

SEPTIC SYSTEM REPAIR ARROWHEAD RANCH & RETREAT HAMLET OF PARKSVILLE SULLIVAN COUNTY, NEW YORK

PREPARED FOR:

Arrowhead Ranch & Retreat
Ms. Rose Barnett
488 Cooley Road
Parksville, New York 12768



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Project No. 3214.26620

September 29, 2025

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FIGURES

FIGURE NO. 1: USGS Location Map

FIGURE NO. 2: Sanitary Sewer Plan (All Phases)

Appendix

APPENDIX A: Phase I Campground Site Improvements

I Introduction

1.1 Background

Arrowhead Ranch & Retreat (Arrowhead) authorized Keystone Associates Architects, Engineers and Surveyors, LLC (Keystone) to conduct an Engineering Study to design and update the existing septic facilities. It is the owner's intention to add phases of campsites to their property, resulting in additional sanitary flows. The below information reflects a sanitary sewer design that will process sanitary flows produced from 100 campsites, 10 RV campsites, a mobile concession area, a 12-room hotel, an 18-room hotel, an event pavilion, and a restaurant/tavern facility.

2 Existing Septic Conditions

2.1 Overall Septic System

The existing septic system is described herein, in an upstream to downstream manner. See Figure 2, Sanitary Sewer Plan (All Phases) for additional details.

Initial wastewater flow from two modular units is collected in a location central to the units. Sewage then flows through ± 160 LF of 6-inch PVC pipe to an existing 3,000-gallon septic tank. The effluent from the tank is transmitted via gravity via ± 475 LF through a 6-inch PVC pipe, where it connects with an unknown size and material of pipe. Prior to that connection, a 12-room hotel discharges into a steel 2,500-gallon tank through ± 35 LF of unknown size and material of pipe. The effluent then travels ± 40 LF through an unknown size and material of pipe to the connection mentioned previously. After the connection of the modular and 12-room hotel pipes, the wastewater then crosses Cooley Road (C.R. 85) through ± 150 LF of unknown size and material pipe. Once the pipe crosses the road, an existing 18-room hotel connects without entering a septic tank. Flow then continues ± 430 LF through an unknown size and material pipe, through two 45-degree bends, and into an existing 7,500-gallon septic tank. Effluent from the tank then flows ± 320 LF through an assumed 6-inch PVC pipe into an existing dosing tank. The dosing tank, with two (2) bell siphons then dose into two (2) existing sand filters. Once filtered, effluent is treated in a chlorine contact chamber and then discharged southeast of the filtering complex to a tributary to Little Beaver Kill. Identified as outfall 001.

2.2 Septic Tanks

The existing septic tank receiving the flow from the two modular units is roughly 6.5 ft wide x 12 ft long and was measured to hold approximately 3,000-gallons. The unit is a precast concrete septic tank and is structurally sound.

The existing septic tank handling flows from the 12-room hotel is 13 ft long and is a diameter of 4 ft. The septic tank is a cylindrical steel tank and has signs of decay.

The existing 7,500-gallon septic tank, south of Cooley Road, has been reported as in good condition by the owner.

2.3 Dosing Tank

The existing dosing tank was measured to be 19 ft x 19 ft (outside to outside) and 4 ft deep with the walls being 10-inch thick concrete. Two internal bell siphons distribute doses of wastewater to two sand filters, respectively.

2.4 Sand Filters

The two existing sand filters are roughly measured to be 38 ft wide x 55 ft long. The filters range from 15 to 20 inches of sand over 10 to 12 inches of pea gravel and 5 to 8 inches of No. 2 round stone. The No. 2 round stone layer also contains 4-inch Orangeburg piping.

3 System Modifications

3.1 Existing Conditions to be Removed/Renovated.

The Owners intend to remove the modular units at the beginning of their current septic system. Thus, no sanitary flow will enter the existing 3,000-gallon septic tank until further improvements are made to the site.

In addition, both hotels will be renovated and become operational. For the 12-room hotel, the existing steel septic tank will be replaced with a new precast concrete 2,500-gallon septic tank.

The existing 7,500-gallon septic tank at the bottom of the system will remain and be used for additional storage only.

The dosing chamber south of Cooley Road is structurally sound and shows no signs of leakage. The dosing bells within shows signs of recent renovation, however, it is suggested that the dosing bells, and appurtenances be replaced.

3.2 Existing Sand Filters to be Renovated.

The contractor shall remove the sand filters to their full depth and replace the entire filter bed and piping. The new sand filter bed dimensions will be extended by 2 feet, making the final dimensions for a single filter bed 40 feet wide by 55 feet long. A 10" bed of 3/4" to 1-1/2" washed stone shall be laid on undisturbed ground, encasing the perforated collection underdrain. This layer shall be topped with 3" of 1/8" to 1/4" washed gravel or crushed stone. 24" of clean coarse sand shall be placed on top of the open sand filter. The existing distribution boxes will be reinstalled with perforated distribution piping laid on the sand bed. See Sand Filter Detail sheet within the engineering plan set for more information.

3.3 Additions to the Sanitary System.

In addition to the items mentioned, the Owner will be adding two-bathroom buildings with showers, and a mobile concession stand.

The Phase I bathroom started in the summer of 2023 and will be placed in the location of the westernmost demolished modular unit and will discharge to the existing 3,000-gallon septic tank. Flows from the bathroom will account for 50 camp sites. The flow will be too high for just the 3,000-gallon septic tank, so it is recommended the Owner add a 3,000-gallon septic tank directly in series with the existing tank.

A mobile concession stand will also be placed in the same area and will require a 500-gallon grease trap. The effluent of the grease trap will then connect into a 3,000-gallon septic tank, serving both the phase 2 event pavilion, and food preparation from the mobile concession stand. This then connects to the existing 3,000-gallon septic tank.

A Phase 2 bathroom will be constructed in the future that will accommodate 50 campsites and 10 RV sites, respectively. This will require a separate 5,000-gallon septic tank to handle those flows. The effluent will then connect just beyond the existing 3,000-gallon tank and new 3,000-gallon tank as to not surcharge the Phase 1 system.

The 18-room hotel renovation will require its own septic tank prior to entering the joint discharge piping. This will be required to avoid surcharging the septic tanks, making the system ineffective.

An event pavilion will be constructed adjacent to the Phase 1 bathroom facility. Flow from this building will be conveyed through the proposed 3,000-gallon septic tank servicing both the event pavilion and the mobile concession stand. Food service for this event pavilion will be provided by the mobile concession stand.

The future tavern/restaurant will be constructed south of Cooley Road, just upstream of the existing 7,500-gallon septic tank. This will require an additional 3,000-gallon septic tank prior to tying into the main system.

4 Calculations

4.1 Sanitary Flow Value Per Improvement

Phase 1			Phase 2		
Improvement	Calculation	Total (GPD)	Improvement	Calculation	Total (GPD)
Bathroom	55 GPD x 50 Sites	2,750	Bathroom	55 GPD x (50 Sites + 10 RV)	3,300
Mobile Concession Stand	15 GPD x 2 Employees + Food preparation for Phase 2 Event Pavilion 10 GPD x 190 Seats	1,930	Event Pavilion	(10 GPD x 190 Seats)	See Phase 1
			Tavern/ Restaurant	(20 Tavern Seats x 20 GPD) + (40 Restaurant Seats x 35 GPD)	1,800
12-Room Hotel	110 GPD x 12 Rooms	1,320			
18-Room Hotel	110 GPD x 18 Rooms	1,980			
Phase 1 Total		7,980	Phase 2 Total		5,100

4.2 Septic Tank Sizing

All septic tanks shall be able to handle 1.5 times the amount of wastewater flow.

Flow to existing 3000-gallon tank,

$$(2,750 \text{ GPD} + 30 \text{ GPD} + 1,900 \text{ GPD}) \times 1.5 = 7,020 \text{ Gallons.}$$

Therefore, add a 3,000-gallon tank in series with existing tank, and add a 3,000-gallon tank downstream of the grease trap to accommodate the mobile concession stand and event pavilion for a total capacity of 9,000-gallons.

Flow from phase 2 bathroom,
 $(3,300 \text{ GPD} \times 1.5) = 4,950 \text{ Gallons}$.
Therefore, a 5,000-gallon tank minimum is required.

Flow from 12-room hotel renovation,
 $(1,320 \text{ GPD} \times 1.5) = 1,980 \text{ Gallons}$.
The current tank will be replaced with a 2,500-gallon septic tank.

Flow from 18-room hotel renovation,
 $(1,980 \text{ GPD} \times 1.5) = 2,970 \text{ Gallons}$.
A 3,500-gallon septic tank minimum will be required prior to entering the rest of the system which will allow flow from other improvements to bypass the tank and not surcharge the tank.

Flow from event pavilion,
 $(1,900 \text{ GPD} \times 1.5) = 2,850 \text{ Gallons}$.
Therefore, need a 3,000-gallon tank is required.

Flow from tavern/restaurant,
 $(1,800 \text{ GPD} \times 1.5) = 2,700 \text{ Gallons}$.
Therefore, need a 3,000-gallon tank minimum is required prior to entering the main sanitary system.

4.3 Sand filter calculations

Open Sand filter storage,
 $(40' \times 55' \times 2 \text{ filter beds} \times 3 \text{ GPD per SF}) = 13,200 \text{ GPD}$
13,200 GPD provided > 13,080 GPD required.

Range of 2 – 5 GPD per SF pulled from 2014 Design Standard. 3 GPD per SF used for seasonal use.

5 Treatment

The proposed sand filters, combined with new/existing septic tanks throughout the sanitary collection system, along with dosing control and disinfection is expected to achieve the New York State Department of Environmental Conservation's effluent limits shown in the SPDES Form D Application. A monitoring program for BOD5, TSS, dissolved oxygen, ammonia, fecal coliform, and temperature is proposed below and will be submitted to the NYSDEC approved laboratory upon completion:

5.1 System Monitoring Post Construction:

Initial Phase (8 weeks post construction):

Weekly samples for dissolved oxygen, total residual chlorine, fecal coliform, pH, ammonia, BOD5 and TSS.

Settleable Solids sample once toward the end of the initial phase.

Verification / Short Term Phase (Months 3 – 6 post construction):

Bi-Weekly fecal coliform (to build 7-day and 30-day geometric mean), dissolved oxygen, total residual chlorine, pH and temperature.

Monthly BOD5, TSS, Ammonia and settleable solids.

Long-Term Monitoring Phase (after demonstration of stable performance)

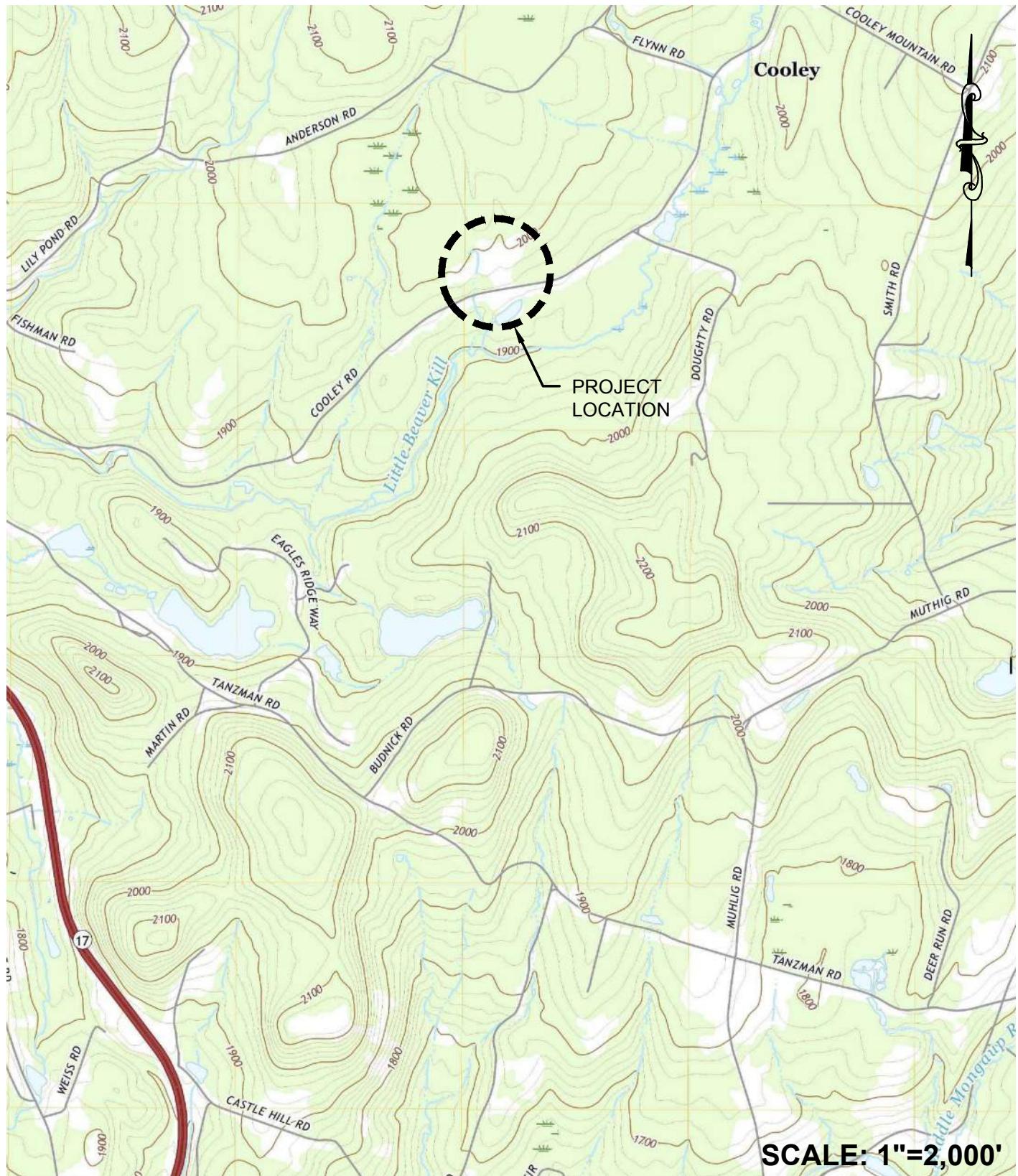
Weekly fecal coliform (for geometric mean)

Monthly BOD5, TSS, Ammonia, pH, temperature, settleable solids, dissolved oxygen and total residual chlorine.

6 Conclusions

The intent of the design within this report provides the Owner a correctly sized septic system to account the final buildout of the campground project. The design includes sizing septic tanks and pipes for two 50 campsite bathroom buildings, an RV site, a mobile concession stand, a 12-room hotel building, an 18-room hotel building, an event pavilion, and a tavern/restaurant facility. Any further connections to the designed system, not included above, will require additional modifications to the septic system.

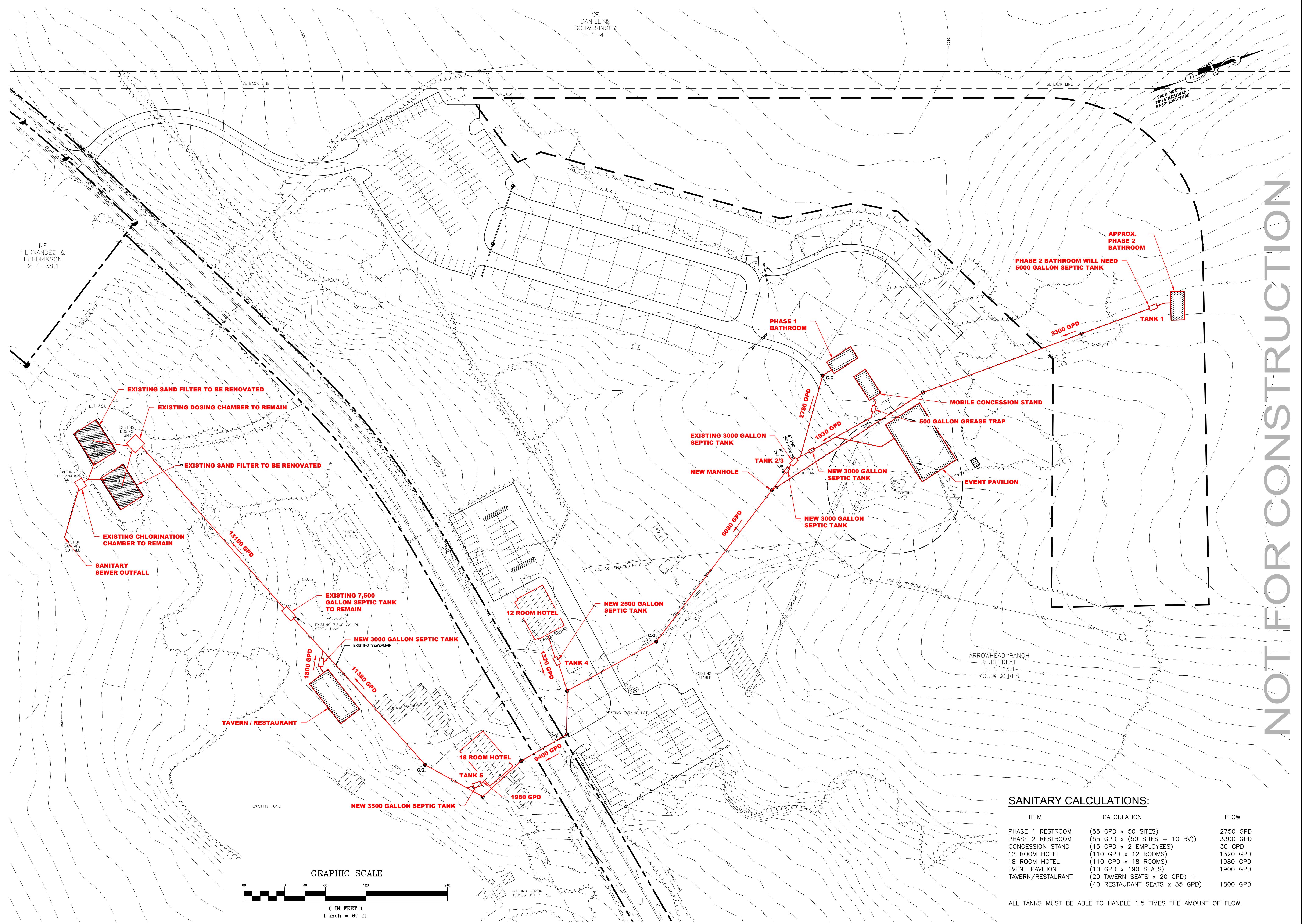
FIGURES



ARROWHEAD RANCH & RETREAT
HAMLET OF PARKSVILLE
SULLIVAN COUNTY NEW YORK STATE
KEYSTONE PROJECT #3214.26620

USGS
LOCATION MAP
FIGURE NO. 1

NOT FOR CONSTRUCTION

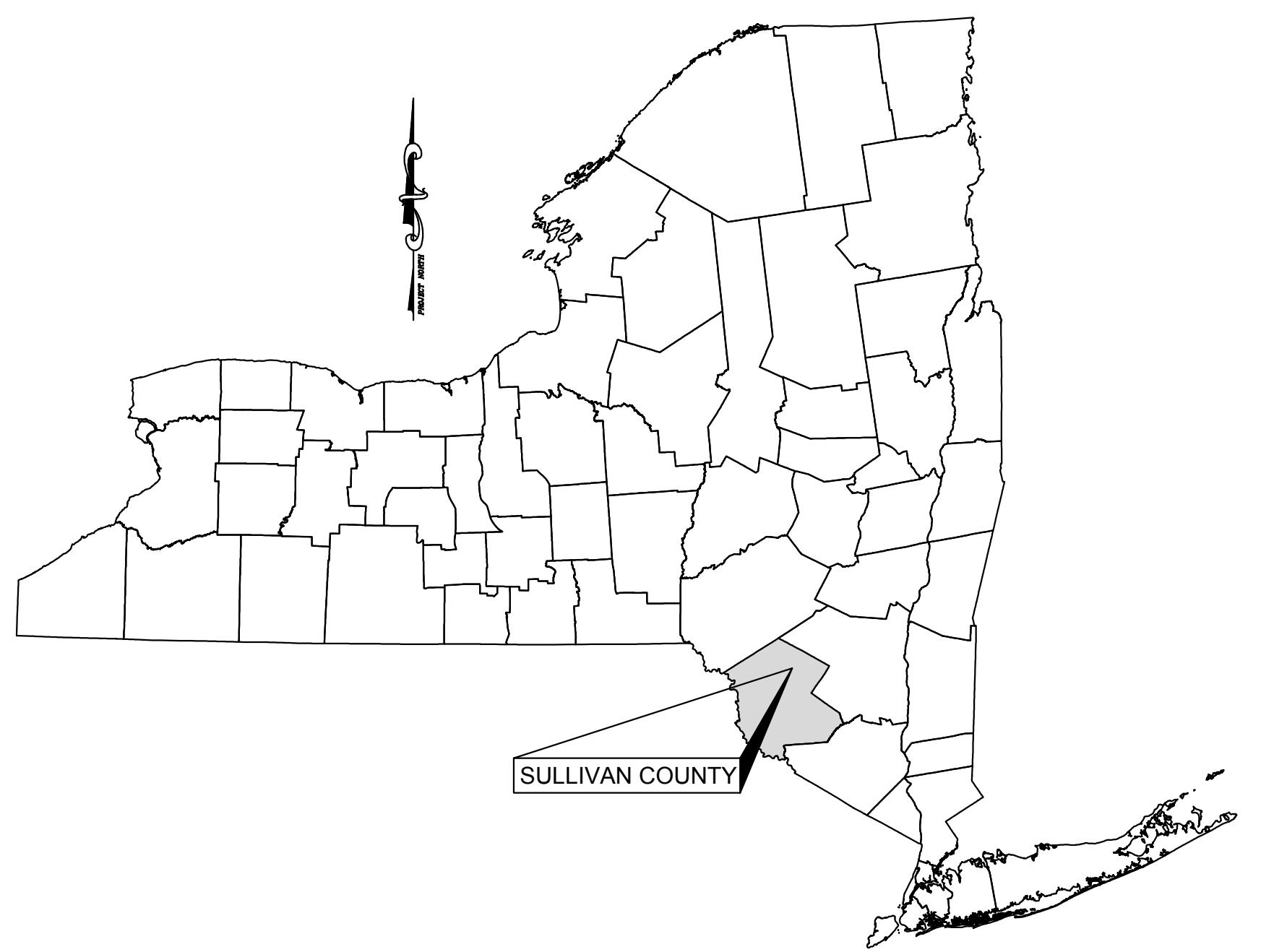


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AKROVIA BACH & RETIREA PHASE I CAMPGROUND SITE IMPROVEMENTS TOWN OF LIBERTY SULLIVAN COUNTY, NEW YORK		SANITARY SEWER PLAN (ALL PHASES)	
SHEET NO.		FIGURE NO. 2	
PROJECT NO.		3214.26620	
DATE:		06/07/21	
FILE NO.:		3214.26620-SITE-NEW	
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NO.	REVISIONS AND DESCRIPTIONS	DATE:	
4	NYSDOH SUBMISSION	01/07/25	
3	NYSDOH SUBMISSION	05/24/24	
2	NYSDEC COMMENTS	10/31/23	
1	UPDATED SAND FILTERS	10/10/22	

APPENDIX A
PHASE I CAMPGROUND SITE IMPROVEMENTS



PHASE 1 CAMPGROUND SITE IMPROVEMENTS ARROWHEAD RANCH & RETREAT

488 COOLEY ROAD

HAMLET OF PARKSVILLE

COUNTY OF SULLIVAN

STATE OF NEW YORK

APPLICANT/DEVELOPER:

MS. ROSE BARNETT
488 COOLEY ROAD
PARKSVILLE, NEW YORK 12768

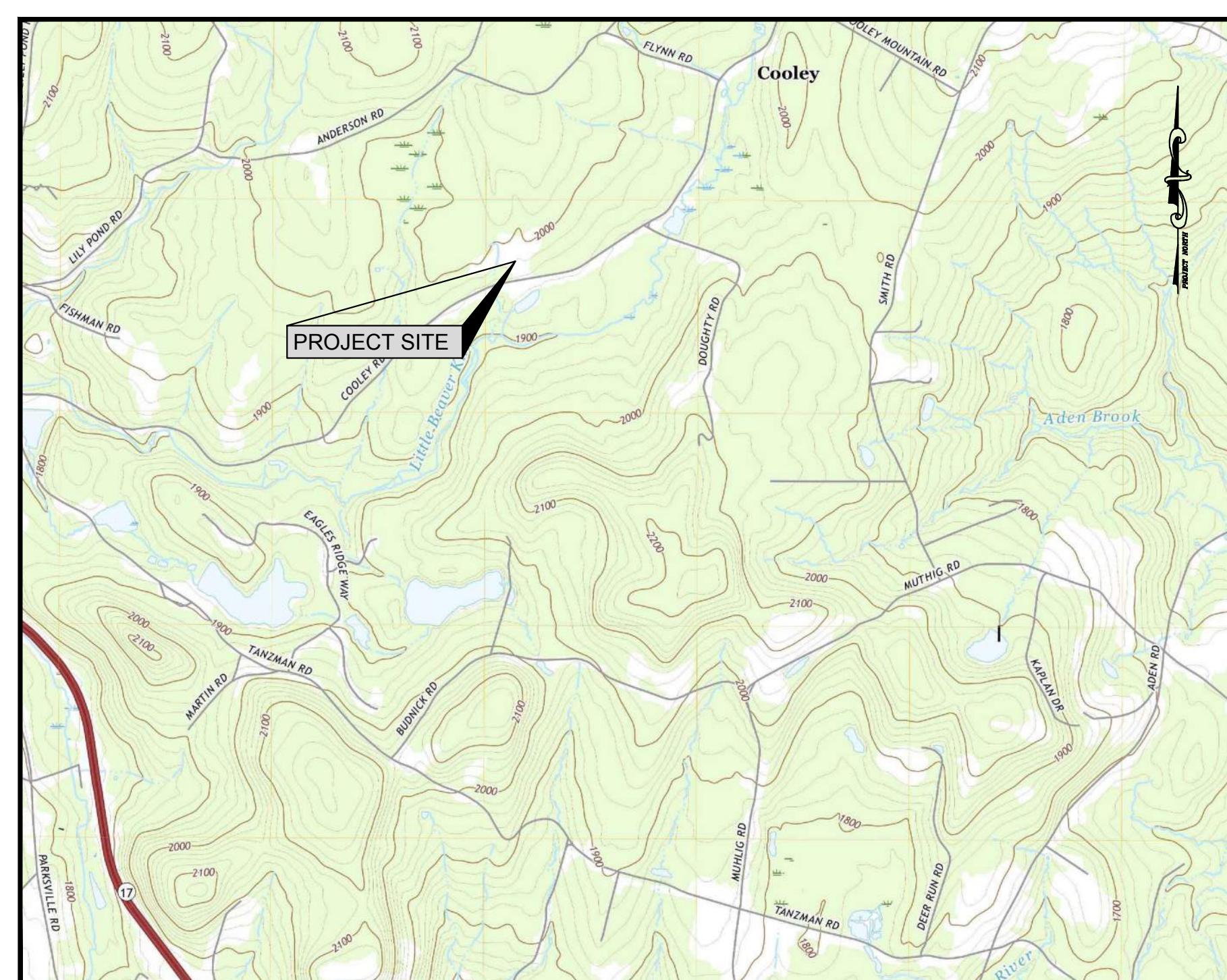
INDEX OF DRAWINGS

SHEET	TITLE
C010	EXISTING CONDITIONS PLAN
C100	OVERALL SITE PLAN
C110	PHASE 1 SITE PLAN
C120	PHASE 1 UTILITY PLAN
C130	PHASE 1 EROSION & SEDIMENT CONTROL PLAN
C140	ACCESS ROAD PLAN & PROFILE
C150	SANITARY CROSSING PLAN & PROFILE
C200	DETAILS
C210	DETAILS
C220	DETAILS
C230	SAND FILTER DETAILS

DRAWINGS PREPARED BY



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LOCATION MAP

SCALE: 1" = 2000'

PROJECT NO. 3214.26620

MAY 07, 2021
REVISED JANUARY 07, 2025

KENNETH D. ELLSWORTH, P.E.
ALTERATIONS NOT CONFORMING TO SECTION 7209, SUBDIVISION 2,
NEW YORK STATE EDUCATION LAW ARE PROHIBITED BY LAW.
LIC. No. 066049-1

NOTATION OR CONSTRUCTION

KEYSTONE
ASSOCIATES

ARCHITECTS, ENGINEERS AND SURVEYORS, LLC



The logo for Keystone Associates consists of a circular emblem on the left side. The emblem features a stylized 'K' shape in the center, with a horizontal bar extending from the top of the 'K' to the right. The entire emblem is composed of a light gray gradient. To the right of the emblem, the word "KEYSTONE" is written in large, bold, black capital letters. Below "KEYSTONE", the word "ASSOCIATES" is written in a slightly smaller, bold, black capital letters. To the far right of the company name, the words "ARCHITECTS, ENGINEERS AND SURVEYORS, LLC" are written in a smaller, regular black font.

MONITOR CONSTRUCTION

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The logo for Keystone Associates consists of a vertical stack of words: "KEYSTONE" at the top, followed by "ASSOCIATES" below it. To the left of the text is a graphic element resembling a stylized mountain peak or a series of stacked geometric shapes in a light grey color.

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PHASE I CAMP GROUND

SITE IMPROVEMENTS

TOWN OF LIBERTY

SULLIVAN COUNTY

OVERALL SITE PLAN

SHEET NO.
C100
PROJECT NO.
3214.26620
DATE
06/07/21
FILE NO.: **3214.26620-C100**

STRUCTURAL CONSTRUCTION

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KEYSTONE ASSOCIATES

ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

ARROWHEAD RANCH & RETREAT PHASE I CAMPGROUND SITE IMPROVEMENTS TOWN OF LIBERTY SULLIVAN COUNTY, NEW YORK		PHASE 1 SITE PLAN	
SHEET NO.		C110	
PROJECT NO.		3214.26620	
DATE:		06/07/21	
CAD FILE NO. 3214.26620-C110			
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NO.	REVISIONS AND DESCRIPTIONS	DATE:	
1	UPDATED SAND FILTERS	10/10/22	
2	NYSDEC COMMENTS	10/31/23	
3	NYSDCH SUBMISSION	05/24/24	
4	NYSDCH SUBMISSION	01/07/25	

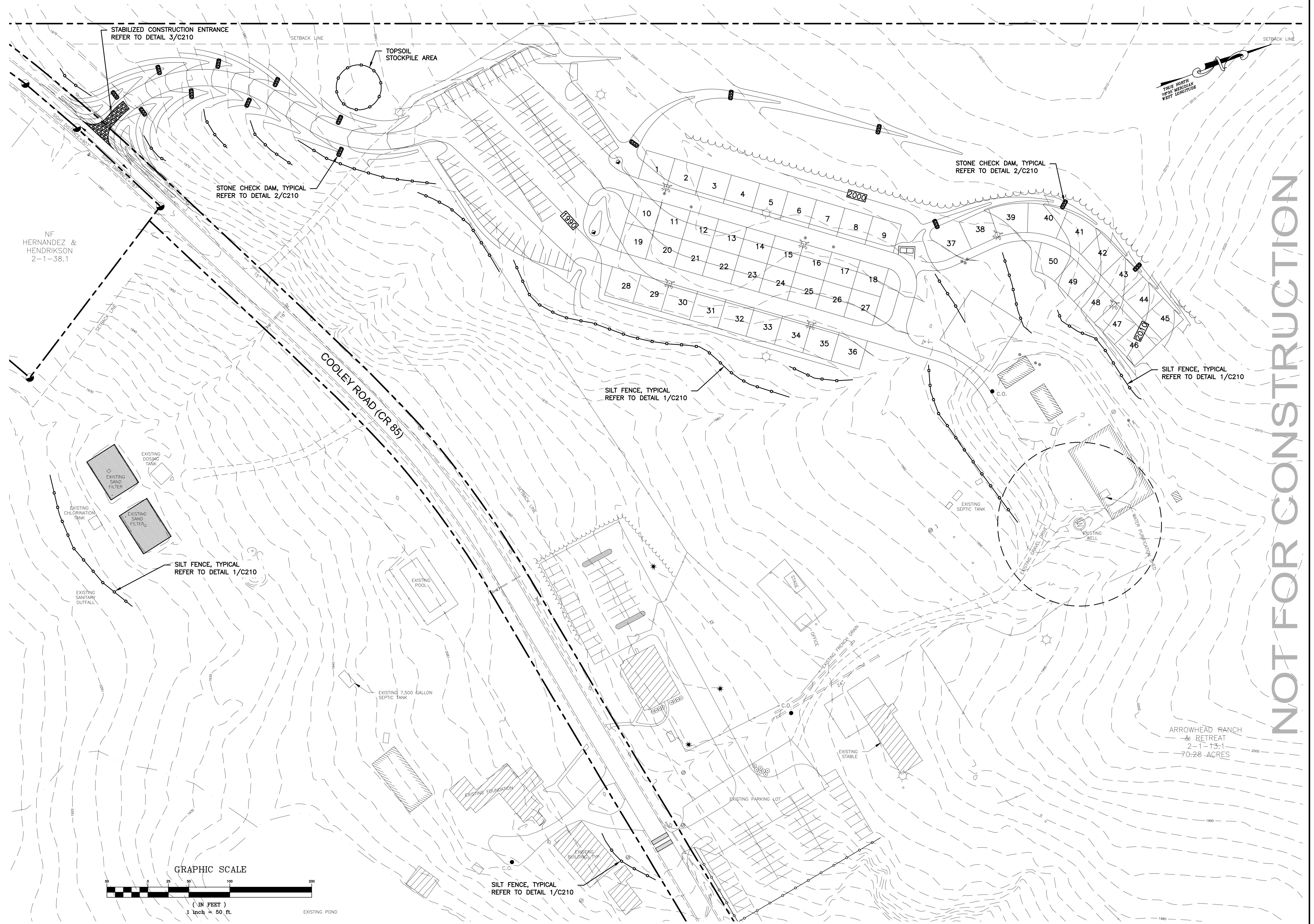
STRUCTURE CONSTRUCTION INTERMANUFACTURED WALLS AND ROOFING

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ARROWHEAD RANCH & RETREAT			
PHASE I CAMPGROUND			
SITE IMPROVEMENTS			
TOWN OF LIBERTY		SULLIVAN COUNTY, NEW YORK	
PHASE 1 UTILITY PLAN			
SHEET NO.			
C120			
PROJECT NO.			
3214.26620			
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2 NYSDEC COMMENTS		10/31/23	
1 UPDATED SAND FILTERS		10/10/22	
NO. REVISIONS AND DESCRIPTIONS		DATE:	

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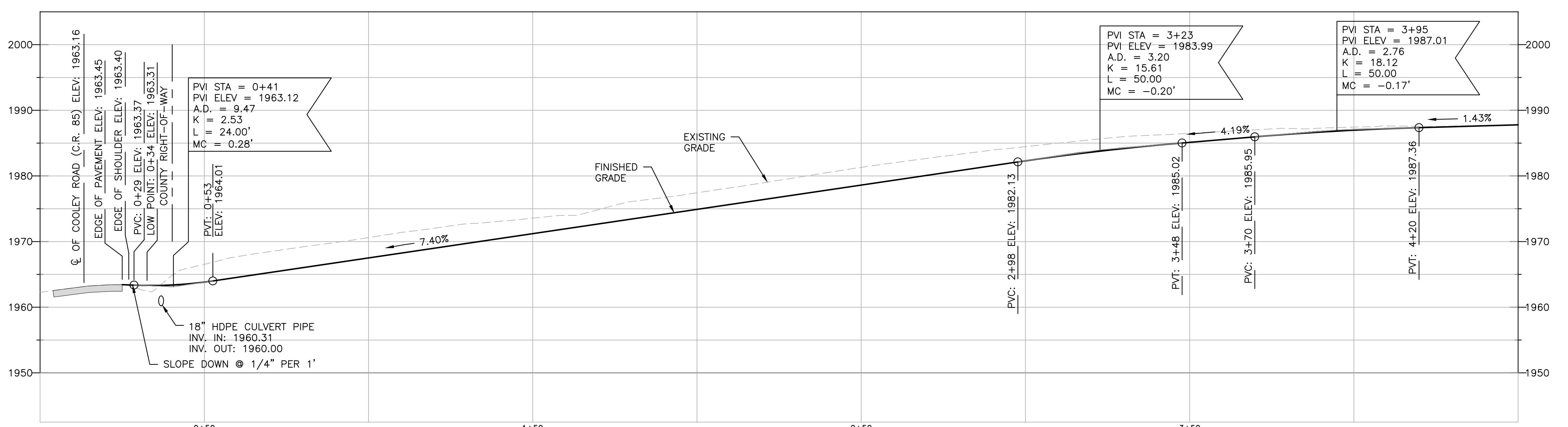
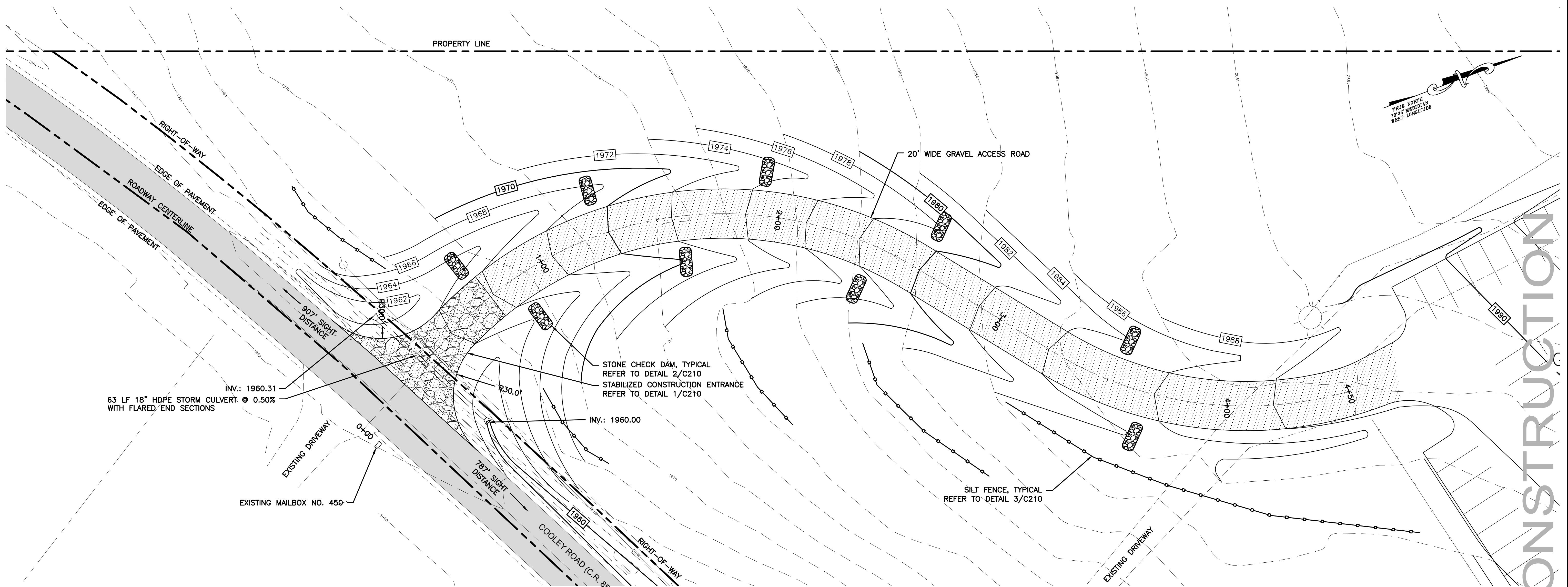


**ARROWHEAD RANCH & RETREAT
PHASE I CAMPGROUND
SITE IMPROVEMENTS
TOWN OF LIBERTY
SULLIVAN COUNTY, NEW YORK
PROJECT NO.
3214.26620
DATE
06/07/21
SHEET NO.
C130
3214.26620-0130**

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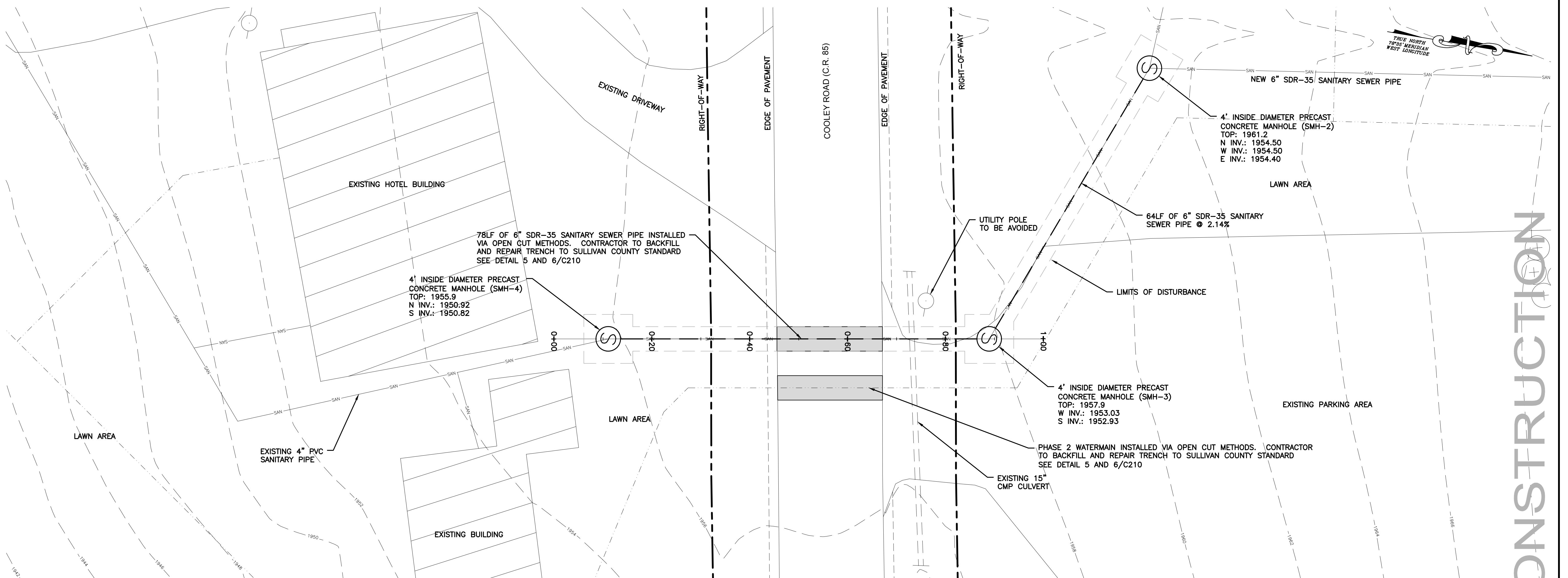
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PHASE I CAMPGROUND
SITE IMPROVEMENTS**
TOWN OF LIBERTY
SULLIVAN COUNTY, NEW YORK

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C140
PROJECT NO.
3214.26620
DATE
06/07/21
REV. NO.
3214.26620-ACCESS

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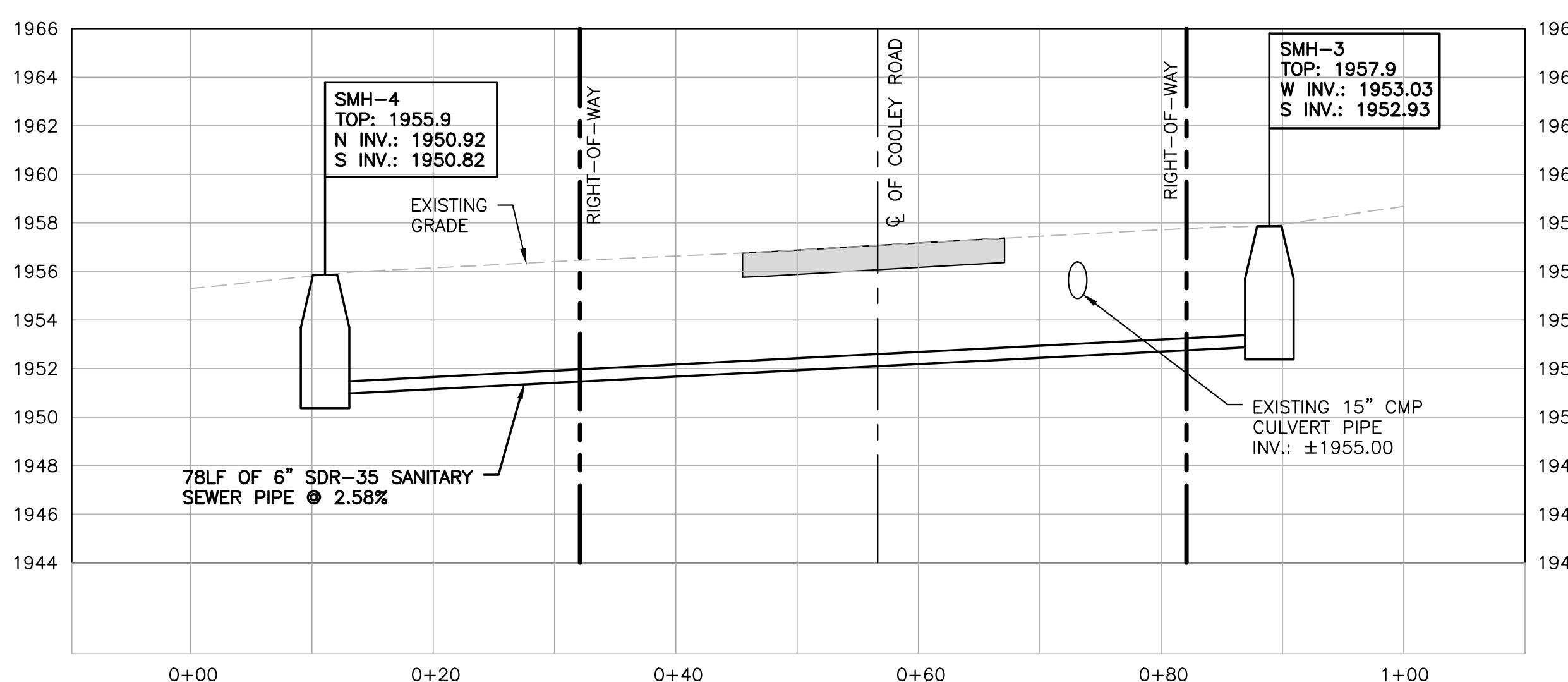
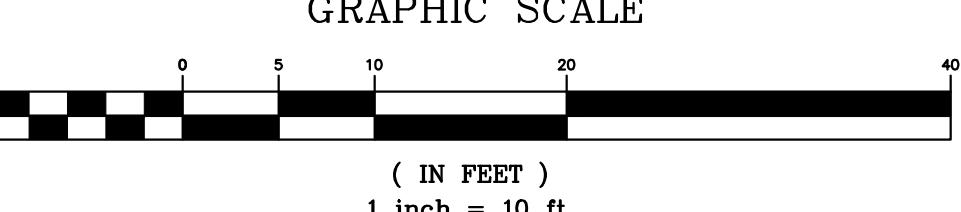
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SANITARY CROSSING OF C.R. 85 PLAN

SCALE: 1"=10'



SANITARY CROSSING OF C.R. 85 PROFILE

SCALE: HORIZ: 1"=10'
VERT: 1"=5'

ARROWHEAD RANCH & RETREAT PHASE I CAMPGROUND SITE IMPROVEMENTS	
TOWN OF LIBERTY	SULLIVAN COUNTY, NEW YORK
1	SANITARY CROSSING PLAN & PROFILE
2	
3	
4	
5	

SHEET NO.	C150
PROJECT NO.	3214.26620
DATE:	06/07/21
REVISION:	3214.26620-C150

GENERAL NOTES

- 1) ALL WORK SHALL CONFORM TO NYSDOH REGULATIONS AND STANDARDS.
 - 2) ALL WORK SHALL BE INSPECTED AND CERTIFIED BY A LICENSED NYS PROFESSIONAL ENGINEER OR HIS REPRESENTATIVE.
 - 3) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKEOUT.
 - 4) ALL AREAS WITHIN OR OUTSIDE THE EXISTING EASEMENTS OR ANY CONTRACT LIMITS DESIGNATED, THAT ARE DISTURBED BY CONTRACTORS OPERATIONS SHALL BE RESTORED AT THE EXPENSE OF THE CONTRACTOR, TO THE SATISFACTION OF THE OWNER.
 - 5) CONTRACTOR SHALL CALL DIG SAFELY NY TWO WORKING DAYS BEFORE DIGGING. 1-800-962-7962
NON-MEMBERS MUST BE CONTACTED SEPARATELY.

6) THERE ARE NO GUARANTEE THAT ALL EXISTING UNDERGROUND OR OVERHEAD UTILITIES WHETHER FUNCTIONAL OR ABANDONED, WITHIN THE PROJECT AREA ARE SHOWN ON THIS PLAN. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UTILITIES BEFORE STARTING WORK AND SHALL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM THIS WORK.

7) KEYSTONE ASSOCIATES ARCHITECTS, ENGINEERS AND SURVEYORS, LLC. IS NOT RESPONSIBLE FOR ANY CONSTRUCTION WORK PERFORMED PRIOR TO FINAL APPROVAL OF ALL PLANS AND SECURING OF ALL PERMITS AND FILING OF ALL MAPS.

8) CONTRACTOR TO COMPLY WITH ALL O.S.H.A. AND OTHER STATE AND LOCAL SAFETY REQUIREMENTS DURING CONSTRUCTION. (PROPER SHORING, ETC.).

9) THE CONTRACTOR SHALL FIELD VERIFY EXISTING TOPOGRAPHY PRIOR TO COMMENCEMENT OF EARTHWORK OPERATIONS. ANY ELEVATION DISCREPANCIES WHICH WILL AFFECT THE WORK REQUIRED AS PART OF THE CONTRACT DOCUMENTS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.

PRECAST REINFORCED CONCRETE SEPTIC TANKS

- A) CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,500 POUNDS PER SQUARE INCH (PSI) AT 28 DAYS SET; 3,000 PSI CONCRETE IS RECOMMENDED.
 - B) WALL THICKNESS SHALL BE A MINIMUM OF THREE INCHES UNLESS THE DESIGN HAS BEEN CERTIFIED BY A NEW YORK STATE LICENSED PROFESSIONAL ENGINEER AS COMPLYING WITH ALL APPROPRIATE REQUIREMENTS FOR THIN-WALL CONSTRUCTION. ALL WALLS, FLOOR, ROOF, AND ACCESS COVERS SHALL CONTAIN REINFORCING TO ASSURE SUPPORT FOR 300 PSF.
 - C) ALL JOINTS SHALL BE SEALED SUCH THAT THE TANK IS WATERTIGHT.
 - D) TANKS WITH A JOINT BELOW THE LIQUID LEVEL MUST BE TESTED FOR WATERTIGHTNESS PRIOR TO BACKFILLING.

DESIGN AND INSTALLATION

THE FOLLOWING GENERAL REQUIREMENTS APPLY TO ALL SEPTIC TANKS REGARDLESS OF CONSTRUCTION MATERIAL:

- A) A MINIMUM LIQUID DEPTH OF 30 INCHES. THE MAXIMUM DEPTH FOR DETERMINING THE ALLOWABLE DESIGN VOLUME OF A TANK SHALL BE 60 INCHES. DEEPER TANKS PROVIDE EXTRA SLUDGE STORAGE BUT NO CREDITIS GIVEN TOWARD DESIGN VOLUME.
 - B) THE MINIMUM DISTANCE BETWEEN THE INLET AND OUTLET SHALL BE SIX FEET. ALL TANK SHALL MEET THE MINIMUM SURFACE AREA REQUIREMENT FOR THE SPECIFIC DESIGN VOLUME IN TABLE 3. THE EFFECTIVE LENGTH OF RECTANGULAR TANKS SHOULD NOT BE LESS THAN TWO OR GREATER THAN FOUR TIMES THE EFFECTIVE WIDTH.
 - C) TANKS MUST BE WATERTIGHT, CONSTRUCTED OF DURABLE MATERIAL, AND NOT SUBJECT TO EXCESSIVE CORROSION, DECAY, FROST DAMAGE, OR CRACKING. WHEN INSTALLED, THE TOP OF ALL TANKS SHALL BE ABLE TO SUPPORT AT LEAST 300 POUNDS PER SQUARE FOOT (PSF).
 - D) TANK ACCESS COVERS AND MANHOLE COVERS SHALL BE WITHIN 12 INCHES OF FINAL GRADE TO PERMIT INSPECTION AND MAINTENANCE. TANKS SHALL HAVE AT LEAST ONE MANHOLE OPENING AND VISUAL ACCESS OPENINGS ABOVE THE INLET AND OUTLET BAFFLES. A MANHOLE OPENING MAY REPLACE A VISUAL ACCESS OPENING. TANKS WITH A LIQUID DEPTH OF 48 INCHES OR MORE SHALL HAVE A TOP OPENING WITH A MINIMUM OF 20 INCHES IN THE SHORTEST DIMENSION TO ALLOW ENTRY INTO THE TANK. TANKS WITH A LIQUID DEPTH LESS THAN 48 INCHES SHALL HAVE A TOP OPENING THAT IS AT LEAST 12 INCHES IN THE SHORTEST DIMENSION. WHEN THE TOP OF A SEPTIC TANK IS MORE THAN 12 INCHES BELOW FINAL GRADE, WATERTIGHT EXTENSION COLLARS SHALL BE USED TO BRING ACCESS COVERS AND MANHOLE COVERS WITHIN 12 INCHES OF FINAL GRADE. SEPTIC TANK ACCESS COVERS LOCATED AT OR ABOVE GRADE SHOULD BE LOCKABLE TO PREVENT ENTRY BY UNAUTHORIZED PERSONS, ESPECIALLY CHILDREN.
 - E) TANKS SHALL HAVE INLET AND OUTLET BAFFLES, SANITARY TEES OR OTHER DEVICES TO PREVENT THE PASSAGE OF FLOATING SOLIDS AND TO MINIMIZE DISTURBANCE OF SETTLED SLUDGE OR FLOATING SCUM BY SEWAGE ENTERING AND LEAVING THE TANK. OUTLET DESIGNS INCORPORATING GAS BUBBLE DEFLECTION (I.E., GAS DEFLECTION BAFFLES) ARE STRONGLY RECOMMENDED TO MINIMIZE SOLIDS LOADING OF THE ABSORPTION SYSTEM. INLET AND OUTLET BAFFLES SHALL EXTEND A MINIMUM OF 12 INCHES AND 14 INCHES, RESPECTIVELY, BELOW THE LIQUID LEVEL IN TANKS WITH A LIQUID DEPTH OF LESS THAN 40 INCHES, AND 16 AND 18 INCHES, RESPECTIVELY, IN TANKS WITH A LIQUID DEPTH OF 40 INCHES OR GREATER. THE HORIZONTAL DISTANCE BETWEEN THE OUTLET BAFFLE AND THE OUTLET SHALL NOT EXCEED SIX INCHES. BAFFLES SHALL BE CONSTRUCTED OF A DURABLE MATERIAL NOT SUBJECT TO EXCESSIVE CORROSION, DECAY, OR CRACKING. INCREASING THE DIAMETER OF THE VERTICAL SECTION OF OUTLET SANITARY TEES TO MORE THAN FOUR (4) INCHES IS RECOMMENDED TO DECREASE UPFLOW VELOCITY AND POTENTIAL DISCHARGE OF SUSPENDED SOLIDS TO THE ABSORPTION SYSTEM.
 - F) THERE SHALL BE A MINIMUM OF ONE INCH CLEARANCE BETWEEN THE UNDERSIDE OF THE ROOF OF THE TANK AND THE TOP OF ALL BAFFLES, AND/OR TEES TO PERMIT VENTING OF TANK GASES. MULTI-CHAMBER AND MULTI-TANK SYSTEMS SHALL ALSO BE DESIGNED TO PERMIT VENTING OF TANK GASES.
 - G) TANKS SHALL BE PLACED ON AT LEAST A THREE-INCH BED OF SAND OR PEA GRAVEL. THIS WILL PROVIDE FOR PROPER LEVELING AND BEARING. A FIVE-INCH BED OF AGGREGATE (3/4 TO 1-1/2 INCHES IN DIAMETER) MAY BE USED IN-LIEU-OF THE REQUIRED THREE INCH BED OF SAND OR PEA GRAVEL. ANY ADDITIONAL INSTRUCTIONS PROVIDED BY THE TANK MANUFACTURER SHALL ALSO BE FOLLOWED.
 - H) THERE SHALL BE A MINIMUM DROP IN ELEVATION OF TWO INCHES BETWEEN THE INVERTS (BOTTOM OF INSIDE OF PIPE) OF THE INLET AND OUTLET PIPES.
 - I) GARBAGE GRINDERS. AN ADDITIONAL 250 GALLONS OF CAPACITY AND SEVEN SQUARE FEET OF SURFACE AREA ARE REQUIRED WHEN A GARBAGE GRINDER CAN REASONABLY BE EXPECTED AT THE TIME OF CONSTRUCTION OR IN THE FUTURE. A GAS DEFLECTION BAFFLE OR OTHER ACCEPTABLE OUTLET MODIFICATION (E.G., GAS BAFFLES) AND A DUAL COMPARTMENT TANK OR TWO TANKS IN SERIES MUST ALSO BE PROVIDED.
 - J) SEPTIC TANKS MAY BE FORCED TOWARD THE GROUND SURFACE DURING CLEANING OR DEWATERING OPERATIONS IF THEY HAVE BEEN INSTALLED WITHIN THE GROUND WATER ZONE. THIS IS CAUSED BY THE BUOYANCY EFFECT OF THE DISPLACED VOLUME OF THE TANK. SEPTIC TANKS SHOULD NOT BE COMPLETELY DEWATERED IF GROUND WATER LEVELS ARE SIGNIFICANTLY HIGHER THAN THE BOTTOM OF THE TANK UNLESS SAID TANKS ARE PROPERLY ANCHORED. TANKS CONSTRUCTED OF FIBERGLASS, PLASTIC, OR STEEL ARE MORE LIKELY TO FLOAT THAN REINFORCED CONCRETE TANKS BECAUSE OF THEIR LIGHTER WEIGHT PER GIVEN VOLUME.
 - K) SPECIAL CARE MUST BE TAKEN IN BEDDING THE SEWER, SEPTIC TANK, AND OUTLET LINE TO PREVENT UNEVEN SETTLEMENT AND POSSIRF CRACKING OR RUPTURE THE INLET AND OUTLET LINES CONNECT TO THE SEPTIC TANK.

PASSING SQUARE
MESH SIEVES

100
90-100
30-65
5-40
0-10

MAXIMUM SLOPE

EXCAVATION LIMITS

ABOVE ALL PIPING EXCEPT STORM TERRATAPE UNDERGROUND UTILITY MARKING TAPE, YELLOW, MANUFACTURED BY REEF INDUSTRIES, INC., OR EQUAL

E BEDDING

TER MAINS: USE WELL GRADED D WITH 3/4" MAX. PARTICLE E AND NOT MORE THAN 10% SING NO. 200 SIEVE

ITIARY SEWER PIPE: USE 1/2"-3/4" CRUSHED STONE, CRUSHED GRAVEL OR PEA GRAVEL

RM SEWER PIPE AND CULVERTS: USE E 1 GRANULAR FILL (REFER TO PIPE CKFILL ABOVE FOR AGGREGATE SIZE)

URAL GAS DISTRIBUTION: USE LL GRADED BANK RUN SAND TING NYSDOT SECTION 703.07 ADATION CRITERIA (<3/8"). PIPE ERT AT 30" BELOW FINISH GRADE

6" MIN. FOR P.E. GAS MAIN AND D.I.P. (12" MIN. FOR ALL OTHERS)

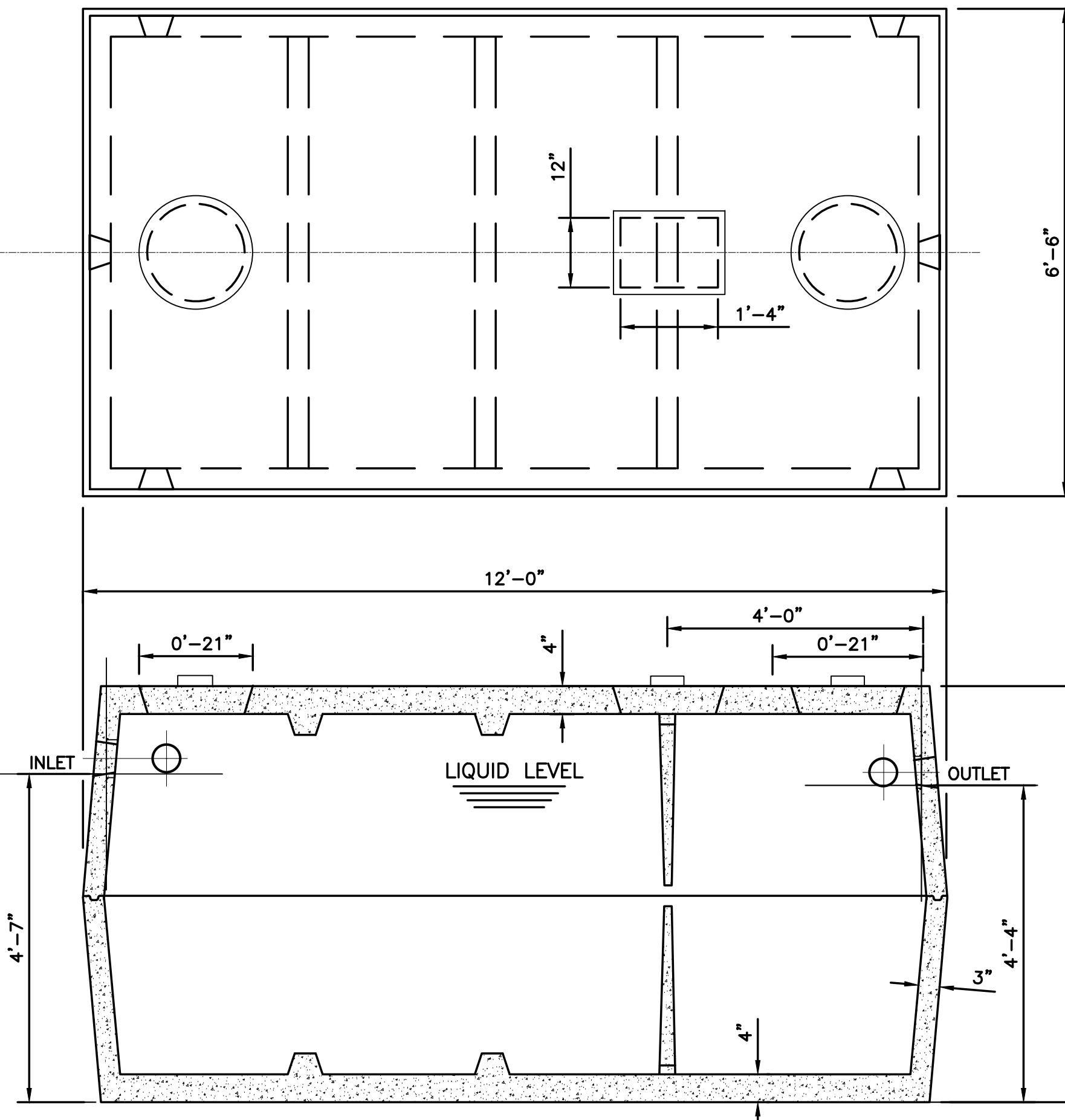
PROPOSED PIPE

4" MIN. FOR D.I.P.

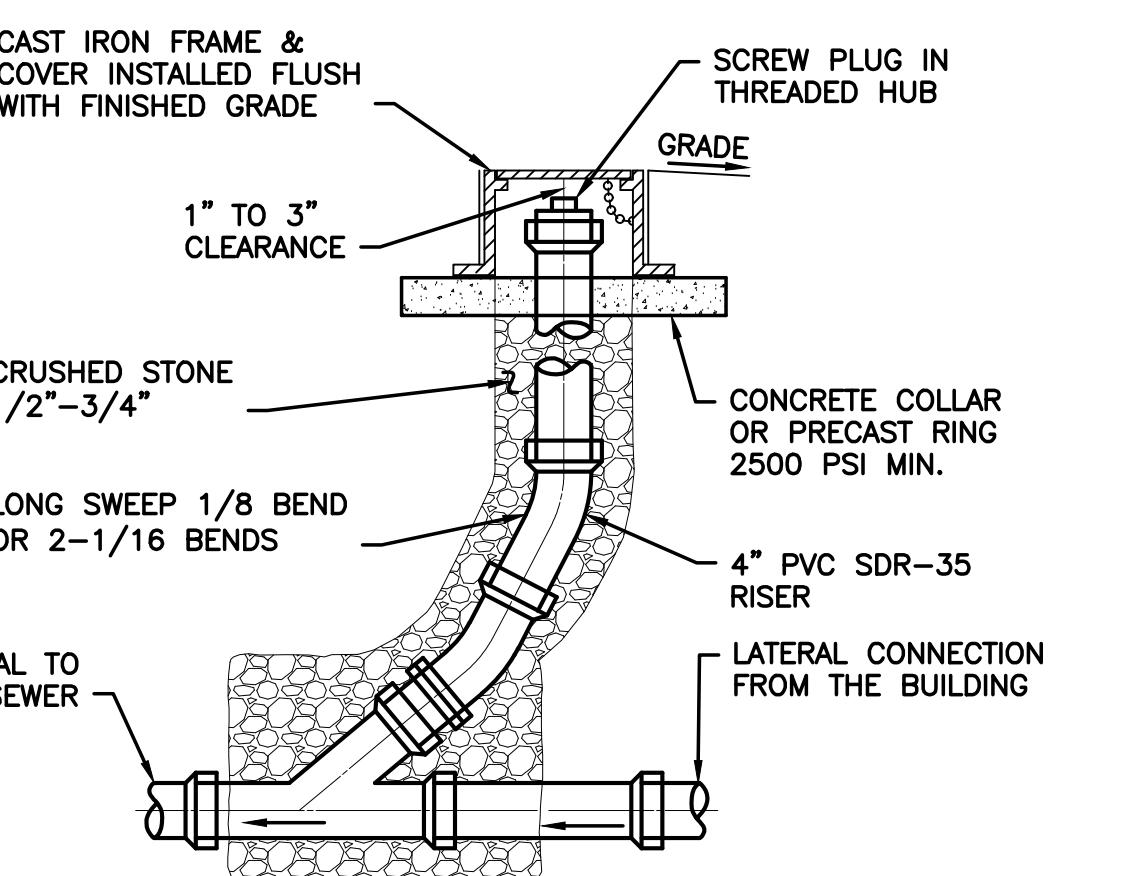
6" MIN. FOR ALL OTHERS UP TO 24" DIA. OVER 24" DIA. = O.D./4

PIPE DIA.
PLUS 2'-0" MIN.

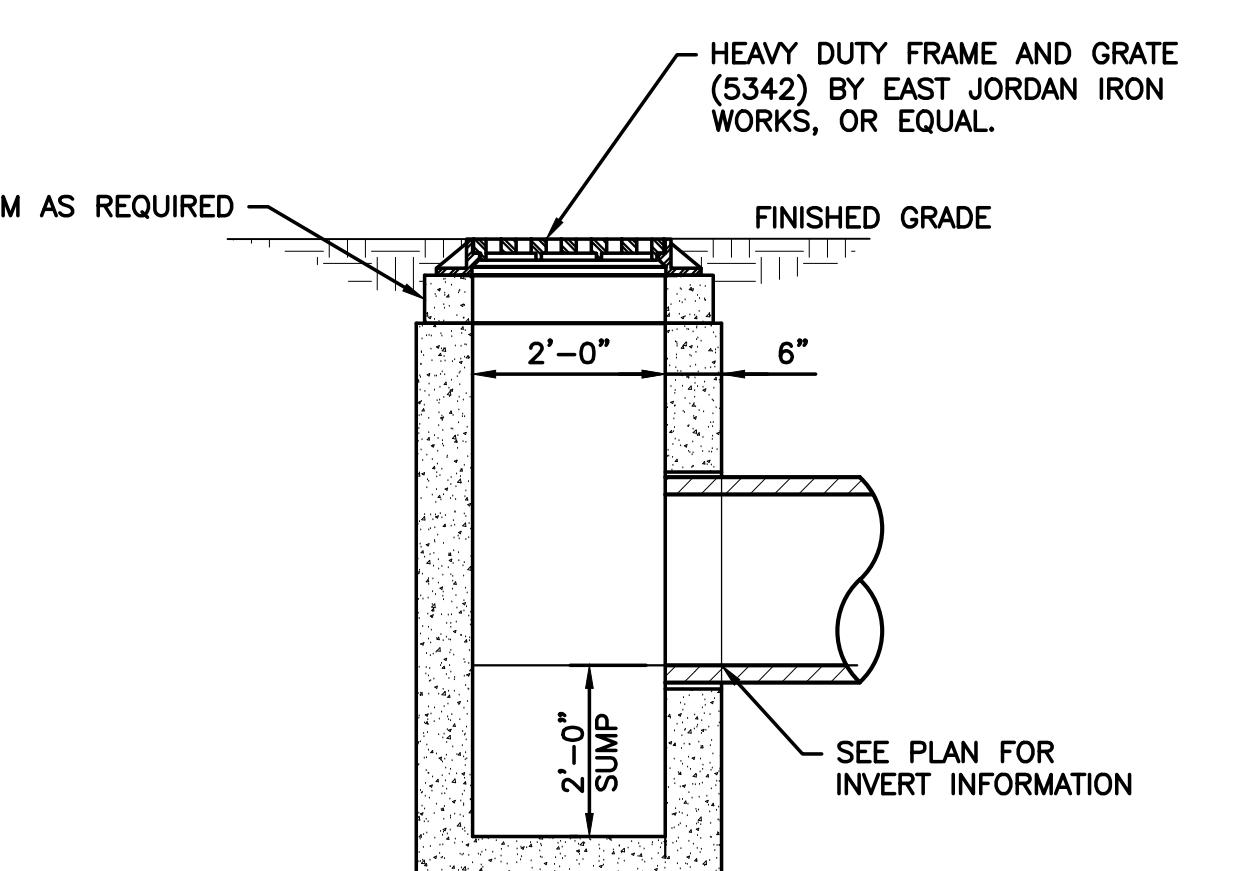
5 PIPE TRENCH DETAIL
C200 N.T.S.



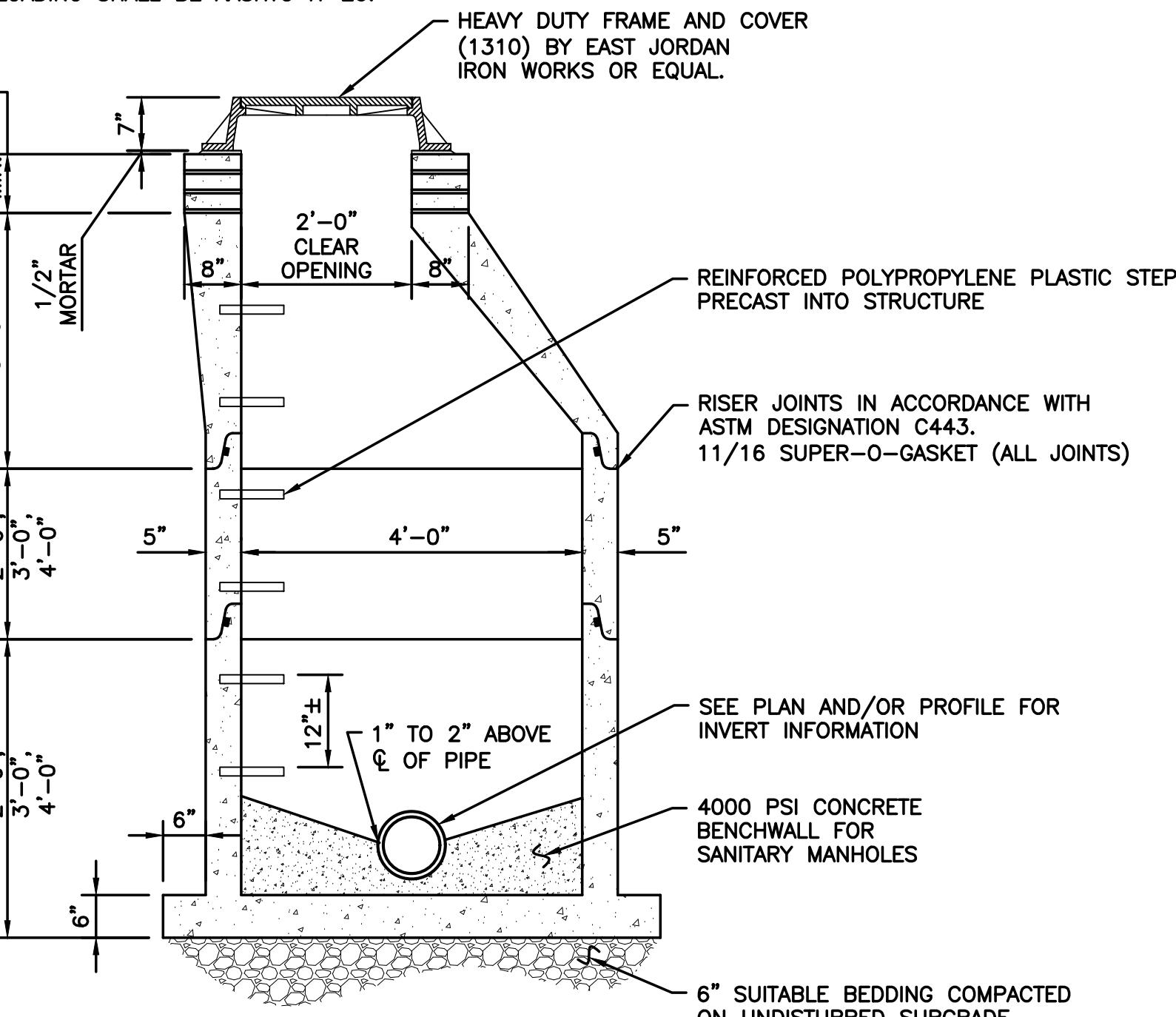
**2000 GALLON DUAL COMPARTMENT
CONCRETE SEPTIC TANK DETAIL**



CLEANOUT DETAIL



CATCH BASIN DETAIL

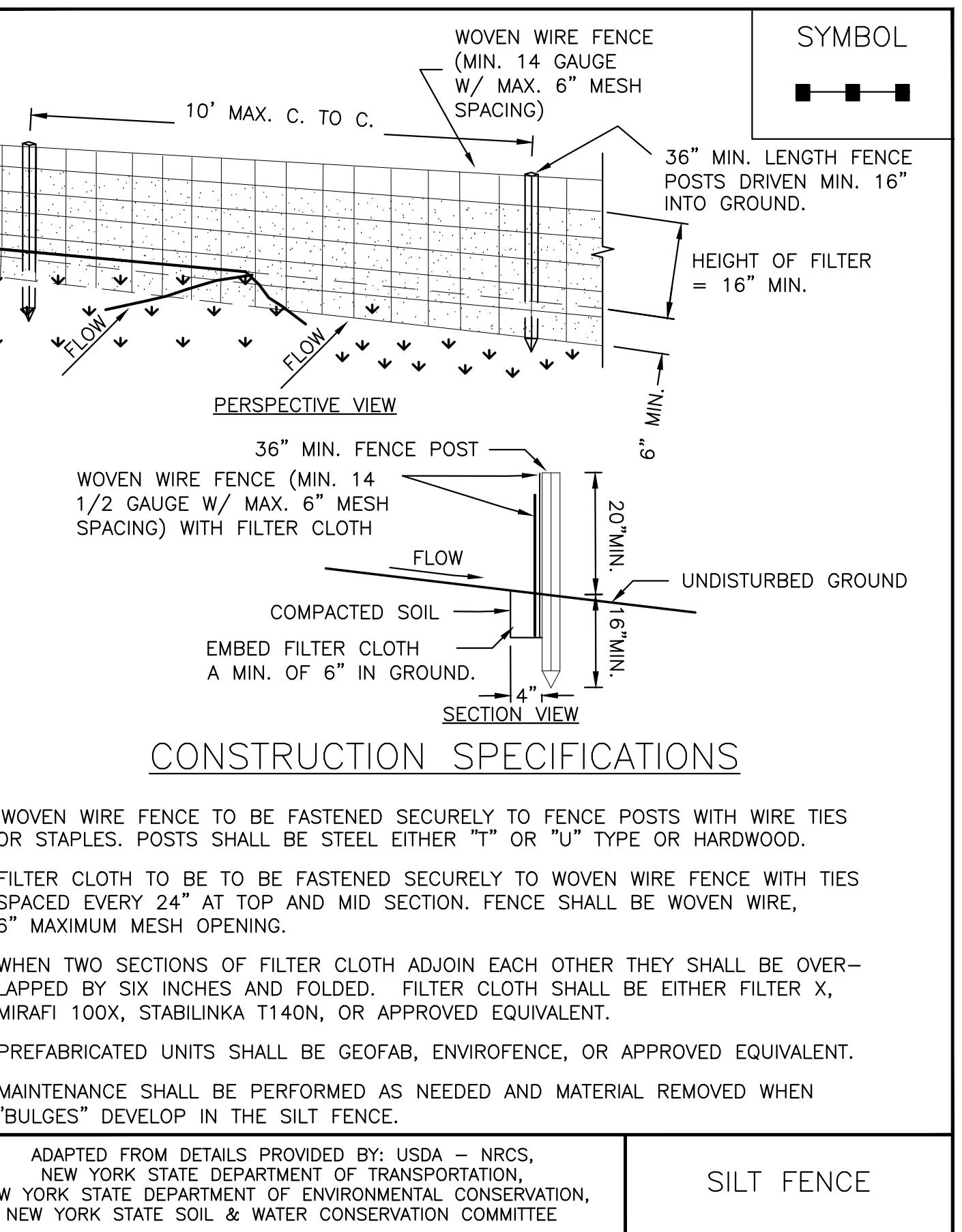
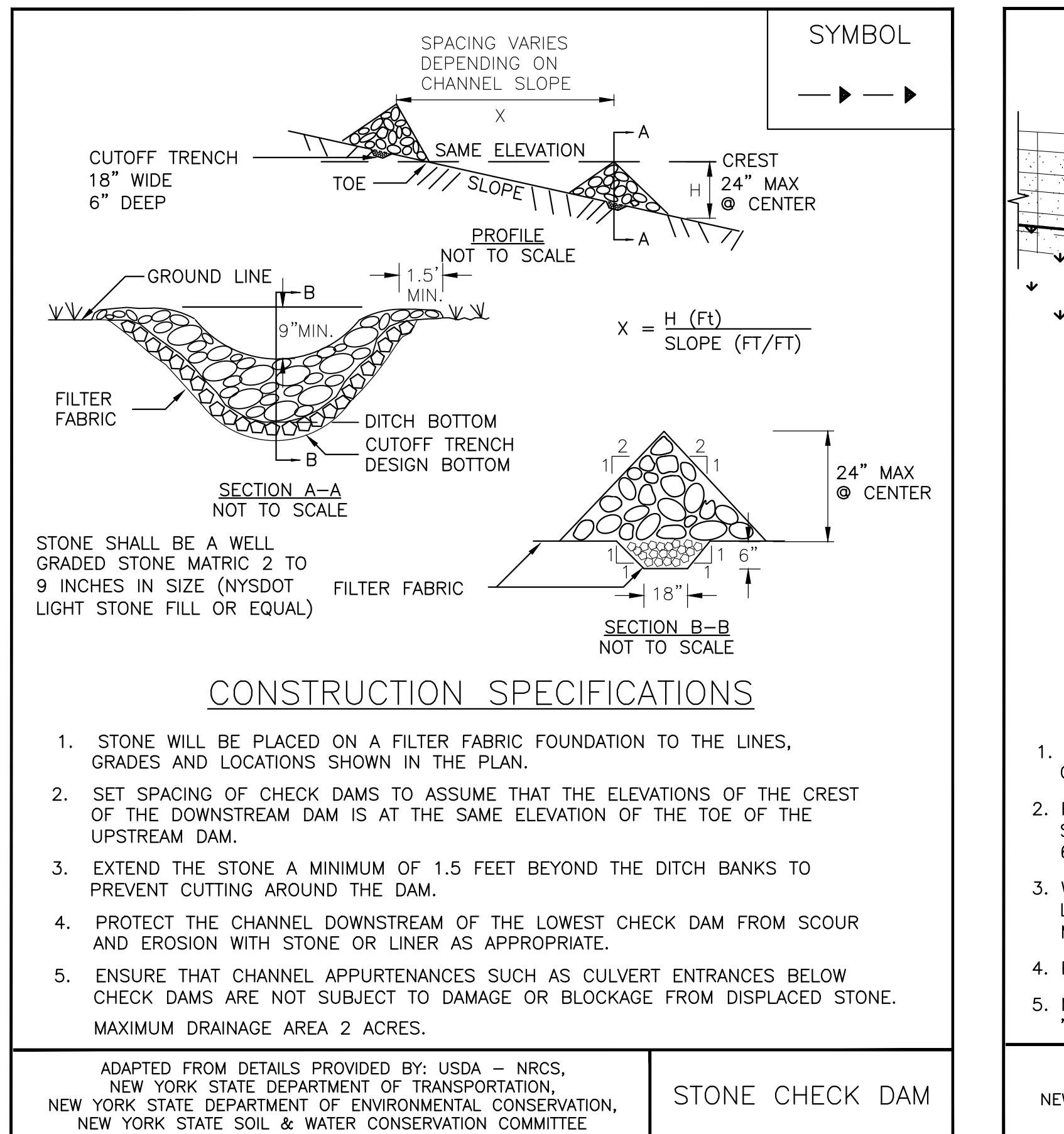
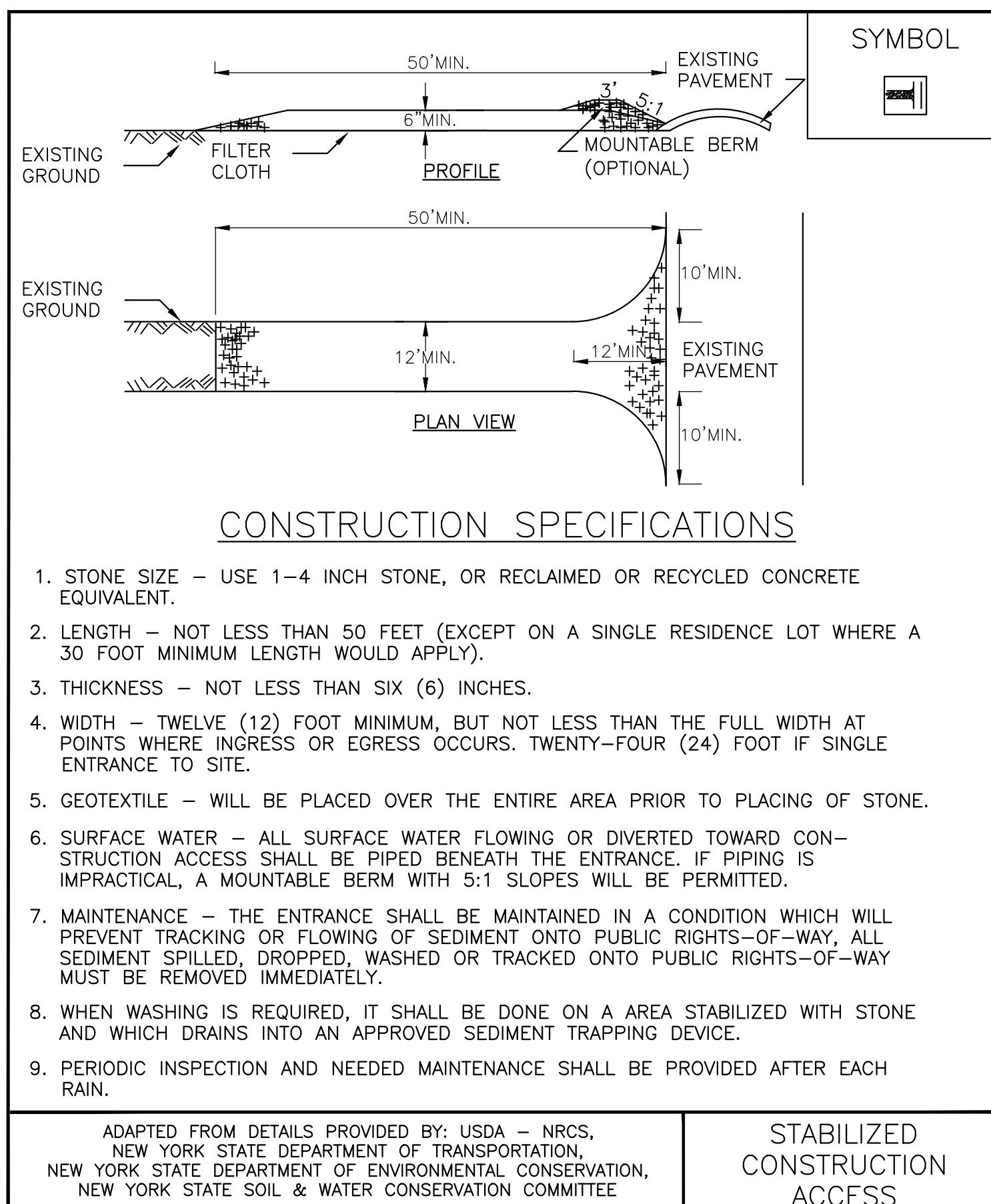


1 MANHOLE DETAIL
C200 N.T.S.

NOT FOR CONSTRUCTION



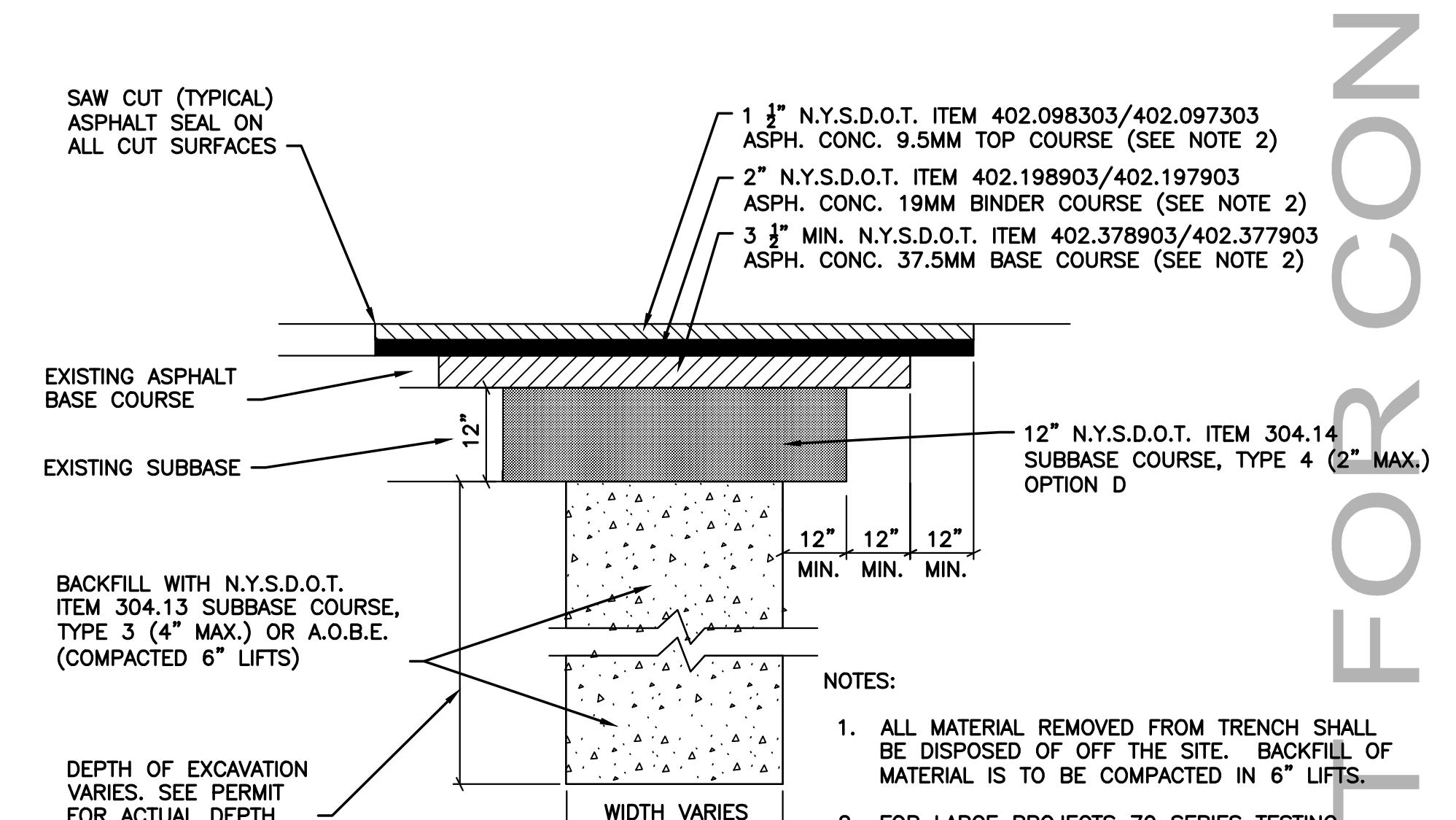
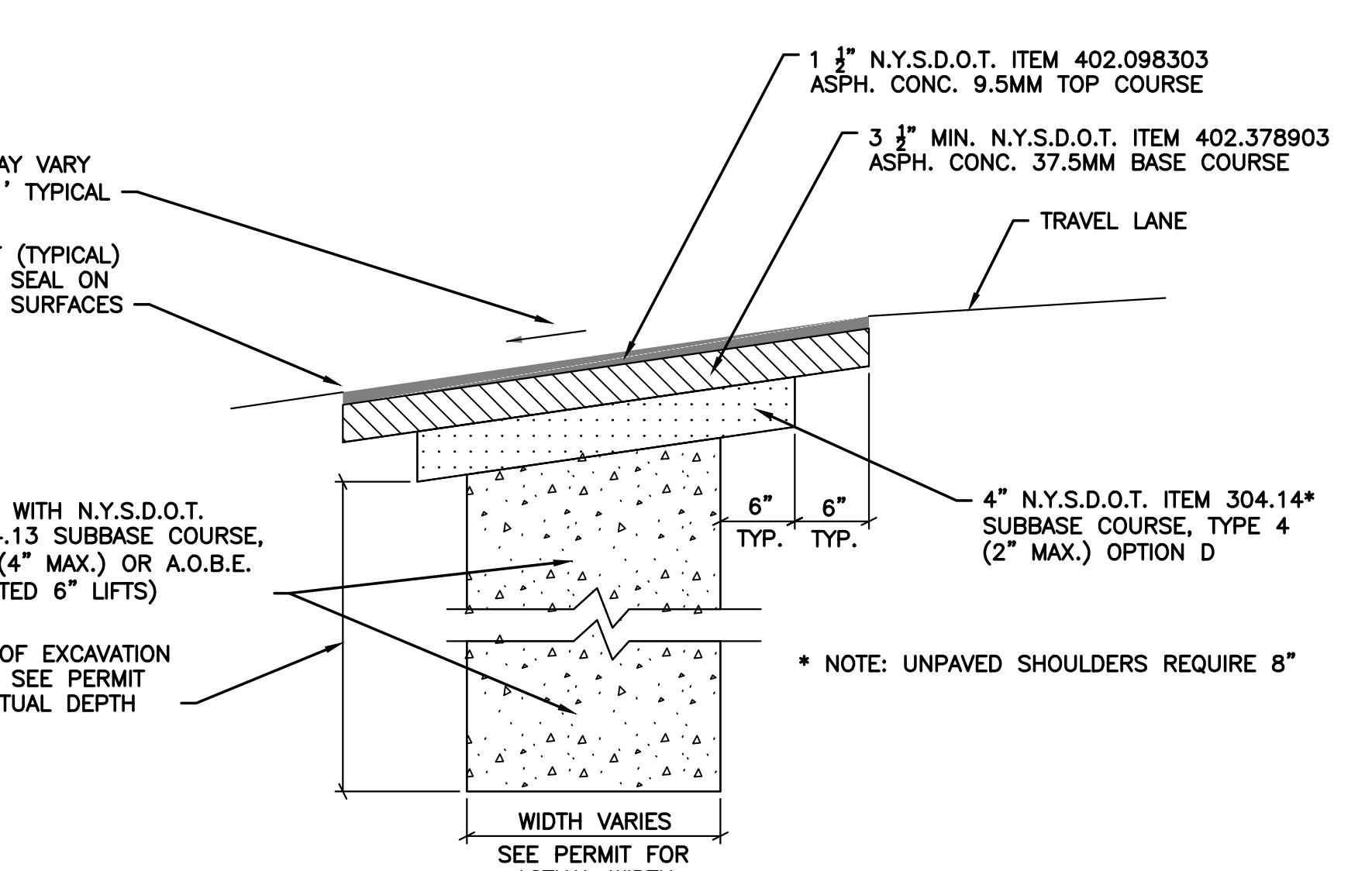
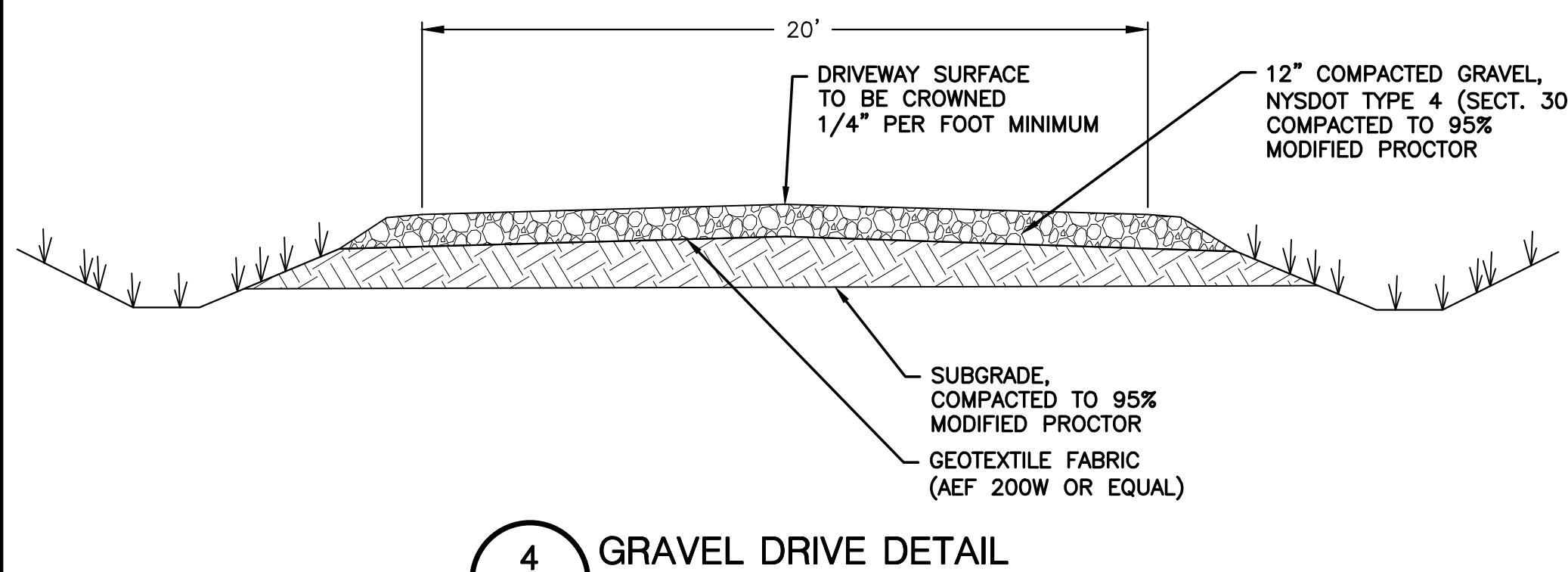
58 Exchange Street 13901
Binghamton, New York 13901
Phone: 601.722.2515
Email: info@keystcomp.com
www.keystcomp.com



1 STABILIZED CONSTRUCTION ACCESS DETAIL
C210
N.T.S.

2 STONE CHECK DAM DETAIL
C210
N.T.S.

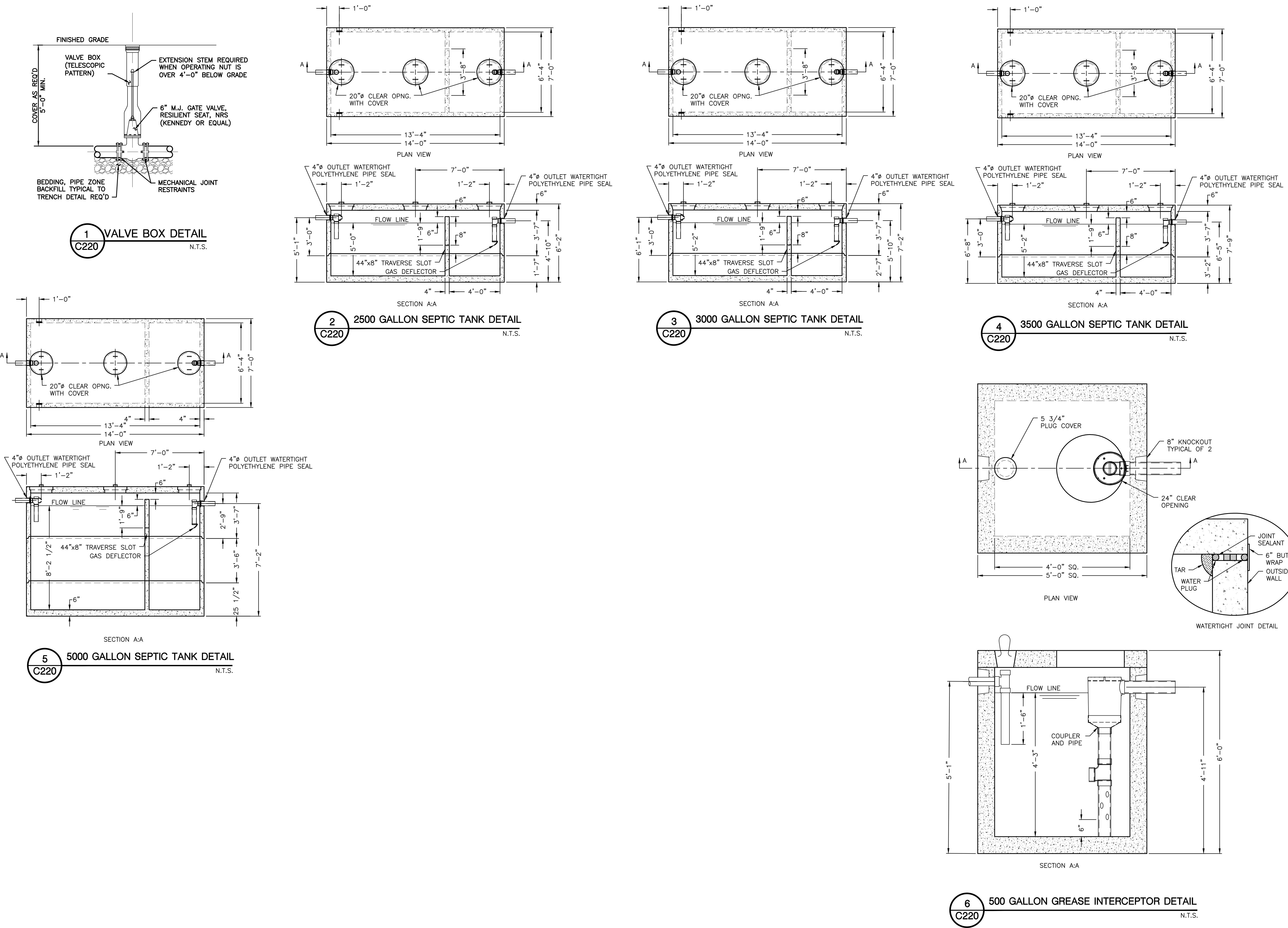
3 SILT FENCE DETAIL
C210
N.T.S.



**ARROWHEAD RANCH & RETREAT
PHASE I CAMPGROUND
SITE IMPROVEMENTS**
TOWN OF LIBERTY
SULLIVAN COUNTY, NEW YORK
DETAILS

SHEET NO.
C210
PROJECT NO.
3214.26620
DATE:
06/07/21
REV. NO.
3214.26620-C200

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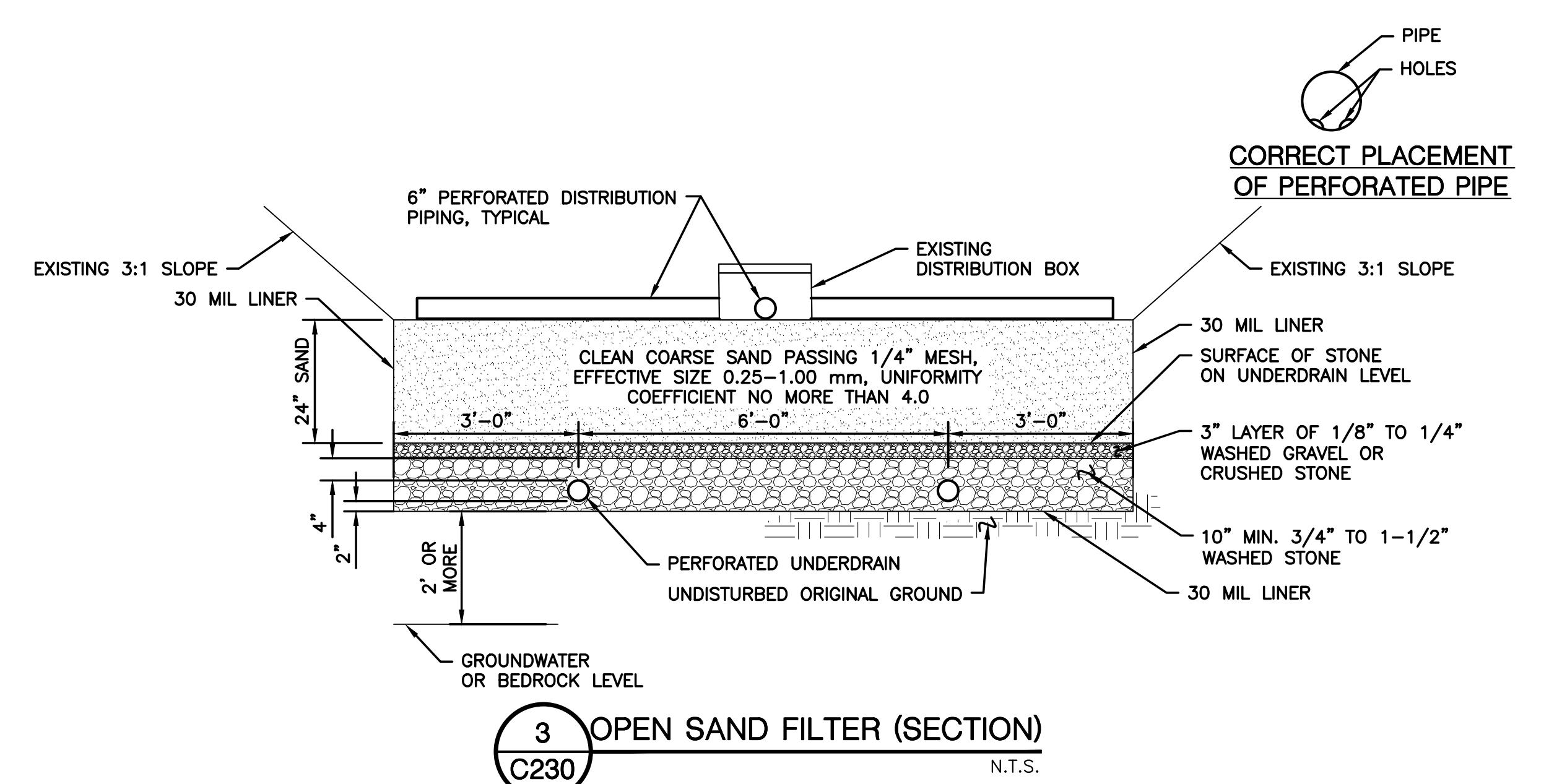
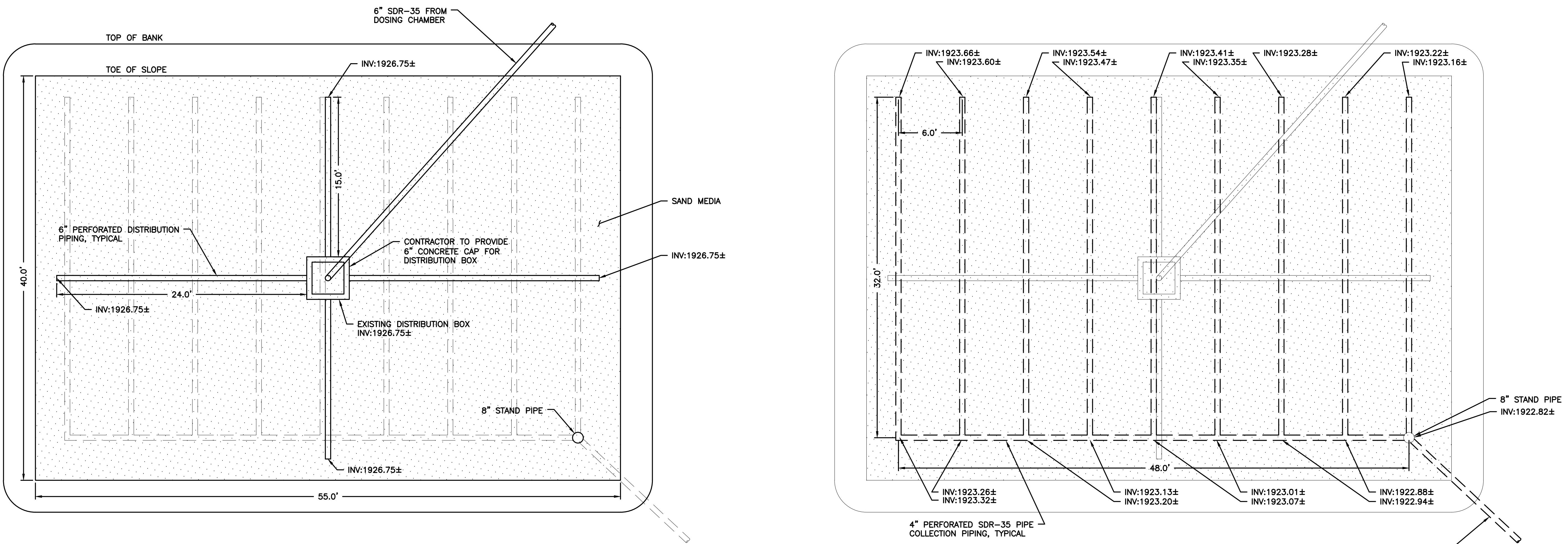
**ARROWHEAD RANCH & RETREAT
PHASE I CAMPGROUND
SITE IMPROVEMENTS**
TOWN OF LIBERTY
SULLIVAN COUNTY, NEW YORK
DETAILS

SHEET NO.
C220
PROJECT NO.
3214.26620
DATE
06/07/21
REV.
3214.26620-C220

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**KEYSTONE
ASSOCIATES**
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC

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**ARROWHEAD RANCH & RETREAT
PHASE I CAMPGROUND
SITE IMPROVEMENTS**
TOWN OF LIBERTY
SULLIVAN COUNTY, NEW YORK

SAND FILTER DETAILS

**SHEET NO.
C230**
PROJECT NO.
3214.26620
DATE
06/07/21
REV. NO.
3214.26620-C200

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ASSOCIATES**
ARCHITECTS, ENGINEERS AND SURVEYORS, LLC