

Kevin VanSickle

219-898-1344



STANDARD LIFT STATION NOTES
(Approved 10/3/2012)

1. The electric service, electrical controls, the natural gas service (if required), and the telemetry monitoring system for the lift station shall be provided by the contractor. All coordination with these utility companies and the cost of their fees, permits and installation work shall be the responsibility of the contractor.
2. All electrical work shall be performed in accordance with the National Electrical Code (NEC), all local electric codes and the requirements of the electrical utility, NIPSCO.
3. The location of all buried electrical conduit shall be marked with continuous plastic tape, a minimum of 6 inches wide and 4 mils thick and buried directly above the conduit, approximately 8 inches below finished grade.
4. The lift station contractor shall meet on-site with Michigan City Sanitary District (MCSD) officials and the engineer at the following lift station construction stages: (1) prior to beginning, (2) at 50% completion, (3) at substantial completion start-up and (4) at 100% completion of the lift station. Prior to scheduling the substantial completion start-up with MCSD officials, the contractor shall fully start-up all lift station equipment. MCSD officials will issue a letter of acceptance at 100% completion upon compliance with any "punch list" of items to be completed, which was generated at the substantial completion start-up of all lift station equipment, or thereafter.
5. The contractor shall furnish the MCSD with one (1) digital and four (4) hard copies of the following documents: (a) lift station operation and maintenance manual, with complete detailed information on all lift station equipment and components and a first page summary sheet or index which clearly indicates the contents of the manual all referenced and marked by numbered tabs; (b) as-built construction drawings of the lift station, including a site plan, with state plane coordinates and NGVD88 elevation data for rims and inverts of wet well, other manholes, and connecting sewers; (c) lift station start-up procedure and results check list; and (d) parts list.
6. The following lift station equipment shall be provided:

- A. Submersible pumps, minimum 3 HP (2.7 HP) and complete pump controls by ABS Pumps, Inc. or approved equal.
- B. If a permanent generator is required for emergency electrical power supply, it shall be natural gas powered and with an automatic transfer switch with adjustable time delay, all by Onan Corp., Generac Corp., Caterpillar Corp. or approved equal
- C. Electrical power for the lift station shall be 240/480 volt, 3-phase, depending on the available power supply and the requirements of the lift station equipment. If an electrical phase converter is required for 3 phase electrical power supply, it shall be a static type by Ronk Electrical Industries, or approved equal, and shall be sized for the proper HP rating.
- D. The portable generator receptacle, if required, shall have an A/B switch or knife switch, which shall be mounted on the bottom right-hand corner of the switch enclosure, facing downward, matching the available power supply and shall be one of the following:
1. Hubbell 560B9W for 240 volt, 3-phase for KW/KVA less than 65/81
 2. Hubbell 460B7W for 480 volt, 3-phase for KW/KVA less than 65/81
 3. Appleton AR20044 for 480 volt, 3-phase for KW/KVA greater than 288
- E. Permanent stainless steel chains for the installation and removal of each pump on its guide rail system. Each chain shall have sufficient strength and length to reach from each pump to at least four (4) feet above the top of the lift station wet well. Each chain shall be secured on a stainless steel hook bolt, anchored to the top slab of the wet well, in the pump access opening.
- F. The pump level control and control transmission system shall include a pressure transducer in the wet well, an Ametek Model 575, complete with 50 feet of cable to extend to the electronic unit without splicing. The electronic unit shall be located in the station control panel.
- G. The preceding electronic unit in Item 6(F) shall include one 24"x24"x8" NEMA 4X fiberglass enclosure, provided complete with a swing-out front panel. The swing-out front panel shall include an ~~SJE Rhombus SP6R-L-SC~~ Level Controller which shall be programmable to start-stop the pumps at the wet well levels indicated on the drawings. A digital display shall be included to display the wet well levels.
MPE SC2000 Level Controller
- H. The rear of the electronic unit enclosure shall include a Mission M800 Real Time RTU, ~~provided by J.M. Process Equipment Co., telephone number 708-429-3040,~~ and with card addition capability for eight (8) digital inputs (DI) and two (2) analog inputs (AI). The Mission M800 shall transmit the following signals to the Sanitary District of Michigan City.

- DI-1 Pump 1 Run/Off
- DI-2 Pump 2 Run/Off
- DI-3 Pump 1 Fail/Normal
- DI-4 Pump 2 Fail/Normal
- DI-5 Low Wet Well Level/Normal
- DI-6 High Wet Well Level/Normal
- DI-7 Power Fail
- DI-8 Float Control

Also included in the 24"x24"x8" electronic unit enclosure shall be a UPS, power fail relay, 24 VDC power supply, lightning arrestor, condensation heater with thermostat, terminal blocks, circuit breaker, receptacle, and GFI.

All alarms shall be automatically self-correcting (alarm condition is removed when event that triggers alarm is corrected). Pump failure shall be monitored through the motor starters with isolated contacts. The M800 and pressure transducer shall be provided with battery back-up to send water level data to the plant in the event of a power failure

I. Provide two (2) mercury-free float switches, each with 50 ft. of cable to extend to the electronic unit with no splicing of cables allowed. The floats shall be utilized to start and stop the "lead" and "lag" pumps in the event of a failure of the level transmitter or controller and to alarm the failure at the elevations indicated on the drawings. The pump controls shall prevent the simultaneous start of both pumps under this situation

J. The pump level control floats shall have sufficient weight to hang freely, without intermediate support, from stainless steel supports that are secured to the wet well wall, just below the top slab of the wet well. The transducer shall be attached to a 1/8" 316 stainless steel cable and 316 stainless steel clamps. A weight shall be attached at the bottom of cable and transducer and shall be attached just above the weight near the bottom of the wet well.

K. Supplier(s) of the pump station control system shall provide one day of supervisory startup service to insure proper operation of the system.

L. If Variable Frequency Drives (VFD) for pump motors are required, they shall be of appropriate make, type and size for this application.

Approved equal in the preceding items shall mean by another manufacturer that is approved prior to bidding the project. This pre-bid approval shall involve a submittal for the engineer's review and recommendation, and final approval by MCSD officials, which verifies that the manufacturer has acceptable experience and the equipment meets specifications, operating conditions and installation requirements.

7. The pump controls shall be provided by the pump manufacturer and shall include the following:

A. A NEMA 3R stainless steel enclosure with outside solid door and an inside door with instrumentation mounting. The control panel shall be designed to conveniently hold the outside door in a 180 degree fully open position and the inside instrument door in a 120 degree open position.

B. The following starting and overload protection facilities for each pump:

1. A combination NEMA rated motor starter and circuit protector to provide short circuit protection per NEC code.
2. A manual reset for dual protection against current overloads and short circuits.
3. An overload relay to be pre-calibrated to match motor characteristics.
4. A hand/off/auto selector switch mounted on the inside door of the control enclosure.

C. Thermal overload protection shutoff switches, restart buttons and warning lights for each pump.

D. A 20 amp 115 volt GFI receptacle in the pump control system enclosure.

E. Run and moisture sensor warning lights for each pump mounted on the inside door of the control enclosure.

F. A separate circuit breaker for the pump control system.

G. Lightning/surge protection for the entire pump control system.

H. A 100 watt heater with thermostat and over-temperature control for moisture control inside the pump control enclosure.

I. Dry contacts for pump thermal failure.

J. Either a 3-phase electrical supply monitor-or a low electrical voltage monitor, if an electrical phase converter is used for lift station power supply. This monitor shall interrupt power to the pump controls in an electrical supply problem condition.

K. Circuit breakers shall be provided in the pump control panel for the following accessories:

1. Area light
2. GFI receptacle
3. 100 watt heater
4. Controls

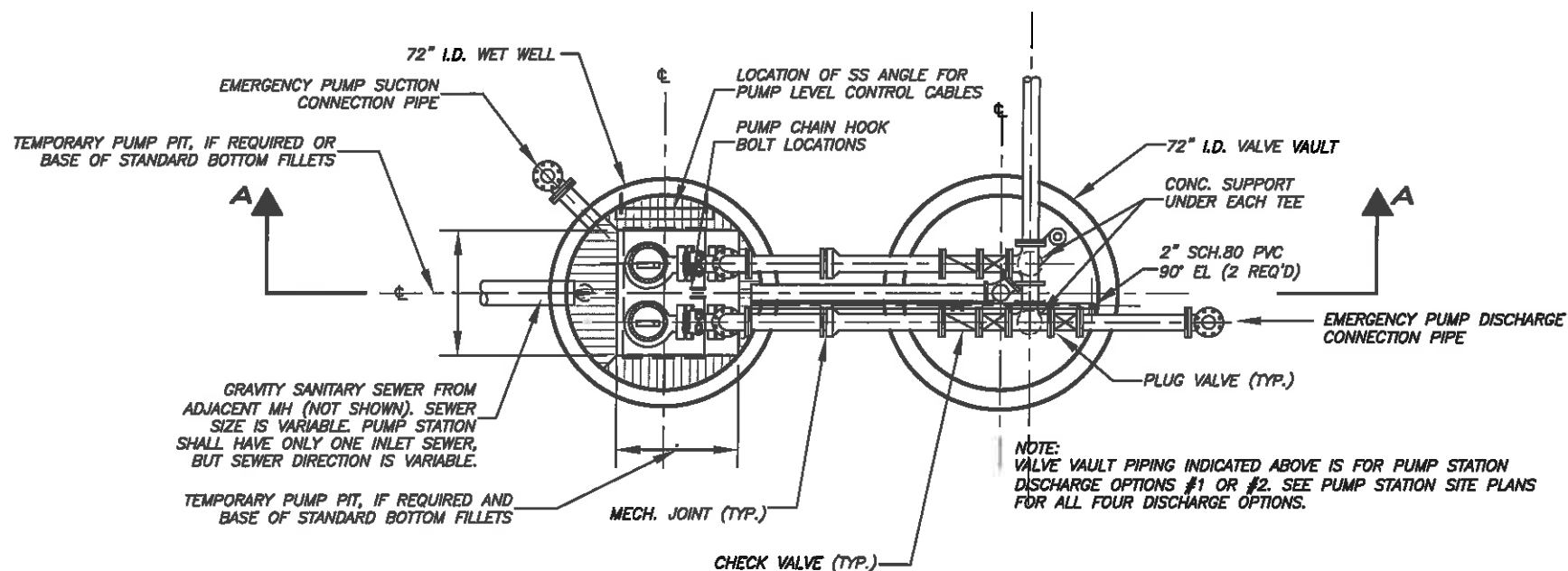
8. The lift station accessories shall be provided, as indicated on the details contained on the drawings and/or specified below and as required:

- A. The aluminum hatches for the tops of the lift station wet well and valve vault structures shall be series SIS, as manufactured by Halliday Products or approved equal. The hatches shall be the size indicated, or larger if required, for the easy removal of the wet well pumps or the valve vault valves. Each hatch shall have a recessed slam-lock and 90 degree open holding latch.
 - B. The area light shall have a 70 watt HP sodium lamp, vandal-proof acrylic prismatic reflector, cast aluminum housing, and integral plug-in photoelectric cell for automatic dusk to dawn operation.
 - C. All cables and conductors shall be in conduit, schedule 80 PVC for buried and rigid galvanized steel for exposed. All conduit sizes shall be oversized for easy future removal of the cables and conductors and their replacement with the next larger size.
 - D. Two valve operating T-wrenches shall be provided, one eight (8) feet long and one three (3) feet long, for opening the plug valves in the valve vault from the top of the vault.
9. The lift station piping, fittings and valves shall be provided as indicated on the details contained on the drawing and/or as specified below.
- A. The sizes of the piping, fittings and valves for the submersible pump discharge and the emergency pump suction and discharge connections shall be specifically determined for the pump station design capacity.
 - B. All interior or buried piping shall be class 50 ductile iron.
 - C. All interior or buried fittings shall be class 250 ductile iron with flanged joints.
 - D. Pump discharge check valves shall be swing-check type with outside weighted arm and manufactured in accordance with AWWA specification C508. The check valves shall be ductile iron and have flanged ends as per ANSI B.16.1 Class 125. The valves shall have an access flange for internal valve maintenance, without removing the valve from the pipeline.

E. Pump discharge plug valves shall have eccentric action such that the valve plug rises off the seat during operation. The valve plug shall be neoprene of BUNA-N faced. The plug valves shall be iron or semi-steel and have flanged ends as per ANSI B.16.1 Class 125. Plug valve operators shall be as indicated in the drawing details. Plug valves shall be DeZurick series 100, or equal.

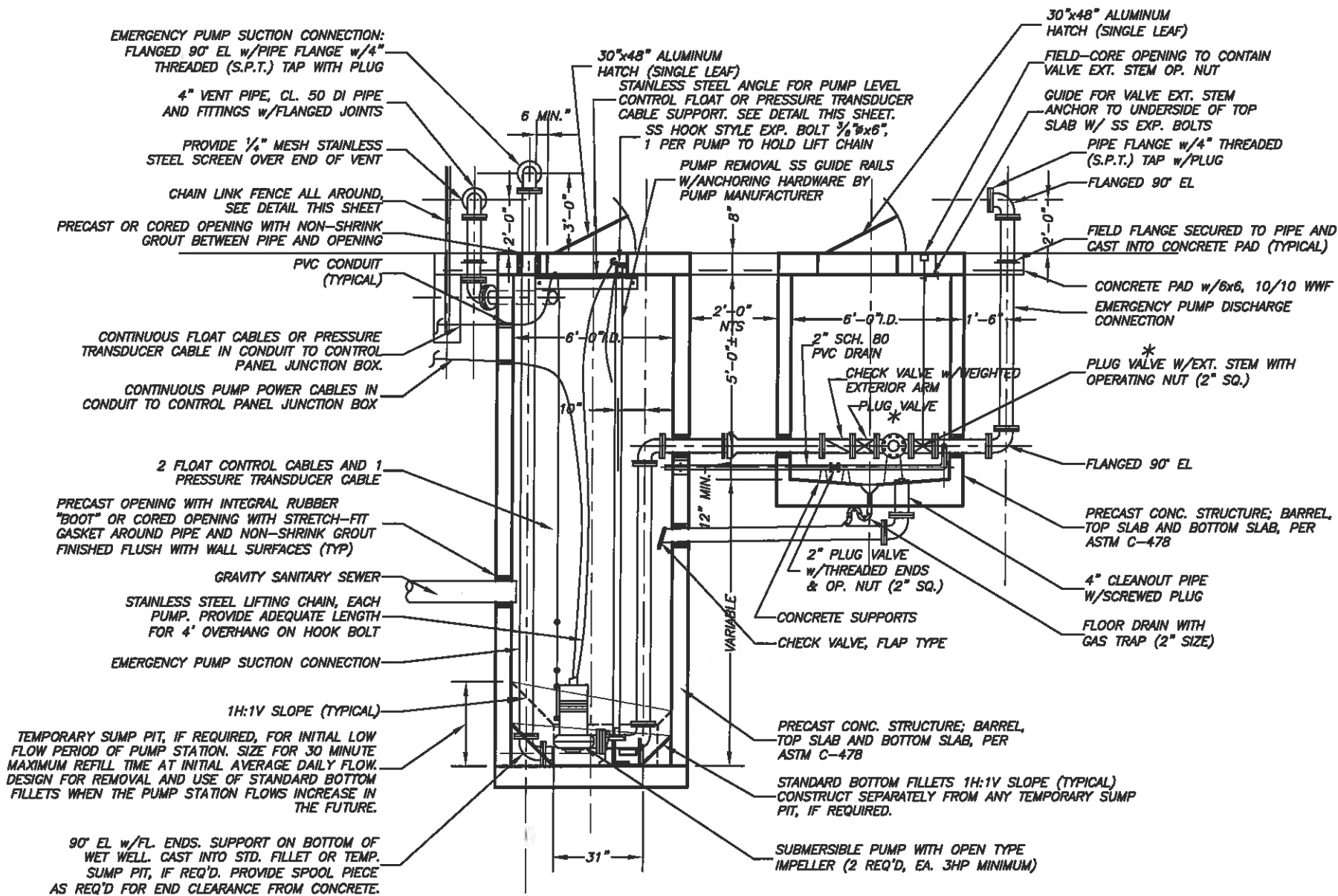
F. All pipe connections to fittings and valves can be with field flanges, Uni-flange or equal.

G. Pump discharge check, plug, and bypass valves shall be located in a separate structure with aluminum hatch. This structure shall have a drain that returns to the wet well with an appropriate trap, as indicated on the drawing.



PUMP STATION PLAN

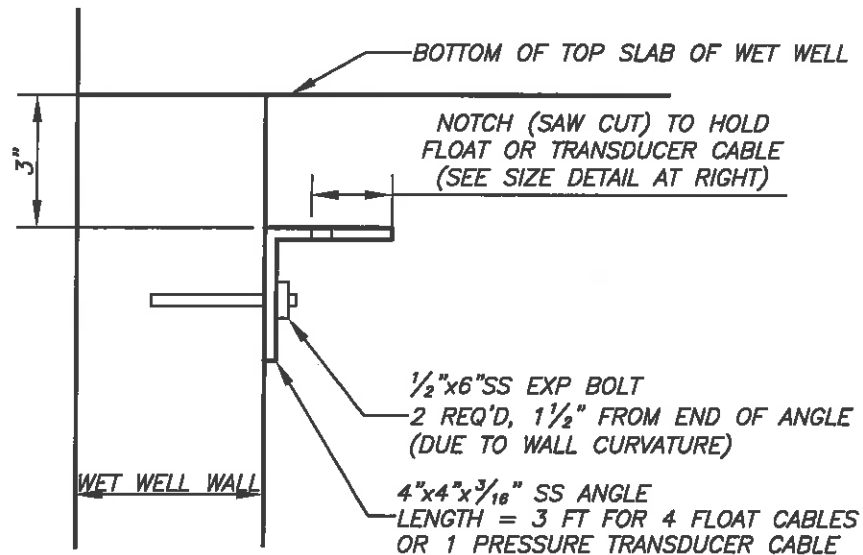
SCALE: $\frac{3}{16}"=1'-0"$



SECTION A-A

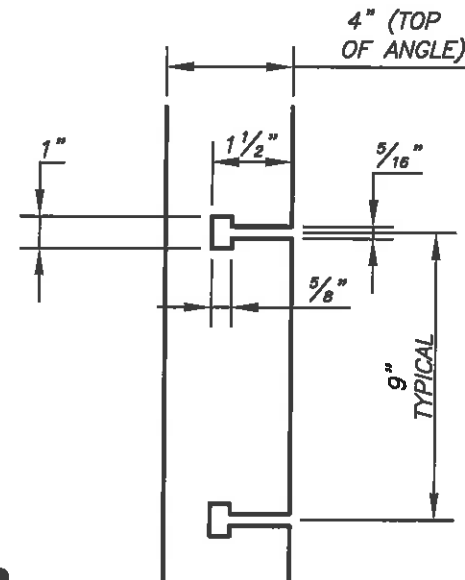
SCALE: 3/16" = 1'-0"

* 4" VALVES SHALL INCLUDE AN OPERATING NUT (2" SQ.).
6" AND LARGER VALVES SHALL INCLUDE A GEAR OPERATOR WITH AN OPERATING NUT (2" SQ.).



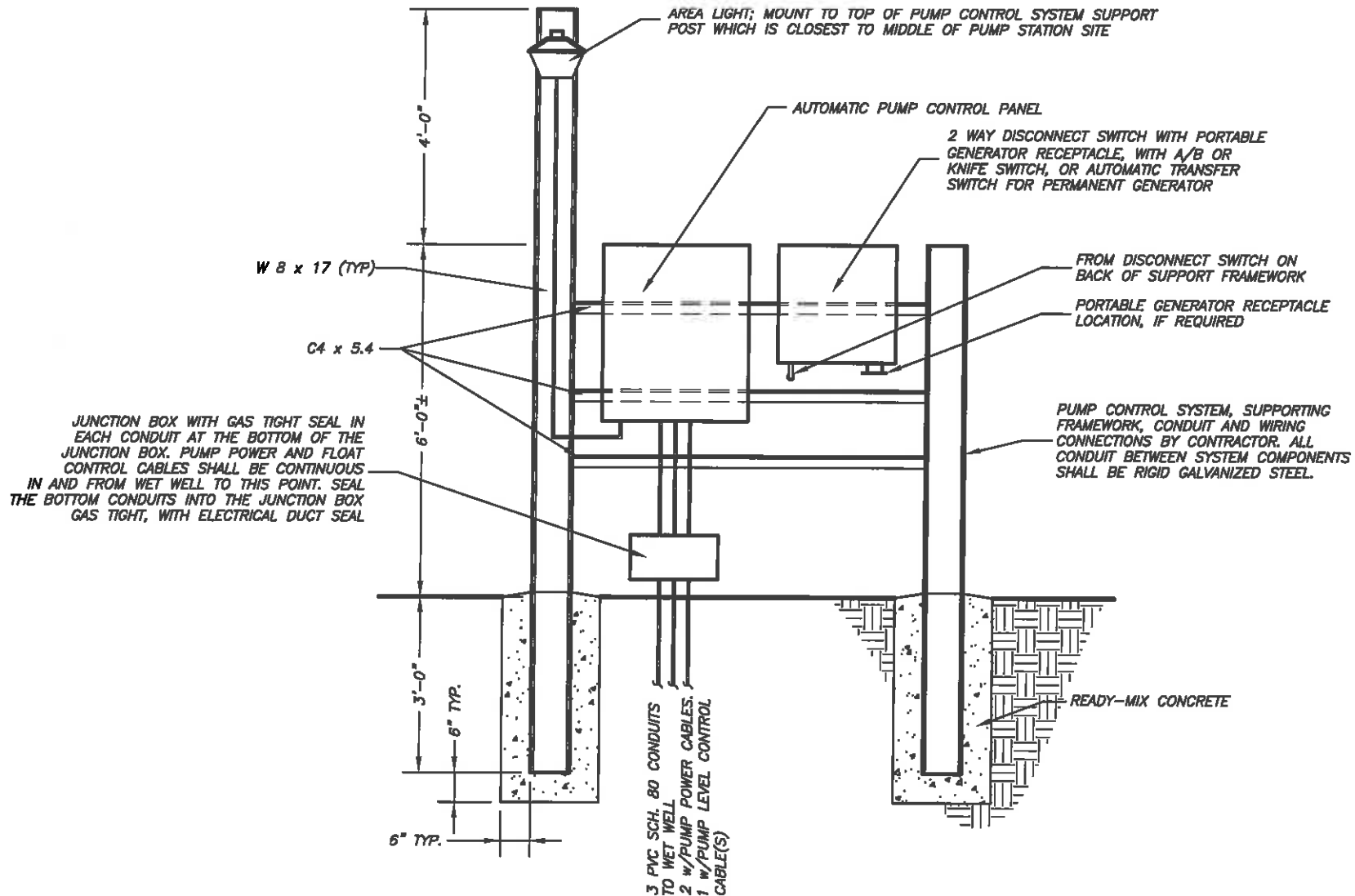
PUMP CONTROL LEVEL FLOAT OR TRANSDUCER CABLE SUPPORT

SCALE: NONE



NOTCH PLAN

SCALE: NONE

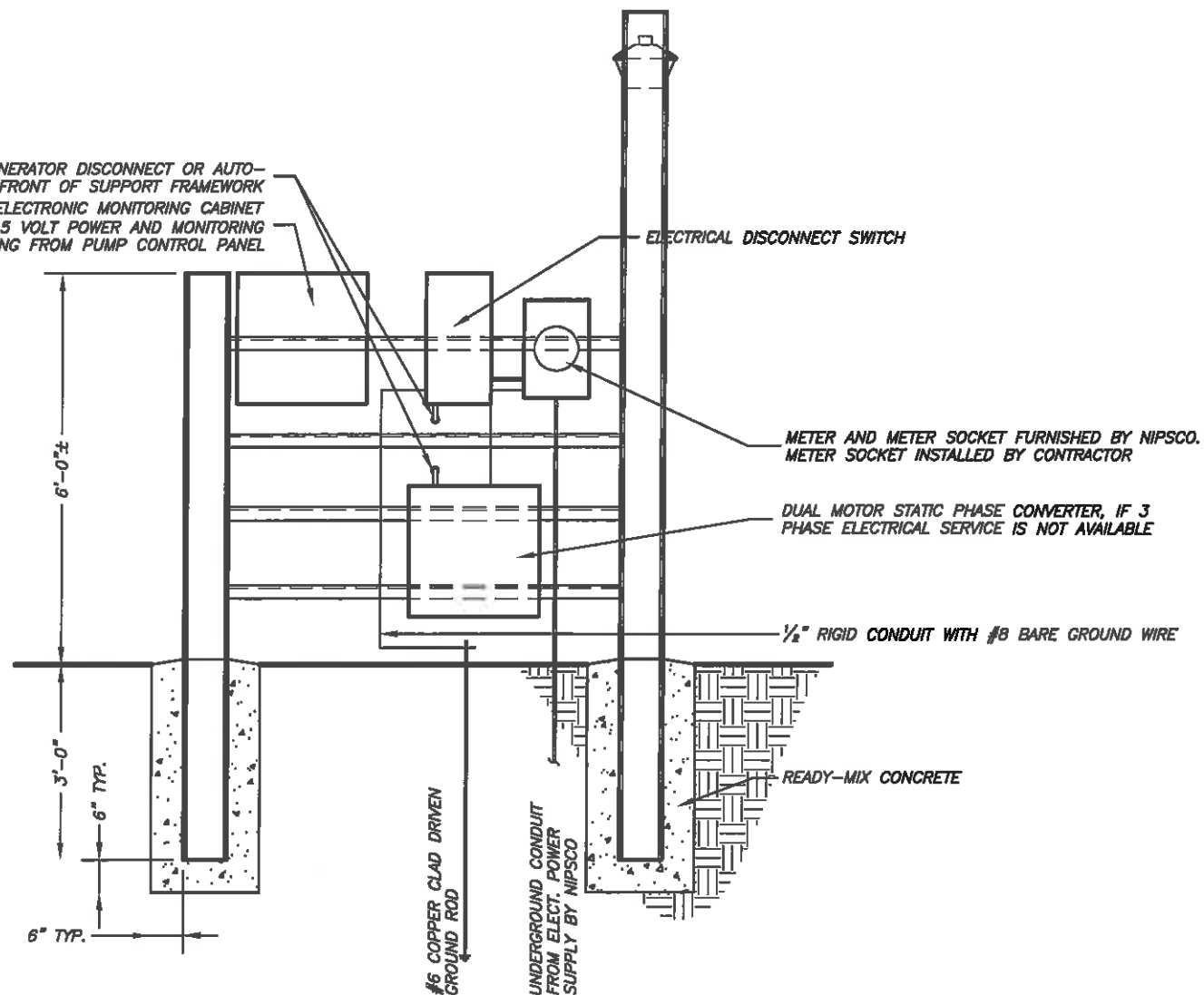


AUTOMATIC PUMP CONTROLS

SCALE: $\frac{3}{8}" = 1'-0"$

(FRONT VIEW)

TO AND FROM GENERATOR DISCONNECT OR AUTO-
TRANSFER SWITCH ON FRONT OF SUPPORT FRAMEWORK
MISSION ELECTRONIC MONITORING CABINET
w/ 115 VOLT POWER AND MONITORING
WIRING FROM PUMP CONTROL PANEL

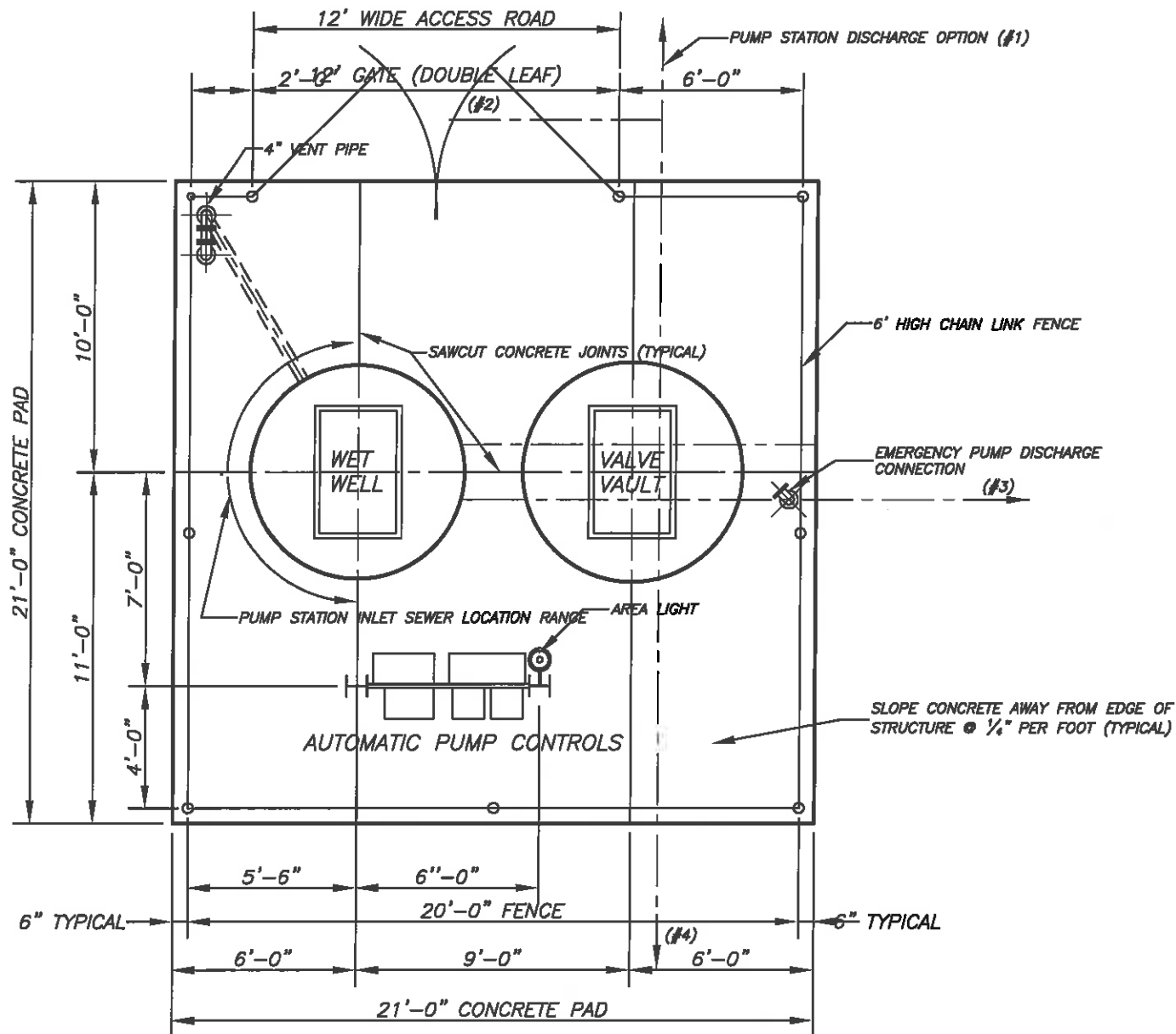


AUTOMATIC PUMP CONTROLS

SCALE: $\frac{3}{8}" = 1'-0"$

(BACK VIEW)

LIFT STATION STANDARDS
SANITARY DISTRICT OF MICHIGAN CITY
DRAWING 5 OF 8



PUMP STATION SITE PLAN

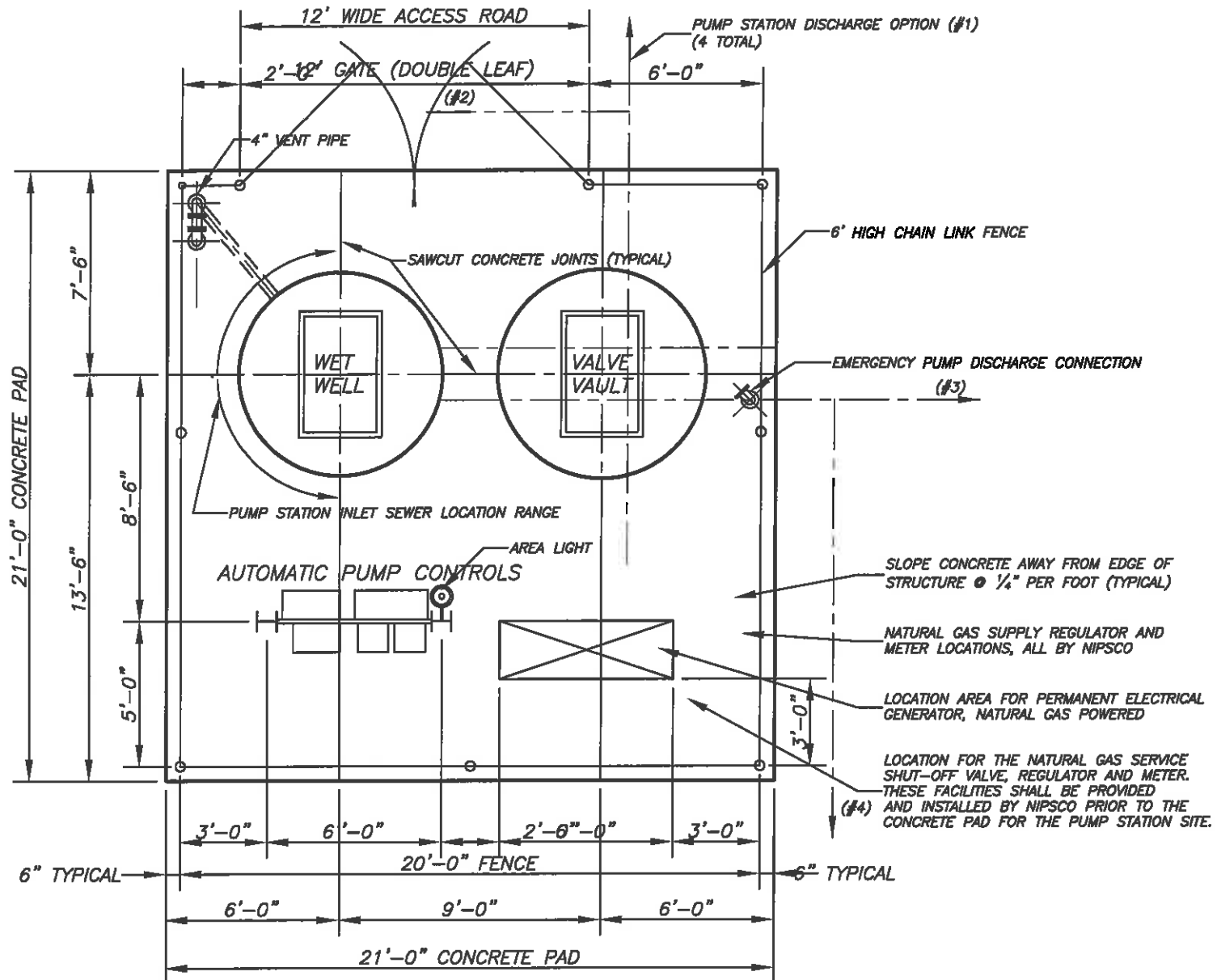
(MINIMUM SIZE) WITHOUT PERMANENT ELECTRICAL GENERATOR

SCALE: $\frac{3}{16}" = 1'-0"$

LIFT STATION STANDARDS

SANITARY DISTRICT OF MICHIGAN CITY

DRAWING 6 OF 8

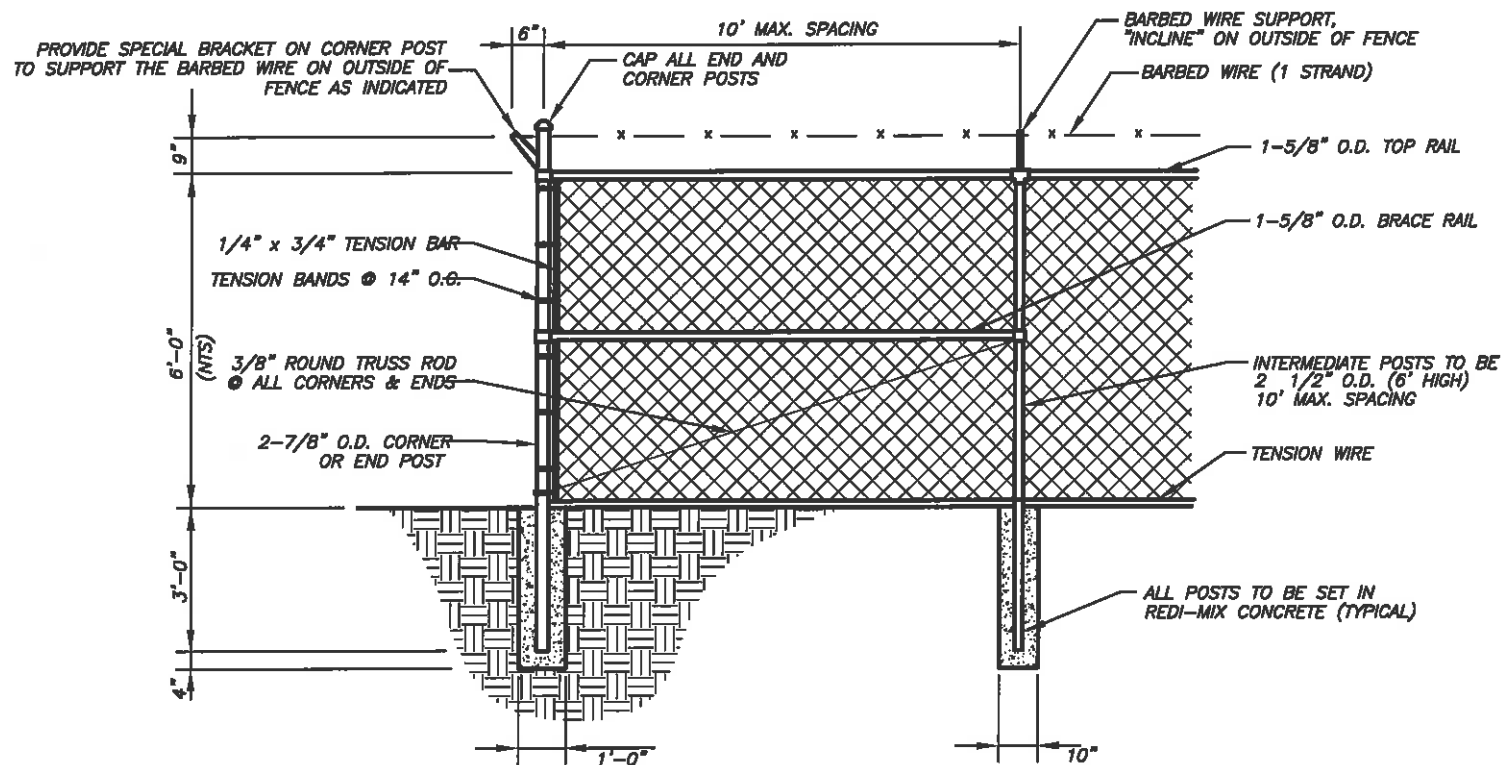


PUMP STATION SITE PLAN

(MINIMUM SIZE) WITH PERMANENT ELECTRICAL GENERATOR

SCALE: 3/16"=1'-0"

LIFT STATION STANDARDS
SANITARY DISTRICT OF MICHIGAN CITY
DRAWING 7 OF 8

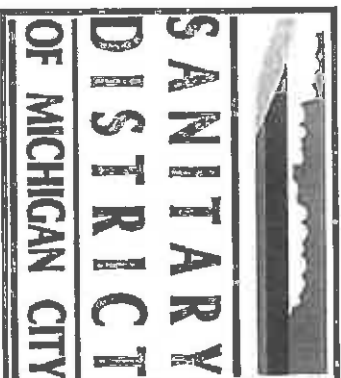


FENCE DETAIL

SCALE: 3/8"=1'-0"

LIFT STATION STANDARDS
SANITARY DISTRICT OF MICHIGAN CITY
DRAWING 8 OF 8

EXHIBIT A



SANITARY SEWER SPECIFICATIONS
(Approved 10-3-2012)

GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Furnish and install materials and equipment required to complete the installation of the sanitary collection piping and appurtenances indicated on the Drawings.

1.03 DEFINITIONS

- A. Regulatory agencies and their standards are referenced by abbreviation as follows:

1.	American National Standards Institute.....	ANSI
2.	American Society for Testing and Materials.....	ASTM
3.	American Water Works Association.....	AWWA
4.	Indiana Administrative Code	IAC
5.	Indiana Department of Environmental Management	IDEM

- B. Materials and product information are referenced by abbreviations as follows:

1.	Ductile Iron Pipe.....	DIP
2.	Polyvinyl Chloride	PVC
3.	High-Density Polyethylene	HDPE
4.	Inner Diameter	I.D.
5.	Outer Diameter	O.D.
6.	Standard Dimension Ratio.....	SDR

- C. Flexible Pipe: Pipes manufactured from plastics such as PVC and HDPE.

- D. Non-Flexible Pipe: Pipes manufactured from rigid or semi-rigid materials including, reinforced concrete and ductile iron.

EXHIBIT A

1.04 PERFORMANCE REQUIREMENTS

- A. Provide materials, equipment, and labor to produce piping systems as indicated on the Drawings and as specified herein.

- 1. Sanitary Sewer Gravity Service Piping

1.05 SUBMITTALS

- A. Shop Drawings and Manufacturer's Product Data for the following standards, except where more stringent requirements are indicated.

- 1. Pipe
 - 2. Flexible Couplings
 - 3. Manholes
 - 4. Manhole Frames and Covers
 - 5. Manhole Steps
 - 6. Cleanouts

1.06 QUALITY ASSURANCE

A. General

- 1. Examine each piece of pipe before installing. Remove all defective material from the site. Ductile iron pipe is to be rung with a light hammer to detect cracks.

B. Testing Requirements for Gravity Sanitary Sewers

- 1. Prior to performing tests, the Contractor shall do the following:

- a. As-Built Drawings must be on file at the Michigan City Sanitary District Wastewater Treatment Facility Administration Office at least three (3) business days prior to testing. These drawings must include all manholes, pipes and lateral locations installed as part of the project. The Contractor must provide proper documentation on official letterhead including a detailed list of material, invert elevations and total lengths installed.

- 2. In accordance with 327 IAC 3-6-19 (d), all gravity sewer pipe shall be tested for infiltration/exfiltration using one of the standard methods, listed below in preferential order.

- a. Low Pressure Air Test – Preferred test method for all sewer pipe materials other than concrete. (Refer to Paragraph C below.)
 - b. Water Infiltration Test (Weir Test) – Preferred test method for concrete sewers. Alternate test method for other sewer pipe materials when the Low Pressure Air Test is failed. (Refer to Paragraph D below.)
 - c. Water Exfiltration Test – Alternate test method for all sewer pipe materials when the Low Pressure Air Test is failed and environmental conditions do not allow for the Water Infiltration Test. (Refer to Paragraph E below.)

EXHIBIT A

3. All proposed sewers constructed of flexible pipe and truss pipe shall be tested for deflection according to the standard method described in Paragraph F below.
4. Test Limits
 - a. Infiltration/Exfiltration shall not exceed 100 gallons per inch of pipe diameter per mile per day (100 gpd/in/mi).
 - b. Deflection shall not exceed 5% of the inside pipe diameter.
5. Test Scheduling
 - a. Infiltration/Exfiltration shall be tested within 15 days after installation and under the supervision of the Michigan City Sanitary District.
 - b. Deflection shall be tested within 45 days but no sooner than 30 days after final backfill has been placed.
6. Test Results
 - a. Test results shall be submitted to the Michigan City Sanitary District within three (3) months of completion of construction.
 - b. If the above limits are exceeded, the Contractor shall, at his own expense, remove and reconstruct as much of the defective work as is necessary to obtain a passing system.
 - c. Regardless of the test results, the Contractor shall, at his own expense, remove and reconstruct any portion of the system exhibiting visible leaks or other obvious flaws.
7. Responsibility for Testing
 - a. All testing of the installed sanitary sewer system shall be the responsibility of the Contractor, unless otherwise noted.
 - b. The Contractor shall furnish, install, and operate all necessary equipment and materials.
 - c. The Contractor shall notify the Owner and the City Engineer at least three (3) business days prior to any testing.
 - d. The Contractor shall provide all water for testing.
- C. Low Pressure Air Test
 1. The Low Pressure Air Test shall be conducted in accordance with the requirements of the applicable ASTM standard.
 - a. For plastic pipe, refer to ASTM F1417.

EXHIBIT A

2. Leakage shall be determined by the inability to stabilize test pressure.

D. Water Infiltration Test (Weir Test)

1. A minimum two (2) feet of static head must be maintained above the sewer throughout the course of testing. If the groundwater level is insufficient, this shall be achieved by flooding the trench, if possible. Otherwise, a Water Exfiltration Test shall be conducted.
2. The infiltrated flow of water shall be measured by means of a weir set up in the inside of the sewer a known distance from a temporary bulkhead or other limiting point of infiltration, after the sewer has been pumped out. The test shall last for a minimum of four hours, with readings at 30-minute intervals.
3. A segment of sewer shall be deemed acceptable if it passes the Water Infiltration Test, even if it has failed the Low Pressure Air Test.

E. Water Exfiltration Test

1. Leakage shall be determined by constructing a bulkhead in the sewer at the lower end of the section under test, and filling the section being tested with water to a level two (2) feet above the crown of the sewer in the manhole at the upper end of the test section. Leakage will be the measured amount of water added to maintain the water at that level. The test shall last for a minimum of four hours, with readings at 30-minute intervals.
2. A segment of sewer shall be deemed acceptable if it passes the Water Exfiltration Test, even if it has failed the Low Pressure Air Test.

F. Deflection Test for Flexible Pipe

1. The deflection of all flexible pipe shall be determined after the final backfill has been in place for at least thirty (30) days in accordance with test procedures from the pipe manufacturer and AWWA standards. No pipe shall experience a vertical deflection (reduction in vertical inside diameter) of more than five percent (5%).
2. If the deflection test is to be run using a rigid ball or mandrel, it shall have a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices.
3. Deflection tests are not necessary for pipe identified as non-flexible. (See Section 1.03 – "Definitions".)

G. Negative Air Pressure (Vacuum) Test for Concrete Manholes

1. All manholes shall be visually inspected after assembly and backfilling for evidence of leakage. Manholes that show evidence of leakage shall be replaced by the Contractor at his own expense and re-inspected until satisfactory.
2. All manholes installed shall be subjected to a Vacuum Test in accordance with the requirements of ASTM C 1244.

EXHIBIT A

H. Inspection

1. All pipe and manhole installations are subject to inspection by the City Engineer of Michigan City, the Michigan City Sanitary District, and civil authorities having jurisdiction.

I. Separation of Sewer and Water

1. Separation of sewer and water piping, structures, and appurtenances must comply with 327 IAC 3-6-9 and with applicable IDEM Standards.
2. Parallel Installation
 - a. Normal Conditions
 - (1) Water lines shall be at least 10 feet horizontally from any existing or proposed sewer lines and at least 8 feet horizontally from any existing or proposed sewer manholes, whenever possible. These distances shall be measured edge to edge.
 - b. Unusual Conditions
 - (1) When local conditions prevent a horizontal separation as described above for parallel installation under normal conditions, then maximum horizontal separation shall be provided with a vertical separation such that the bottom of the water line is at least 18 inches above the top of the sewer. The water line shall be laid in a separate trench or on an undisturbed earth shelf to one side of the sewer.
3. Crossing
 - a. Normal Conditions:
 - (1) When water lines and sewer lines cross, a vertical clearance of at least 18 inches shall be provided, whenever possible, between the edges of either pipe, and the water line should be above the sewer line. In instances where such separation is not possible, the sewer line will need to meet water grade piping specifications.
 - (2) One full length of water pipe shall be placed at the crossing such that maximum separation is achieved between either pipe joint and the sewer.
 - (3) The above conditions must be maintained for a minimum distance of 10 feet on either side of the water line, measured edge to edge.

EXHIBIT A

- (4) All sewer pipe joints within 10 feet of the outside edge of the water line must be compression type joints.

- b. Unusual Conditions

- (1) When local conditions prevent a vertical separation as described above for crossing under normal conditions, then the sewer must be constructed of waterworks grade ductile iron pipe, pressure rated to 150 psi, with compression type joints, in accordance with Part 2 of this section.

- 4. No water line shall pass through or come in contact with any part of a sewer or sewer manhole.

1.07 JOB CONDITIONS

- A. The Contractor is responsible for site conditions and no extra cost will be allowed for failure to visit the site and ascertain existing conditions.

1.08 EXCAVATION, BEDDING AND BACKFILL

- A. Excavation, bedding and backfill shall be as specified as shown on the Drawings.

1.09 REQUIREMENTS OF REGULATORY AGENCIES

- A. All sanitary sewer utility work must conform to the requirements of the Michigan City Sanitary District, and the applicable rules and regulations of the Indiana Department of Environmental Management (IDEM), and federal and local agencies.
- B. In every case the latest formally adopted version of the applicable standards shall be used.
- C. The Contractor shall secure all necessary permits and approvals and shall assume any associated costs and fees.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Sanitary Sewer Piping

- 1. Sanitary sewer gravity pipe shall be selected in accordance with the pipe schedule below, unless otherwise indicated on the drawings. The X's designate acceptable standard dimension ratios (SDR) and pressure classes for given depths of bury.

EXHIBIT A

SANITARY SEWER GRAVITY PIPE SCHEDULE

Depth (ft.)	Ductile Iron Pipe (Pressure Class)	PVC Pipe SDR	
	350	35	26
0-14	X	X	X
14-19	X		X
19-24	X		

2. Polyvinyl Chloride (PVC) Plastic Pipe
 - a. Polyvinyl chloride (PVC) gravity piping shall be constructed of polyvinyl chloride (PVC) sewer pipe and fittings in accordance with the requirements of ASTM D 3034. Pipes shall be joined with integral bells and bell and spigot type rubber gaskets. Joints shall conform to ASTM D 3212. Gaskets shall conform to ASTM F 477.
3. Polyvinyl Chloride (PVC) Corrugated Sewer Pipe
 - a. Polyvinyl chloride (PVC) corrugated sewer piping with smooth interior and fittings shall meet the requirements of ASTM F 949.
- B. Mechanical Couplings
 1. Flexible couplings shall be of a gasketed, sleeve type. Each coupling shall consist of a steel middle ring, two steel followers, two rubber compound wedge section gaskets, and a galvanized track having sufficient steel bolts to properly compress the gaskets. Couplings shall be manufactured by Dresser Manufacturing Company, Rockwell International, or an approved equal.
- C. Flanged Adapters
 1. Flanged adapters for joining plain-end-pipe to flanged items shall be 128 or 127 as manufactured by Dresser Manufacturing Division of Dresser Industries or Rockwell International, Type 912 or 913, Uniflange or approved equal.
- D. Cleanouts
 1. Cleanouts shall be constructed in accordance with the details for the type and size of sewer indicated on the Drawings.
- E. Manholes
 1. Manholes shall be constructed in accordance with the details for the type and size of manhole indicated on the Drawings.
 2. Manhole frames and covers shall be provided in accordance with the details for the type of frame and cover indicated on the Drawings.

EXHIBIT A

3. Manholes shall be constructed in accordance with ASTM C 478, with joints meeting the requirements of ASTM C 443.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Depth of Cover Over Sewer Pipe

1. Depth of cover over sewer pipe shall be as shown on the plans, but in no case shall be less than four (4) feet.

B. Laying Pipe

1. Take all precautions necessary to insure that pipe, fittings, and related items are not damaged in unloading, handling, and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged material.
2. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. Close ends of in-place pipe at the end of any work period to prevent entry of animals and foreign material.
3. Bed pipe as specified by the manufacturer and as shown on the Drawings.
4. Gravity lines must be laid at a constant and uniform slope from the beginning of the line to its end. The constant and uniform slope shall be maintained through all manholes.
5. Do not lay pipe when weather or trench conditions are unsuitable.
6. Underground detectable warning tape shall be placed above the sewer approximately three (3) feet below finished grade. Tape to be two (2) inches wide, metallic lined, with the wording "CAUTION SEWER LINE BURIED BELOW" continuously printed, as manufactured by the Seton Name Plate Corp. (New Haven, Connecticut) or approved equal.

C. Gravity Lines

1. Lay gravity sewers so that true alignment and grade, as indicated on the Drawings, are maintained. All sewer pipes shall be laid using a laser beam method to control alignment. All sewer pipes shall be laid true to both horizontal and vertical alignment, and will be subject to review by the Project Representative. After completion the pipe shall exhibit a 100% full circle of light when lighted at one manhole and viewed from the next. Pipes that do not "Lamp" shall be removed and re-laid to a true line and grade. An Owner's representative must be present for viewing the lamping of each segment.
2. Commence laying gravity sewers at the lowest point on a section of line and lay pipe with the bell ends uphill.

EXHIBIT A

3. Prior to making pipe joints on gravity sewer lines, clean and dry all surfaces of joint pipe and jointing material. Use lubricants, primers, adhesives and similar materials as recommended by the manufacturers. Place, fit, join and adjust the jointing materials or factory-fabricated joints as recommended by the manufacturer to obtain the degree of water tightness required. As soon as possible, after the joint is made, place sufficient backfill material, as in accordance with manufacturers recommendation with the pipe and on the Drawings along each side of the pipe to resist forces that might tend to move the pipe off line and off grade.

4. Backfill shall be in accordance with pipe manufacturer's recommendation and on the Drawings. Place backfill over the pipe immediately after the pipe has been laid.

D. Joint Assembly

1. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joint pipe to remove oil, grit, excess coating, and other foreign matter. Flex the rubber gasket and insert it in the gasket recess of the bell socket. Apply a thin film of gasket lubricant, as supplied by the pipe manufacturer, to either the gasket or the spigot end of the joining pipe.
2. Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jacked type device. Field-cut pipe shall be filed on the cut end to match the manufactured spigot end.

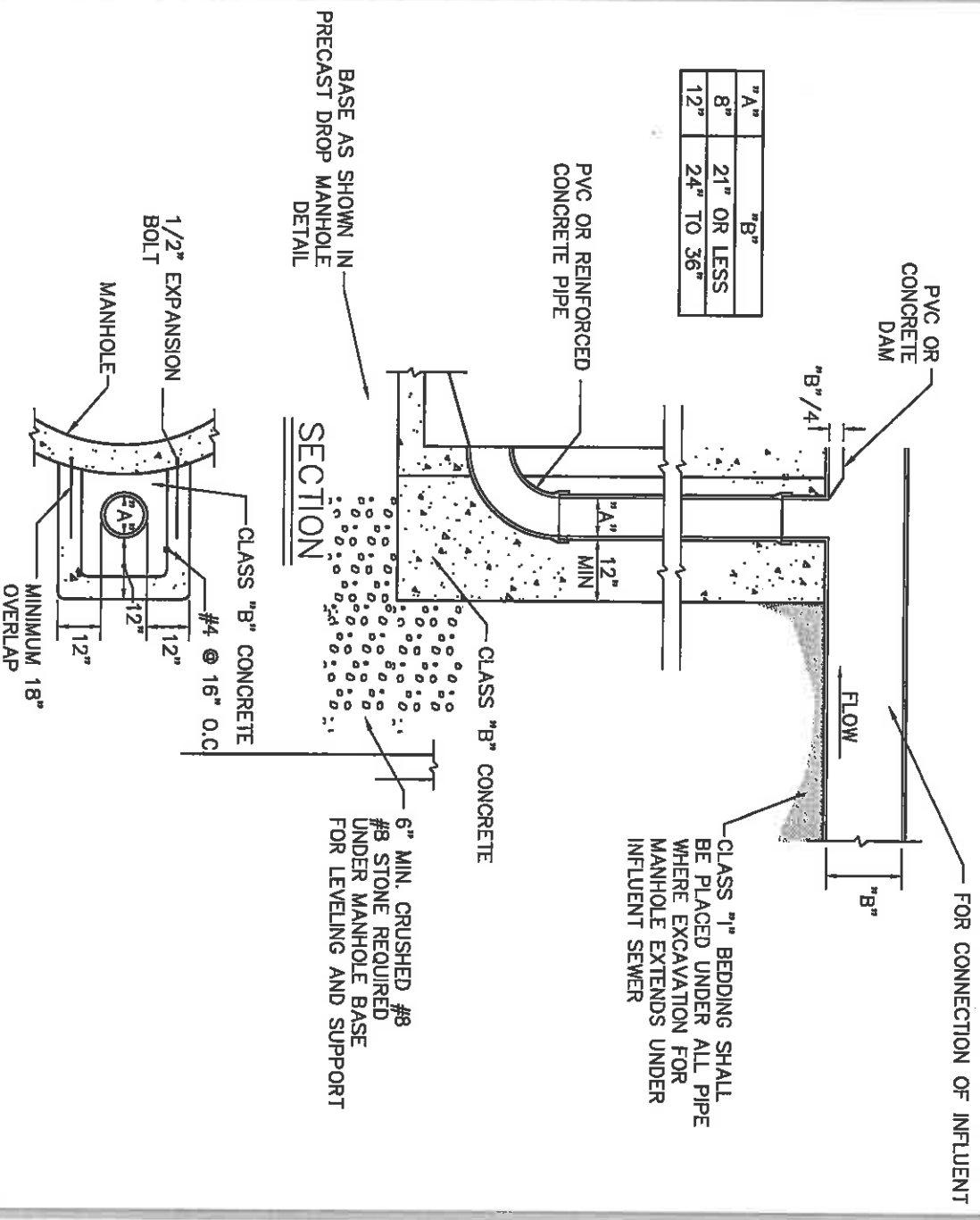
3.02 CONNECTION TO THE MICHIGAN CITY SANITARY DISTRICT SEWER SYSTEM

- A. Notice shall be given to the Michigan City Sanitary District at least three (3) business days before any connection to the City's sewer system is to be made.

3.03 PAVEMENT, CURB & SIDEWALK REPLACEMENT

- A. All pavement, curbs or sidewalks (or other structures) damaged or removed during the course of the work performed by the contractor and/or subcontractors must be replaced to a condition equal to or better than its condition at the time it was damaged, removed, or replaced. Additionally, any improvements must be made to such pavement, curbs or sidewalks (or other structures) in accordance with any ADA Standards or other applicable rules and/or regulations.

²² A ²³	²² B ²³
8 ²²	21 ²² OR LESS
12 ²²	24 ²² TO 36 ²²



SECTION PLAN

CAST-IN-PLACE DROP PIPE DETAILS

SANITARY DISTRICT OF MICHIGAN CITY

STANDARD CONSTRUCTION DETAILS