

Sanitary Sewer Lift Station Standards

April 2021

PUMPS

1. KSB
2. ABS
3. Flygt

Note: Shall be submersible unless otherwise specified. Each pump shall be equipped with a seal failure early warning system. Wet well shall be equipped with a Wet Well Wizard aerator by Reliant Water Technologies or approved equal. Aerator shall be sized proportionate to wet well capacity. Type 304 stainless steel (ASTM A240) chains shall be attached to each pump and run full length to top of wet well. Chain shall be sized according to recommended manufacturer specifications.

CHECK VALVES

1. Mueller Swing Type with lever and weight, FL x FL ends. (A-2600-6-01)
2. Kennedy Iron Swing Check with lever and weight, FL x FL ends. (Fig. 126)
3. Waterous Swing Check with lever and weight, FL x FL ends. (Series 6800)
4. Approved Equal

PLUG VALVES

1. Mueller-Pratt BallCentric Series 601
2. FLG x FLG for interior installations – MJ for direct bury
3. Exposed Hardware (nuts/bolts) to be Grade 316 Stainless Steel, ASTM A240
4. Approved Equal

CONTROL PANEL/ELECTRICAL

1. Control panel shall be Type 304 stainless steel (ASTM A240) with hinged door and lockable latch installed minimum 3 feet above ground. A Type 304 stainless steel (ASTM A240) sub-panel with hinged door and lockable latch shall be installed outside of wet well for motor lead connections. Sub-panel to be minimum 12 inches tall by 12 inches wide by 8 inches deep and shall be minimum 12 inches above ground elevation. Both shall be watertight and Type 4X.
2. The following electrical components shall be standard equipment in control panel:
 - Main Circuit Breaker
 - Control Circuit Breaker
 - Motor Breaker
 - Duplex Receptacle Breaker

- Motor Starter
- Alternator
- Phase Monitor
- Lightning Arrestor
- Relays 1-6
- Duplex Receptacle (GFCI Protected) mounted to side of panel.
- Control Power Transformer
- Control Circuit Transformer
- Terminal Strips
- Isolated Neutral Block and Ground Buss
- Time Delay Relay (1 per pump)
- H O A Switch
- High Level Alarm Light (red), with audible alarm
- Flasher
- Pilot Lights (pump run-green, pump off-red)
- Fuse Blocks
- Hour meter (1 per pump)
- Warning lights (high pump temperature and seal failure)
- Power and timer for aerator.
- WHECO Data Acquisition and Monitoring System
- Panel shall include 4 foot minimum depth rain shelter/awning that extends the width of the rack (304 Stainless, ASTM A240), with a LED light fixture. Light fixture to be switched and have photocell (see detail).
- Panel shall include 4 feet minimum depth concrete pad (6 inch depth) that extends the width of the rack (see detail).

Note: All breakers and motor starters shall be Square D brand, all relays shall be pin and socket, control power shall be 120 volts, phase and primary voltage to be determined.

BACKUP GENERATOR

Site shall include backup generator with auto switching controls and include the following minimum items:

1. To be sized by engineer based on designed requirements
2. Auto-Run-Off Mode Selector Switch
3. Remote Monitoring and Control Interface (direct interface to SCAD w/ EIA/RS-485 connection)
4. Battery Charger/Maintainer
5. Sound attenuating housing, producing a noise level greater than 75 dB at 7 meters
6. Outdoor Weather Protective Housing
7. O&M Manuals, and factory guided training
8. Minimum 3 year manufacturer's warranty (including any transportation and or shipping costs)
9. Rated for operational temperatures for this region
10. 4 stroke, water cooled, diesel engine w/ minimum of 4 cylinders
11. Emergency Stop Switch
12. Reset switch
13. Panel Lamp Switch (DC powered lighting)
14. Digital Metering Set (RMS voltage, current, frequency, output current, output kW, kW hours, and power factor.
15. Generator Set Alarm Display (alarm and alarm status indicating lamps, high intensity LED type)

Alarm Display to include indicator for:

- a. Low oil pressure (alarm)
- b. Low oil pressure (shutdown)
- c. Oil pressure sender failure (alarm)
- d. Low coolant temperature (alarm)
- e. High coolant temperature (alarm)
- f. High coolant temperature (shutdown)
- g. Engine temperature sender failure (alarm)
- h. Low coolant level (alarm or shutdown selectable)
- i. Fail to crank (shutdown)
- j. Over crank (shut down)
- k. Over speed (shutdown)
- l. Low DC voltage (alarm)
- m. High DC voltage (alarm)
- n. Weak battery (alarm)
- o. Low fuel day tank (alarm)
- p. High AC voltage (shutdown)
- q. Low AC voltage (shutdown)
- r. Under frequency (shutdown)
- s. Over current (shutdown)
- t. Short circuit (shutdown)
- u. Overload (alarm)
- v. Fuel leak (alarm)
- w. Ground fault trip (shutdown)

16. Engine Status Monitoring

- a. Engine oil pressure (psi)
- b. Engine coolant temperature
- c. Engine oil temperature
- d. Engine speed (rpm)
- e. Number of hours of operation
- f. Number of start attempts
- g. Battery voltage (DC Volts)

17. Electromechanical hour meter

18. Control Functions

- a. Cycle Cranking System: selected crank time, rest time, and # of cycles
- b. Idle Mode Control
- c. Engine Governor Control: adjustable gain, damping, and ramping function
- d. Time Delay Start/Stop: adjustable 0-300 second start – 0-600 second stop
- e. Sender Failure Monitoring: logic for speed sensing, oil pressure, and engine temperature

19. Alternator Control Function

- a. Generator phase sequence
- b. Over/under voltage (27/59)
- c. Over/under frequency (81 O/U)
- d. Reverse power (kW)(32RP)
- e. Reverse reactive power (kVAR)(32RV)
- f. Overcurrent protection (50/51)

20. Vibration Isolators

21. Starting and control batteries

22. Exhaust silencer (critical grade muffler(s))

23. Fuel storage tank (24 hour usable capacity @ 100% load)

24. Service and feeder lugs and connectors (copper, crimp type)
25. Circuit Breakers
26. Panelboard (board and housing to be NEMA 4X 316 Stainless Steel, ASTM A240)
27. Generator access platform
28. Spare Parts
 - a. 2 air cleaner elements of each type
 - b. 2 fuses of each type
 - c. One radiator house of each type
 - d. 2 fuel filters of each type
 - e. 2 oil filters of each type
 - f. 1 belt of each type

AUTOMATIC CONTROLS

1. LS 100 Transducer w/ Float Backup
2. Weighted Floats (2): On and Off

CONDUIT

1. Schedule 80 PVC electrical conduit shall be used for all wiring. Underground conduit shall be buried minimum 18 inches.
2. Conduit shall be minimum 3 inch I.D.
3. All conduit ends shall be sealed to prevent gases from entering.

WET WELL

1. Wet well shall be portland concrete cast-in-place or precast reinforced polymer concrete. Concrete to be Class "F" (6.5 sack, 4200 PSI) per NCTCOG specification 702.2.4.2. Precast reinforced polymer concrete by US Composite or approved equal.
2. Structural steel for base and deck to be per engineer's design.
3. Well interior to be completely coated (80 millimeters minimum thickness) with one of the following (*including ductile piping*):
 - a) Belzona International Ltd – Magma Quartz System
 - b) CCI Spectrum - SpectraShield
 - c) Sprayroq Inc. – Spraywall
 - d) Chesterton
4. Guide rails and all hardware shall be Type 304 stainless steel (ASTM A240). Mounting hardware shall include lock nuts and or lock washers.
5. Float hanger (*w/ 10 hooks min.*), all hardware, bolts, nuts, etc. shall be stainless steel (ASTM A240).
6. Location of wet well within fence shall provide direct access for equipment (*eg: crane trucks*) backing into site from driveway.
7. Cover shall be made of aluminum, full opening and capable of being locked. Hatch shall include safety grate. Must open to provide direct access from gate (*should open away from gate to accommodate lift/crane truck to back directly to well*).
8. Wet well shall be vented with minimum 4 inches, 180 degree ductile iron pipe. Ell on end of vent shall be screened with stainless steel #8 mesh.
9. Control floats must be hung away from incoming flow.

10. Water stop gaskets shall be installed where pipe(s) pass through wall.
11. Wet well shall include "Wet Well Wizard" aerator as manufactured by Reliant Water Technologies or approved equal and installed per manufacturer specifications.
12. Wet well top to be 6 – 8 inches above finished grade.
13. Incoming sanitary sewer lines with a height above wet well finished floor of more than 5 feet shall be connected with an outside drop connection. Drop connection outfall shall not be more than 2 feet above finished wet well floor. A cross shall be installed where sewer main turns down to incorporate a cleanout for dropped line to ground level with a cap and concrete pad. Drop connection shall be completely encased in concrete.

DRY WELL

1. A plug valve, check valve and flange coupling adapters are required for each pump. Plug and check valves shall be readily accessible for repair or maintenance.
2. Dry well shall have drain line discharging to wet well. Line shall be minimum 4 inch schedule 40 PVC with a flap valve on end where it enters wet well.
3. Dry well shall be vented with minimum 4 inch ductile iron pipe. Ell on end of pipe shall be screened with stainless #8 mesh.
4. Cover shall be made of aluminum, full opening and capable of being locked.
5. All hardware, bolts, nuts, etc. shall be stainless steel (ASTM A240).
6. An oil filled pressure gauge shall be installed after check valves.

PAINTING SYSTEM

1. Coatings for all piping shall conform to City of Mansfield coating specifications.

Products: The following special coating products are manufactured by Tnemec Company, Inc. Manufacturers of products of equal substance, function and performance subject to the review and approval of the Engineer will be considered.

Coating Schedule: Exterior Exposed Steel: (Piping in dry well, by-pass piping and vents)

1. System Type: Epoxy/urethane
2. Surface Preparation: SSPC-SP 6
3. Primer: Series N69-Color Hi-Build Epoxoline II. DFT 3.0 to 5.0 mils.
4. Intermediate Coat: Series N69-Color Hi-Build Epoxoline II. DFT 4.0 to 6.0 mils.
5. Finish Coat: Series 74-Color Endura-Shield. DFT 3.0 to 5.0 mils.
6. Total DFT: 10.0 to 16.0 mils.
7. Color: Tnemec Bare Beige-RD

SITE

1. Fenced area shall be minimum 25 foot x 25 foot, area shall be accessible from a street or access easement with paved drive.
2. Fence shall be wrought iron and a height of 8 foot. (See detail).
3. Two 6 foot wide wrought iron gates shall be installed. (See detail)
4. The area within the fence shall consist of minimum 6 inch compacted flex base with a 2 inch crushed stone surface. Stone shall be 1 inch nominal in size with geotextile fabric below.

5. The access road shall be minimum 12 foot wide consisting of 6 inch HMAC or 6 inch reinforced concrete (6 sack, 3600 psi concrete, w/ #4 bars @ 12" centers) and shall have a concrete drive approach at street connection (*commercial drive approach per COM Standard Details*). Asphalt will only be permitted in areas not permanently improved.
6. Culverts and or trench drains shall be installed as needed for drainage.
7. All plug valve boxes and by-pass riser shall have a concrete pad per City of Mansfield Standard Construction Details.
8. Connect wet and dry wells with 4" deep concrete slab the width of the dry well.
9. Install one 1" water service, one 1" RPZ valve, and one frost proof yard hydrant (Yard Hydrant: Woodford Y34 IOWA Yard Hydrant 3-ft bury depth ¾-in female orange brass hydrant or approved equal).
10. Site to include landscape buffer around exterior of fence and appropriate screening plants shall be installed (where required by zoning).
11. Site to include irrigation system for locations which have landscape areas. (shared w/yard hydrant)
12. Site to include luminaire appropriately sized to adequately illuminate interior fenced area. Light to include a manual switch and have photocell switch and avoid excess lighting of areas outside of fenced area.

ADDITIONAL SPECIFICATIONS

1. A 6-inch by-pass shall be installed on discharge piping outside of dry well, consisting of a vertical tee with riser and blind flange extending 12 inches above ground.
2. A plug valve shall be installed outside dry well on force main downstream of by-pass. The transition from ductile iron pipe to PVC shall take place downstream of plug valve.
3. All piping in wet well, dry well and to plug valve on force main shall be flanged ductile iron pipe. No MJ fittings allowed. Piping shall be rigidly supported to prevent movement. A flexible coupling shall be installed between wet and dry well. All ferrous items shall be wrapped with polyurethane material.

FORCE MAIN PIPING

1. Force main piping shall be green DR-18 AWWA C-900.
2. Force main shall be hydrostatically tested to 100 p.s.i. for a minimum of 2 hours.

ACCEPTANCE TESTING

1. Both pumps shall be removed and reinstalled to check for proper alignment of guide rails and access cover.
2. Both pumps shall be operated to check for proper rotation and operation and to make sure both are properly seated after reinstallation.
3. All electrical components shall be tested for proper operation.
4. Pump manufacturer shall issue a Certificate of Operation verifying all components have been tested and passed along with performance curves. Two copies of O&M manuals shall be submitted to the City of Mansfield.
5. Backup generator manufacturer shall issue a Certificate of Operation verifying all components have been tested and passed. Two copies of O&M manuals shall be submitted to the City of Mansfield.
6. A 60 day observation period will be observed after pump certification and before final acceptance and warranty begins.

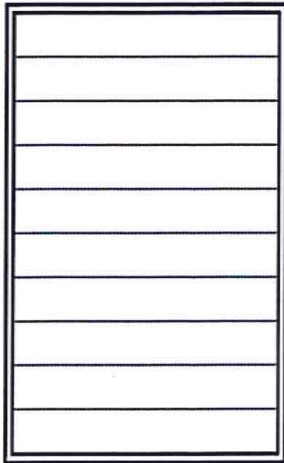
Detailed Drawings

Rain Shelter/Awning

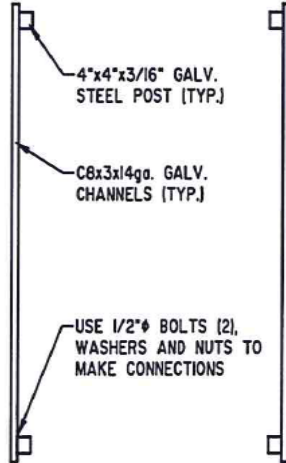
NOTES:

1. DIMENSIONS OF THE COVER SHALL BE DETERMINED BY THE SIZE OF ELECTRICAL EQUIPMENT SUPPLIED AND THE FINAL PAD SIZE.
2. VERIFY COMPONENTS AND INSTALLATION PER THE SPECIFICATIONS PROVIDED WITH THE SHELTER MATERIALS.
3. SLOPE ROOF 1/8" PER FT. WITH NATURAL GROUND.
4. MATERIAL OF CONSTRUCTION IS TO BE WHITE PAINTED METAL, "CARPORT" TYPE.

EAVE FLASHING (TYP.)



ROOF PLAN

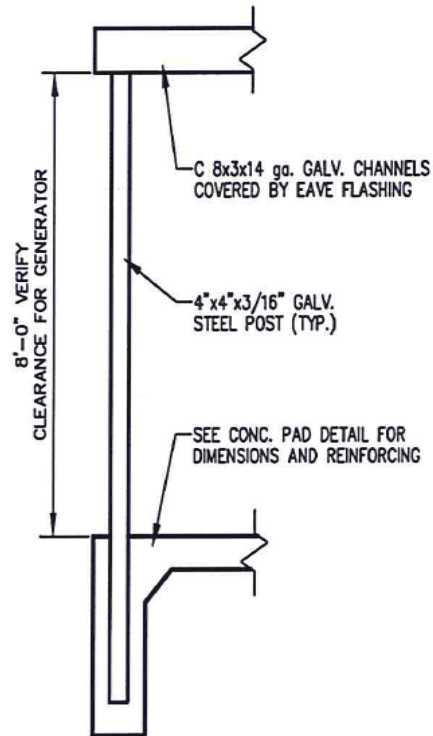


FRAMING PLAN

RAIN SHELTER DETAILS

NO SCALE

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RAIN SHELTER POST SECTION

NO SCALE

RAIN SHELTER POST SECTN.dwg

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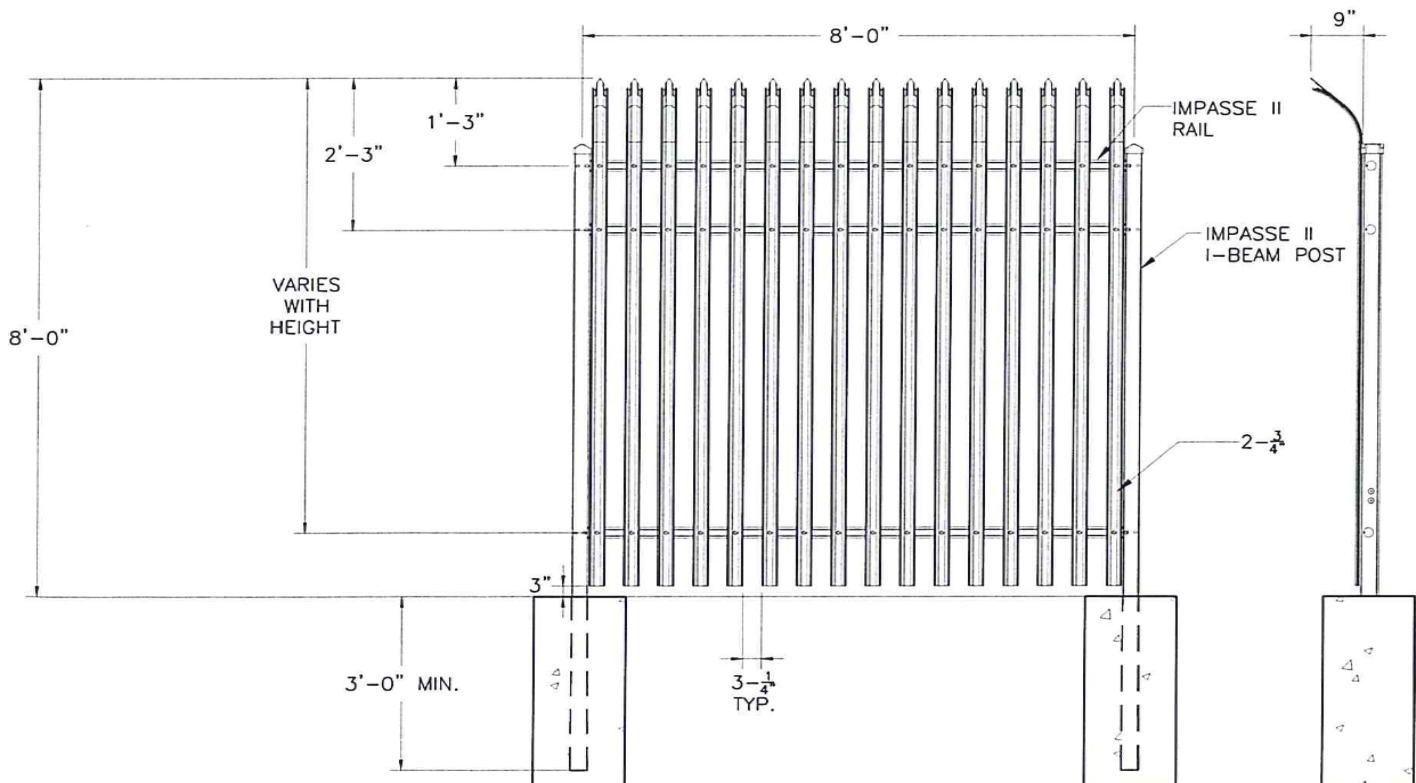
IMPASSE GAUNTLET GATE
NOT TO SCALE

Impasse Gauntlet Fence

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NOTES

1. FENCES AND GATES SHALL BE FURNISHED COMPLETE WITH ALL NECESSARY FITTINGS AND HARDWARE.
2. FOR GATES, SIZES OF PIPE, SAG RODS AND TURNBUCKLES SHALL BE MANUFACTURER'S STANDARD WHICH ALSO MEET THE REQUIREMENTS OF THIS DRAWING.
3. POSTS SHALL BE ROLLED OR EXTRUDED SECTIONS OR TUBING OF STEEL CAPABLE OF WITHSTANDING A LATERAL FORCE OF 200 POUNDS APPLIED AT THE TOP. ALL HOLLOW POSTS SHALL BE CAPPED.
4. STANDARD PIPE SIZES INDICATED ARE NOMINAL DIAMETER, SCHEDULE 40, PER AMERICAN STANDARDS ASSOCIATION (ASA) B 36.10.
5. PROVIDE PLUNGE ROD AND CATCHES FOR ALL GATES IN OPEN AND CLOSED POSITION.
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6. PIER AND POST LENGTH MAY VARY DEPENDING ON SOIL TYPE, FIELD CONDITIONS AND APPLICATION. DIMENSIONS SHOWN AND SPECIFIED ARE MINIMUM. DIMENSIONS SHALL BE MODIFIED AS REQUIRED BY FENCE MFR / INSTALLER.
7. $\frac{3}{4}$ "x10' GROUND ROD W/ TOP OF ROD 12" BELOW GRADE. ATTACH #2 BARE COPPER WIRE TO FENCE W/ 3 STEEL CABLE CLAMPS. (MIN. 1 PER SIDE OR AS RECOMMENDED BY FENCE MFR.)
8. FENCE AND GATE SHALL BE MANUFACTURED BY AMERISTAR OR APPROVED EQUAL.



Impasse Gauntlet Fence

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