

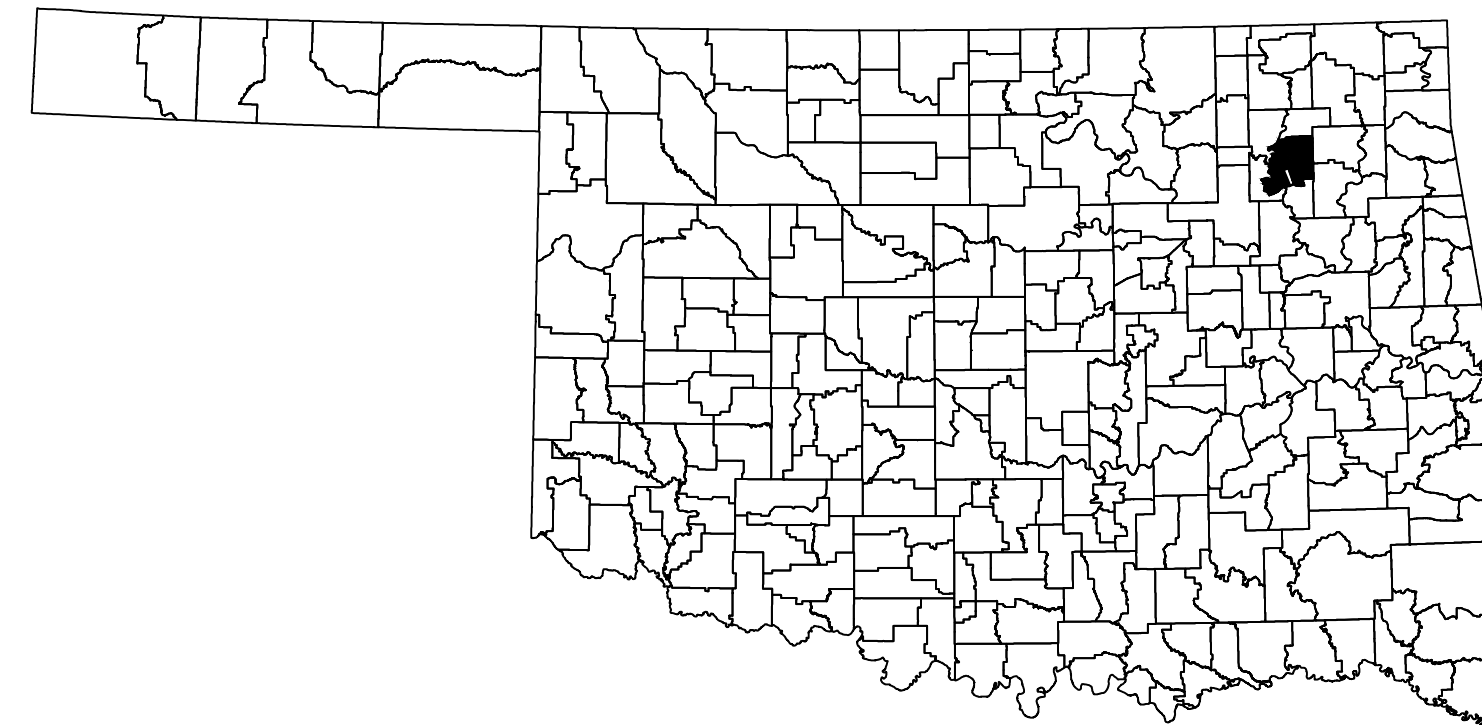
PRIVATE GRAVITY AND PRESSURE SANITARY SEWER EXTENSIONS

FOR WILL ROGERS DOWNS KOA

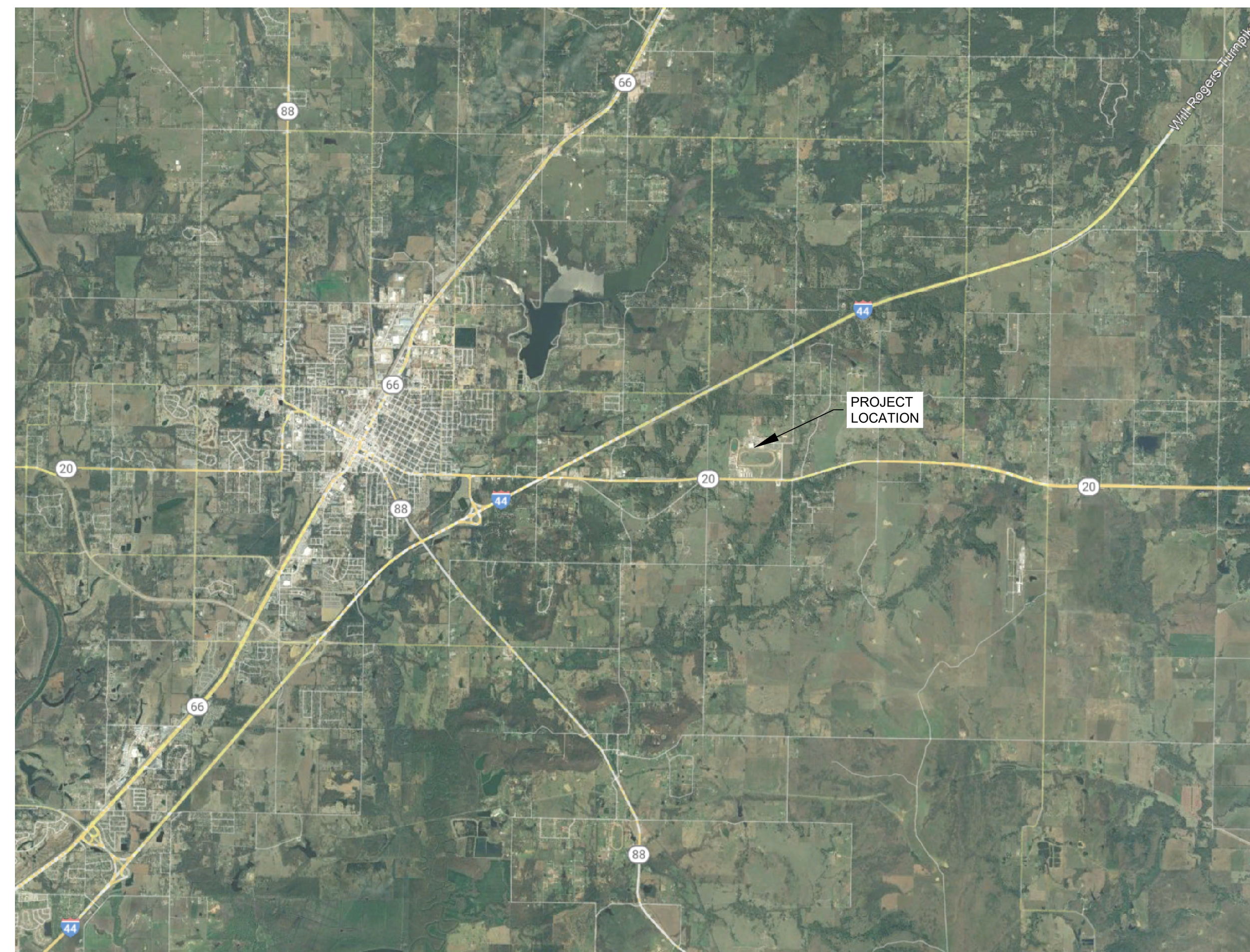
CHEROKEE NATION ENTERTAINMENT

ROGERS COUNTY, OKLAHOMA

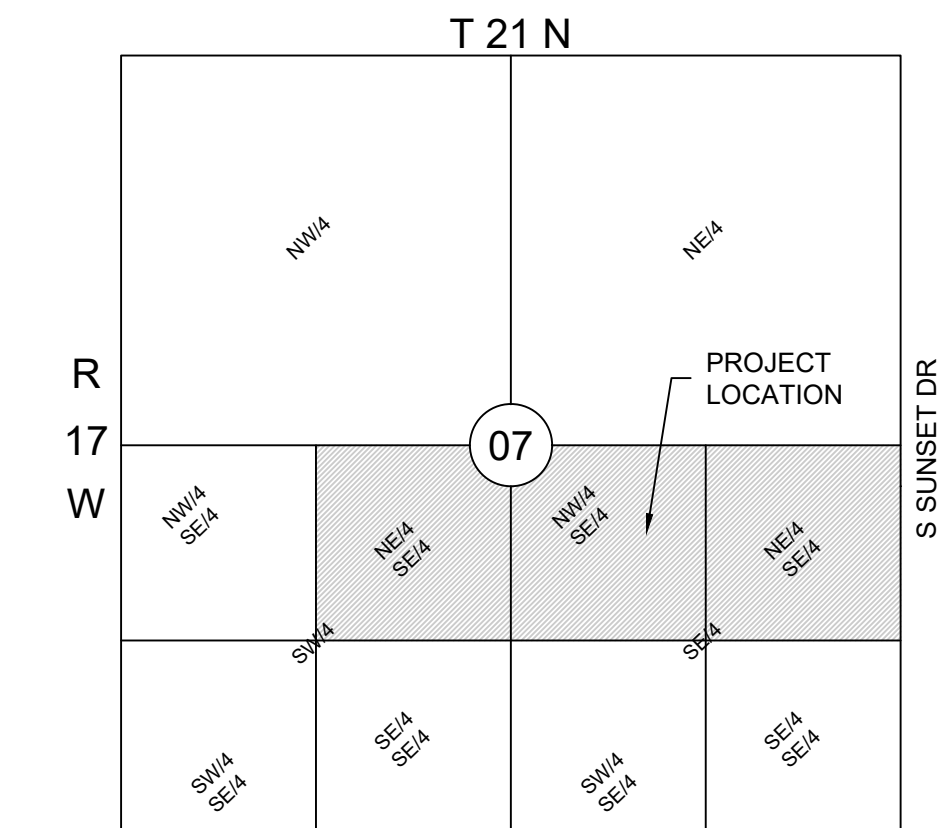
NOVEMBER 2024



VICINITY MAP
NOT TO SCALE
ROGERS COUNTY, OK



PROJECT LOCATION MAP
NOT TO SCALE



SECTION LOCATION MAP
NOT TO SCALE
ROGERS COUNTY, OK

CONTACTS

OWNER
CHEROKEE NATION ENTERTAINMENT
MARK WATOWICH
777 W CHEROKEE ST
CATOOSA, OK 74015
918-828-6291

SITE CONTACT
CHEROKEE NATION ENTERTAINMENT
STEPHEN GOODELL
20900 S 4200 RD
CLAREMORE, OK 74019
918-621-7103

SURVEYOR
OSBURN LAND SURVEYORS
KELLY OSBURN
P.O. BOX 1406
SALLISAW, OK 74955
918-775-9322

CIVIL ENGINEERING
KAS GALES COMPANY
ZAK JOHNSTON
155 FANTINEL DR
SUITE D
TONTITOWN, AR 72762
501-454-3038

WATER DEPARTMENT
CITY OF CLAREMORE
724 W RAMM RD
CLAREMORE, OK 74017
918-341-0457

SHEET LIST

- C000 COVER SHEET
- C001 SPECIFICATIONS
- C100 OVERALL SITE PLAN - WEST
- C101 OVERALL SITE PLAN - EAST
- C200 SEWER PROFILE
- C201 SEWER PROFILE
- C201 SEWER PROFILE
- C201 SEWER PROFILE
- C500 LIFT STATION PLAN AND DETAIL
- C501 STANDARD SEWER DETAILS

ESTIMATED QUANTITIES FOR LIFT STATION, GRAVITY SEWER, AND FORCEMAIN

ITEM	DESCRIPTION	UNIT	QUANTITY
1	4" SDR-26 PVC Sewer Main	LF	1,570
2	6" SDR-26 PVC Sewer Main	LF	1,994
3	8" SDR-26 PVC Sewer Main	LF	2,616
4	4" Sch 40 Sanitary Service Line	LF	9,569
5	3" Sch 80 Force Main	LF	101
6	Two-Way Sanitary Clean Out	EA	4
7	Sanitary Manhole, 4' Diameter	EA	18
8	Sanitary Service Wye, 4"x4", Installed	EA	55
9	Sanitary Service Wye, 8"x4", Installed	EA	90
10	Sanitary Service Wye, 8"x4", Installed	EA	49
11	Sanitary RV Hookup	EA	194
12	Sanitary RV Dump Station	EA	1
13	Concrete Roadway T-Patch	SY	22
14	Aggregate Stone Drive Surface, 6" Depth	SY	1,065
15	Lift Station Package	EA	1

BENCHMARK TABLE

Point #	Raw Description	Elevation	Northing	Easting
1	CP PRIMARY OPUS BM1	640.420	487070.7200	2696437.9800
2	CP BM2 NEC CONC SAFE ROOM PAD MAG SPIKE	644.368	487326.6740	2696486.1080
4	CP BM4 SET MAG NWC PAD	651.019	487595.5070	2696249.1230
3	CP BM3 MAG SPIKE SEC ASPHALT PARKING	643.549	487091.0880	2695785.8590

LEGEND

	FOUND MONUMENT		FENCE
	FIRE HYDRANT		EDGE OF PAVEMENT
	FROST FREE YARD HYDRANT		RIGHT OF WAY
	WATER VALVE		ROAD CENTERLINE
	POWER POLE		CURB AND GUTTER
	GUY WIRE		EXISTING EASEMENT LINE
	EXISTING SANITARY SEWER MANHOLE		PROPOSED EASEMENT LINE
	STREET LIGHT		EXISTING STORM SEWER
	ELECTRIC HOOKUP PANEL		EXISTING SANITARY SEWER
	EXISTING SANITARY HOOKUP		EXISTING WATER LINE
	PROPOSED SANITARY HOOKUP		PROPOSED SANITARY SEWER
	BENCHMARK		PROPOSED SANITARY SERVICE LINE
			PROPOSED UNDERGROUND ELECTRIC
			PROPOSED ASPHALT PAVEMENT
			PROPOSED CONCRETE SIDEWALK (HOME BUILDER)
			PROPOSED SANITARY SEWER MANHOLE
			PROPOSED SANITARY CLEANOUT
			UTILITY EASEMENT
			DRAINAGE EASEMENT
			BUILDING SETBACK LINE
			POINT OF BEGINNING

SEWER CONSTRUCTION NOTES:

- THE CONTRACTOR SHALL SET ALL LINE AND GRADE STAKES
- THE RV SERVICE LATERALS ARE TO BE LOCATED AS DIRECTED BY THE ENGINEER
- THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES FOR LOCATION OF ALL UTILITY SERVICES BEFORE BEGINNING EXCAVATION.
- THE CONTRACTOR, AT THIS OWN EXPENSE, SHALL REMOVE AND RESET ALL FENCES, POSTS, CULVERTS, STREET MARKERS, MAILBOXES, AND THE LIKE WITHIN THE LIMITS OF THE PROPOSED IMPROVEMENTS
- ALL TRENCHES UNDER DRIVES AND STREETS MUST BE BACKFILLED WITH BASEROCK AND COMPACTED TO 95% PD.
- ASPHALT AND CONCRETE STREETS AND CURB AND GUTTER SHALL BE RESTORED TO MATCH ORIGINAL CONDITIONS PRIOR TO CONSTRUCTION.
- ALL SEWER LINES SHALL BE AIR TESTED AND ALL MANHOLES SHALL BE VACUUM TESTED.
- ALL SANITARY SEWER PIPE SHALL BE SDR26 UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE ENGINEER WITH ALL SUBMITTALS FOR PIPING, RING AND COVER, MANHOLES AND EXTERNAL SEALANTS FOR THE REVIEW AND APPROVAL PRIOR TO BEGINNING CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE ENGINEER WITH CONSTRUCTION RECORD/AS BUILT DRAWINGS WITH VERIFIED USGS ELEVATIONS AND OKLAHOMA STATE PLANE COORDINATES AT HIS EXPENSE.
- SANITARY LINES SHOWN IN THIS COLOR ARE TO BE DESIGNATED AS SERVICE LINE AND ARE TO BE CONSTRUCTED UNDER OKLAHOMA PLUMBING CODE.



THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

Permit Number: SL000066240874-R
Date Received: December 04 2024

Permit Number: SX000066250011
Date Received: January 07 2025



ENGINEER
KAS Gales Company
Consulting Engineers
18772 Harmon Road
Fayetteville, AR 72704
Wk. 479.361.9977
Cell 479.422.0763
Email: carl.d.gales@gmail.com



ISSUE DATE: 10/02/2024



WILL ROGERS KOA SEWER EXTENSION
CLAYMORE, OK

REVISION:

PROJ: 24-108

COVER
C-000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Lift Station Specifications
- 1.2 SUMMARY
- A. Section Includes:
 1. PVC pipe and fittings.
 2. Nonpressure-type transition couplings.
 3. Pressure-type pipe couplings.
 4. Expansion joints and deflection fittings.
 5. Backwater valves.
 6. Cleanouts.
 7. Encasement for piping.
 8. Manholes.
 9. Concrete.

1.3 DEFINITIONS

- A. The following are industry abbreviations for materials:

EPDM: Ethylene-propylene-diene-monomer rubber. PVC: Polyvinyl chloride plastic.
TPE: Thermoplastic elastomer.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Pipe and fittings.
2. Non-pressure and pressure couplings
3. Expansion joints and deflection fittings.
4. Backwater valves.
5. Cleanouts.

- B. Shop Drawings: For manholes. Include plans, elevations, sections, details, and frames and covers.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings:
 1. Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from sewer system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- B. Product Certificates: For each type of pipe and fitting.
- C. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.

1.7 FIELD CONDITIONS

- A. Interruption of Existing Sanitary Sewerage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 1. Notify Owner no fewer than two days in advance of proposed interruption of service.
 2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

- A. PVC, Schedule 40 and 80 Pipe: ASTM D 1785.
 1. PVC, Schedule 40 and 80 Socket Fittings: ASTM D 2466.
- B. PVC Type PSM Sewer Piping:
 1. Pipe: ASTM D 3034, [SDR 35] [SDR 26], PVC Type PSM sewer pipe with bell-and- spigot ends for gasketed joints, for diameters of 8 inches to 15 inches
 2. Fittings: ASTM D 3034, PVC with bell ends.
 3. Gaskets: ASTM F 477, elastomeric seals.

2.2 NONPRESSURE-TYPE TRANSITION COUPLINGS

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling; for joining underground nonpressure piping. Include ends of same sizes as piping to be joined and include corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
 1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
 2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Nonpressure-Type, Rigid Couplings:
 1. Description: ASTM C 1461, sleeve-type, reducing- or transition-type mechanical coupling; molded from ASTM C 1440, TPE material; with corrosion-resistant-metal tension band and tightening mechanism on each end.

2.3 PRESSURE-TYPE PIPE COUPLINGS

- A. Tubular-Sleeve Couplings: AWWA C219, with center sleeve, gaskets, end rings, and bolt fasteners.
- B. Metal, bolted, sleeve-type, reducing or transition coupling; for joining underground pressure piping. Include 200-psig minimum pressure rating and ends of same sizes as piping to be joined.

C. Center-Sleeve Material: Manufacturer's standard.

- D. Gasket Material: Natural or synthetic rubber.
- E. Metal Component Finish: Corrosion-resistant coating or material.

2.4 EXPANSION JOINTS AND DEFLECTION FITTINGS

- A. Ductile-Iron Expansion Joints:
 1. Description: Three-piece assembly of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110/A21.10 or AWWA C153/A21.53. Include rating for 250-psig minimum working pressure and for expansion indicated.
- B. Ductile-Iron Deflection Fittings:
 1. Description: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110/A21.10 or AWWA C153/A21.53.
 2. Include rating for 250-psig minimum working pressure and for up to 15 degrees of deflection.

2.5 BACKWATER VALVES

- A. Cast-Iron Backwater Valves:
 1. Description: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.
 2. Horizontal type; with swing check valve and hub-and-spigot ends.
 3. Combination horizontal and manual gate-valve type; with swing check valve, integral gate valve, and hub-and-spigot ends.
 4. Terminal type; with bronze seat, swing check valve, and hub inlet.

2.6 CLEANOUTS

- A. Cast-Iron Cleanouts:
 1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside call or spigot connection and countersunk, tapered-thread, brass closure plug.
 2. Top-Loading Classification(s): as indicated on plans and according to section 3.7 below
 3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, east-iron soil pipe and fittings.
- B. PVC Cleanouts:
 1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.7 ENCASUREMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105/A21.5.
- B. Material: Linear low-density polyethylene film of 0.008-inch minimum thickness.
- C. Form: tube.
- D. Color: Black

2.8 MANHOLES

- A. Standard Precast Concrete Manholes
 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
 2. Diameter: 48 inches minimum unless otherwise indicated.
 3. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section; with separate base slab or base section with integral floor.
 5. Riser Sections: 4-inch minimum thickness, of length to provide depth indicated.
 6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated; with top of cone of size that matches grade rings.
 7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
 9. Steps: ASTM A 615, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
 10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.
- B. Designed Precast Concrete Manholes:
 1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44 in AASHTO HL), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
 2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
 3. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 4. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
 5. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP; wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
 6. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser, with 4-inch- minimum-width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "SANITARY SEWER."
2. Material: ASTM A 48/A 48M, Class 35 gray iron unless otherwise indicated.

D. Manhole-Cover Inserts:

1. Description: Manufactured, plastic form, of size to fit between manhole frame and cover and designed to prevent stormwater inflow. Include handle for removal and gasket for gastight sealing.
2. Type: Solid

2.9 CONCRETE

- A. General: Cast-in-place concrete complying with ACI 318, ACI 350, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

- 1. Reinforcing Bars: ASTM A 615, Grade 60 deformed steel.

- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - a. Invert Slope: 2 percent through manhole.
 2. Benches: Concrete, sloped to drain into channel.
 - a. Slope: 8 percent.

- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
 1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed steel.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Standard Details

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details to indicate general location and arrangement of underground sanitary sewer piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe- jacking process of microtunneling, boring or combination of any.
- F. Install gravity-flow, nonpressure, drainage piping according to the following:
 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent unless otherwise indicated.
 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
 3. Install piping with 30-inch minimum cover.
 4. Install piping below frost line.
 5. Install ductile-iron, gravity sewer piping according to ASTM A 746.
 6. Install PVC profile sewer piping according to ASTM D 2321 and ASTM F 1668.
 7. Install PVC Type PSM sewer piping according to ASTM D 2321 and ASTM F 1668.
- G. Install force-main, pressure piping according to the following:
 1. Install piping with restrained joints at tee fittings and at horizontal and vertical changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place-concrete supports or anchors.
 2. Install piping with 36-inch minimum cover.
 3. Install piping below frost line.
 4. Install ductile-iron pressure piping according to AWWA C600 or AWWA M41.

STRUCTURE TABLE (GRAVITY SYSTEM)							
STRUCTURE NAME:	SEWER ALINGMENT:	SEWER STA:	MH SIZE AND RIM ELEV	PIPES IN:	PIPES OUT	NORTHING:	EASTING:
CLEAN OUT 1	SANITARY LINE 3	3+23.04	DIA.: 48" 653.28	NE 6" SDR 26 PVC	S 6" SDR 26 PVC	487684.1114	2695816.1698
CLEAN OUT 2	SANITARY LINE 3	3+51.67	DIA.: 48" 653.66	E 6" SDR 26 PVC	SW 6" SDR 26 PVC	487704.7200	2695836.1698
MH-108	SANITARY LINE 1	0+00.16	DIA.: 48" 639.76	E 8" PVC SDR 26 PVC		487104.3226	2694250.9063
MH 1A	SANITARY LINE 1	3+91.10	DIA.: 48" 637.28	E 8" PVC SDR 26 PVC	W 8" SDR 26 PVC	487044.5275	2694637.2506
MH 1B	SANITARY LINE 1	7+83.14	DIA.: 48" 640.18	E 8" PVC SDR 26 PVC	W 8" SDR 26 PVC	487056.2460	2695029.1092
MH 1C	SANITARY LINE 1	11+77.14	DIA.: 48" 641.33	E 8" PVC SDR 26 PVC	W 8" SDR 26 PVC	487067.9948	2695422.9340
MH 1D	SANITARY LINE 1	15+70.55	DIA.: 48" 642.63	N 8" PVC SDR 26 PVC	W 8" SDR 26 PVC	487079.7842	2695816.1698
MH 1E	SANITARY LINE 1	16+26.16	DIA.: 48" 643.85	N 6" SDR 26 PVC E 8" PVC SDR 26 PVC	S 8" SDR 26 PVC	487135.3881	2695816.2848
MH 1F	SANITARY LINE 1	18+51.84	DIA.: 48" 647.21	E 4" SDR 26 PVC N 6" SDR 26 PVC	S 6" SDR 26 PVC	487361.0697	2695816.1698
MH 1G	SANITARY LINE 1	23+30.87	DIA.: 48" 646.42		W 4" SDR 26 PVC	487375.4251	2696294.9912
MH 2A	SANITARY LINE 2	5+00.26	DIA.: 48" 642.55		W 8" SDR 26 PVC	487149.7709	2696316.3405
MH 3A	SANITARY LINE 3	1+47.52	DIA.: 48" 649.67	N 6" SDR 26 PVC E 4" SDR 26 PVC	S 6" SDR 26 PVC	487508.5906	2695816.1698
MH 3B	SANITARY LINE 3	6+82.27	DIA.: 48" 653.14		W 6" SDR 26 PVC	487714.6272	2696166.6210
MH 4A	SANITARY LINE 4	3+69.85	DIA.: 48" 648.40		W 4" SDR 26 PVC	487519.6860	2696185.8564

5. Install ductile-iron special fittings according to AWWA C600.
 6. Install PVC pressure piping according to AWWA M23 or to ASTM D 2774 and ASTM F 1668.
 7. Install PVC water-service piping according to ASTM D 2774 and ASTM F 1668.
- H. Install corrosion-protection piping encasement over the following underground metal piping according to ASTM A 674 or AWWA C105/A21.5:
 1. Ductile-iron pipe and fittings.
 2. Expansion joints and deflection fittings.
 - I. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, nonpressure, drainage piping according to the following:
 1. Join ductile-iron, gravity sewer piping according to AWWA C600 or AWWA M41 for push-on joints.
 2. Join PVC profile sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
 3. Join PVC Type PSM sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 4. Join PVC gravity sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasket joints.
 5. Join dissimilar pipe materials with nonpressure-type, rigid couplings.
- B. Join force-main, pressure piping according to the following:
 1. Join ductile-iron pressure piping according to AWWA C600 or AWWA M41 for push-on joints.
 2. Join ductile-iron special fittings according to AWWA C600 or AWWA M41 for push-on joints.
 3. Join PVC pressure piping according to AWWA M23 for gasketed joints.
 4. Join dissimilar pipe materials with pressure-type couplings.

- C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
 1. Use pressure pipe couplings for force-main joints.

3.4 MANHOLE INSTALLATION

- A. General: Install manholes complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Install FRP manholes according to manufacturer's written instructions.
- D. Form continuous concrete channels and benches between inlets and outlet.
- E. Set tops of frames and covers flush with finished surface of manholes that occur in pavements.
- F. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.
- G. Install manhole-cover inserts in frame and immediately below cover.

3.5 CONCRETE PLACEMENT

- A. Place cast-in-place concrete according to ACI 318.

3.6 BACKWATER VALVE INSTALLATION

- A. Install horizontal-type backwater valves in piping manholes or pits.
- B. Install combination horizontal and manual gate-type valves in piping and in manholes.
- C. Install terminal-type backwater valves on end of piping and in manholes. Secure units to sidewalls.

3.7 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts, and use cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads .
- B. Set cleanout frames and covers in earth in cast-in-place-concrete block, 12 by 12 by 6 inches deep. Set with tops 1 inch above surrounding grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.8 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of, and be flush with, inside wall unless otherwise indicated. On outside of pipe or manhole wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
 4. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.9 CLOSING ABANDONED SANITARY SEWER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 1. Close open ends of piping with at least 8-inch- thick, bulkheads made from flowable fill.

2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes: Excavate around manhole as required and use either procedure below:
 1. Remove manhole and close open ends of remaining piping.
 2. Remove top of manhole down to at least 36 inches below final grade. Close open ends of piping. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
 - C. Backfill to grade according to Construction Details.

3.10 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 1. Submit separate report for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to requirements of authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
 5. Hydrostatic Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction and the following:
 - a. Fill sewer piping with water. Test with pressure of at least 10-foot head of water, and maintain such pressure without leakage for at least 15 minutes.
 - b. Allowable leakage is maximum of 50 gal./inch of nominal pipe size per mile of pipe, during 24-hour period.
 - c. Close openings in system and fill with water.
 - d. Purge air and refill with water.
 - e. Disconnect water supply.
 - f. Test and inspect joints for leaks.
 6. Air Tests: Test sanitary sewerage according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
 - a. Test plastic gravity sewer piping according to ASTM F 1417.
 7. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than 1-1/2 times the maximum system operating pressure, but not less than 150 psig.
 - a. Ductile-Iron Piping: Test according to AWWA C600
 - b. PVC Piping: Test according to AWWA M23
 8. Manholes: Perform hydraulic test according to ASTM C 969.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.11 CLEANING

- A. Clean dirt and superfluous material from interior of piping. Flush with potable water.



ENGINEER
KAS Gales Company
Consulting Engineers
18772 Harmon Road
Fayetteville, AR 72704
Wk. 479.361.9977
Cell 479.422.0763
Email: carl.d.gales@gmail.com



ISSUE DATE: 10/02/2024



WILL ROGERS KOA SEWER EXTENSION
CLAYMORE, OK

REVISION:



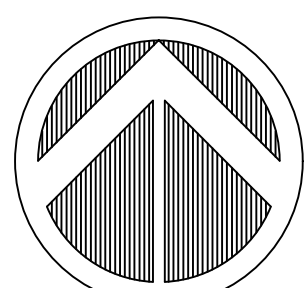
ENGINEER
 KAS Gales Company
 Consulting Engineers
 18772 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com



ISSUE DATE: 10/02/2024



WEST ZONE



NORTH
SCALE



CHEROKEE NATION ENTERTAINMENT LLC
 PARCEL #660006457
 20900 S 4200 RD
 74019-4295

WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

REVISION:

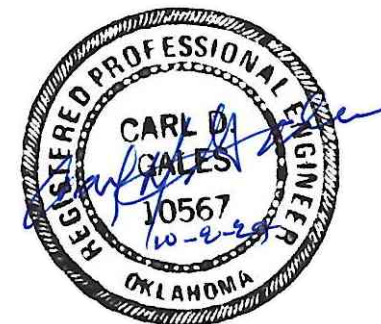
PROJ: 24-108

OVERALL WEST
C-100

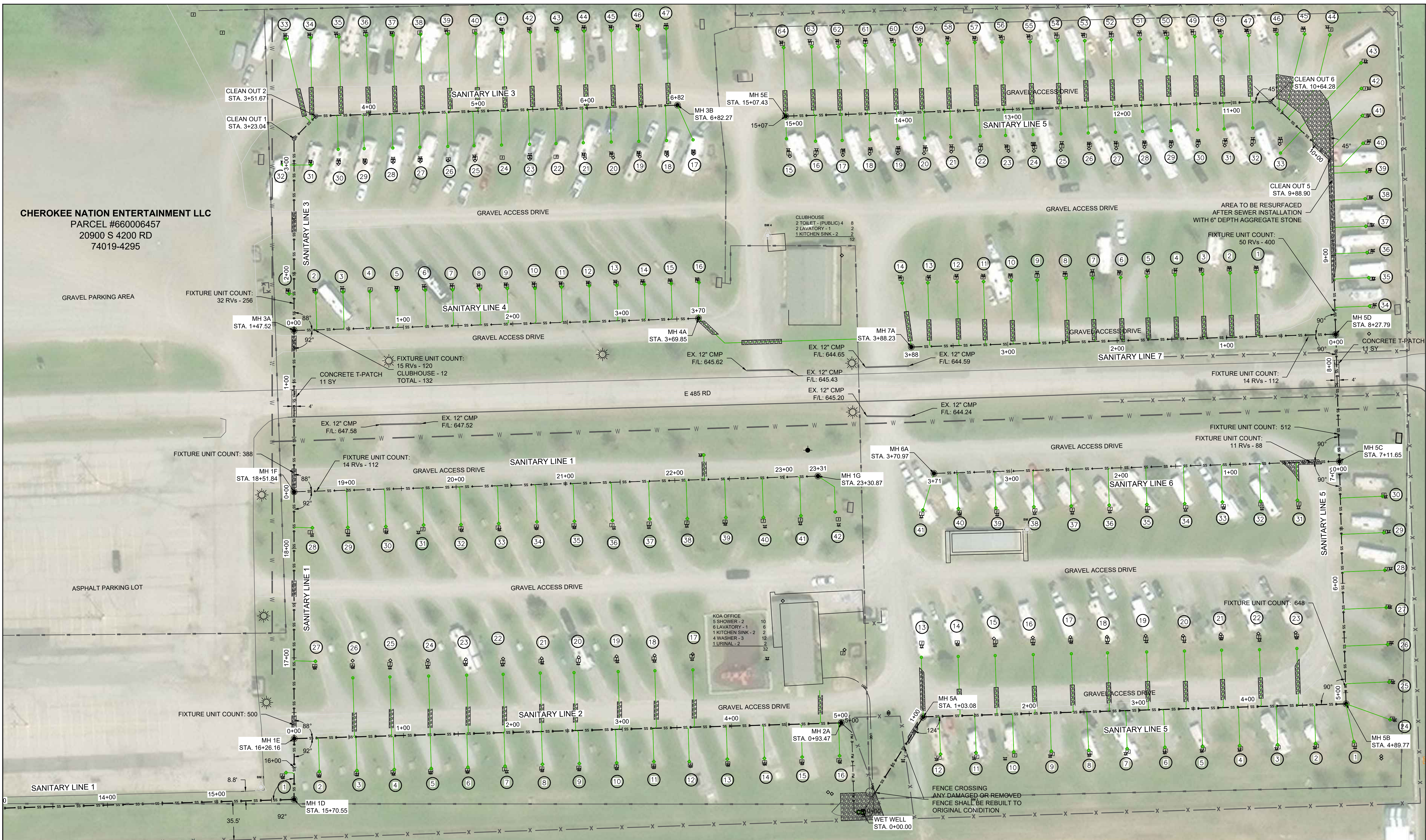
CHEROKEE NATION ENTERTAINMENT LLC
 PARCEL #660006457
 20900 S 4200 RD
 74019-4295



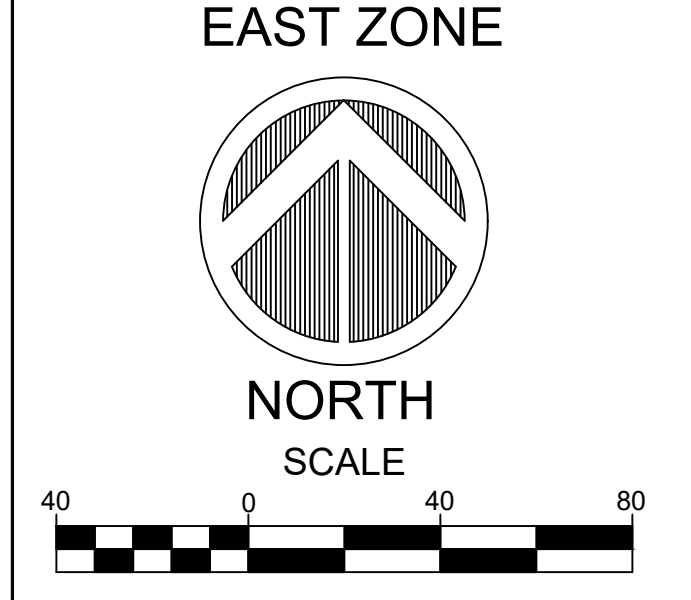
ENGINEER
 KAS Gales Company
 Consulting Engineers
 18772 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com



ISSUE DATE: 10/02/2024



EXACT LOCATION OF EXISTING UTILITIES IS UNKNOWN DUE TO LIMITED MARKINGS. LOCATION SHOWN IS APPROXIMATE. HAND DIGGING IS EXPECTED TO BE NECESSARY IN THE KOA AREA.

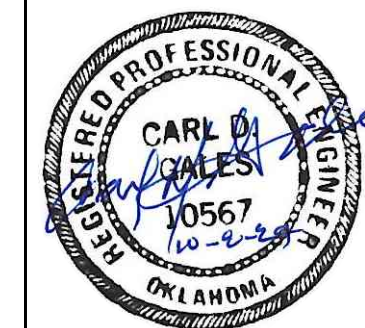


WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

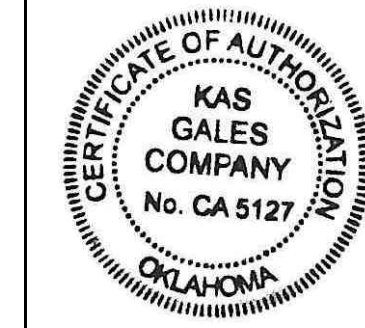
REVISION:
 PROJ: 24-108
 OVERALL EAST
C-101



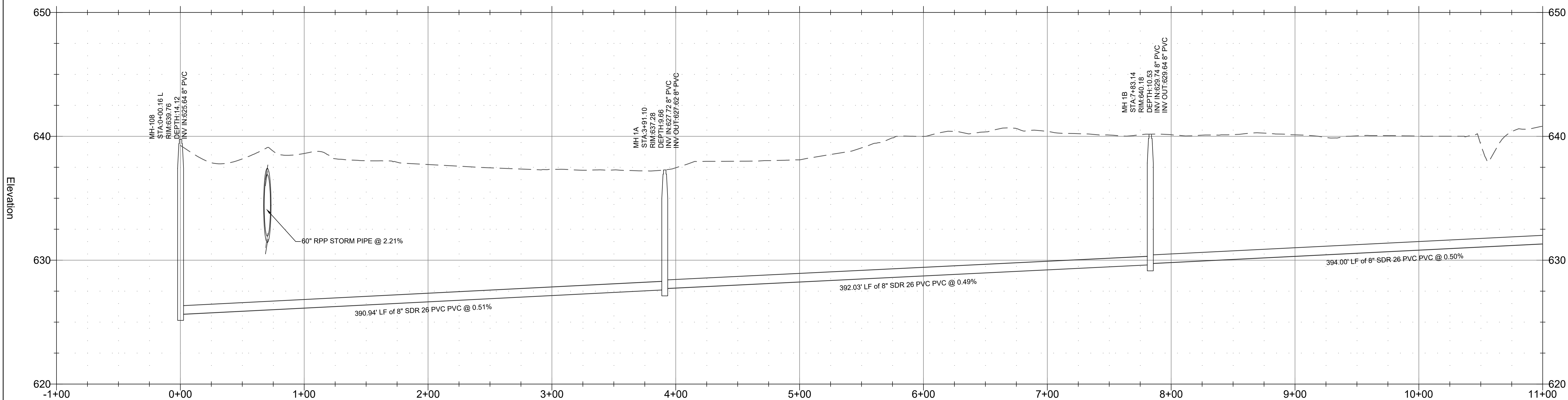
ENGINEER
KAS Gales Company
Consulting Engineers
18772 Harmon Road
Fayetteville, AR 72704
Wk. 479.361.9977
Cell 479.422.0763
Email: carl.d.gales@gmail.com



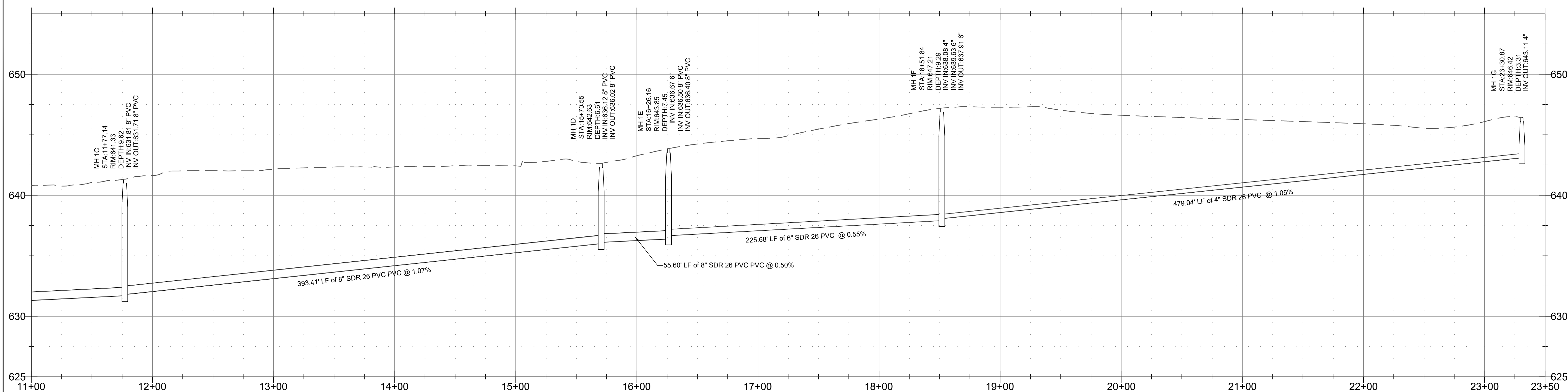
ISSUE DATE: 10/02/2024



SANITARY LINE 1 PROFILE
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'



SANITARY LINE 1 PROFILE
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'



WILL ROGERS KOA SEWER EXTENSION
CLAYMORE, OK

REVISION:

PROJ: 24-108

SANITARY P&P
C-200



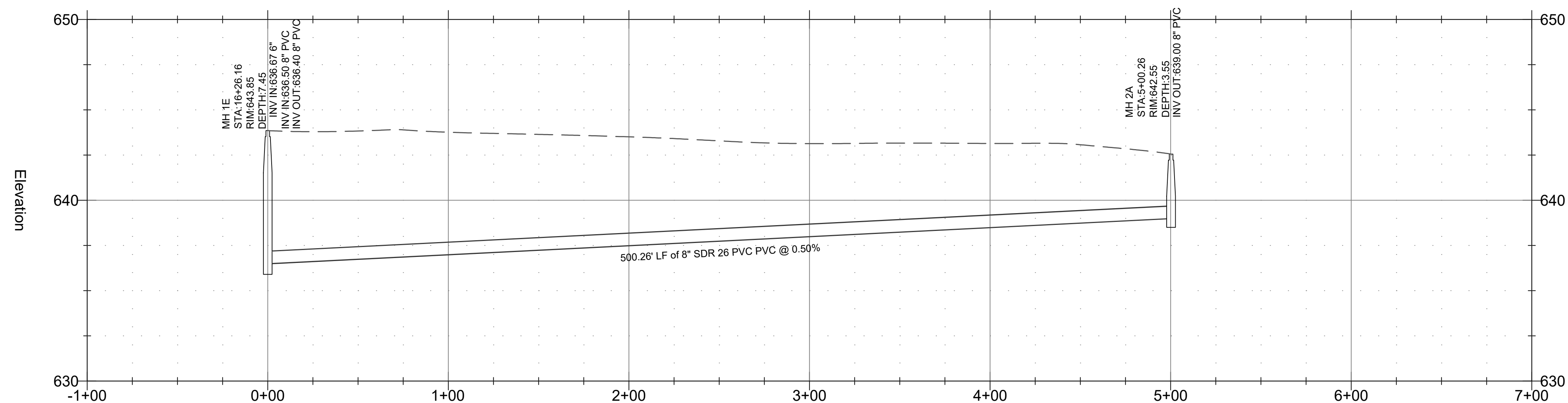
ENGINEER
 KAS Gales Company
 Consulting Engineers
 18772 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com



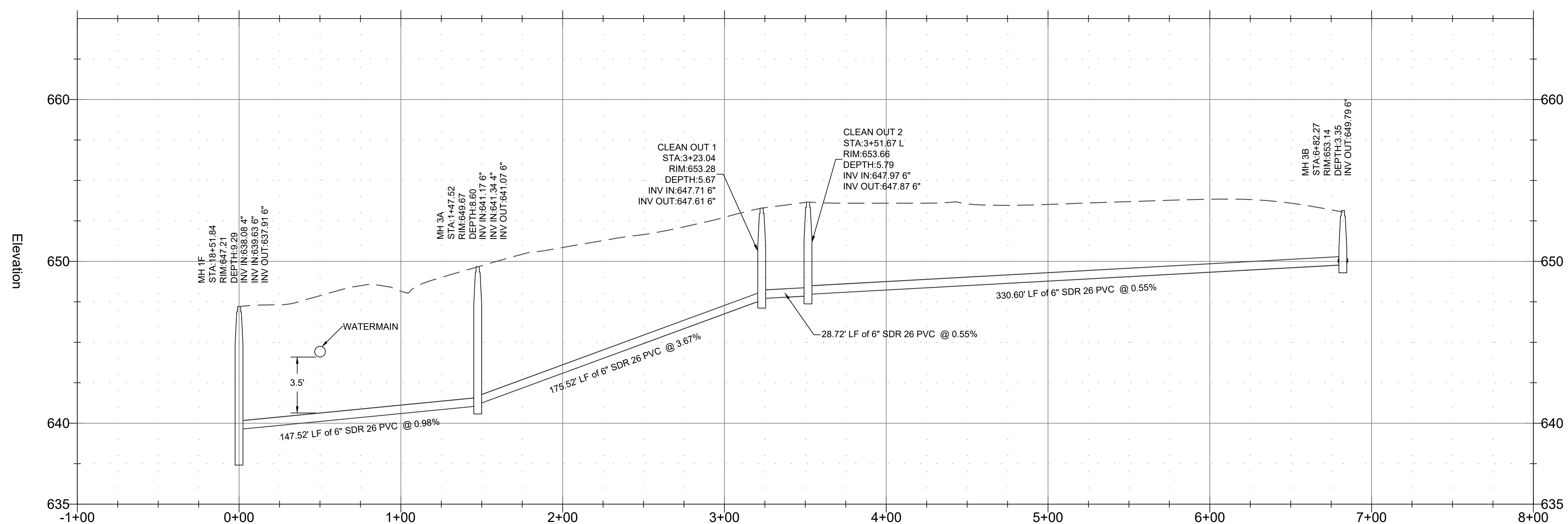
ISSUE DATE: 10/02/2024



SANITARY LINE 2 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



SANITARY LINE 3 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



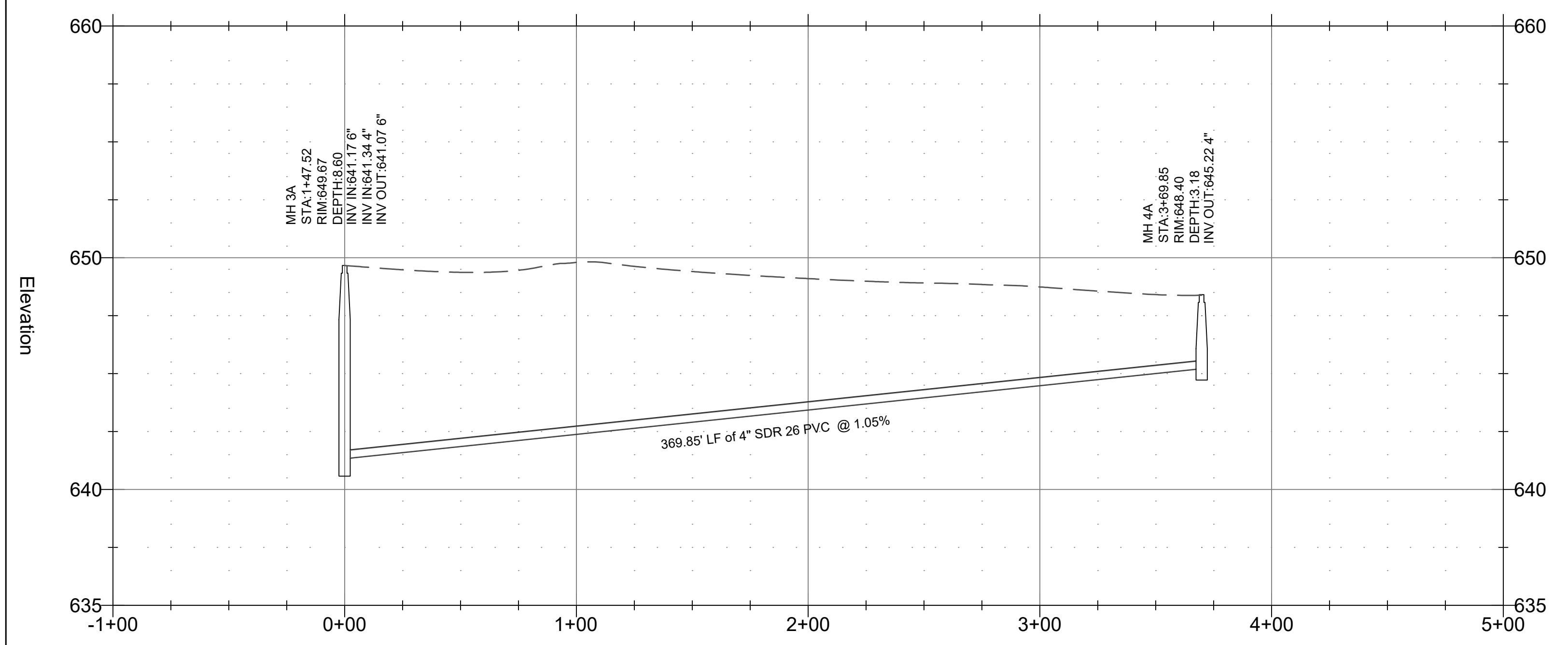
REVISION:

PROJ: 24-108

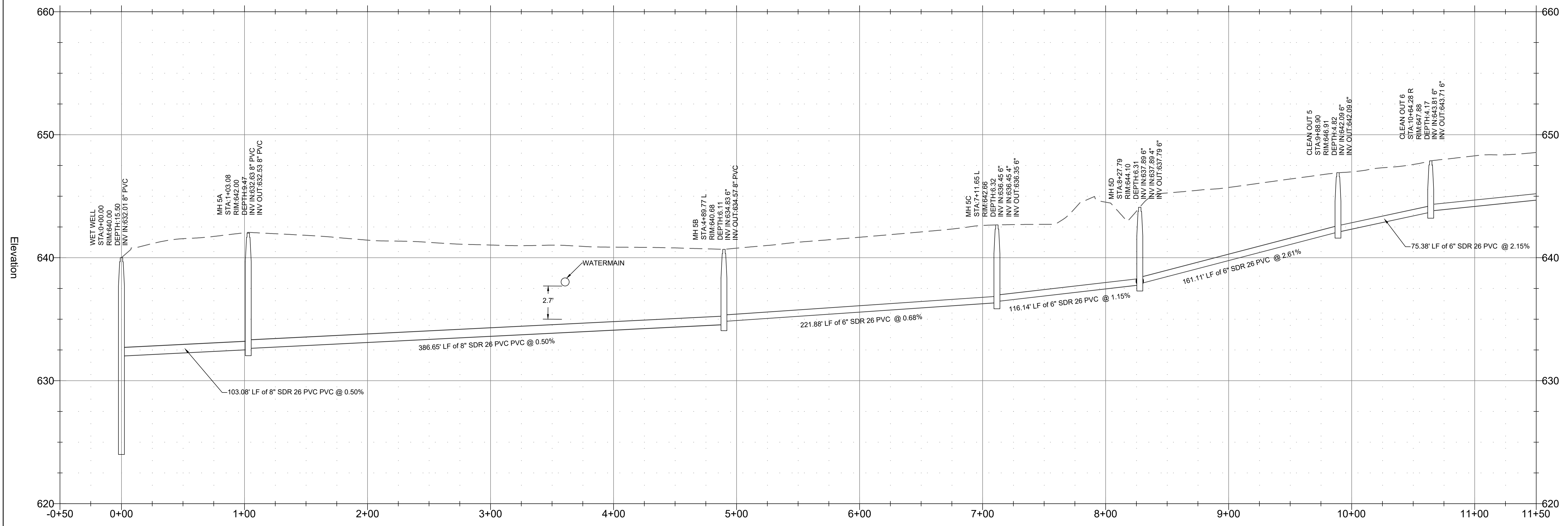
SANITARY P&P
 C-201

WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

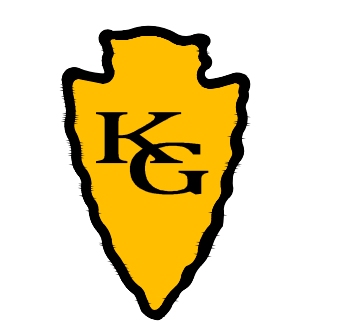
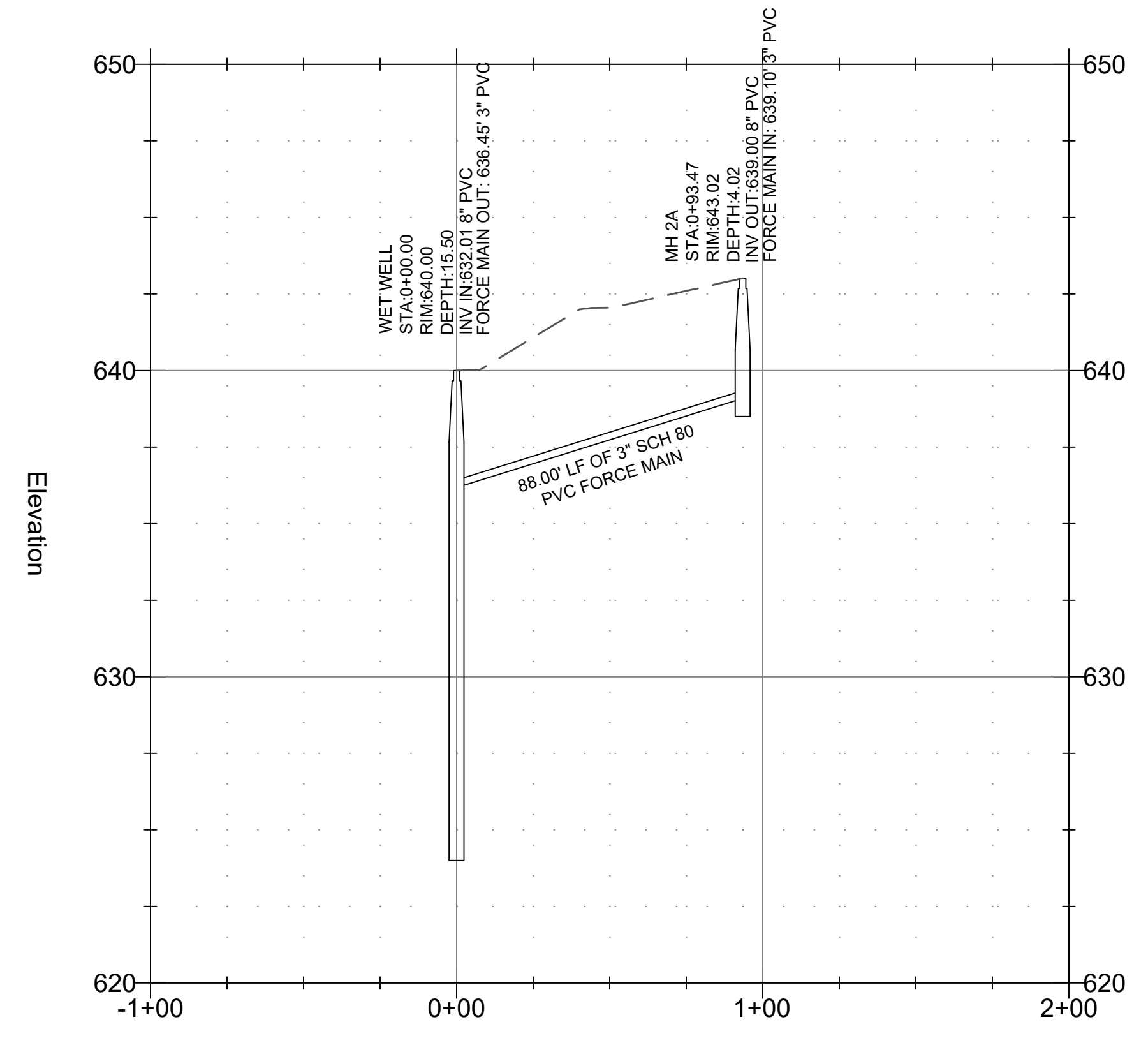
SANITARY LINE 4 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



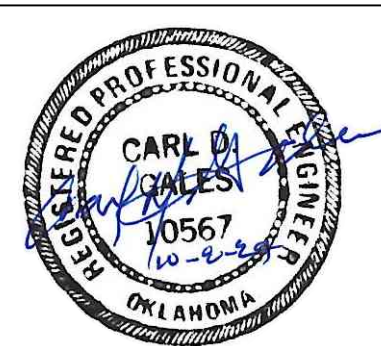
SANITARY LINE 5 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



FORCE MAIN PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



ENGINEER
 KAS Gales Company
 Consulting Engineers
 1872 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com



ISSUE DATE: 10/02/2024



WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

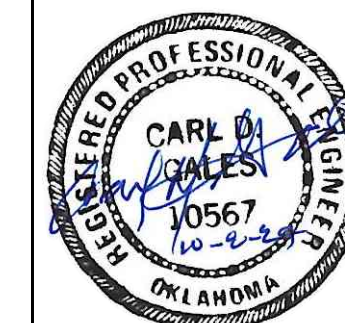
REVISION:

PROJ: 24-108

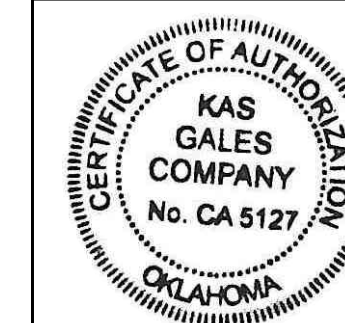
SANITARY P&P
C-202



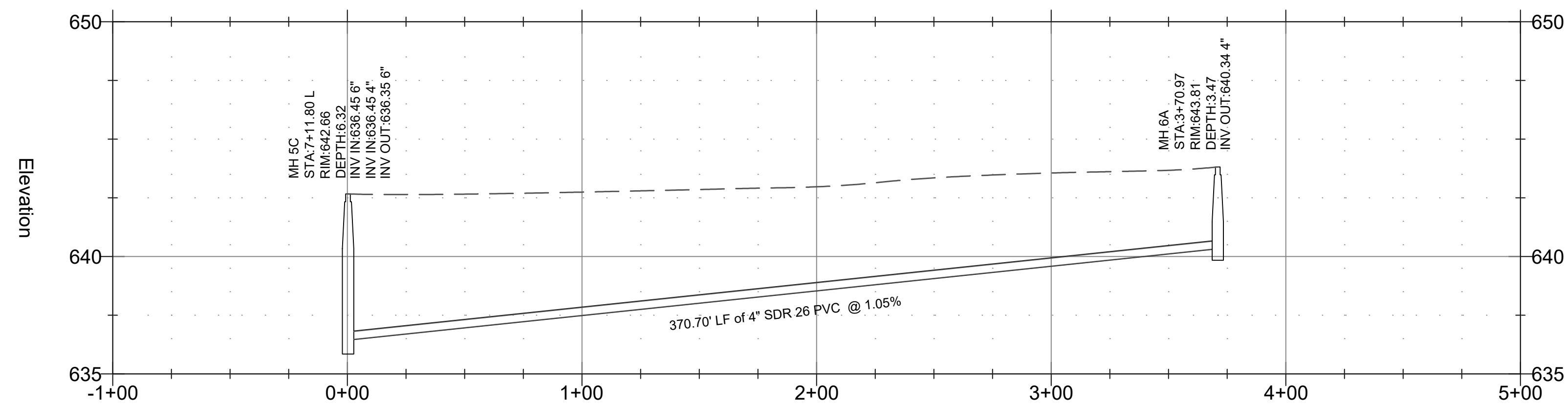
ENGINEER
 KAS Gales Company
 Consulting Engineers
 18772 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com



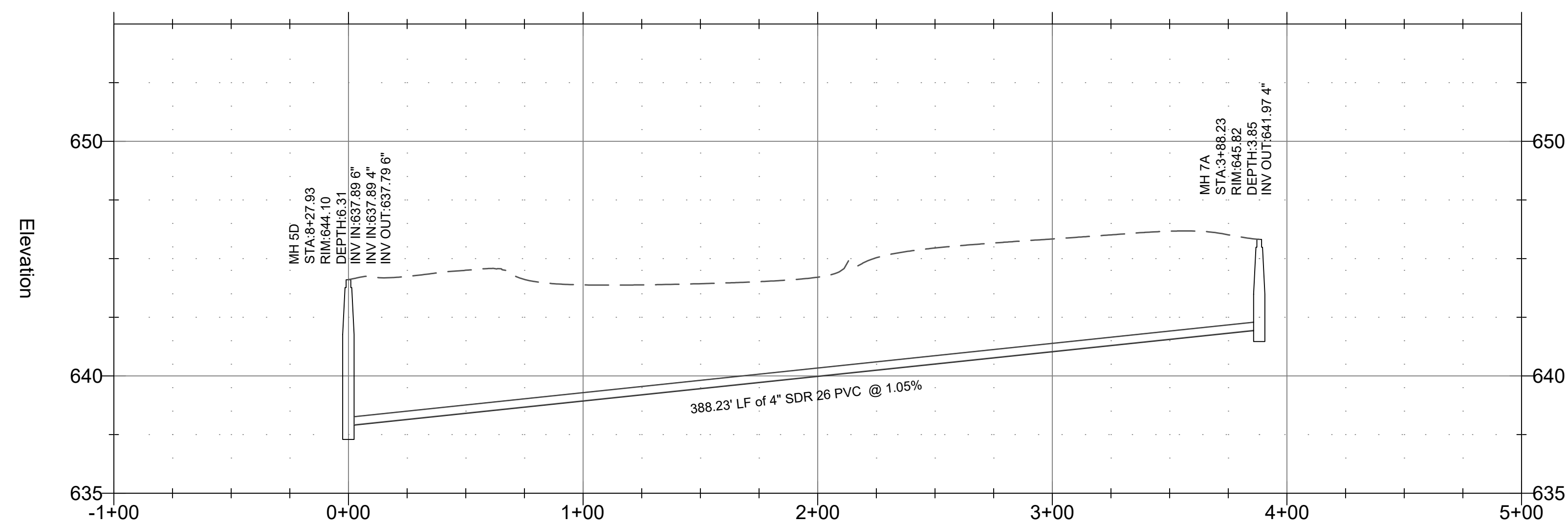
ISSUE DATE: 10/02/2024



SANITARY LINE 6 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



SANITARY LINE 7 PROFILE
 HORIZONTAL SCALE: 1"=40'
 VERTICAL SCALE: 1"=4'



WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

REVISION:

PROJ: 24-108

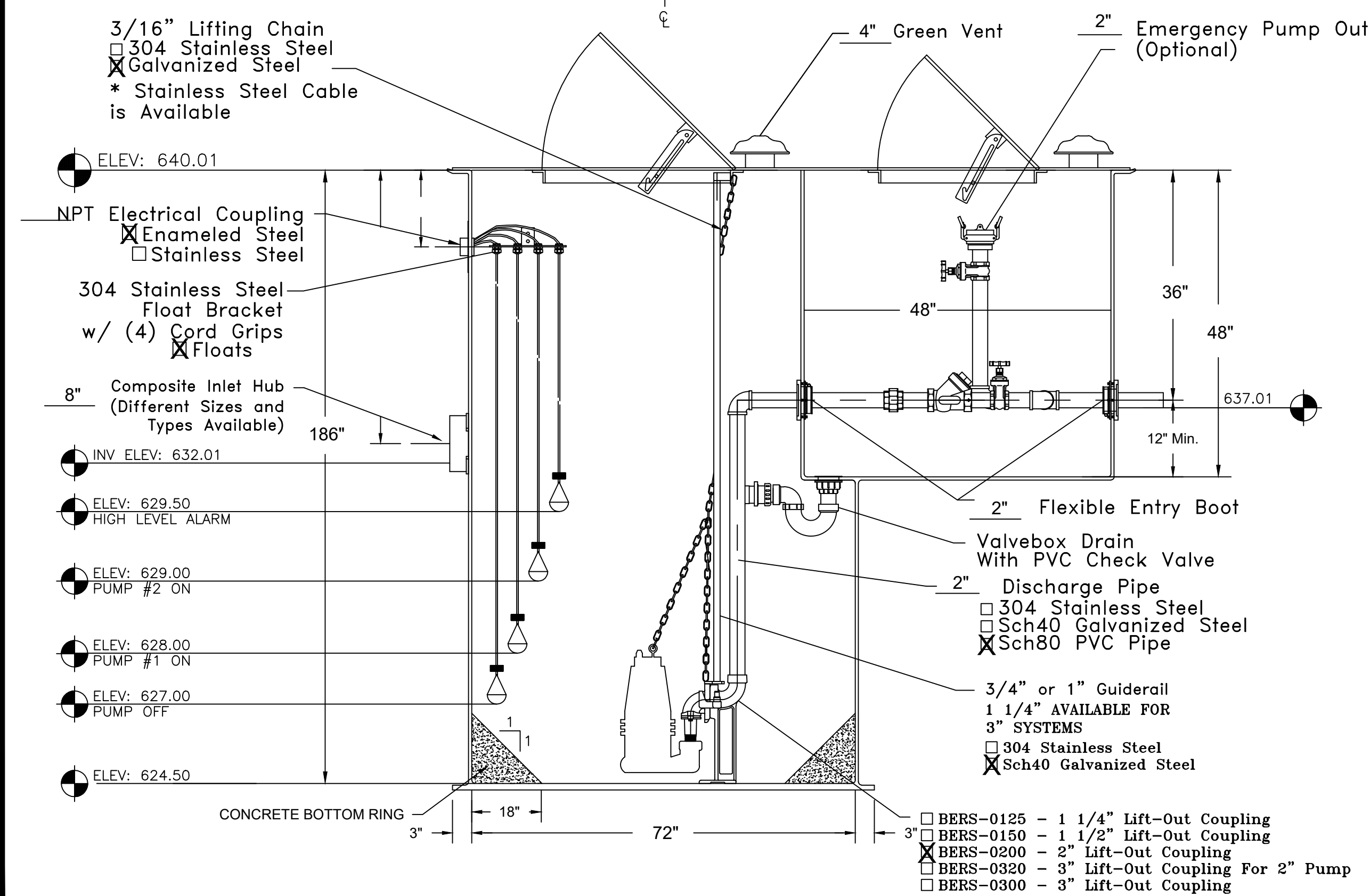
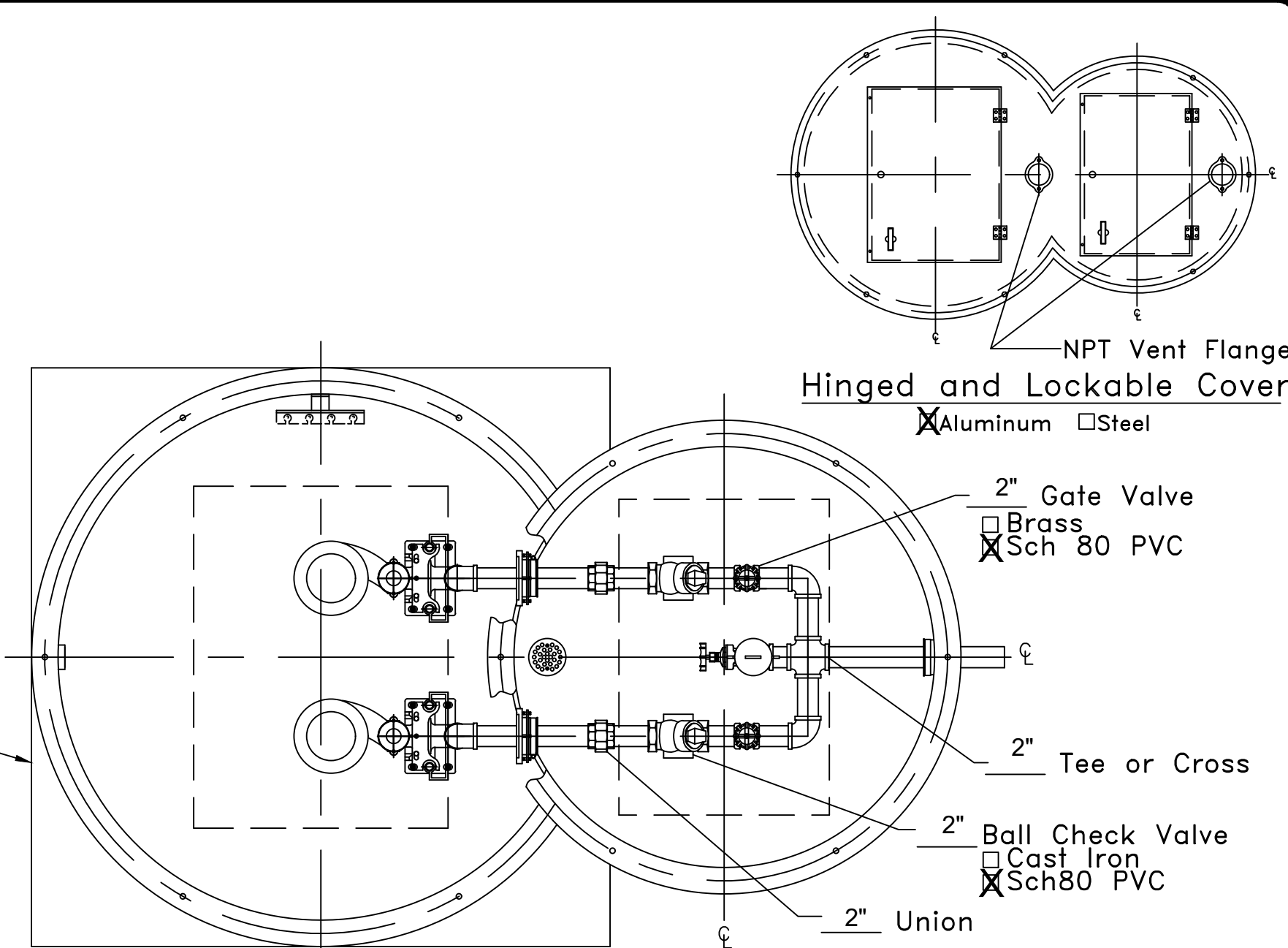
SANITARY P&P
C-203

PUMP INFORMATION

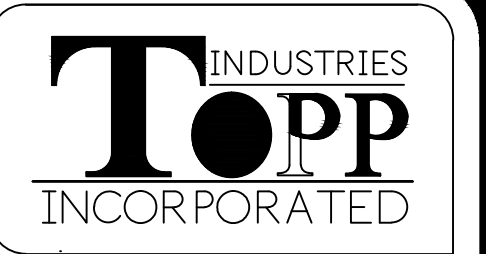
Type: Sump Pump(s)
 Grinder Pump(s)
 Non-Clog Pump(s)
 Model NO: HOMA GRP 16/1/C
 Rating: 45 GPM 17 TDH
 Motor: 2 HP 3550 RPM
 Elec: 1 PH HZ
 Elec: FL AMPS 230 v

DISCHARGE PIPE

304 Stainless Steel
 Sch40 Galvanized Steel
 Sch80 PVC Pipe
 1 1/4"
 1 1/2"
 2"
 3"
 Anti-Floatation Flange
 Fiberglass Encapsulated
 ASTM A-36 Square Steel
 Round Fiberglass
 None



- BERS-0125 - 1 1/4" Lift-Out Coupling
- BERS-0150 - 1 1/2" Lift-Out Coupling
- BERS-0200 - 2" Lift-Out Coupling
- BERS-0320 - 3" Lift-Out Coupling For 2" Pump
- BERS-0300 - 3" Lift-Out Coupling

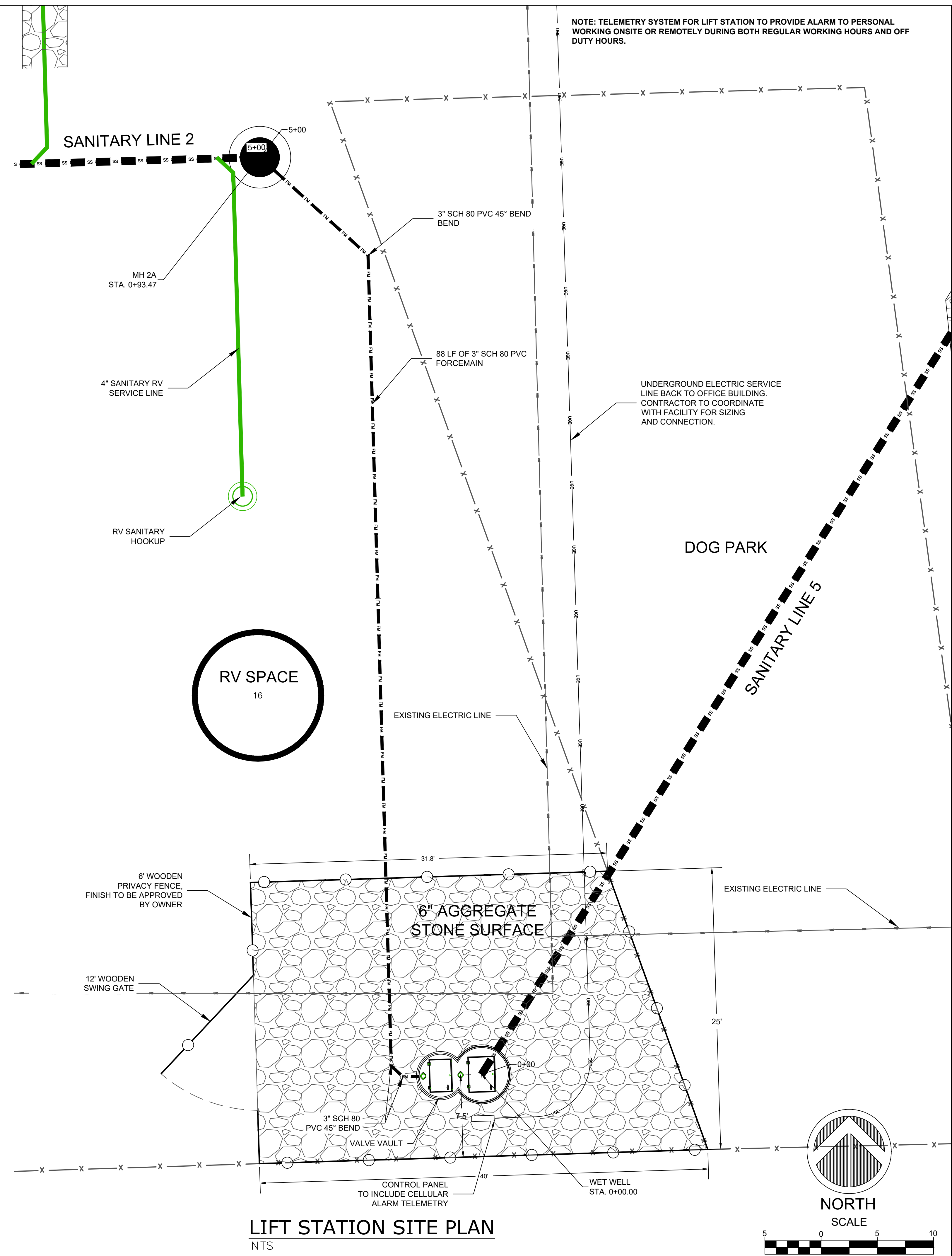


Prefabricated Fiberglass Lift Station
 1 1/4" - 3" Duplex With Cylindrical Valvebox
 Highway 25 North P.O. Box 420
 Rochester, IN 46975
 Phone: 800/354-4534 Fax: 574/223-6106

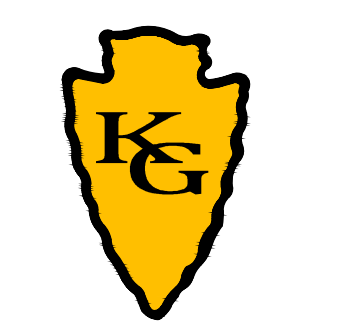
Scale: None
 Drawn By: R17
 App'd By:
 Date: 04/21/03
 Supersedes Prints Prior To: 01/06/09
 Reference No: 16794

Revisions	
1	First Released.

NOTE: 9'X9'X2' CONCRETE ANCHOR PAD TO BE POURED UNDER LIFT STATION. CONCRETE PAD SHALL BE ANCHOR BOLTED TO THE BOTTOM OF THE LIFT STATION



NOTE: TELEMETRY SYSTEM FOR LIFT STATION TO PROVIDE ALARM TO PERSONAL WORKING ONSITE OR REMOTELY DURING BOTH REGULAR WORKING HOURS AND OFF DUTY HOURS.



ENGINEER
 KAS Gales Company
 Consulting Engineers
 18772 Harmon Road
 Fayetteville, AR 72704
 Wk. 479.361.9977
 Cell 479.422.0763
 Email: carl.d.gales@gmail.com

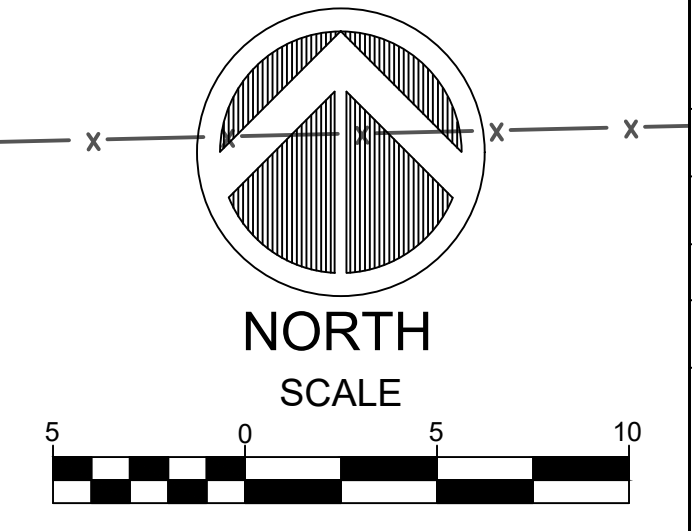


ISSUE DATE: 10/02/2024



WILL ROGERS KOA SEWER EXTENSION
 CLAYMORE, OK

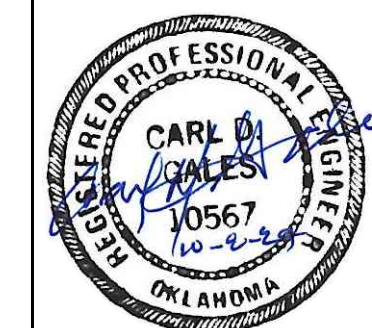
REVISION:
 PROJ: 24-108
 LIFT STATION C-500



LIFT STATION SITE PLAN
 NTS



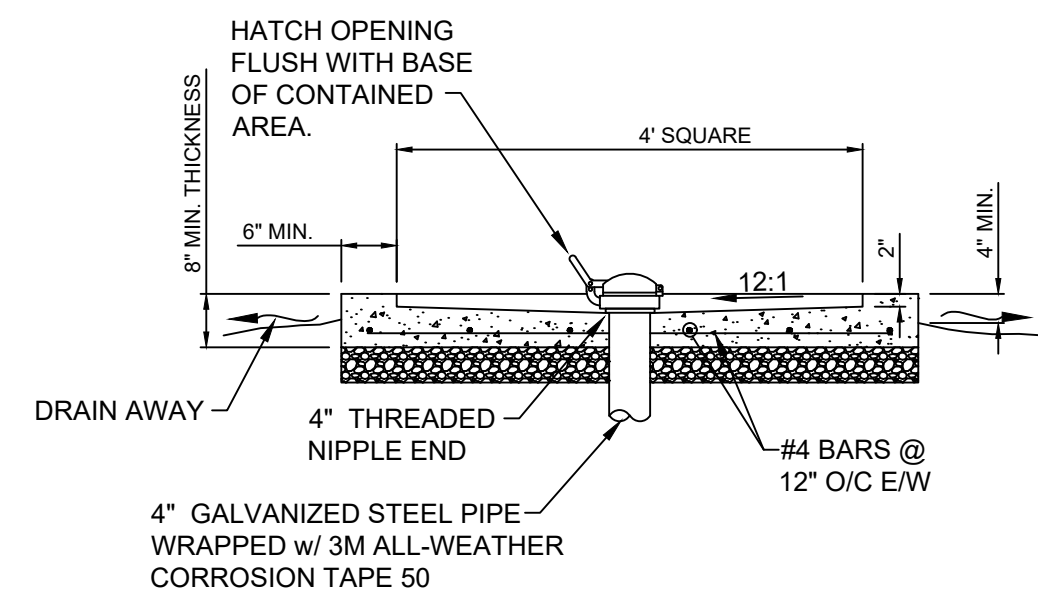
ENGINEER
KAS Gales Company
Consulting Engineers
18772 Harmon Road
Fayetteville, AR 72704
Wk. 479.361.9977
Cell 479.422.0763
Email: carl.d.gales@gmail.com



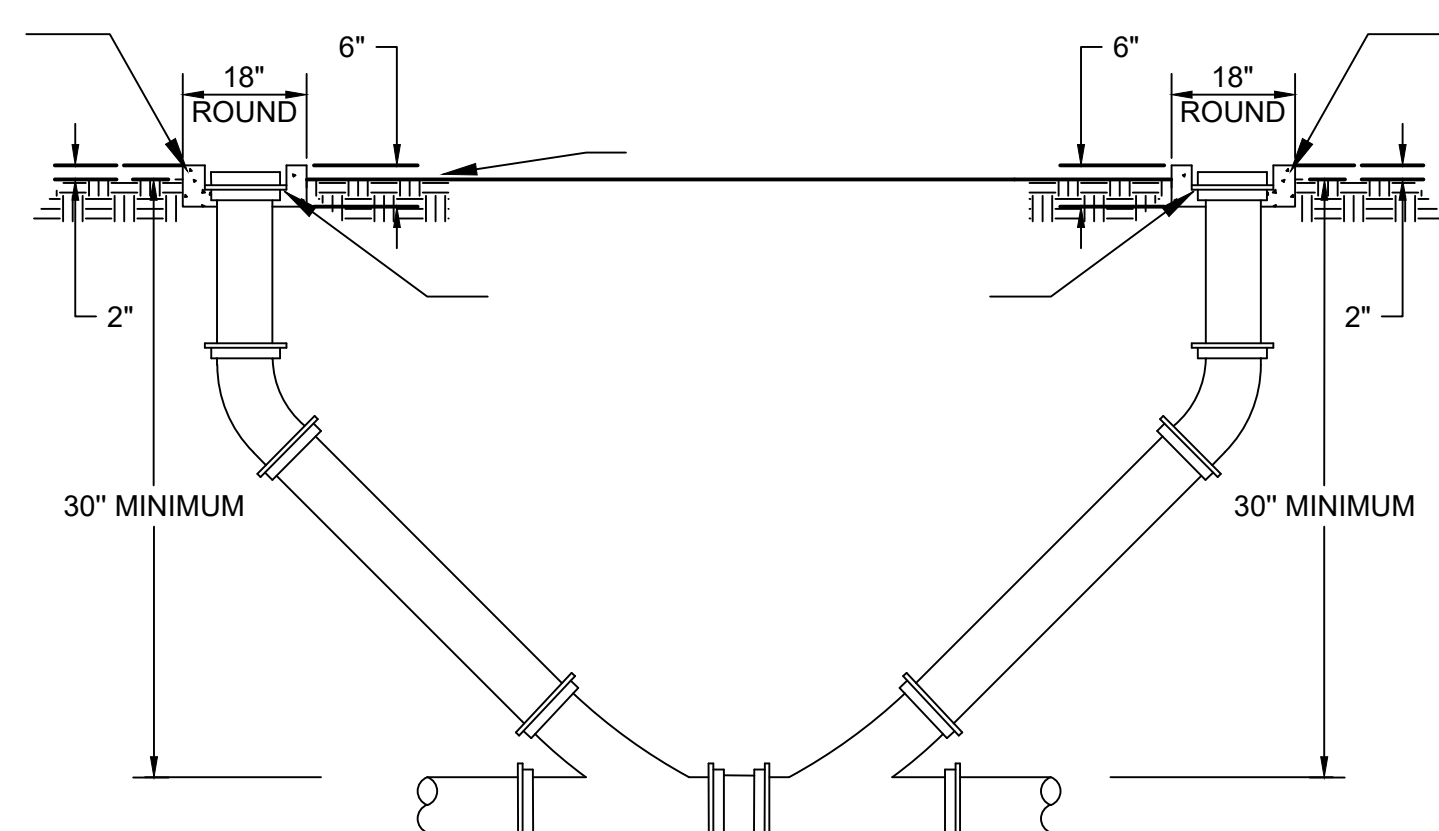
ISSUE DATE: 10/02/2024



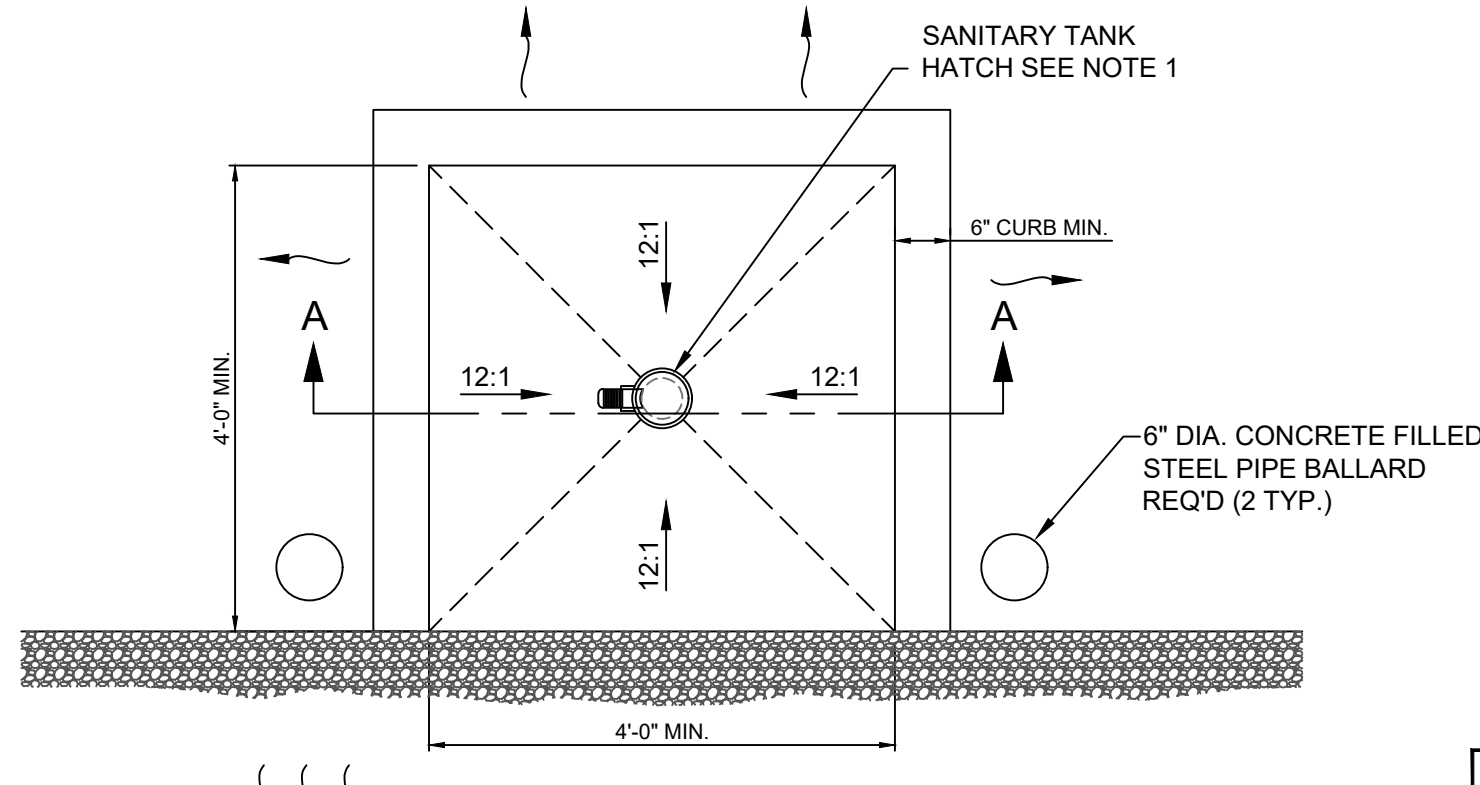
WILL ROGERS KOA SEWER EXTENSION
CLAYMORE, OK



SECTION A-A
N.T.S.



TWO-WAY CLEANOUT DETAIL
N.T.S.



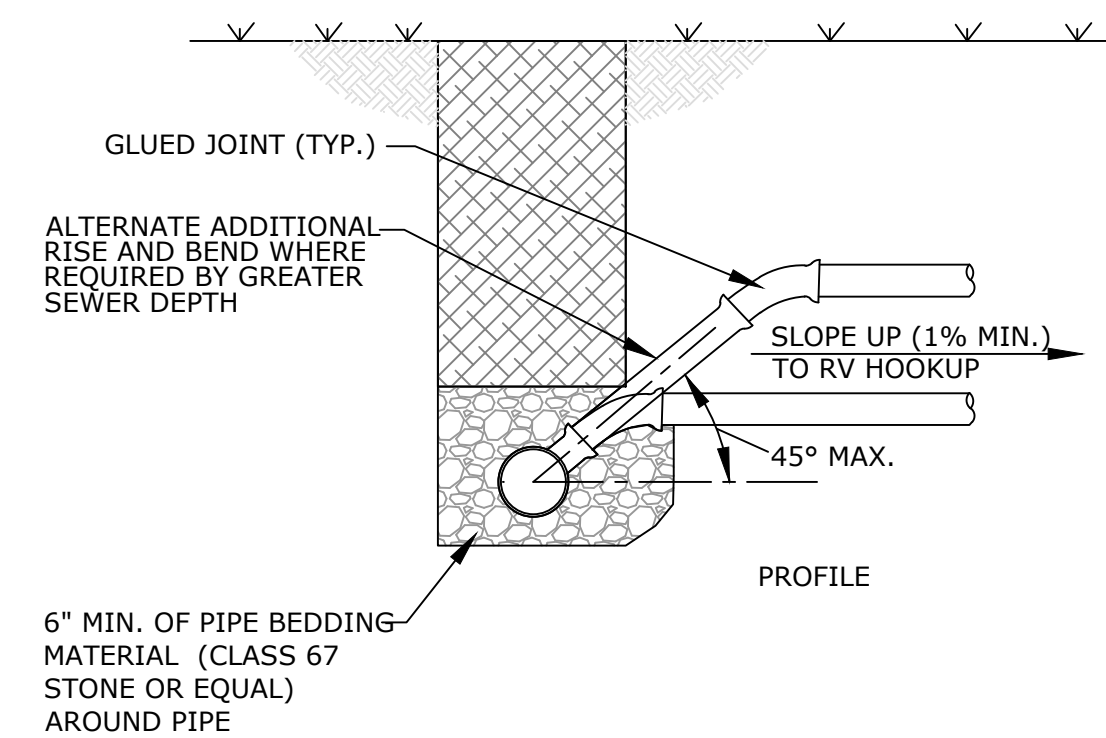
PLAN VIEW
N.T.S.

DRAINAGE OF SURFACE WATER MUST BE SLOPED TO DRAIN AWAY FROM RV DUMP AREA (TYP.)

RV DUMP STATION DETAIL
NTS

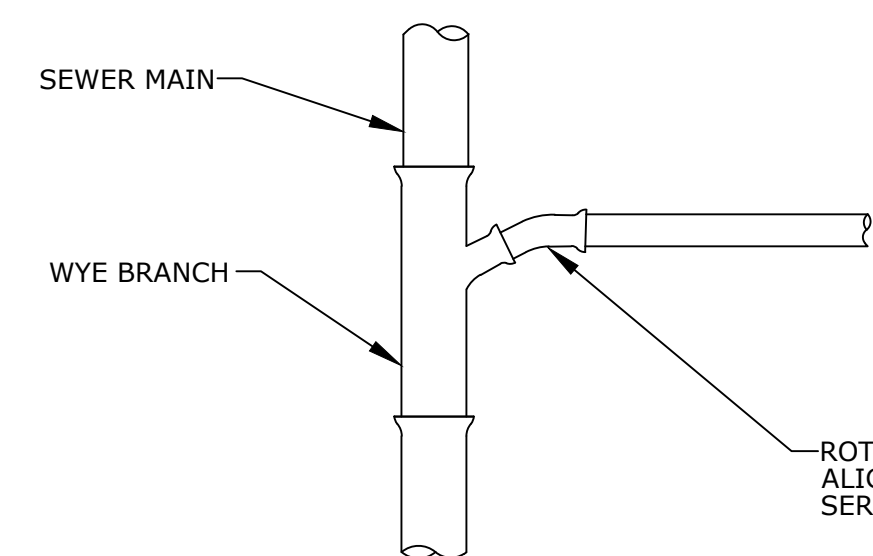
Inside Diameter of Manhole	Minimum Wall Thickness	Base Thickness	Minimum Ring & Cover Size
4' DIA	5"	8"	24" (< or Equal to 24" Pipes)
5' DIA	6 1/2"	8"	
6' DIA	7"	8"	

MANHOLE INFORMATION TABLE



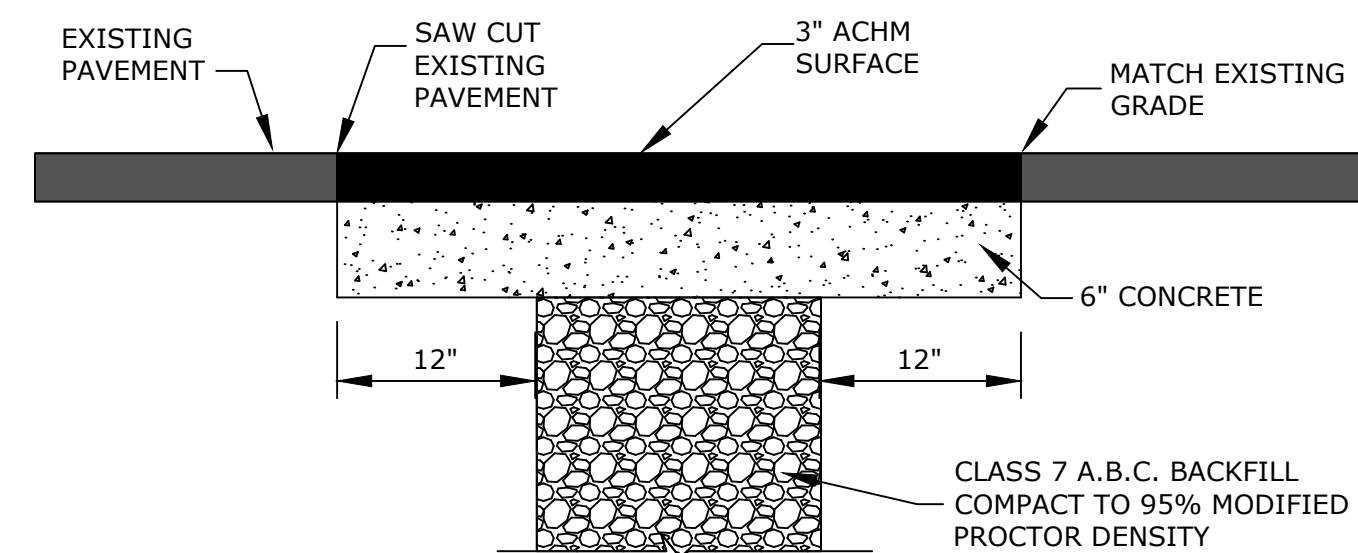
PROFILE

6" MIN. OF PIPE BEDDING MATERIAL (CLASS 67 STONE OR EQUAL) AROUND PIPE

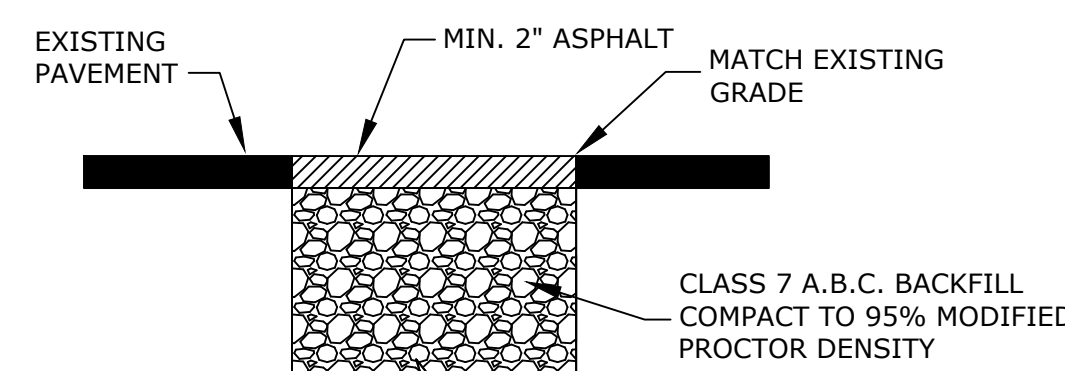


PLAN

SEWER SERVICE LATERAL
NTS



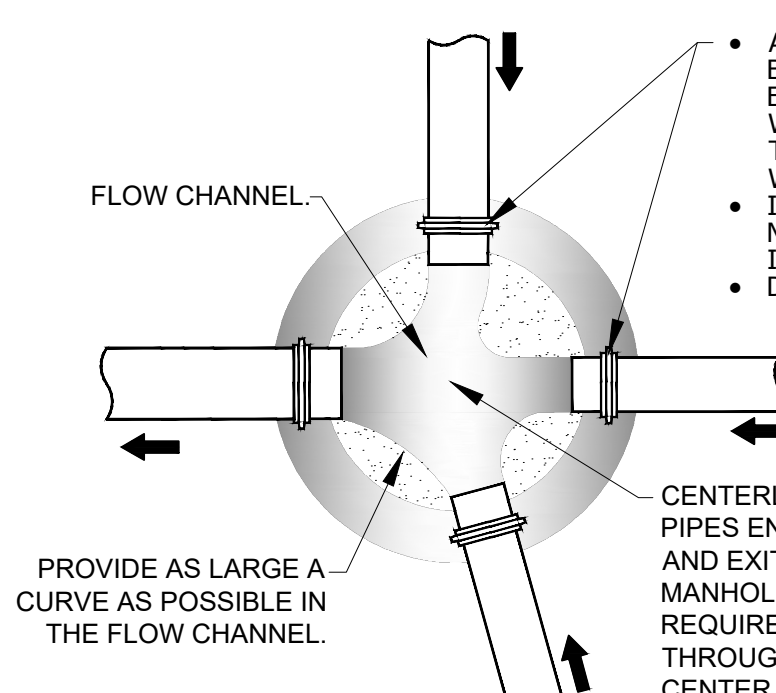
ASPHALT PAVEMENT REPAIR



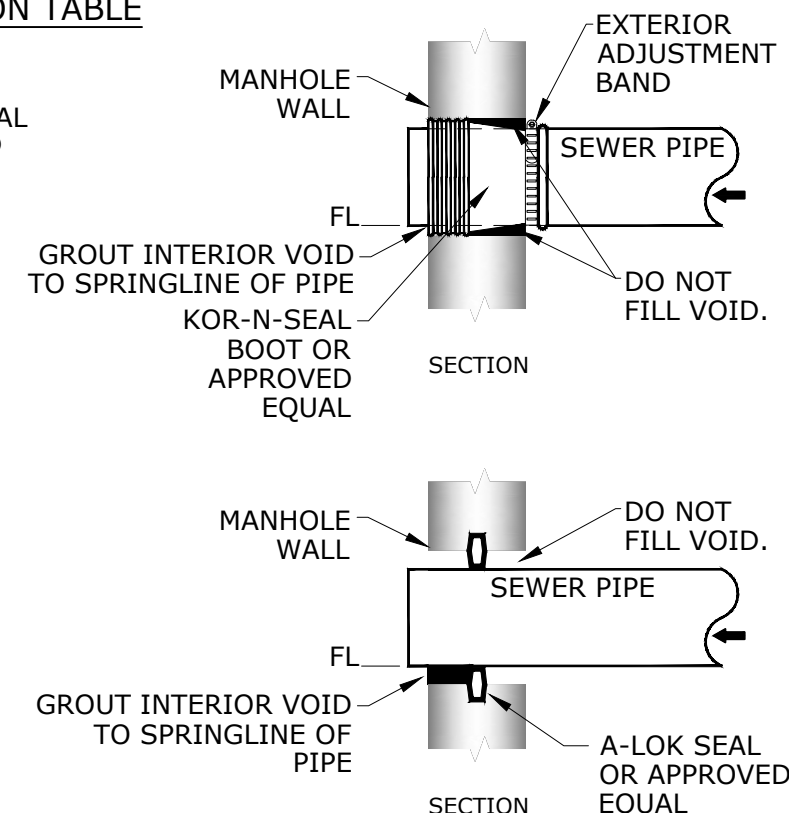
TEMPORARY PAVEMENT REPAIR

- NOTES:
1. CONCRETE SHALL HAVE A MINIMUM OF 5.5 BAGS OF CEMENT PER CU. YD. AND 5 1/2% ± 1 1/2% AE AND DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3500 psi @ 28 DAYS.
 2. PERMANENT REPAIRS TO BE USED ONLY WHERE ADJACENT PAVEMENT IS TO REMAIN. USE TEMPORARY PATCH IN AREAS WHERE ADJACENT PAVEMENT IS TO BE REMOVED OR RECONSTRUCTED.
 3. ASPHALT FOR TEMPORARY REPAIRS MAY BE HOT MIX OR COLD MIX.

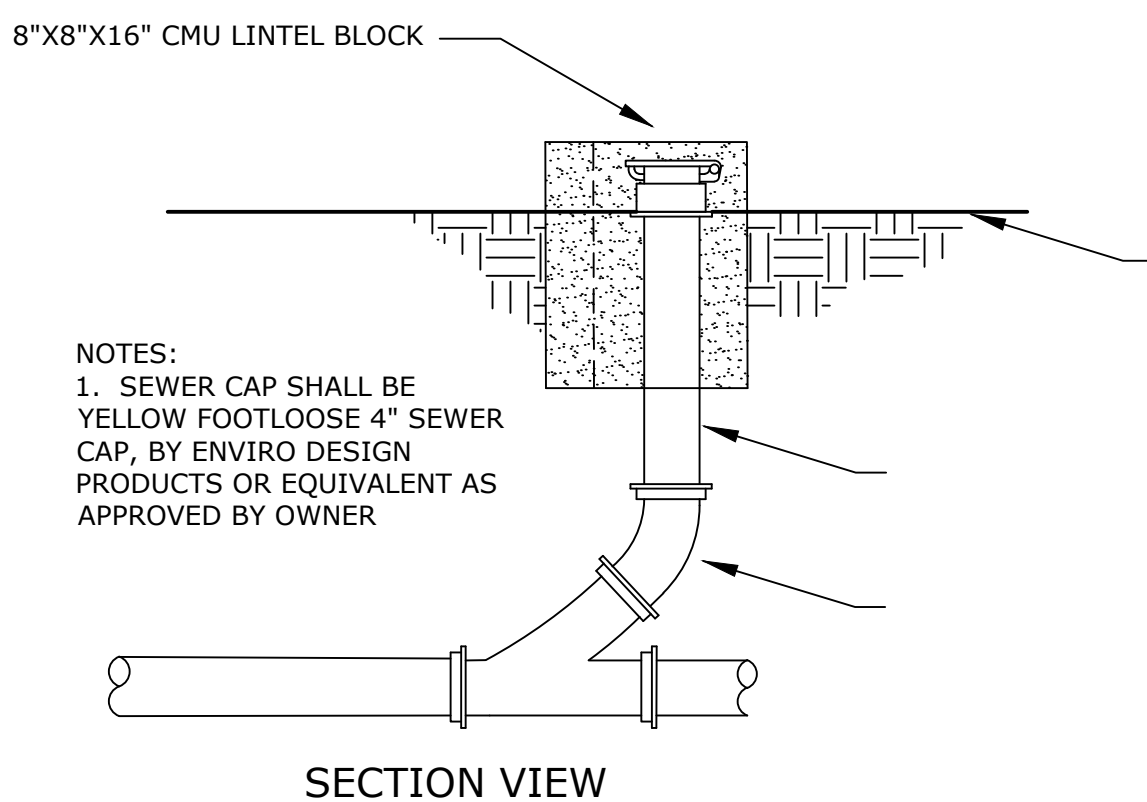
T-PATCH REPAIR DETAIL
NTS



MANHOLE FLOW CHANNEL

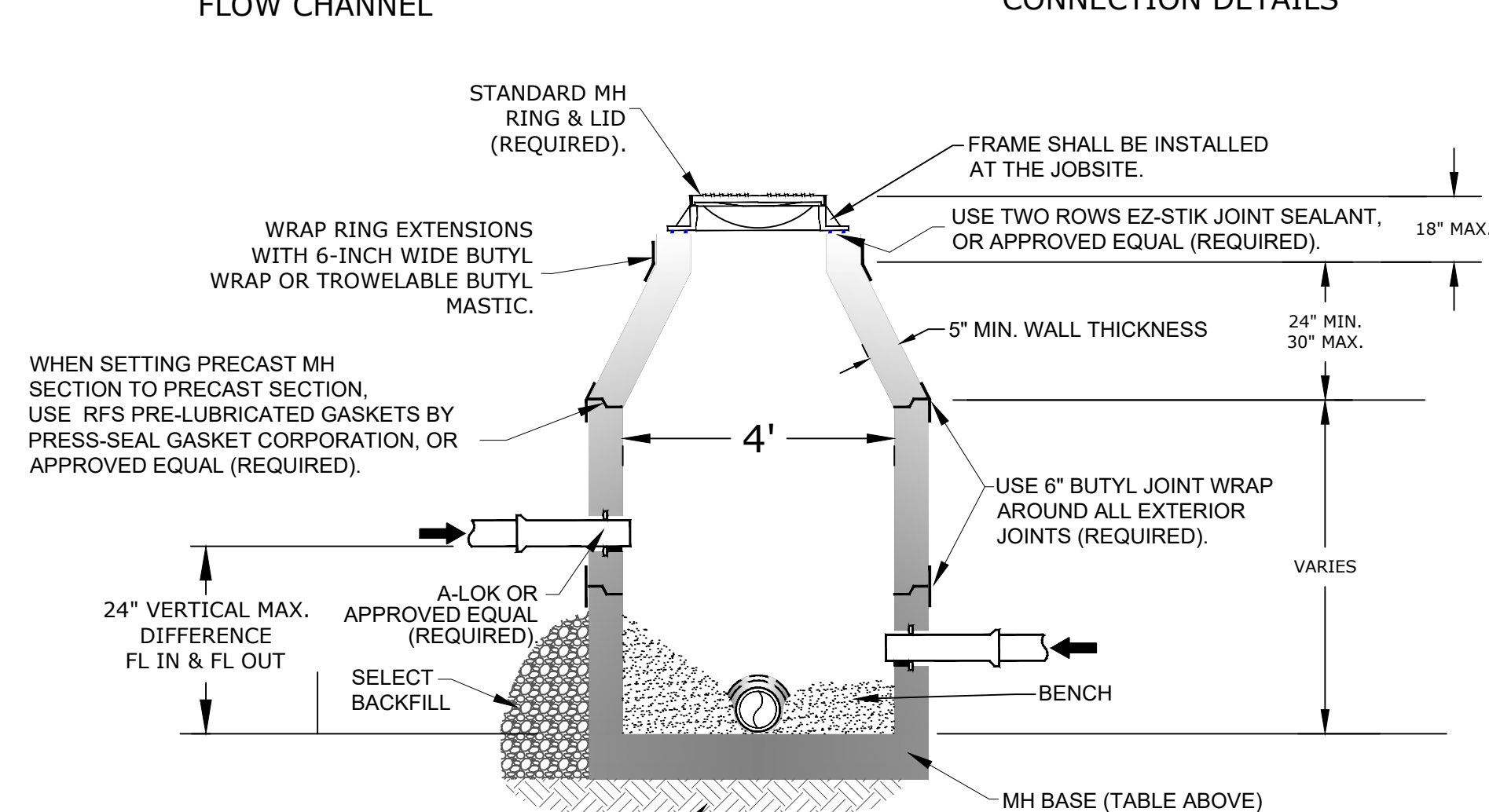


CONNECTION DETAILS

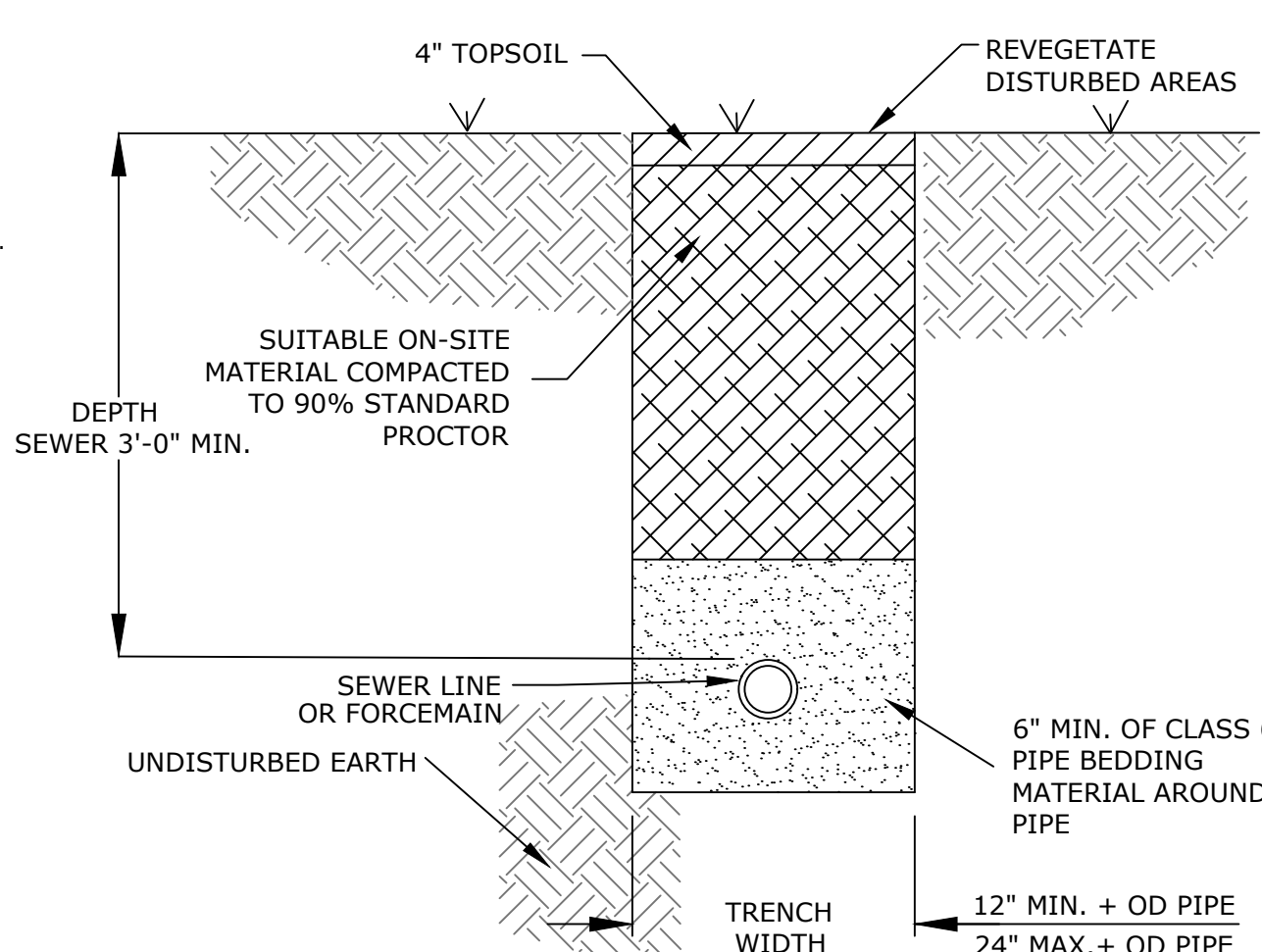


SECTION VIEW

RV SITE HOOK UP DETAIL
NTS



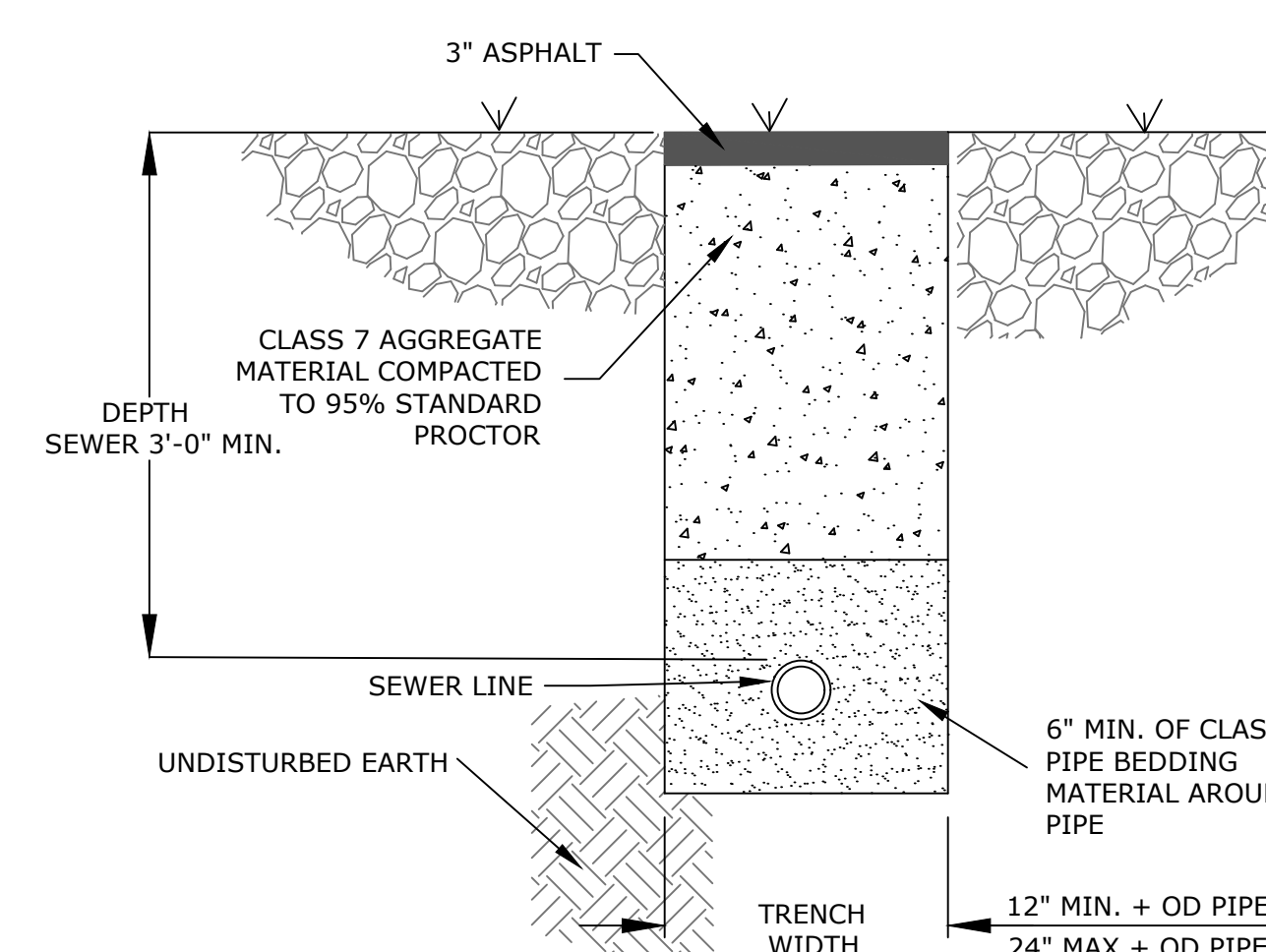
PRECAST MANHOLE
NTS



NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

SANITARY TRENCH OUTSIDE PAVEMENT
NTS



NOTES:

1. THE CONTRACTOR SHALL PROVIDE ALL ITEMS NECESSARY TO CONNECT WITH ANY PART OF THE EXISTING SEWER SYSTEM THAT WILL REMAIN IN ORDER TO ESTABLISH A SATISFACTORY AND ACCEPTABLE SEWER SYSTEM.
2. CONTRACTOR TO CONSTRUCT ALL TRENCH EXCAVATION IN ACCORDANCE WITH ALL OSHA REGULATIONS (29 CFR CH.XVII, SUBPART B)
3. TRENCH SHALL BE EXCAVATED BELOW GRADE REQUIRED TO PROVIDE A MINIMUM 36" OF PIPE COVER.

SANITARY TRENCH UNDER PAVEMENT
NTS

REVISION:

PROJ: 24-108

STANDARD DETAILS

C-501