



Department of Energy

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February 19, 2021

Mr. Brian Begley
Federal Facility Agreement Manager
Division of Waste Management
Kentucky Department for Environmental Protection
300 Sower Boulevard, 2nd Floor
Frankfort, Kentucky 40601

PPPO-02-10009461-21

Mr. Victor Weeks
Federal Facility Agreement Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

Dear Mr. Begley and Mr. Weeks:

TRANSMITTAL OF THE SITE EVALUATION REPORT FOR THE C-350 DRYING AGENT STORAGE BUILDING AT THE PADUCAH GASEOUS DIFFUSION PLANT, PADUCAH, KENTUCKY, DOE/LX/07-2452&D1

In accordance with Appendix 4 of the approved Site Management Plan of the Paducah Federal Facility Agreement (FFA), the U.S. Department of Energy (DOE) is submitting the D1 *Site Evaluation Report for the C-350 Drying Agent Storage Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-2452&D1 (SE), to the U.S. Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KDEP) for review and comment. A joint policy issued under DOE and EPA memorandum, dated May 22, 1995, *Policy on Decommissioning Department of Energy Facilities Under CERCLA*, establishes a framework for conducting the decommissioning of DOE facilities and also provides guidance on the use of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response authority to decommission DOE facilities. This policy states that DOE is required to conduct a removal site evaluation, in accordance with the National Contingency Plan and interagency agreements (i.e., FFA), to assess site conditions and determine whether a release or substantial threat of release exists at the facility. DOE, EPA, and KDEP have agreed to conduct decontamination and decommissioning activities for facilities that pose an environmental release threat at the Paducah Site under the existing FFA. Section IX, *Site Evaluation(s)*, of the FFA requires DOE to conduct integrated site evaluations that consist of the removal site evaluation, remedial site evaluation, and solid waste management unit assessment reports. These integrated site evaluations are to be documented in an SE report.

The enclosed SE recommends that CERCLA action for the facility is not warranted. Upon approval, the *Detailed Facility D&D OU Facilities List* in Appendix 4 for this facility will be updated to indicate the facility requires no further action. In accordance with Section XX of the

FFA, EPA and KDEP have a 30-day review period to provide comments and/or approval of the document.

If you have any questions or require additional information, please contact me at (270) 441-6862.

Sincerely,

Tracey L.
Duncan

Digitally signed by Tracey
L. Duncan
Date: 2021.02.19
07:43:11 -06'00'

Tracey Duncan
Federal Facility Agreement Manager
Portsmouth/Paducah Project Office

Enclosures:

1. Certification Page
2. *Site Evaluation Report for the C-350 Drying Agent Storage Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-2452&D1*

Administrative Record File—DDARC

cc w/enclosures:

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CERTIFICATION

Document Identification: *Site Evaluation Report for the C-350 Drying Agent Storage Building at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/LX/07-2452&D1*

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Four Rivers Nuclear Partnership, LLC

MYRNA REDFIELD
(Affiliate)

 Digitally signed by MYRNA
REDFIELD (Affiliate)
Date: 2021.02.18 15:46:09 -06'00'

2/18/2021


Myrna E. Redfield, Program Manager
Four Rivers Nuclear Partnership, LLC

Date Signed

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

U.S. Department of Energy

Jennifer R. Woodard

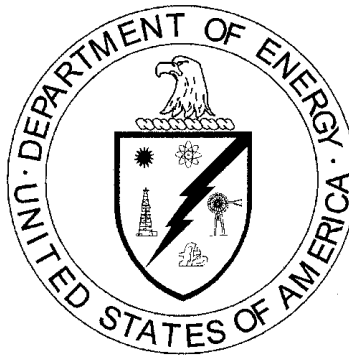
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Jennifer Woodard, Paducah Site Lead
Portsmouth/Paducah Project Office
U.S. Department of Energy

Date Signed

**DOE/LX/07-2452&D1
Primary Document**

**Site Evaluation Report for the
C-350 Drying Agent Storage Building at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**



CLEARED FOR PUBLIC RELEASE

**DOE/LX/07-2452&D1
Primary Document**

**Site Evaluation Report for the
C-350 Drying Agent Storage Building at the
Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

Date Issued—February 2021

U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
FOUR RIVERS NUCLEAR PARTNERSHIP, LLC,
managing the
Deactivation and Remediation Project at the
Paducah Gaseous Diffusion Plant
under Contract DE-EM0004895

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ACRONYMS

ACM	asbestos-containing material
AOC	area of concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
D&D	decontamination and decommissioning
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
NTCRA	non-time-critical removal action
OU	operable unit
PGDP	Paducah Gaseous Diffusion Plant
RCRA	Resource Conservation and Recovery Act
SE	site evaluation
SMP	Site Management Plan
SWMU	solid waste management unit
TRU	transuranic

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1. FACILITY/UNIT NUMBER

C-350

2. FACILITY/UNIT NAME

Drying Agent Storage Building

3. DATE

February 18, 2021

4. REGULATORY STATUS

A joint policy issued under a U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA) Memorandum dated May 22, 1995, *Policy on Decommissioning Department of Energy Facilities under CERCLA* (DOE 1995), establishes a framework for conducting decommissioning of DOE facilities and provides guidance on the use of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) response authority to decommission DOE facilities. The Policy states that DOE is required to conduct a removal site evaluation (SE) in accordance with the *National Contingency Plan* and interagency agreements [i.e., Federal Facility Agreement (FFA)] to assess site conditions and determine whether a release or substantial threat of release exists at the facility. At any facility for which DOE conducts a removal site evaluation, DOE will consult with EPA and will provide, as requested, EPA with such information necessary for EPA to review such evaluation. DOE, EPA, and the Commonwealth of Kentucky have agreed to conduct decontamination and decommissioning (D&D) activities for those facilities that pose an environmental release threat at the Paducah Gaseous Diffusion Plant (PGDP) under the existing FFA. Section IX [Site Evaluation(s)] of the FFA requires that DOE conduct integrated SEs that consist of the removal site evaluation, remedial site evaluation, and solid waste management unit (SWMU) assessment report. The integrated SEs are to be documented in a site evaluation report consistent with the format in Appendix D of the FFA (EPA 1998).

Industrial facilities that DOE has determined to pose a potential threat of release of hazardous substances to the environment are listed as part of the facility D&D Operable Unit (OU) in Appendix 4 of the Site Management Plan (SMP). The SE report shall state whether demolition of the facility should be conducted using a CERCLA Non-Time-Critical Removal Action (NTCRA) and will serve to designate any facility or portions thereof that are related to any identified release as a SWMU and/or area of concern (AOC).

5. LOCATION

The C-350 facility is located in the central portion of the industrialized area of the Paducah Site, south of the C-335 Process Building. See Figure 1, Aerial Photograph Showing the C-350 Drying Agent Storage Building Location, and Figure 2, Map Showing the C-350 Drying Agent Storage Building Location, for C-350 facility location.

6. APPROXIMATE DIMENSION OR CAPACITY

The C-350 facility is comprised of two structures connected by aboveground piping (see Figure 3, Exterior of C-350; Figure 4, Exterior of C-350, Southeast Corner; and Figure 5, Aboveground Piping Connecting the C-350 Structures). The original structure was built in 1973 and is referred to as the east storage drum room; the second structure was built in 1978 and is referred to as the west storage drum room. The facility consists of 10-ft high concrete blocks with a prestressed concrete roof, an 8-inch concrete floor slab in the

east storage drum room, and a 6-inch concrete floor slab in the west storage drum room. Asbestos-containing materials (ACMs) may have been used on the original roof of the west storage drum room as reinforced base flashing. Each storage drum room has nominal dimensions of 13 ft × 50 ft and contains a 2,000 ft³ storage tank. The east storage drum room has a north extension with nominal dimensions of 9 ft × 30 ft. The overall footprint of the C-350 facility is 1,570 ft² (i.e., 920 ft² for the east storage drum room plus the north extension and 650 ft² for the west storage drum room) (see Figure 6, Engineering Drawing ES 12657 A, Rev. 1 of the Original Drying Agent Storage Facility, and Figure 7, Engineering Drawing S5E 148959 B, Rev. 1 of the Addition to the ClF₃ Facility).

7. FUNCTION

The C-350 facility was used exclusively for the storage of chlorine trifluoride (ClF₃)/nitrogen (N₂)/fluorine (F₂) mixed gases, which were used as drying and cleaning agents for process lines. Liquid ClF₃ cylinders were transferred, as needed, from the C-745-B storage yard to the C-350 building where the liquid was vaporized and the ClF₃ gas was fed into the C-350 storage tanks. A N₂/F₂ mixture from the F₂ system header was added to the tanks to produce ClF₃/N₂/F₂ mixed gas. Mixed gas was distributed to the process buildings through distribution piping in the heated tie-line housing, as needed (see Figure 8, Distribution Piping). There are four drains in the building that discharged to the storm water system.

8. BRIEF HISTORY

The C-350 Drying Agent Storage Building was constructed in 1973 and operated from construction to 2019 to store and feed ClF₃/N₂/F₂ mixed gases to the process buildings. The United States Enrichment Corporation leased the facility in the early 1990s and continued to use it for its intended purpose until PGDP was deleased and returned to DOE in 2014. In 2014, the storage drums were isolated; only N₂/F₂ gas mixtures were transferred to the process buildings. In 2019, the ClF₃/N₂/F₂ systems were shut down and the remaining gases were evacuated; steam was used to purge any residual constituents from the drums; a hole was introduced into each storage drum to remove ability for future storage capabilities; and drums were monitored by industrial hygiene and confirmed no detectable levels of F₂ gas remained.

9. OPERATIONAL STATUS

Deactivating

10. DATES OPERATED

1973 to 2019

11. SITE/PROCESS DESCRIPTION

The north extension to the east storage drum structure originally housed two charging stands and currently has one charging stand. The stand consists of a steel charging cabinet designed to house a single ClF₃ cylinder; a cylinder scale; a pigtail for a ClF₃ cylinder connection; hydrogen fluoride detection sensors; and a local exhaust enclosure that vents through the roof to protect the operators (see Figure 9, Inside the North Extension). A mechanism was attached to the cylinder valve during tank charging operations that allowed the valve to be operated manually from outside of the building. The charging cabinet scale indicated the liquid ClF₃ quantity in the feed cylinder. Normally, a cylinder containing up to approximately 160 lb of liquid ClF₃ was connected to the pigtail. The connected cylinder was secured to the cabinet by a metal band to prevent the cylinder or cylinder valve from turning when the cylinder valve was operated. The ClF₃ cylinder valve was closed when charging was complete. Spare cylinders and empties cylinders were secured in storage racks in the west portion of the north extension.

From the feed cylinder on the charging stand, gaseous ClF_3 flowed to the east or west mixed gas storage tanks. A N_2/F_2 mixture from the F_2 system header was added to the tanks to produce mixed gas. Each tank has nominal dimensions of an 8 ft diameter and are 42 ft 10 inches long with a capacity of 2,000 ft^3 (see Figure 10, East Mixed Gas Storage Tank, and Figure 11, West Mixed Gas Storage Tank). Tank operating pressure was maintained below atmospheric pressure. Flow to the storage tanks was isolated automatically by closure of F_2/N_2 and ClF_3 charging valves when either tank set-point pressure was reached. Tank pressure during charging operations was monitored locally and could be monitored from the C-335 building area control room.

The west portion of the north extension also housed the leak detection panel. The toxic gas leakage detection system was designed to provide alarm indications upon detection of releases from the primary system (FFS 2017).

The building stopped being used to store mixed gases in 2019. In 2019, the remaining gas mixture was evacuated from both storage tanks. As part of this process, steam was used to help purge any residual constituents in the tank. Once the purging process was complete, a 12 inch \times 12 inch hole was cut into each storage tank to permanently remove the pressure vessels from service and provide a means to access to conduct air sampling for residual fluoride compounds. Air sampling confirmed no detectable levels of fluoride gases remained in the storage tanks; therefore, the storage tanks are empty of hazardous chemicals. During a prejob survey supporting the installation of material to cover the hole in the east mixed gas storage tank, unanticipated radiological contamination was discovered inside the tank (FRNP 2019). Subsequent analysis resulted in the C-350 building being posted as a Radioactive Materials Area, and the east mixed gas storage tank was posted as a transuranic (TRU) Materials Contamination Area.

A walkdown inspection conducted in October 2020 confirmed no unusual conditions. The facility no longer contains pressurized ClF_3 or F_2 . The systems are no longer maintained, tested, or monitored.

12. WASTE DESCRIPTION

The primary waste stream that would be generated during D&D of the C-350 facility would be nonhazardous construction and/or demolition debris. This demolition debris will be comprised primarily of concrete blocks and prestressed concrete. Wastes such as polychlorinated biphenyl (PCB)-containing liquids and electrical components and/or Resource Conservation Recovery Act (RCRA) mixed waste sludges or liquids, are not anticipated to be generated with exceptions noted below.

ACM was used as sealing compound around pipe insulation joints and may have been used on the original roof of the west storage drum room as reinforced base flashing.

The interior and exterior surfaces of the buildings, based on the age of the facility, may have been painted with lead-based paints.

Limited infrastructure items remain in the facility (e.g., light fixtures, instrumentation panels, alarms) that could potentially contain *de minimis* quantities of regulated items (e.g., mercury, lead) which will be removed to the extent practicable during deactivation. Generation of any residual amounts of regulated items will be properly containerized, characterized, and dispositioned in accordance with applicable regulatory requirements. Oil products were not used in the facility as they react violently with the chemicals used in the facility.

Two 2,000 ft^3 mixed gas storage tanks remain in the facility. No hazardous chemicals remain in the tanks. The east storage tank is posted as a TRU Materials Contamination Area. Both tanks may have been painted with lead-based paints.

13. WASTE QUANTITY

Based on the waste forecast information available in the *Remedial Investigation/Feasibility Study Report for CERCLA Waste Disposal Alternatives Evaluation at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky* (DOE 2018), the demolition waste volume associated with the C-350 facility is approximately 1,080 yd³. This volume is assumed to be approximately 15 yd³ Toxic Substances Control Act waste; 505 yd³ low-level waste; and the remaining nonhazardous solid waste. Because the east storage tank is posted as a TRU Materials Contamination Area, the east storage tank will be disposed of off-site in an approved repository.

14. SUMMARY OF ENVIRONMENTAL SAMPLING DATA

Sample location 400-052 is located within 50 ft of the C-350 facility (see Figure 12, SWMU and Sample Locations Near C-350). Environmental sample results from this location would not reflect atmospheric releases from C-350 that occurred during operations. Historical atmospheric releases are not expected to have resulted in unacceptable environmental contamination.

15. DESCRIPTION OF RELEASE AND MEDIA AFFECTED

<u>GROUNDWATER:</u>	None Known
<u>SURFACE WATER:</u>	None Known
<u>SOIL:</u>	None Known
<u>ECOLOGY AFFECTED</u> (i.e., threatened/endangered species):	None Known
<u>AIR:</u>	Yes

Raw gaseous releases of ClF₃, N₂, and F₂ to the environment occurred during operations. Releases of mixed gases during operations are not expected to have resulted in unacceptable environmental contamination. The facility no longer contains pressurized ClF₃, N₂, or F₂ and potential releases of ClF₃, N₂, or F₂ are no longer a hazard.

16. DOCUMENTATION OF NO RELEASE

There have been no known spills or releases of materials from the C-350 facility to soil, groundwater, or surface water. The C-350 facility has not been identified as a SWMU or AOC nor did it contain any areas designated as a SWMU or AOC. No information was identified that warranted the designation of the C-350 facility or portions thereof as a SWMU or AOC.

17. IMPACT ON OR BY OTHER SWMU/AOC

There is no evidence that this facility impacts or is being impacted by other SWMUs and/or AOCs.

18. PRELIMINARY REMEDIATION GOAL COMPARISON

Not Applicable. Sample location 400-052 is located near the C-350 facility; however, sample results were not compared to preliminary remediation goals because atmospheric releases of mixed gases during operations would not have resulted in unacceptable environmental contamination.

19. RCRA FACILITY INVESTIGATION NECESSARY

A RCRA Facility Investigation is not necessary for the C-350 Drying Agent Storage Building. There is no evidence of a release, or threat of any release, to the environment from the building and the facility is not believed to pose a risk to human health or the environment.

20. CERCLA NTCRA NECESSARY

A CERCLA NTCRA is not recommended as necessary for demolition of the facility structure following completion of deactivation. Limited non-RCRA infrastructure items and any RCRA-regulated items remaining in the building will be removed, to the extent practicable, during deactivation. Building materials used for construction could contain lead-based paints and ACMs, both of which can be verified effectively during a predemolition inspection, contained, and managed properly using standard demolition and waste management practices. Because of the size of the storage tanks, the storage tanks cannot be removed from the facility until the facility is undergoing demolition. Residual radiological material is confined and contained within the storage tanks. It is anticipated the storage tanks can be removed and dispositioned effectively without posing a threat of an environmental release; therefore, the demolition and disposal of the tanks and the facility can be conducted outside of the FFA and/or CERCLA process.

All applicable laws, regulations, and DOE procedures/protocols will be followed to ensure the demolition and disposal of the aboveground structure occurs in a safe, compliant manner, including conducting any additional radiological characterization through confirmation radiological surveys (as necessary) to support demolition and waste disposition.

21. OU ASSIGNMENT

C-350 currently is assigned to the Facility D&D OU, Other Buildings (non-SWMUs) [SMP Appendix 4].

22. REFERENCES

FFS (Fluor Federal Services, Inc.) 2017. *Hazard Analysis for Balance of Plant Facilities Paducah Site Deactivation Project, Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, CP2-NS-3012, Paducah, KY, July.

FRNP (Four Rivers Nuclear Partnership) 2019. *Radiological Anomalous Condition Report (RACR) Form*, RACR-FRNP-19-0019, September.

DOE (U.S. Department of Energy) 1995. *Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)*, Joint policy from the U.S. Department of Energy and U.S. Environmental Protection Agency, May 22, 1995.

DOE 2018. *Remedial Investigation/Feasibility Study Report for CERCLA Waste Disposal Alternatives Evaluation at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0244 D2/R2, July.



Figure 1. Aerial Photograph Showing the C-350 Drying Agent Storage Building Location

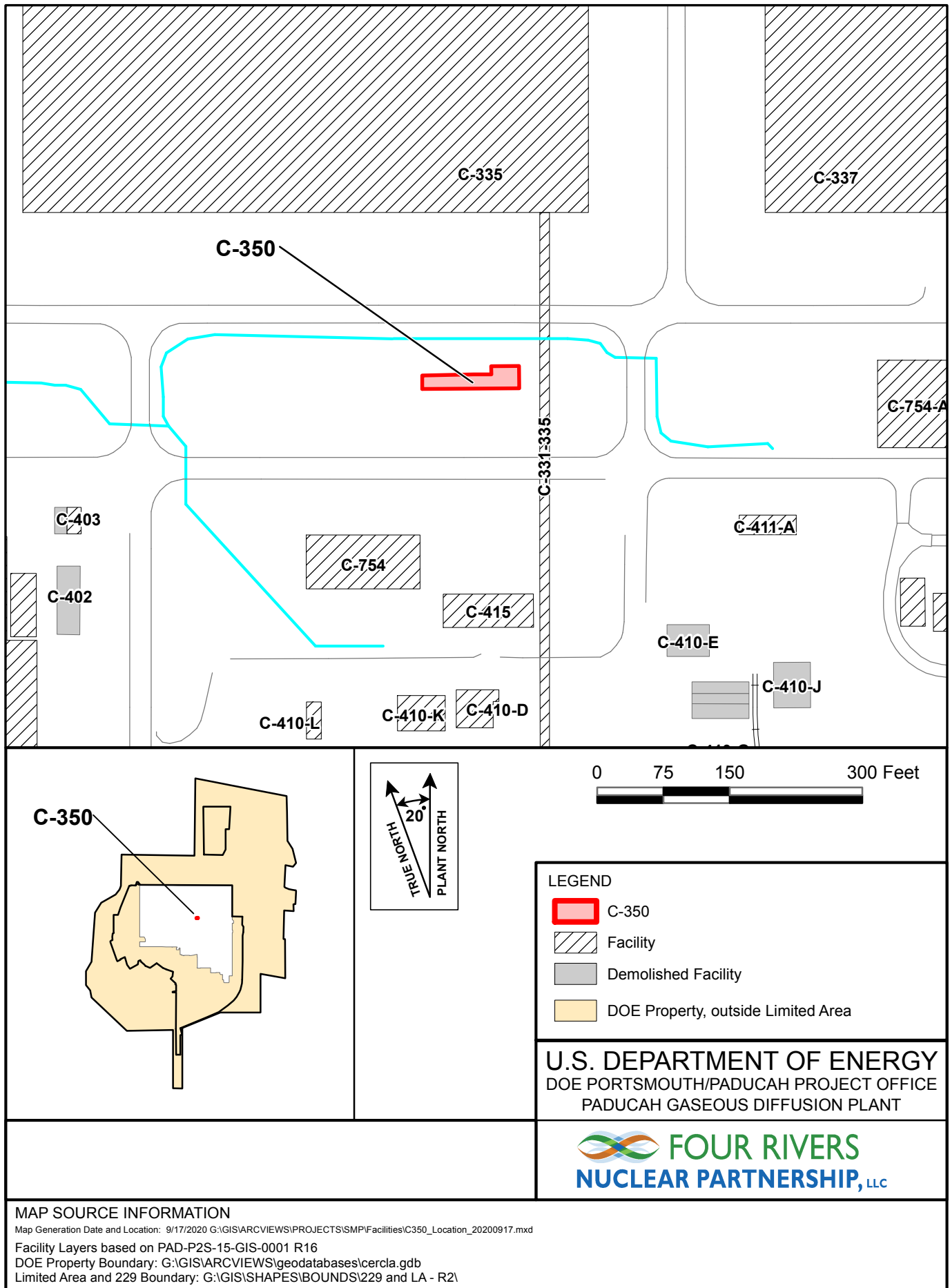


Figure 2. Map Showing the C-350 Drying Agent Storage Building Location



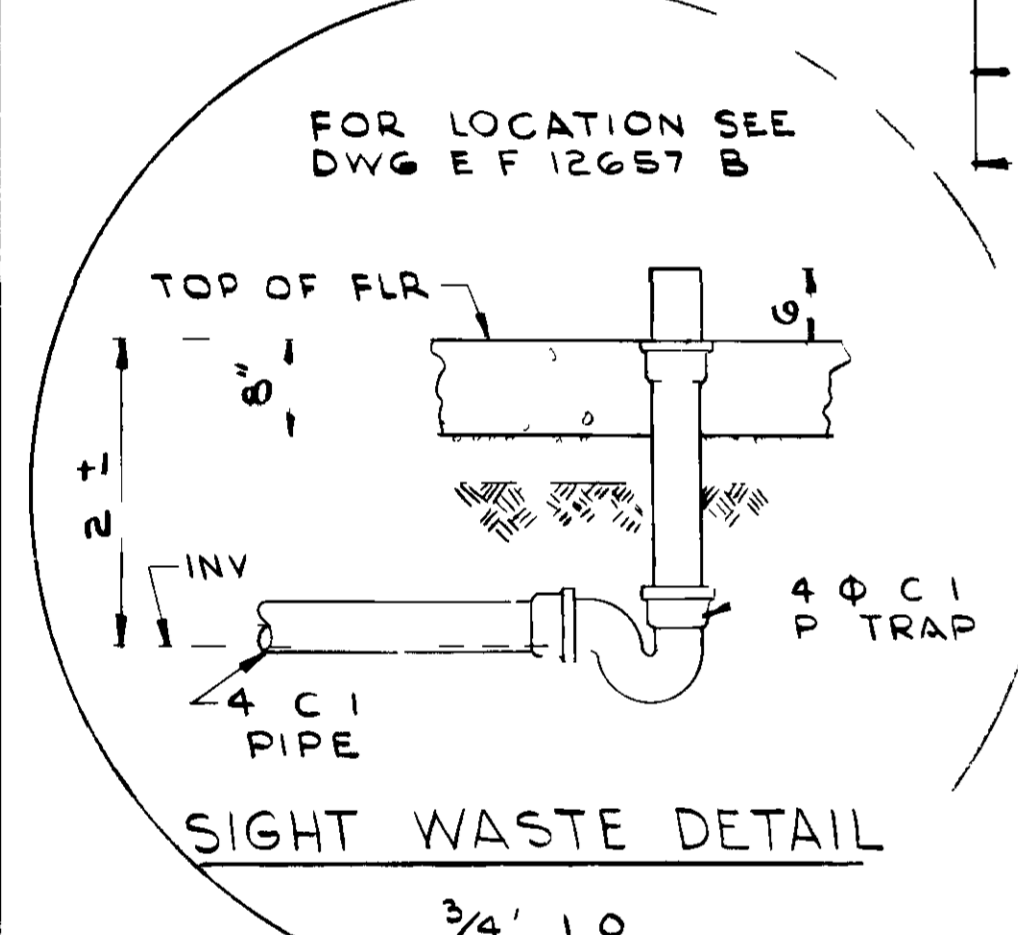
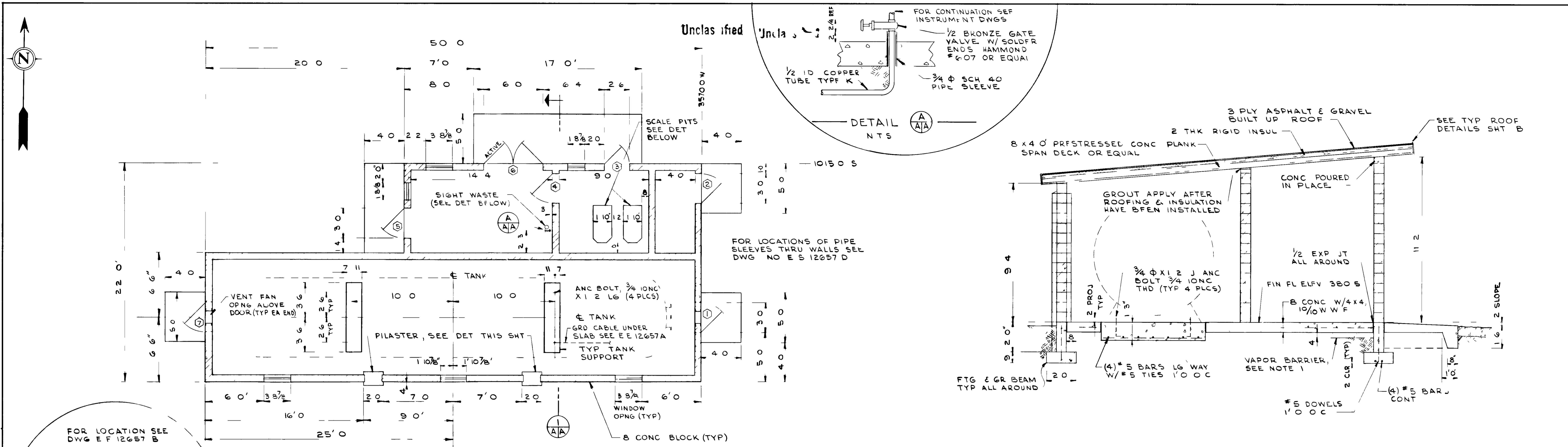
Figure 3. Exterior of C-350 (Looking South at the North Extension)



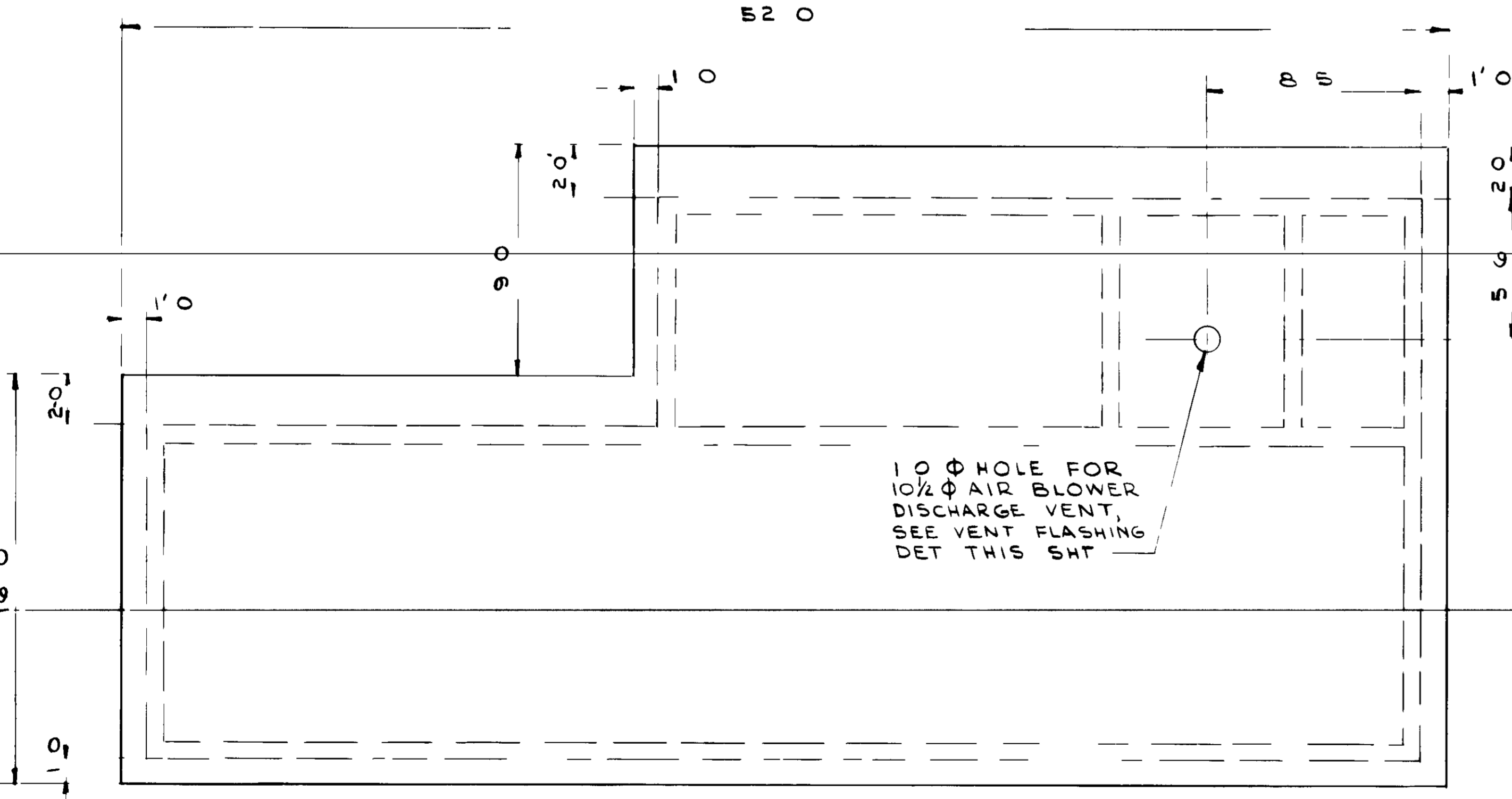
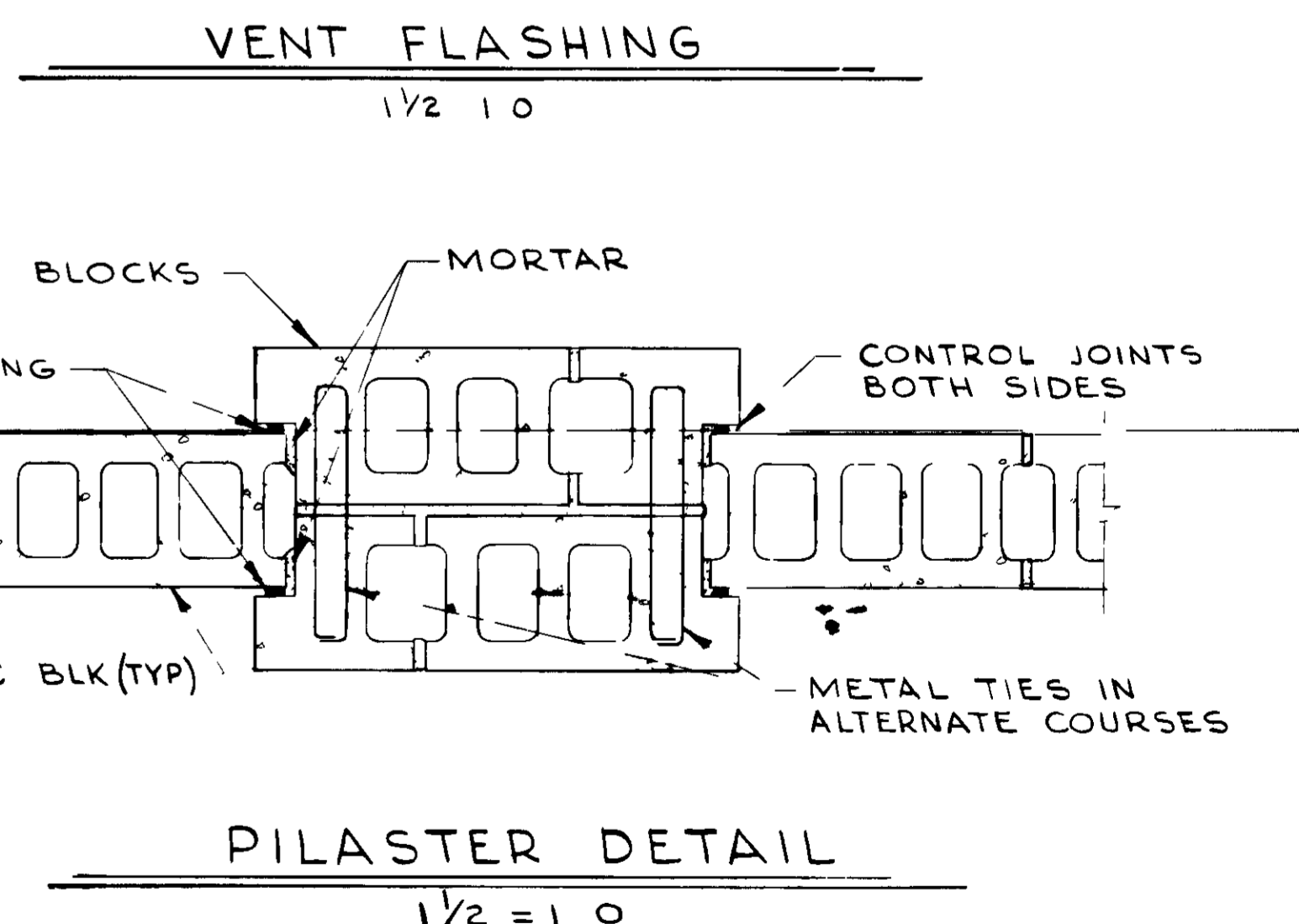
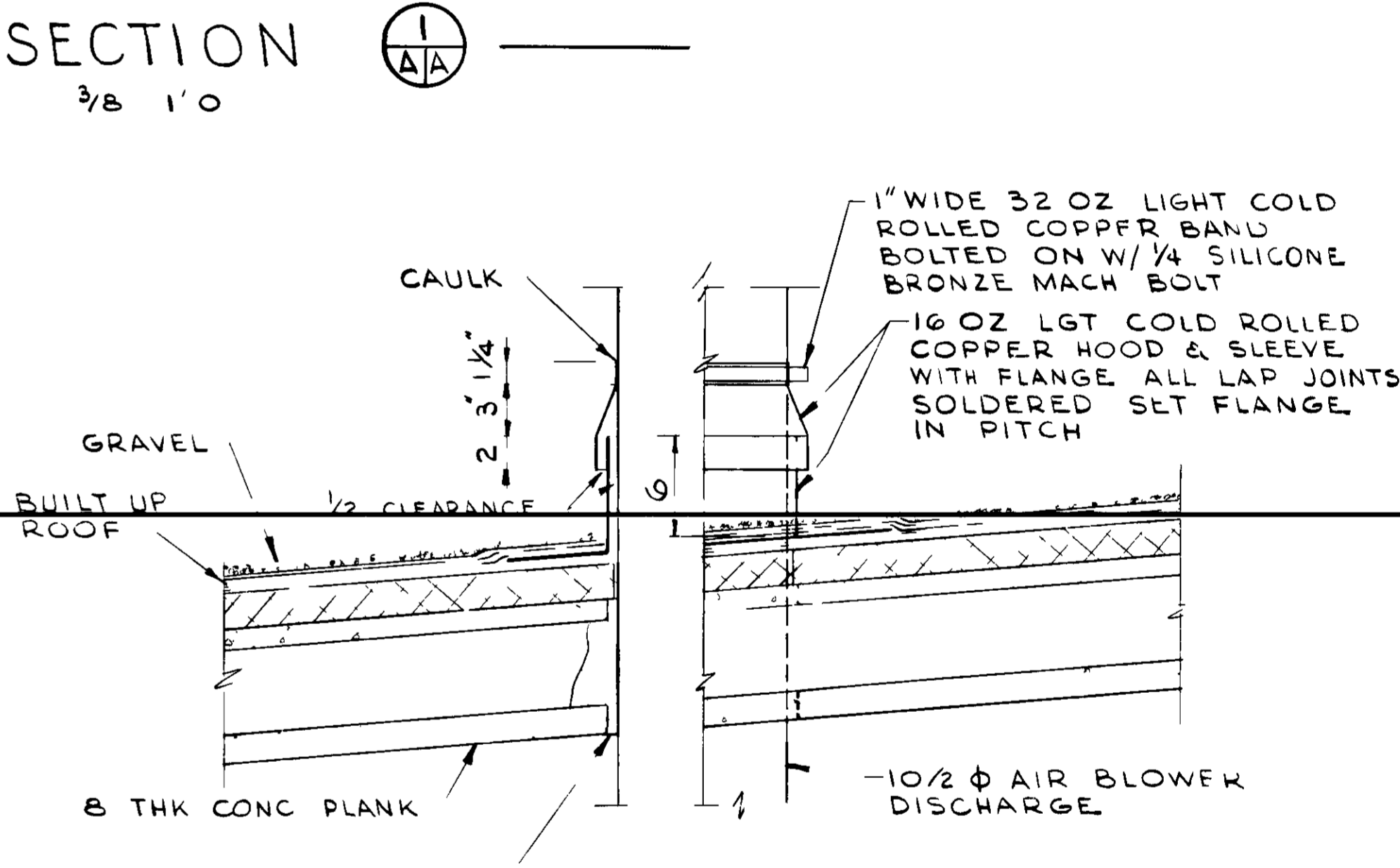
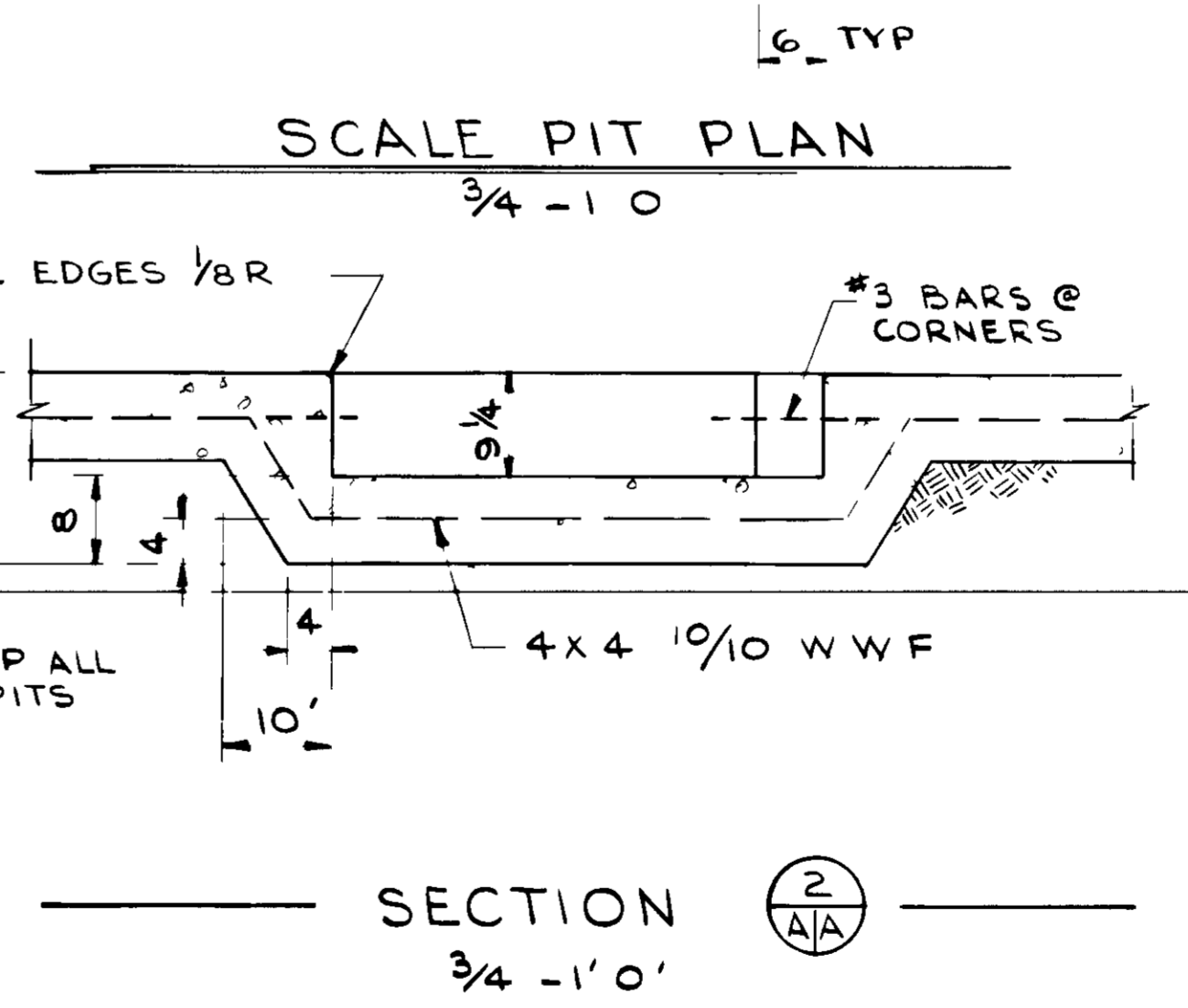
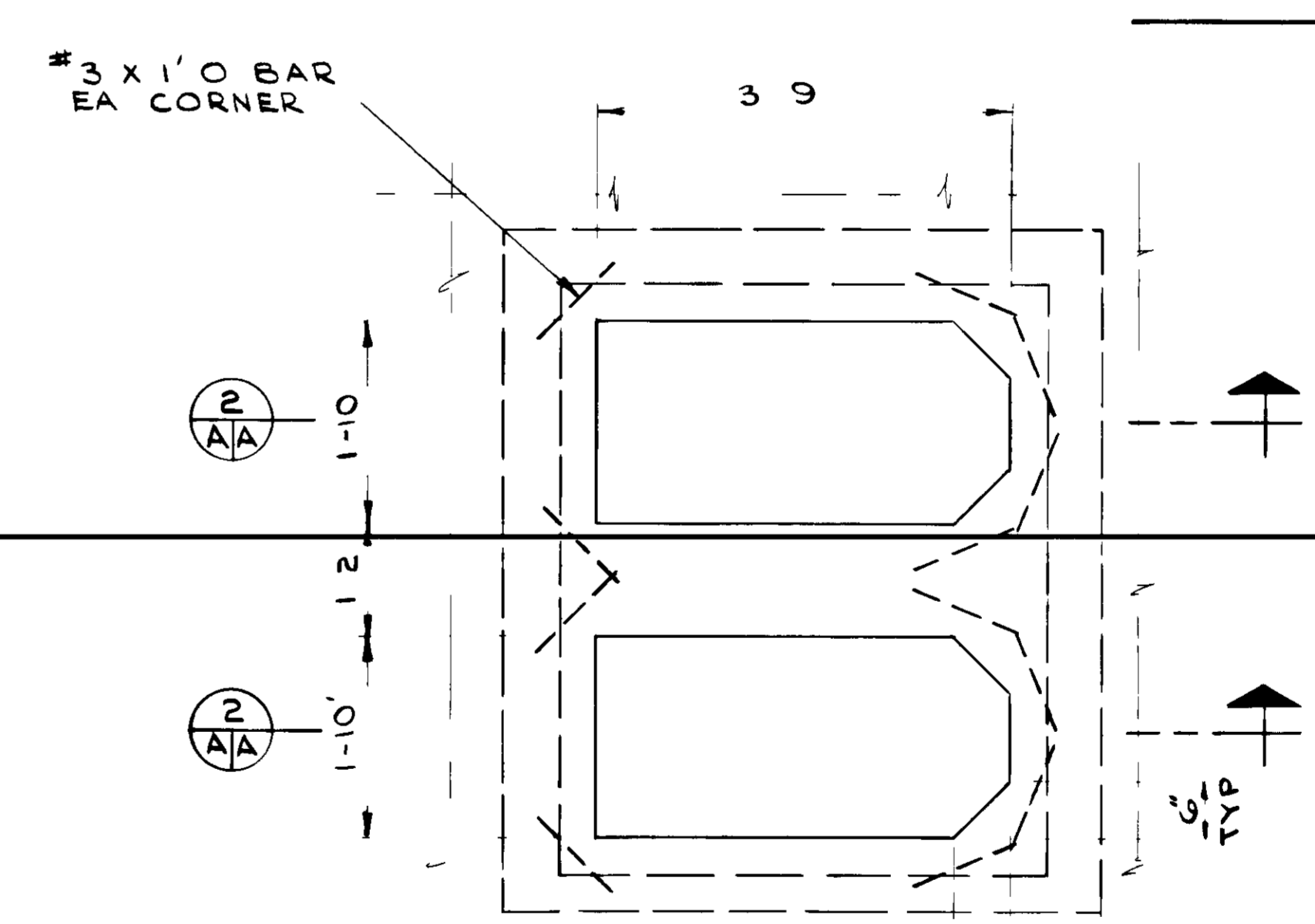
Figure 4. Exterior of C-350, Southeast Corner (Looking West)



Figure 5. Aboveground Piping Connecting the C-350 Structures (Looking North)



FLOOR PLAN
1/4" = 1'0"



NOTE

1 CONCRETE SLABS SHALL BE INSULATED WITH A MIN OF 4" OF COMPACTED SAND OR STONE OVER A 3 MIL POLYETHYLENE VAPOR BARRIER

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REVIEWED BY [Signature]

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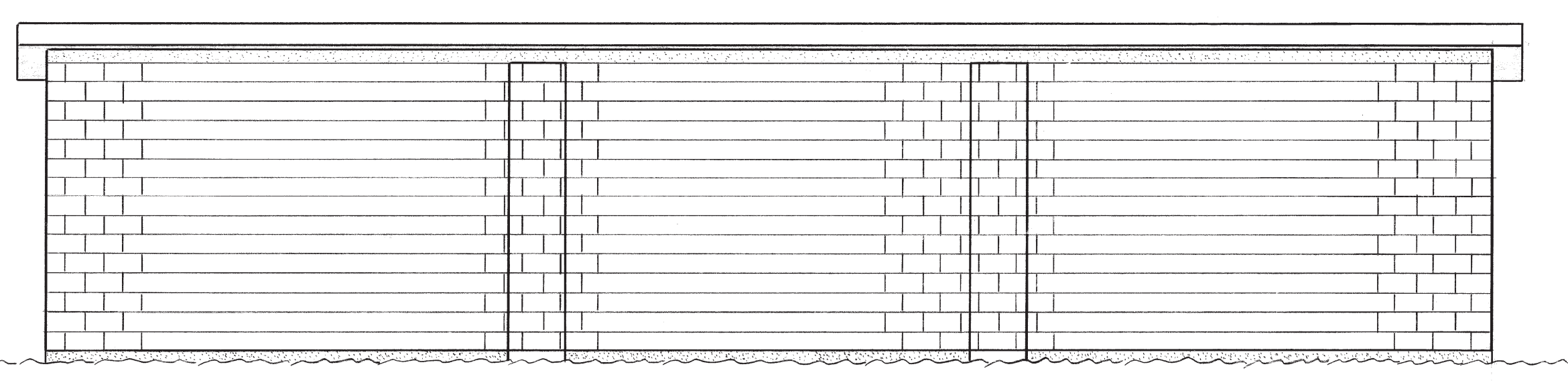
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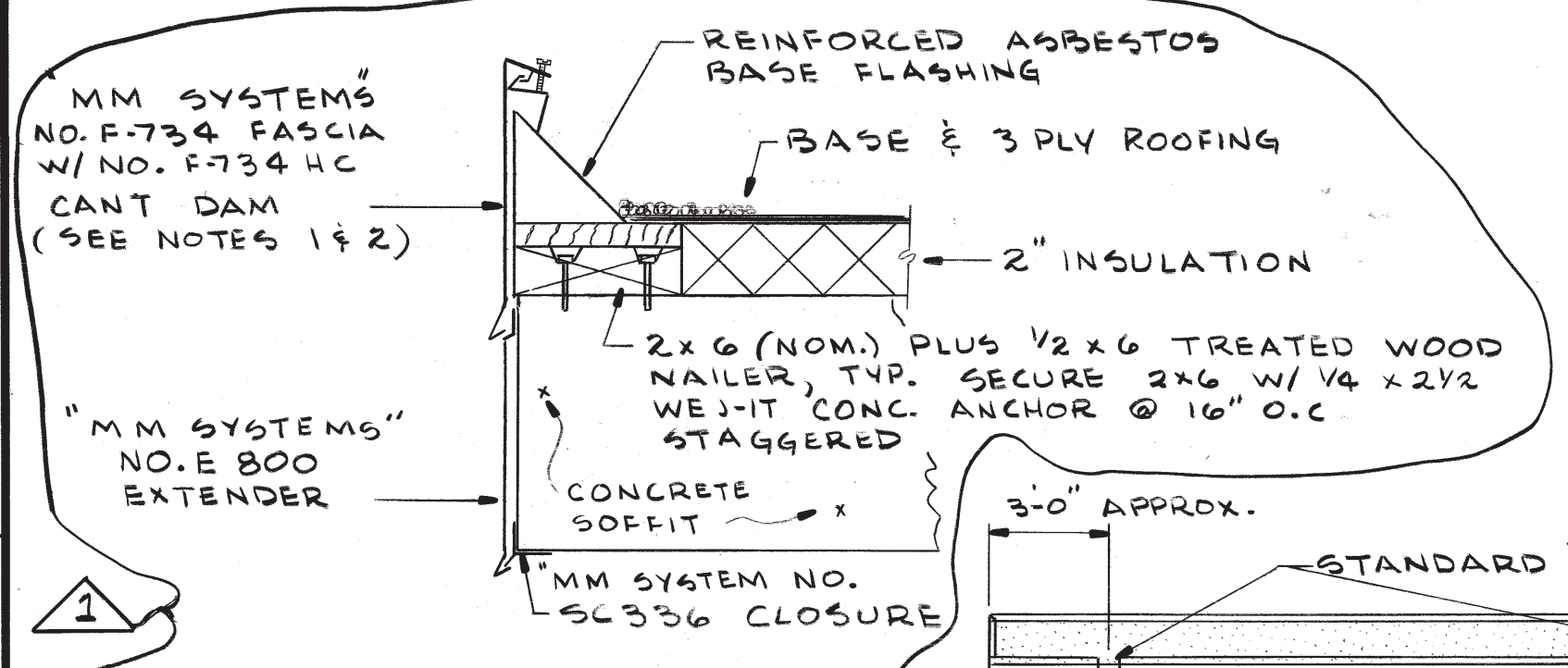
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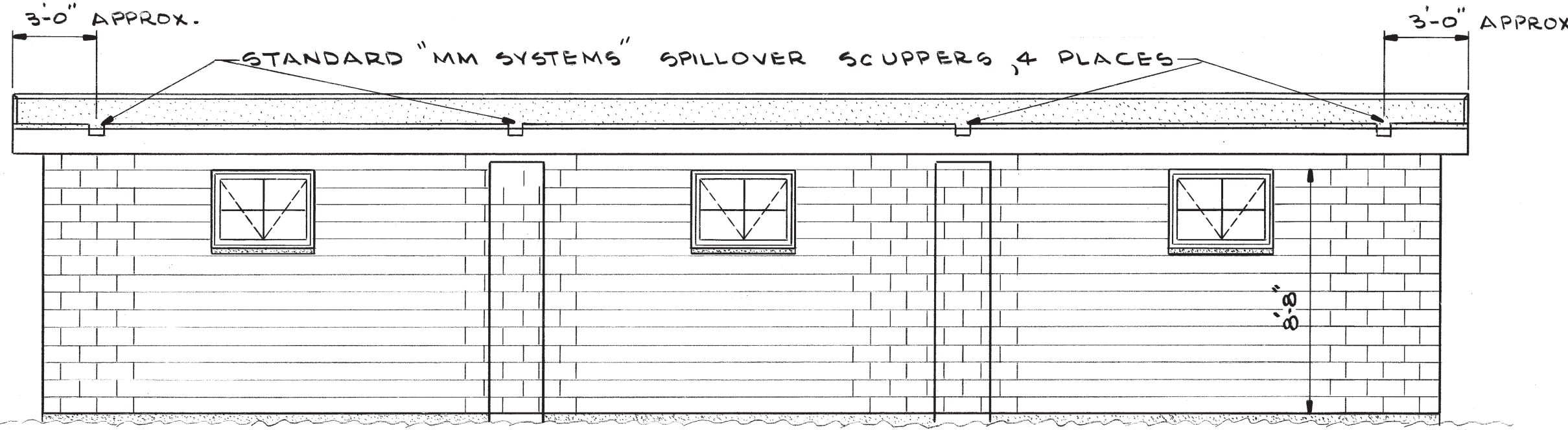


NORTH ELEVATION
SCALE: 1/4" = 1'-0"

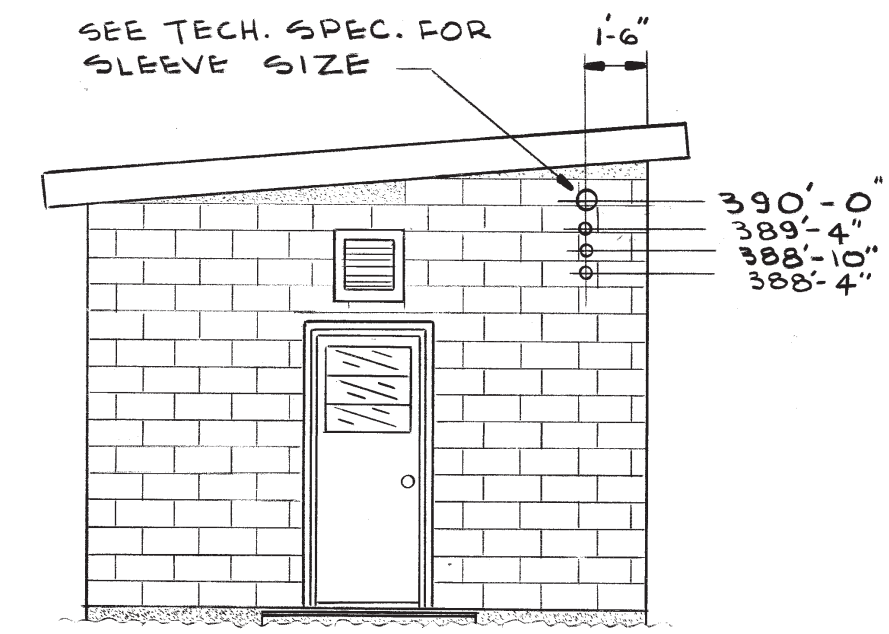


TYPICAL FLASHING DETAIL
N.T.S.

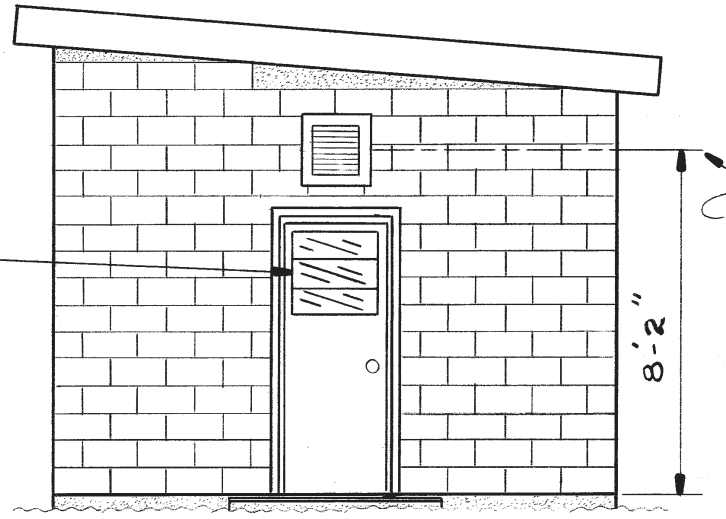
NOTES:
1. INSTALL FOUR (4) EACH STANDARD "MM SYSTEMS" SPILLOUT SCUPPERS EQUALLY SPACED ALONG SOUTH EAVE TO MATCH NO.F-734 FASCIA
2. ALL EXPOSED FASCIA SHALL HAVE SUPER-COTE II FINISH BY MM SYSTEMS IN # 471 LIGHT BRONZE COLOR OR APPROVED EQUAL



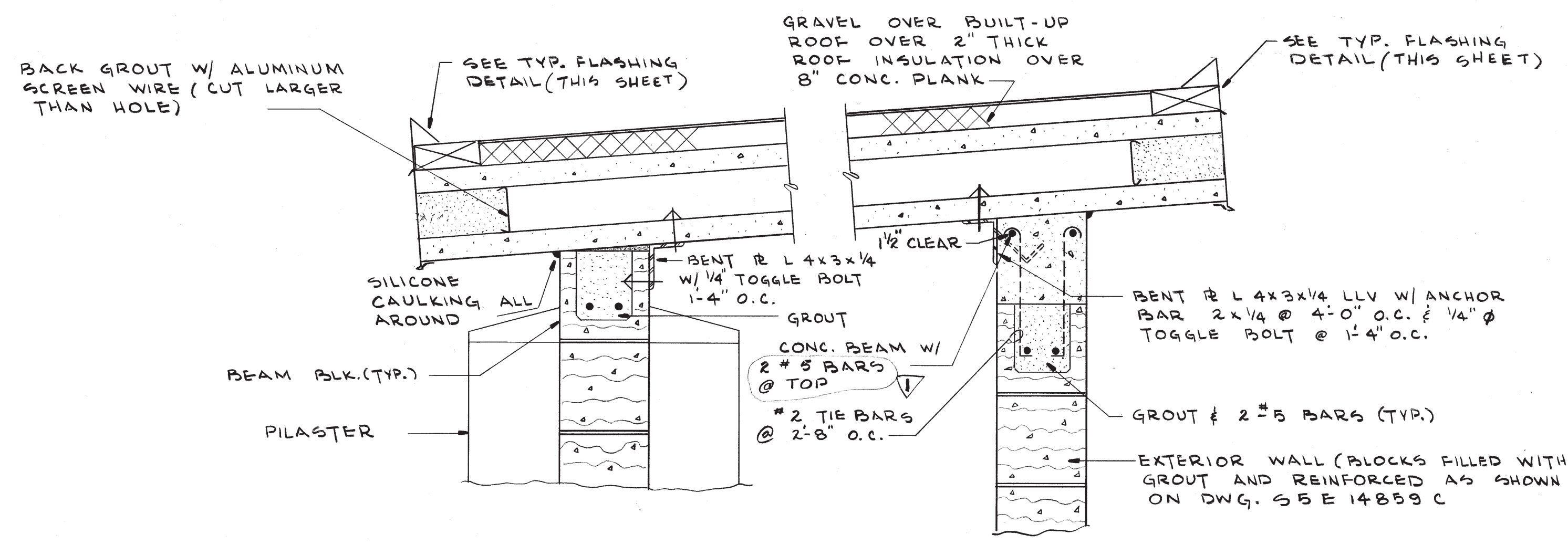
SOUTH ELEVATION
SCALE: 1/4" = 1'-0"



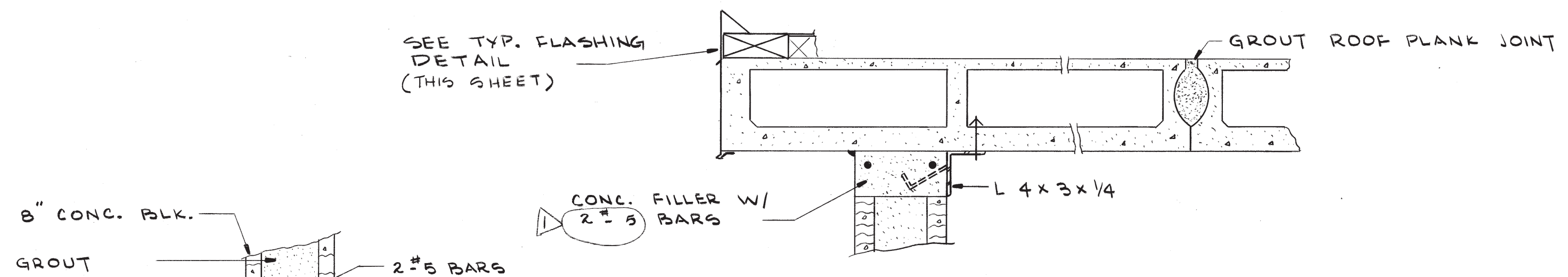
EAST ELEVATION
SCALE: 1/4" = 1'-0"



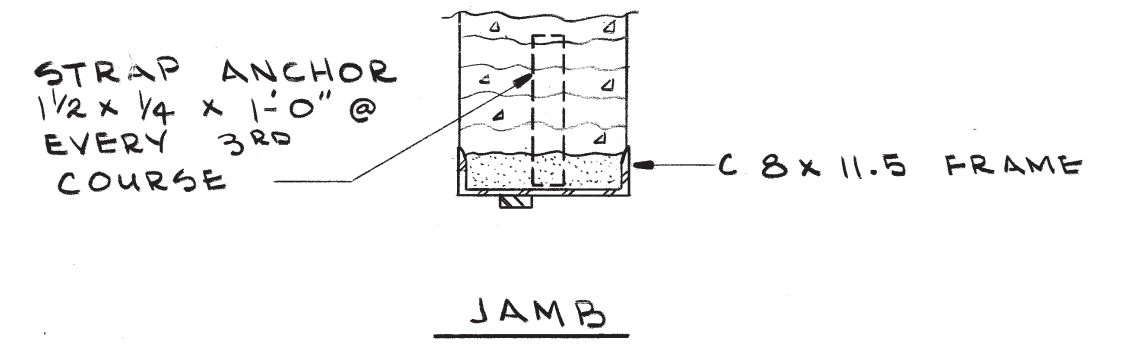
WEST ELEVATION
SCALE: 1/4" = 1'-0"



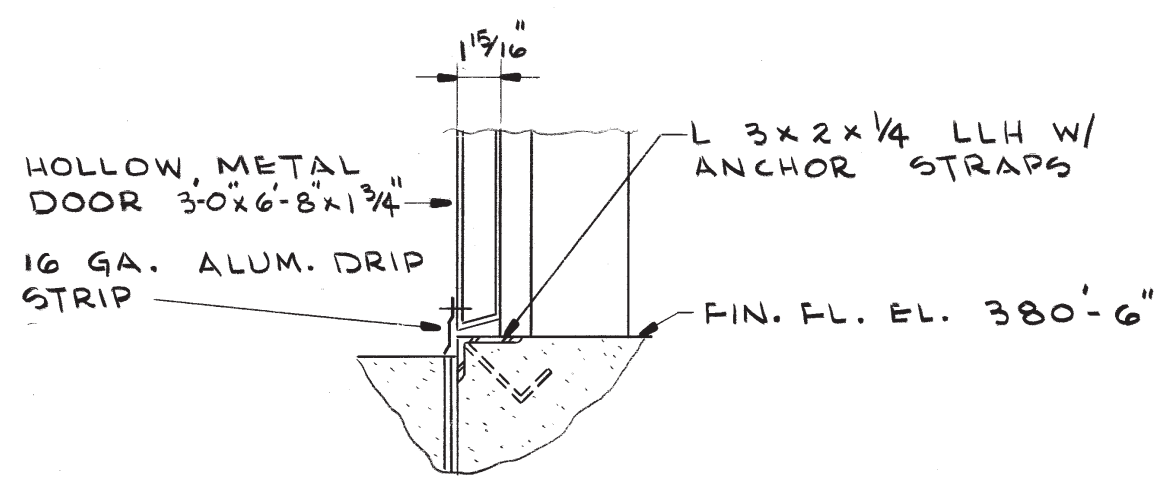
TYP. ROOF DETAILS
SCALE: 1/2" = 1'-0"



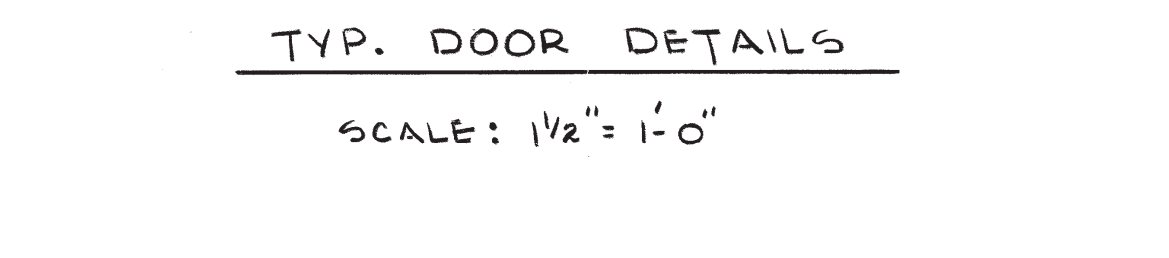
ROOF DETAILS (EAST & WEST)
SCALE: 1/2" = 1'-0"



HEAD

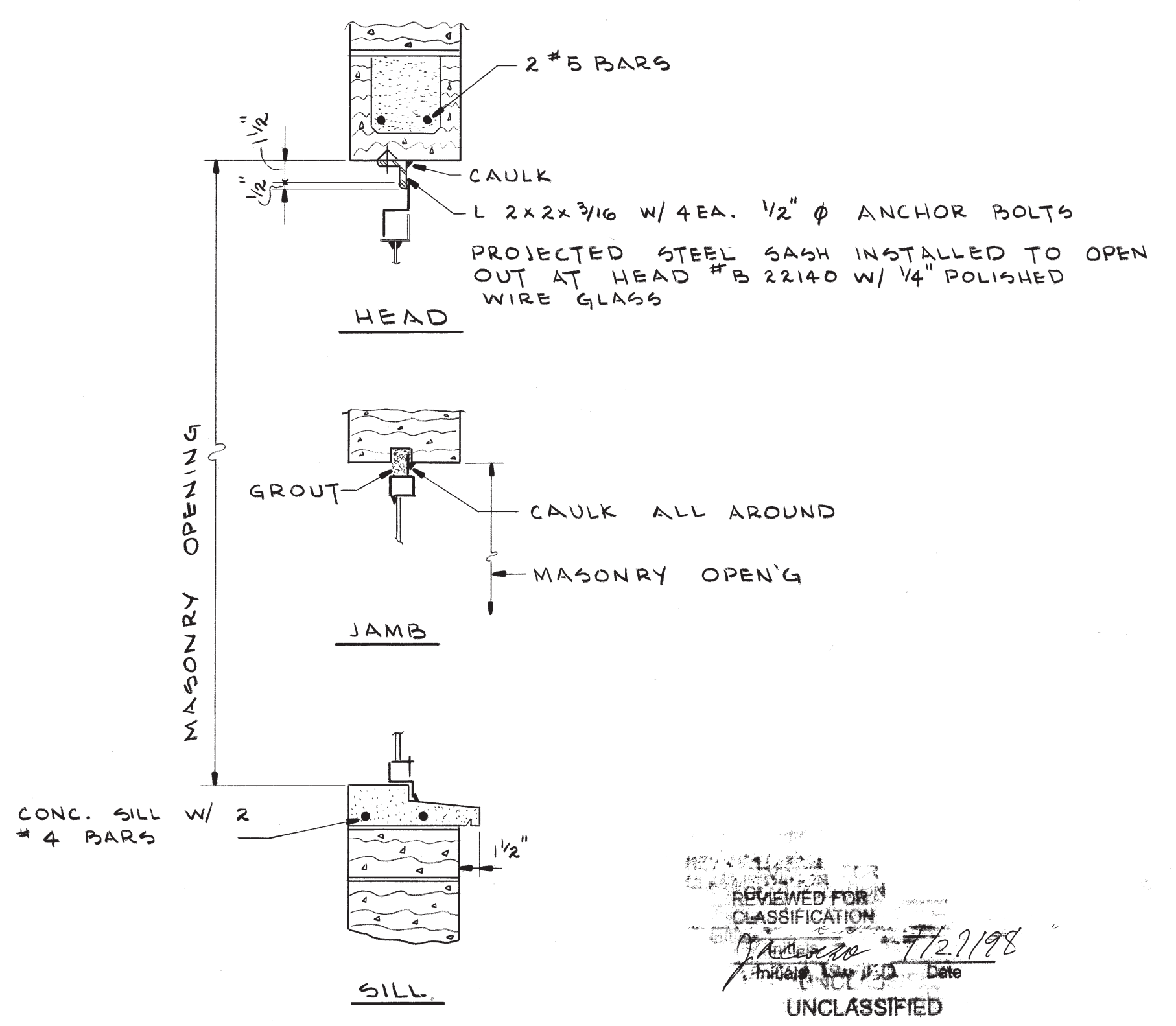


JAMB



TYP. DOOR DETAILS
SCALE: 1/2" = 1'-0"

NOTE: PRESSED STEEL FRAMES MAY BE SUBSTITUTED FOR C X 11.5 FRAMES



WINDOW DETAILS
SCALE: 1/2" = 1'-0"

REVIEWED FOR CLASSIFICATION
UNCLASSIFIED

BT Images, Inc.
00020933

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REF. DWGS. E-9-12657-A, B, C, D

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SECTION NUMBER OR DETAIL LETTER	SHEET WHERE DETAIL OR SECTION IS SHOWN
SECTION 8 DETAIL LEGEND	

BY	DATE	APPD.	REV	DESCRIPTION	BY	CHK	SECT	DEPT	DATE	FE	RED	DATE	UCCND	DATE	ERDA	DATE	CA	EG	EE	EM	IE	M	PD	WMP	XAD
			1	ADDED "MM SYSTEM" FLASHING DETAILS & MISC. REVISIONS	M&K																				
			2	INITIAL ISSUE # C.F.C. - GPP FY 77	M&K																				

TOLERANCES UNLESS OTHERWISE SPECIFIED	DES	DATE
FRACTIONS ±	R.L. ECHOLS	97B
XX DECIMALS ±	DRW MICHAEL E. KING	1-9-78
XXX DECIMALS ±	CHK D.D. JOHNSON	2/3
ANGLES BREAK SHARP EDGES MAX. FINISH	SECT B A KRESS	3/6
A-E	DEPT & PLANT	
	OPER. J.E.D.	3-2
	F.D. C.L.V.	2-28
	SAFETY J.D.L.	3-2

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ADDITION TO CLF ₃ FACILITY									
ELEVATIONS & DETAILS									
ADDITION TO CLF ₃ FACILITY									
SCALE	ID	PLANT	BLDG	FL	SHT.	OF	CLASS	U	REV
AS NOTED	RCD 4853	55E14859	B						1

8 7 6 5 4 3 2 1



Figure 8. Distribution Piping (Looking East)



Figure 9. Inside the North Extension



Figure 10. East Mixed Gas Storage Tank



Figure 11. West Mixed Gas Storage Tank

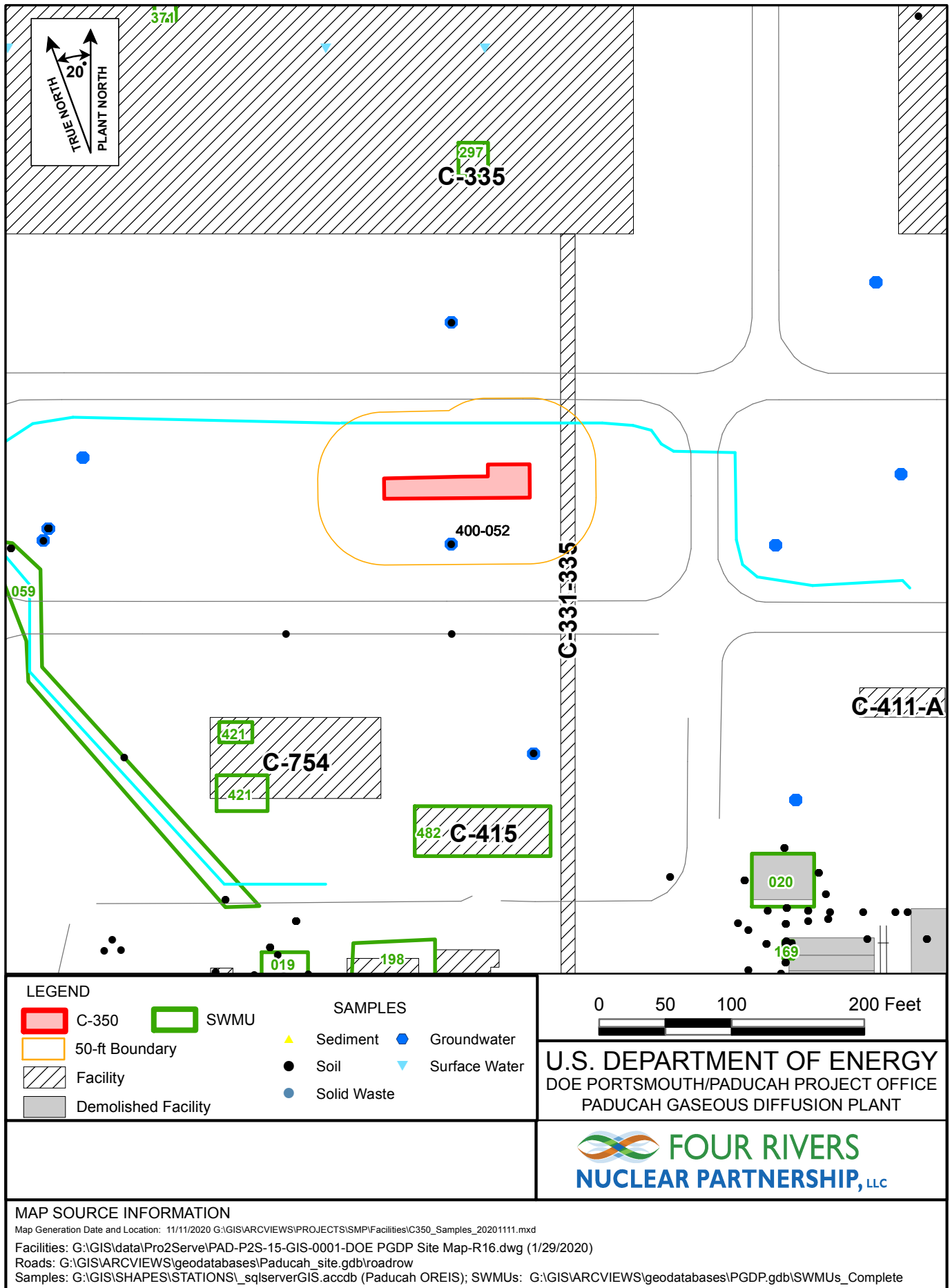


Figure 12. SWMU and Sample Locations near C-350