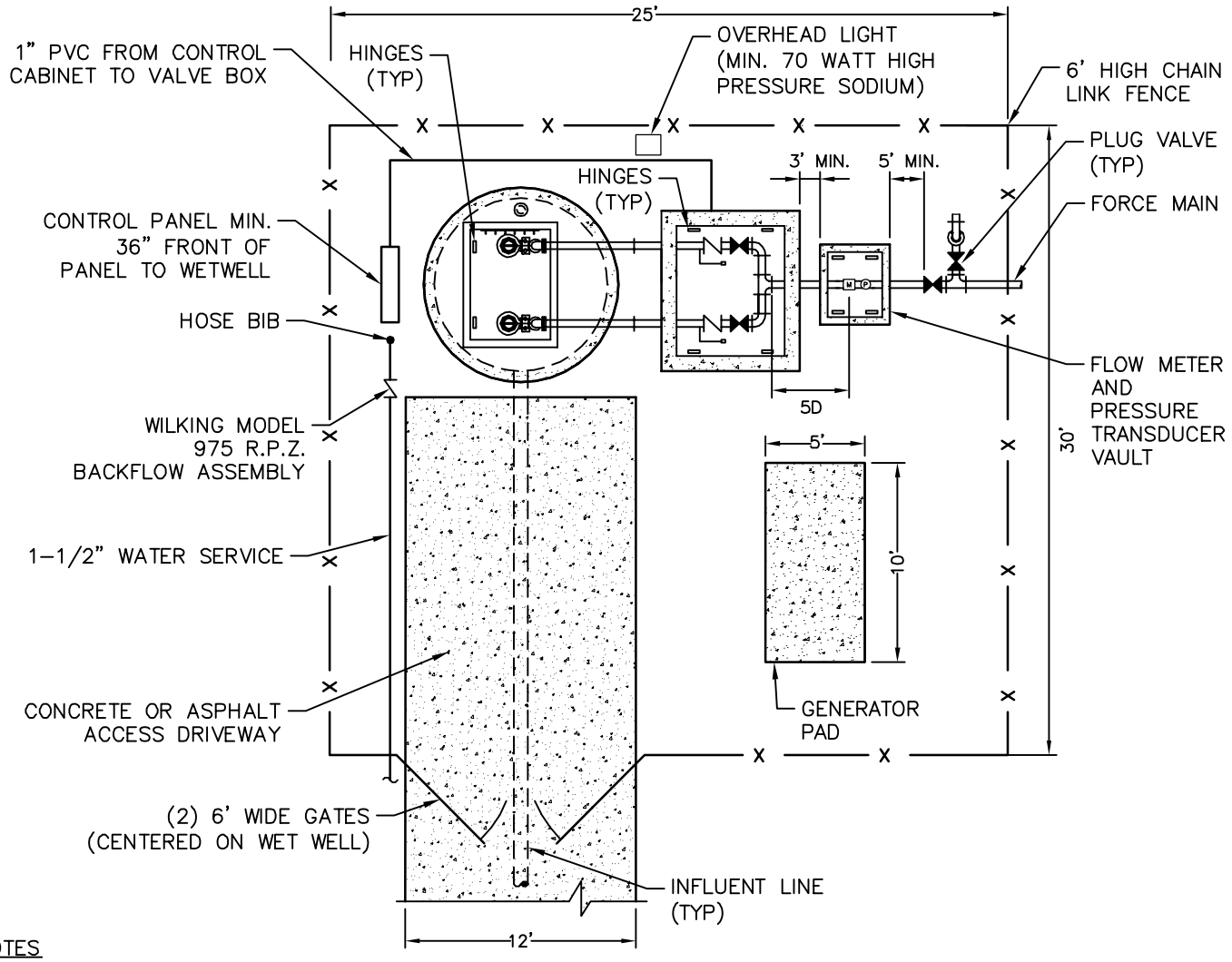
LATEST REVISION
11-10-14

CITY OF WILDWOOD SEWER DETAIL

PRECAST CONCRETE MANHOLE JOINT CONSTRUCTION

DETAIL NUMBER
S-15
1 OF 1

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-15 Manhole Joint Const.dwg Model Jul 01, 2015 1:15pm by: Michael.Stanley



NOTES

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

1. NORTH ARROW.
2. FENCE WITH 2-6' WIDE GATES.
3. INFLUENT LINE ENTRY LOCATION.
4. HINGE LOCATION.
5 SHOW POWER SERVICE FEED.
6. 36"-42" FROM PANEL TO WET WELL OPENING.
7. EMERGENCY PUMP OUT LOCATION SHALL BE OUTSIDE OF THE VALVE BOX (SHALL BE SAME SIZE AS PUMP DISCHARGE).
8. DESIGN TO BE COORDINATED WITH DETAIL SHEET.
9. FENCED AREA TO BE COVERED WITH WEED BLOCK FABRIC AND A MINIMUM OF 3" OF 3/4" TO 1-1/4" COURSE AGGREGATE.
10. INFLUENT MAIN SHALL BE CLEAR OF PANEL AND VAULT.
11. MIN. LOT SIZE TO BE 30' x 25'.
12. FLOW METER, PRESSURE TRANSDUCER, AND VAULT TO BE SUBMITTED AND APPROVED BY CITY.

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 9-21-2015	CITY OF WILDWOOD SEWER DETAIL TYPICAL LIFT STATION LAYOUT DETAIL	DETAIL NUMBER S-16 1 OF 7

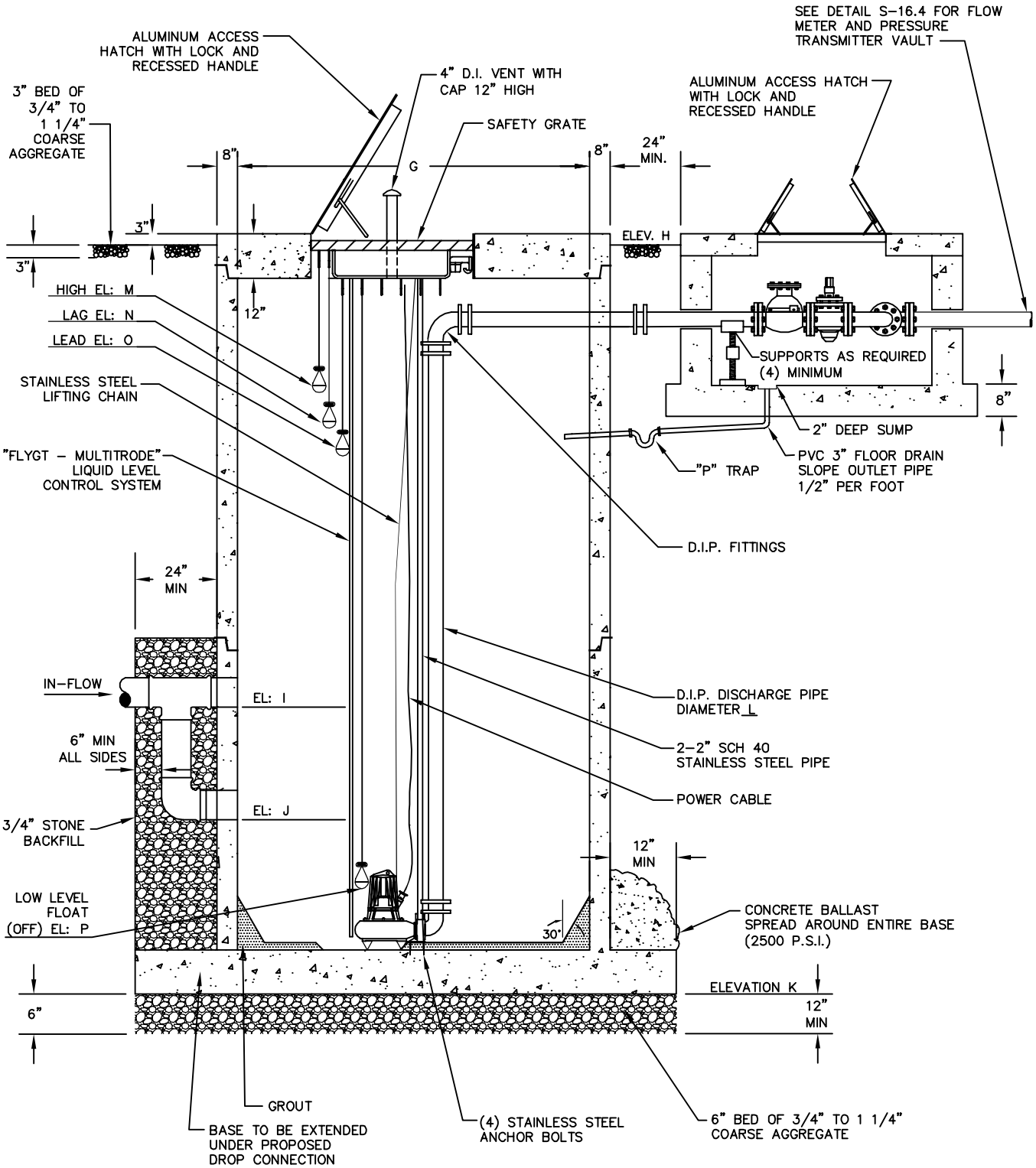
Drawing name: G:\Cities and Counties\Wildwood\Standard Details\PDFs\9-21-2015\S-16.1 Lift Station Layout.dwg Model Sep 21, 2015 3:13pm by: Matt.Tebow

LIFT STATION DATA

PUMPING STATION	DIMENSION/ ELEVATION
G	
H	
I	

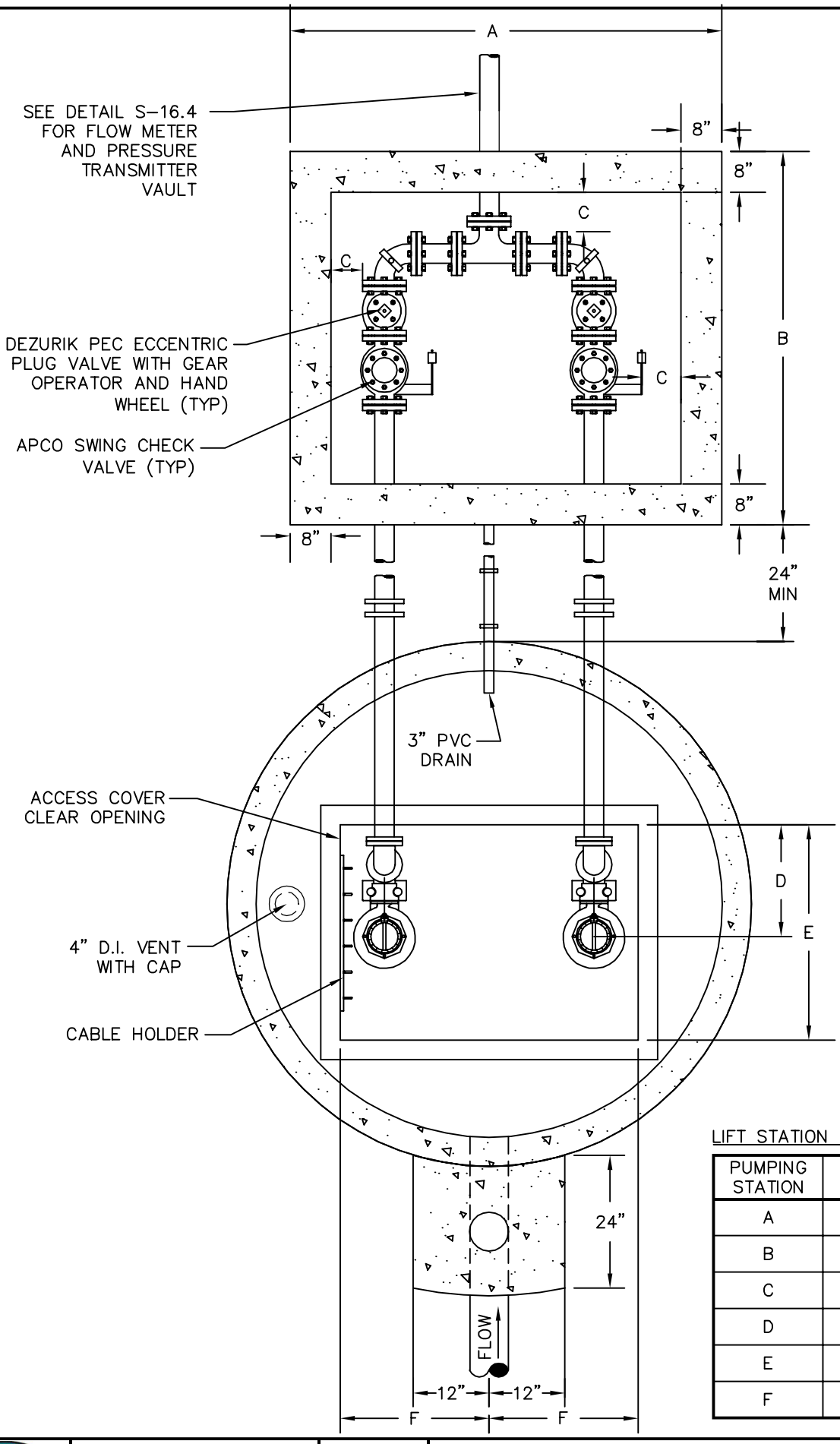
PUMPING STATION	DIMENSION/ ELEVATION
J	
K	
L	

PUMPING STATION	DIMENSION/ ELEVATION
M	
N	
O	
P	



Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.2 Lift Station Section View.dwg Model Sep 21, 2015 2:26pm by: Matt.Tebow

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE LATEST REVISION 9-21-2015	CITY OF WILDWOOD SEWER DETAIL LIFT STATION SECTION VIEW	DETAIL NUMBER S-16 2 OF 7

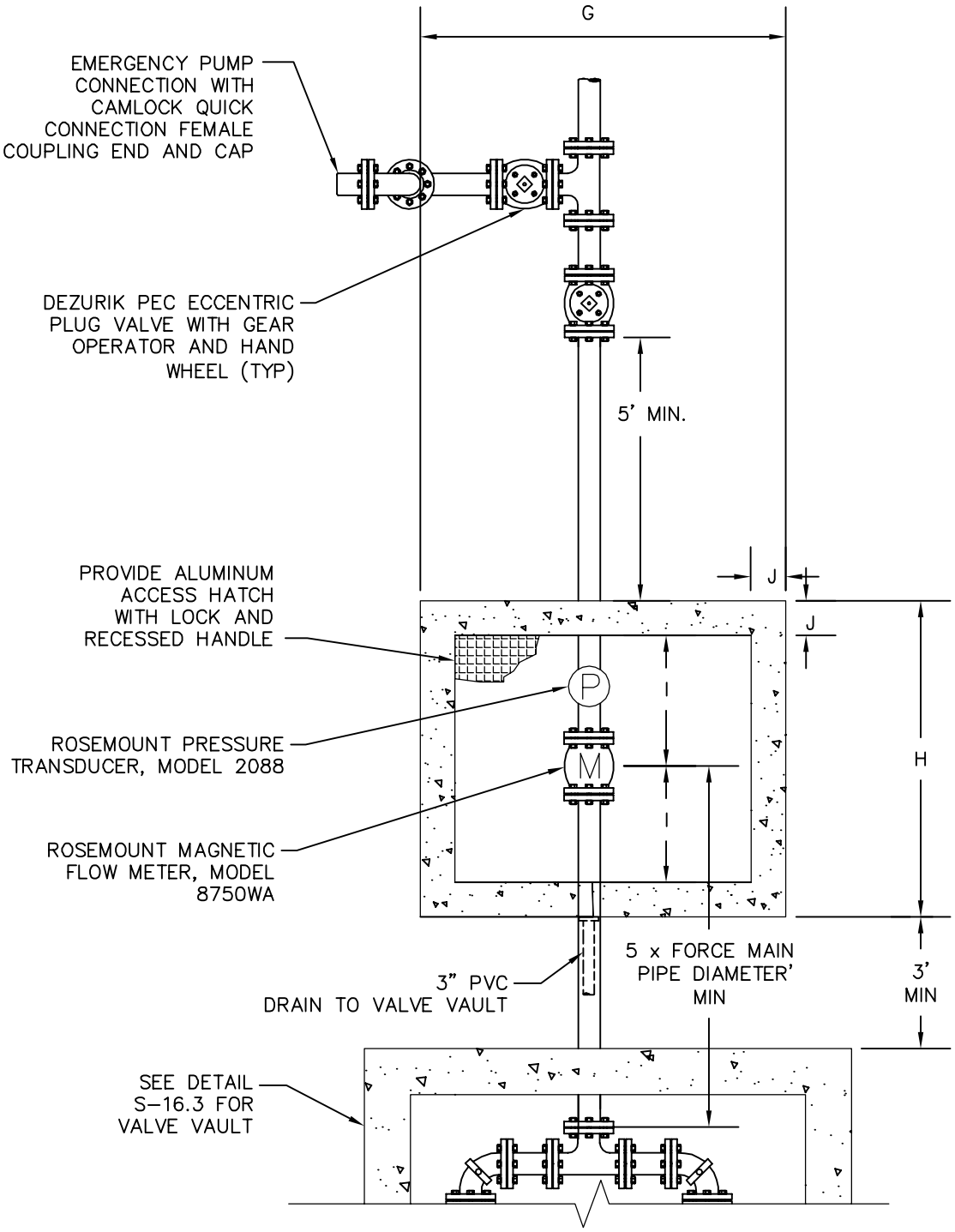


LIFT STATION DATA

PUMPING STATION	DIMENSION
A	
B	
C	
D	
E	
F	

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE	CITY OF WILDWOOD SEWER DETAIL	DETAIL NUMBER	
	LATEST REVISION 9-21-2015	LIFT STATION PLAN VIEW	S-16	3 OF 7

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.3 Lift Station Plan View.dwg Model Sep 21, 2015 2:41pm by: Matt.Tebow



LIFT STATION DATA

PUMPING STATION	DIMENSION
G	
H	
I	
J	

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

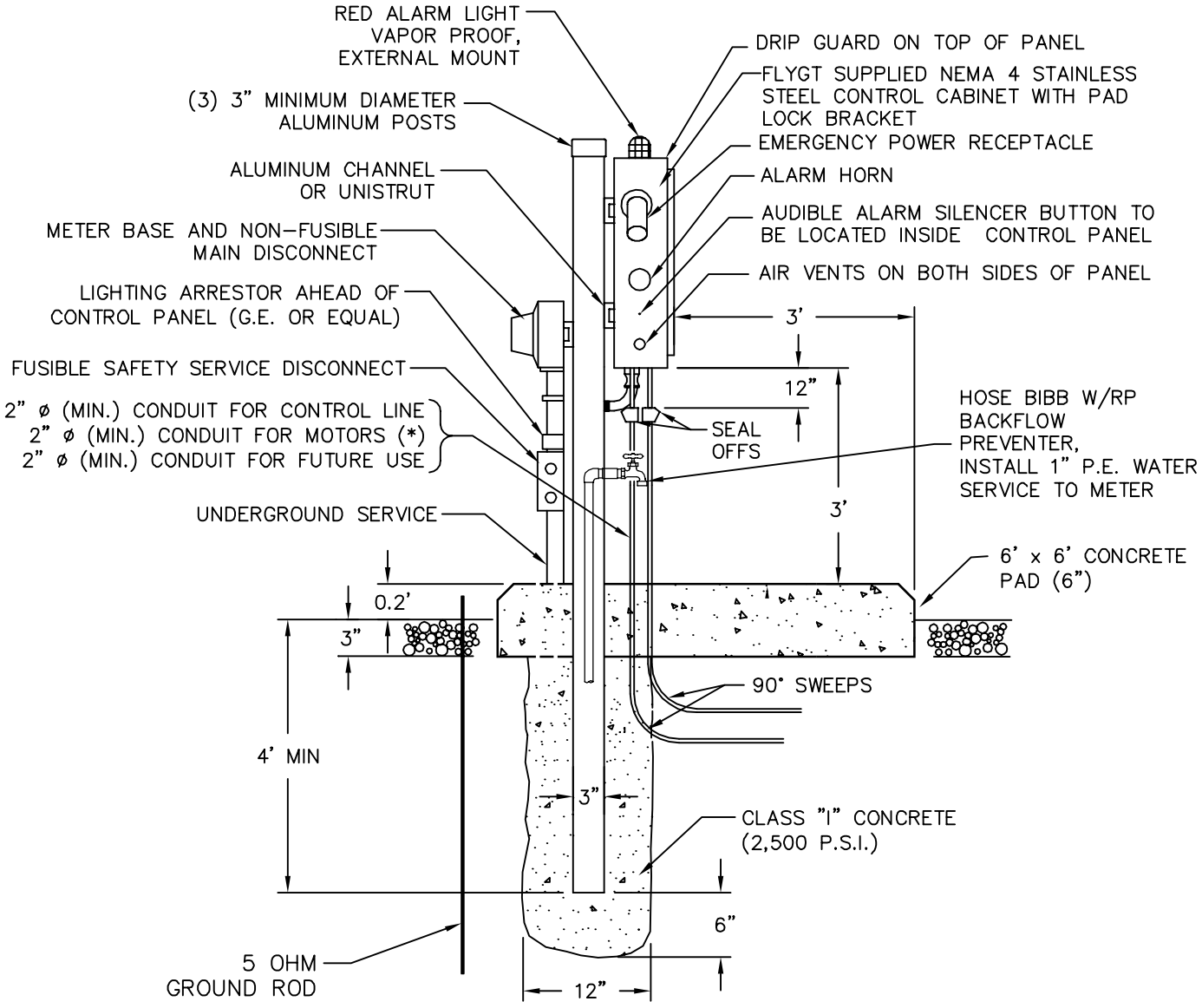
LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION FLOW METER AND PUMP OUT PLAN VIEW

DETAIL NUMBER: S-16

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.4 Lift Station Meter Box and Pump out Plan View.dwg Model Sep 21, 2015 2:30pm by: Matt.Tebow



Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.4 Lift Station Control Panel.dwg Model Sep 21, 2015 12:47pm by: Matt.Tebow

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

LATEST REVISION
11-10-14

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION CONTROL PANEL

DETAIL NUMBER
S-16
5 OF 7

GENERAL NOTES

1. ALL EXPOSED METAL SHALL BE PAINTED WITH 2 COATS OF EXTERIOR ENAMEL PAINT.
2. BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC.
3. VALVE VAULT SHALL BE SIZED BY MANUFACTURER AND SHALL PERMIT EASY REMOVAL OF CHECK VALVE SPINDLES WITH MINIMUM CLEARANCES AS SHOWN FOR 8" DIAMETER PIPE AND SMALLER. MINIMUM CLEARANCE IS 12".
4. VALVE VAULT AND FLOW METER VAULT SHALL HAVE SEALED FLOOR AND DRAIN.
5. ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.
6. THERE SHALL BE NO VALVES OR ELECTRICAL JUNCTION BOXES IN THE WET WELL.
7. WET WELL, VALVE VAULT, AND FLOW METER VAULT ACCESS HATCH SHALL BE ALUMINUM WITH 316 SS HARDWARE AND LOCK HASP; BY US FOUNDRY, HALLIDAY, OR APPROVED EQUAL.
8. WET WELL ACCESS HATCH SHALL BE EQUIPPED W/ OPT-GRATE AS MANUFACTURED BY HALLIDAY PRODUCTS OR EQUAL.
9. FLEXIBLE COUPLING SHALL BE SLEEVE TYPE.
10. ALL HARDWARE IN WET WELL AND VALVE VAULT TO BE STAINLESS STEEL.
11. LIFT STATION CONTROL PANEL WILL BE CONSTRUCTED UTILIZING SCI-TEXT PLUS SCADA AND SHALL BE CONSTRUCTED TO CONNECT TO EXISTING CITY OF WILDWOOD SYSTEM.
12. ALL INTERIOR WALLS OF THE WET WELL SHALL BE CONSTRUCTED WITH "AGRU SURE GRIP" HDPE OR APPROVED EQUAL.
13. ALL INTERIOR WALLS OF THE VALVE VAULT SHALL BE COATED WITH A MINIMUM OF TWO (2) COATS OF COAL TAR, (9 MILS. EA.).
14. WET WELL AND VALVE VAULT SHALL BE COATED WITH COAL TAR OUTSIDE. (2 COATS, 9 MILS EACH)
15. PUMPS SHALL BE FLYGT. ONE PUMP SHALL BE INSTALLED WITH A "FLYGT MIX-FLUSH" VALVE.
16. WET WELL LIQUID LEVEL CONTROLS SHALL BE "FLYGT MULTITRODE" SYSTEM WITH FLOAT BACK-UP.
17. FENCE AROUND VALVE VAULT AND WET WELL, MINIMUM 25'x25' (CHAIN LINK OR APPROVED EQUAL).
18. 2"x6" PRESSURE TREATED WOOD AROUND OUTSIDE 1 FOOT BEYOND FENCE AND ROCK.
19. PROVIDE GROUNDING GRID AROUND PERIMETER OF STATION.
20. ALL PANELS TO BE NEMA 4X STAINLESS STEEL. PANEL TO INCLUDE CT'S FOR AMPERAGE MONITORING.
21. EMERGENCY PUMPING CAPABILITY SHALL BE PROVIDED FOR ALL PUMP STATIONS.
22. LIFT STATIONS SHALL BE EQUIPPED WITH STANDBY POWER GENERATOR MANUFACTURED BY CATERPILLAR, KOHLER, ONEN, OR APPROVED EQUAL.
    A. AN AUTOMATIC TRANSFER SWITCH SHALL BE INSTALLED BETWEEN THE GENERATOR AND THE ELECTRIC PANEL.
    B. THE GENERATOR SHALL BE RATED AT THE MAXIMUM STATION AMPERAGE PLUS 25 PERCENT.
    C. THE GENERATOR SHALL HAVE ON SITE FUEL STORAGE SUFFICIENT TO RUN THE GENERATOR FOR A MINIMUM OF 24 HOURS.
    D. THE GENERATOR SHALL BE ENCLOSED BY A NEMA RATED WATERPROOF ENCLOSURE AND BE SOUND ATTENUATED.
    E. CONTRACTOR SHALL BE RESPONSIBLE FOR A MANUFACTURER'S START UP WITH THE CITY IN ATTENDANCE.
    F. GENERATOR SHALL BE MOUNTED ON A 28 DAY, 3,000 PSI, 6-INCH THICK, SLAB WITH A MINIMUM TWO FOOT SKIRT ON ALL FOUR SIDES.
23. OUTFLOW PIPE SHALL BE EQUIPPED WITH A ROSEMOUNT PRESSURE TRANSDUCER, MODEL 2088 WITH DISPLAY (0-150 PSI) AND ROSEMOUNT MAGNETIC FLOW METER, MODEL 8750WA. THE FLOW METER AND PRESSURE TRANSDUCER DISPLAY SHALL BE IN A SEPARATE CABINET OR IN THE MAIN CONTROL PANEL. THE FLOW METER, PRESSURE TRANSDUCER, AND VAULT TO BE INSTALLED AS REQUIRED BY THE CITY. THE DETAIL SHOWING THE FLOW METER, PRESSURE TRANSDUCER, AND THE VAULT SHALL BE SUBMITTED AND APPROVED BY THE CITY.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.5 Lift Station General Notes.dwg Model Sep 21, 2015 2:56pm by: Matt.Tebow

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION
GENERAL NOTES

DETAIL NUMBER: S-16

LIFT STATION PUMP SPECIFICATIONS

PUMP MANUFACTURER		
PUMP MODEL		
IMPELLER SIZE		
DESIGN POINT	GPM	HEAD
PUMP POWER AND SPEED	HP	RPM
ELECTRICAL DATA	PHASE	VOLTS
INTAKE PIPE DIAMETER		
DISCHARGE PIPING DIAMETER		

NOTE
DESIGN ENGINEER TO PROVIDE PUMP CURVE FOR SPECIFIED IMPELLER. CURVE TO SHOW HEAD IN FEET, FLOW RATE IN GPM, MOTOR HORSE POWER LIMITS, PUMPING EFFICIENCIES, AND ANTICIPATED SYSTEM HEAD.

PUMP CURVE

INSERT PUMP CURVE

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

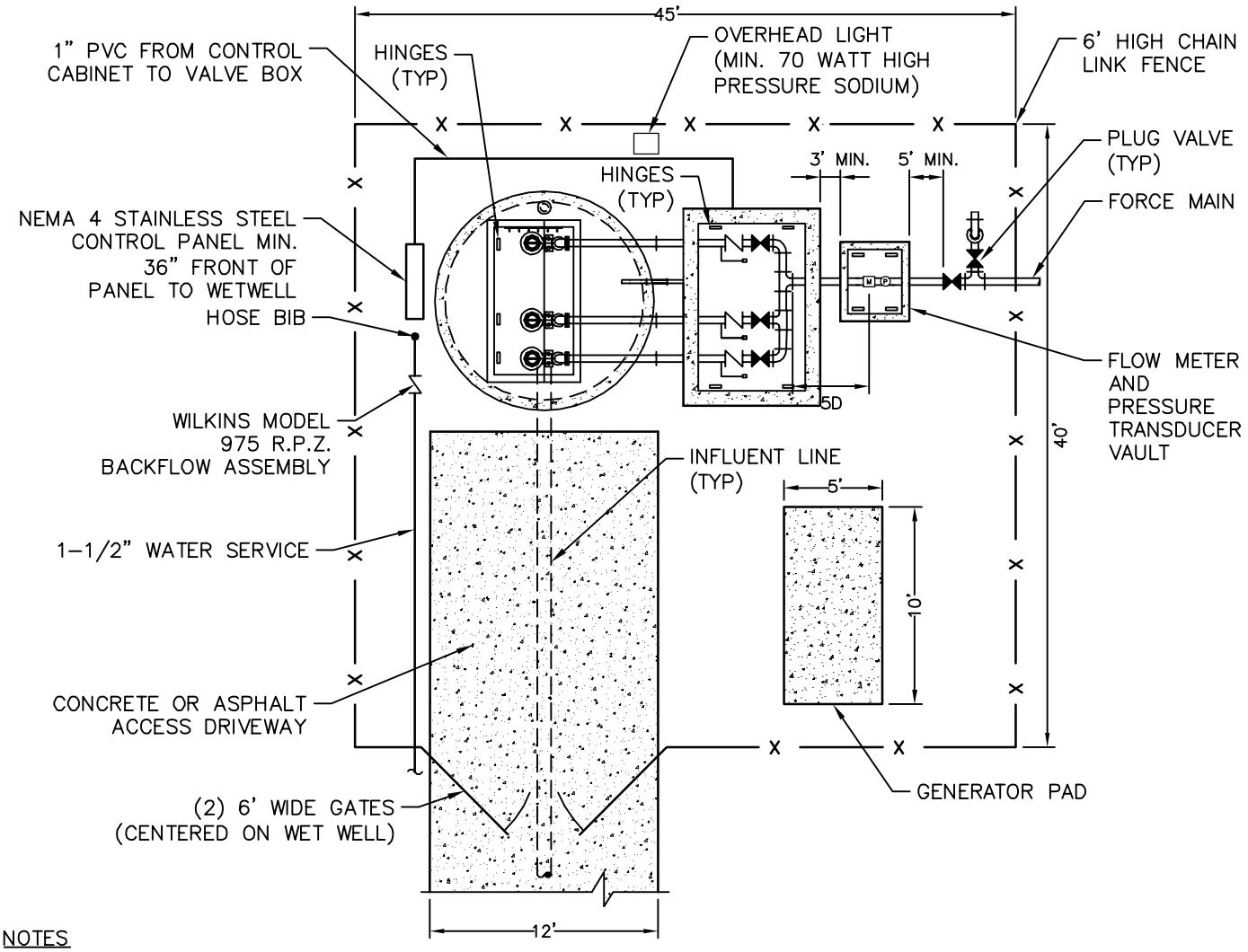
LATEST REVISION
9-21-2015

CITY OF WILDWOOD SEWER DETAIL

PUMP SPECIFICATIONS

DETAIL NUMBER
S-16
7 OF 7

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-16.6 Lift Station Pump Specs.dwg Model Sep 21, 2015 12:44pm by: Matt.Tebow



NOTES

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

1. NORTH ARROW.
2. FENCE WITH 2–6' WIDE GATES.
3. INFLUENT LINE ENTRY LOCATION.
4. HINGE LOCATION.
5 SHOW POWER SERVICE FEED.
6. 36"–42" FROM PANEL TO WET WELL OPENING.
7. EMERGENCY PUMP OUT LOCATION SHALL BE OUTSIDE OF THE VALVE BOX (SHALL BE SAME SIZE AS PUMP DISCHARGE).
8. DESIGN TO BE COORDINATED WITH DETAIL SHEET.
9. FENCED AREA TO BE COVERED WITH WEED BLOCK FABRIC AND A MINIMUM OF 3" OF 3/4" TO 1-1/4" COURSE AGGRIGATE.
10. INFLUENT MAIN SHALL BE CLEAR OF PANEL AND VAULT.
11. MIN. LOT SIZE TO BE 45' x 40'.
12. FLOW METER, PRESSURE TRANSDUCER, AND VAULT TO BE SUBMITTED AND APPROVED BY CITY.

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE: NONE

LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

TYPICAL LIFT STATION LAYOUT DETAIL

DETAIL NUMBER: S-17

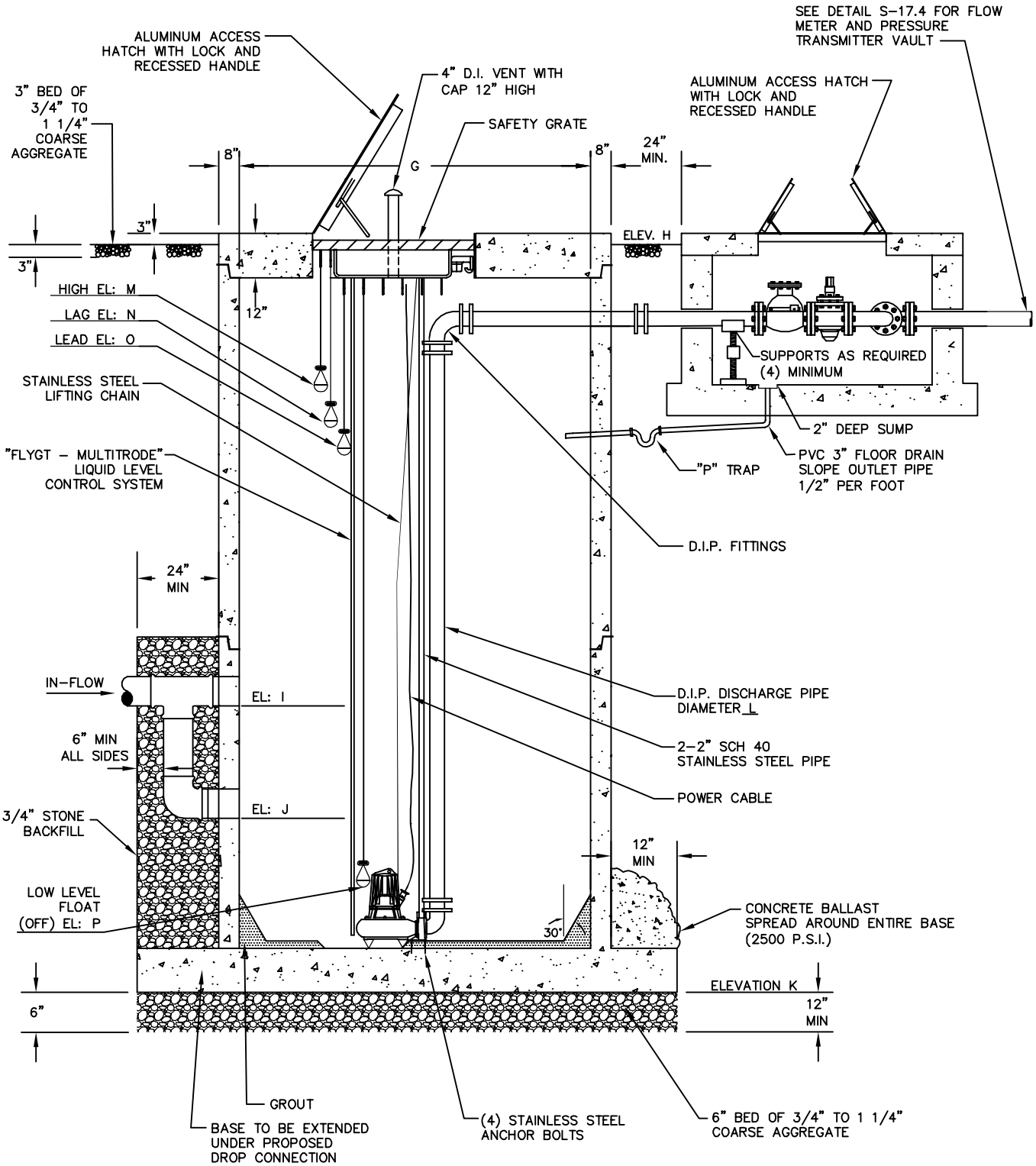
Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.1 Lift Station Layout.dwg Model Sep 21, 2015 3:12pm by: Matt.Tebow

LIFT STATION DATA

PUMPING STATION	DIMENSION/ ELEVATION
G	
H	
I	

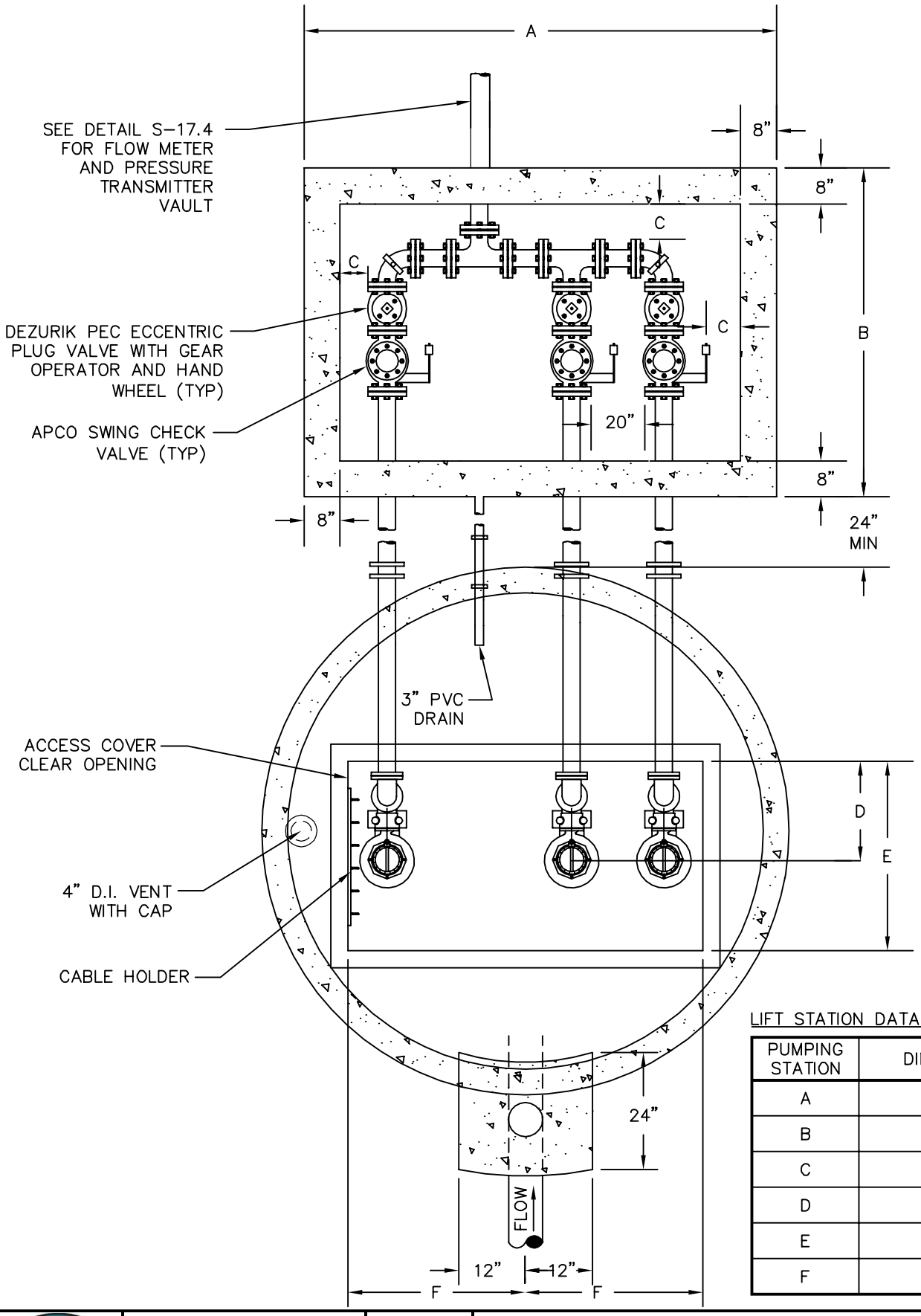
PUMPING STATION	DIMENSION/ ELEVATION
J	
K	
L	

PUMPING STATION	DIMENSION/ ELEVATION
M	
N	
O	
P	



Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.2 Lift Station Section View.dwg Model Sep 21, 2015 2:39pm by: Matt.Tebow

CITY OF WILDWOOD 100 NORTH MAIN STREET WILDWOOD, FLORIDA 34785 (352) 330-1330	SCALE NONE	CITY OF WILDWOOD SEWER DETAIL	DETAIL NUMBER	
	LATEST REVISION 9-21-2015	LIFT STATION SECTION VIEW	S-17	2 OF 7



LIFT STATION DATA

PUMPING STATION	DIMENSION
A	
B	
C	
D	
E	
F	

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.3 Lift Station Plan View.dwg Model Sep 21, 2015 2:45pm by: Matt.Tebow

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

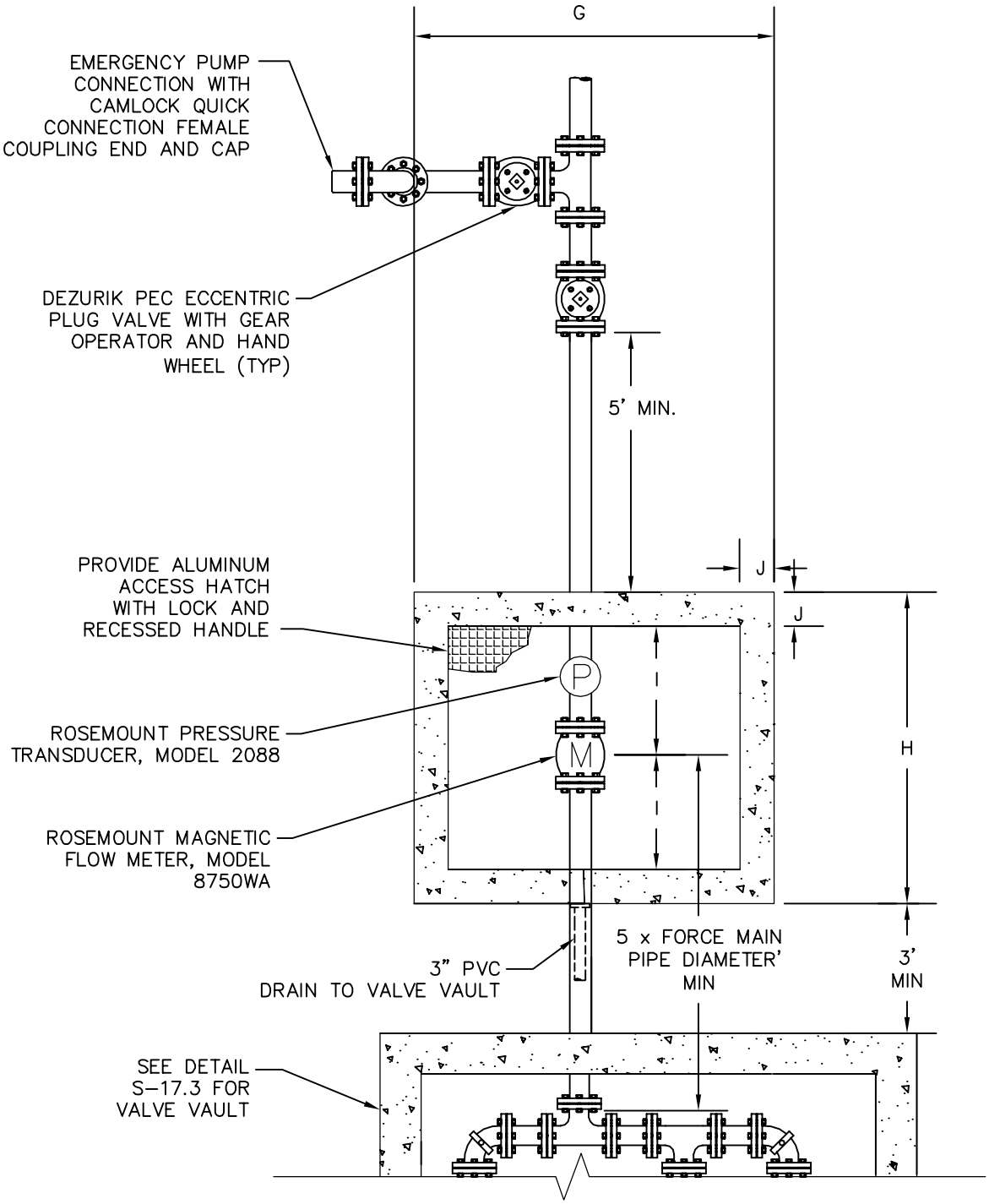
SCALE: NONE

LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION PLAN VIEW

DETAIL NUMBER: S-17



LIFT STATION DATA

PUMPING STATION	DIMENSION
G	
H	
I	
J	

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.4 Triplex Lift Station Meter Box and Pump out Plan View.dwg Model Sep 21, 2015 2:50pm by: Matt.Tebow

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

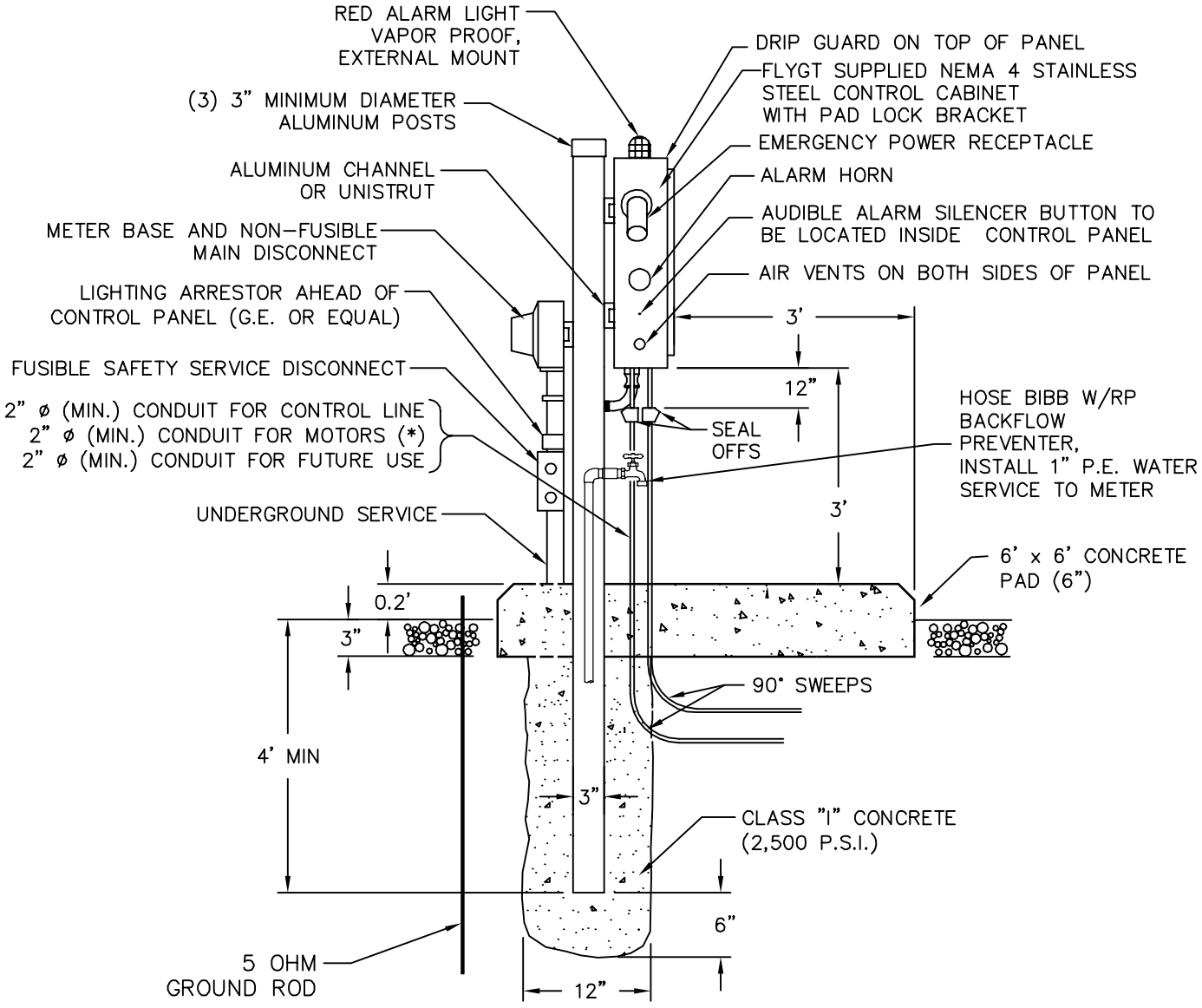
SCALE: NONE

LATEST REVISION: 9-21-2015

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION FLOW METER AND PUMP OUT PLAN VIEW

DETAIL NUMBER: S-17



CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

LATEST REVISION
11-10-14

CITY OF WILDWOOD SEWER DETAIL

LIFT STATION CONTROL PANEL

DETAIL NUMBER
S-17
5 OF 7

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.4 Lift Station Control Panel.dwg Model Sep 21, 2015 2:46pm by: Matt.Tebow

GENERAL NOTES

1. ALL EXPOSED METAL SHALL BE PAINTED WITH 2 COATS OF EXTERIOR ENAMEL PAINT.

2. BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC.

3. VALVE VAULT SHALL BE SIZED BY MANUFACTURER AND SHALL PERMIT EASY REMOVAL OF CHECK VALVE SPINDLES WITH MINIMUM CLEARANCES AS SHOWN FOR 8" DIAMETER PIPE AND SMALLER. CLEARANCES SHALL INCREASE AS REQUIRED FOR LARGER PIPE SIZES.

4. VALVE VAULT AND FLOW METER VAULT SHALL HAVE SEALED FLOOR AND DRAIN.

5. ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT.

6. THERE SHALL BE NO VALVES OR ELECTRICAL JUNCTION BOXES IN THE WET WELL.

7. WET WELL, VALVE VAULT, AND FLOW METER VAULT ACCESS HATCH SHALL BE ALUMINUM WITH 316 SS HARDWARE AND LOCK HASP; BY US FOUNDRY, HALLIDAY, OR APPROVED EQUAL. WET WELL HATCH SHALL HAVE SAFETY GRATING.

8. FLEXIBLE COUPLING SHALL BE SLEEVE TYPE.

9. ALL HARDWARE IN WET WELL AND VALVE VAULT TO BE STAINLESS STEEL.

10. LIFT STATION CONTROL PANEL WILL BE CONSTRUCTED UTILIZING SCI-TEXT PLUS SCADA AND SHALL BE CONSTRUCTED TO CONNECT TO EXISTING CITY OF WILDWOOD SYSTEM.

11. ALL INTERIOR WALLS OF THE WET WELL SHALL BE CONSTRUCTED WITH "AGRU SURE GRIP" HDPE OR APPROVED EQUAL.

12. ALL INTERIOR WALLS OF THE VALVE VAULT SHALL BE COATED WITH A MINIMUM OF TWO (2) COATS OF COAL TAR, (9 MILS. EA.).

13. PUMPS SHALL BY FLYGT. ONE PUMP SHALL BE INSTALLED WITH A "FLYGT MIX-FLUSH" VALVE.

14. WET WELL LIQUID LEVEL CONTROLS SHALL BE "FLYGT MULTITRODE" SYSTEM WITH FLOW BACK-UP.

15. FENCE AROUND VALVE VAULT AND WET WELL, MINIMUM 40'x40' (CHAIN LINK OR APPROVED EQUAL).

16. 2"x6" PRESSURE TREATED WOOD AROUND OUTSIDE 1 FOOT BEYOND FENCE AND ROCK.

17. GROUNDING GRID AROUND PERIMETER OF STATION.

18. ALL PANELS TO BE NEMA 4X STAINLESS STEEL.

19. PANEL TO INCLUDE CT'S FOR AMPERAGE MONITORING.

20. EMERGENCY PUMPING CAPABILITY SHALL BE PROVIDED FOR ALL PUMP STATIONS.

21. LIFT STATIONS SHALL BE EQUIPPED WITH STANDBY POWER GENERATOR MANUFACTURED BY CATERPILLAR, KOHLER, ONEN, OR APPROVED EQUAL.
    A. AN AUTOMATIC TRANSFER SWITCH SHALL BE INSTALLED BETWEEN THE GENERATOR AND THE ELECTRIC PANEL.
    B. THE GENERATOR SHALL BE RATED AT THE MAXIMUM STATION AMPERAGE PLUS 25 PERCENT.
    C. THE GENERATOR SHALL HAVE ON SITE FUEL STORAGE SUFFICIENT TO RUN THE GENERATOR FOR A MINIMUM OF 24 HOURS.
    D. THE GENERATOR SHALL BE ENCLOSED BY A NEMA RATED WATERPROOF ENCLOSURE AND BE SOUND ATTENUATED.
    E. CONTRACTOR SHALL BE RESPONSIBLE FOR A MANUFACTURER'S START UP WITH THE CITY IN ATTENDANCE.
    F. GENERATOR SHALL BE MOUNTED ON A 28 DAY, 3,000 PSI, 6-INCH THICK, SLAB WITH A MINIMUM TWO FOOT SKIRT ON ALL FOUR SIDES.

22. OUTFLOW PIPE SHALL BE EQUIPPED WITH A ROSEMOUNT PRESSURE TRANSDUCER, MODEL 2088 WITH DISPLAY (0-150 PSI) AND ROSEMOUNT MAGNETIC FLOW METER, MODEL 8750WA. THE FLOW METER AND PRESSURE TRANSDUCER DISPLAY SHALL BE IN A SEPARATE CABINET OR IN THE MAIN CONTROL PANEL. THE FLOW METER, PRESSURE TRANSDUCER, AND VAULT TO BE INSTALLED AS REQUIRED BY THE CITY. THE DETAIL SHOWING THE FLOW METER, PRESSURE TRANSDUCER, AND THE VAULT SHALL BE SUBMITTED AND APPROVED BY THE CITY.

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.5 Lift Station General Notes.dwg Model Sep 21, 2015 2:56pm by: Matt.Tebow

LIFT STATION PUMP SPECIFICATIONS

PUMP MANUFACTURER		
PUMP MODEL		
IMPELLER SIZE		
DESIGN POINT	GPM	HEAD
PUMP POWER AND SPEED	HP	RPM
ELECTRICAL DATA	PHASE	VOLTS
INTAKE PIPE DIAMETER		
DISCHARGE PIPING DIAMETER		

NOTE
DESIGN ENGINEER TO PROVIDE PUMP CURVE FOR SPECIFIED IMPELLER. CURVE TO SHOW HEAD IN FEET, FLOW RATE IN GPM, MOTOR HORSE POWER LIMITS, PUMPING EFFICIENCIES, AND ANTICIPATED SYSTEM HEAD.

PUMP CURVE

INSERT PUMP CURVE

CITY OF WILDWOOD
100 NORTH MAIN STREET
WILDWOOD, FLORIDA 34785
(352) 330-1330

SCALE
NONE

LATEST REVISION
11-10-14

CITY OF WILDWOOD SEWER DETAIL

PUMP SPECIFICATIONS

DETAIL NUMBER
S-17
7 OF 7

Drawing name: G:\Cities and Counties\Wildwood\Standard Details\SEWER\S-17.6 Lift Station Pump Specs.dwg Model Sep 21, 2015 2:51pm by: Matt.Tebow