G-000-104.2

3002

APPLICATION FOR PERMIT TO INSTALL STORMWATER/SPILL RETENTION FACILITY - FMPC OCTOBER 1, 1987

10/01/87

82
APPLICATION

3002

APPLICATION FOR PERMIT TO INSTALL STORMWATER/SPILL RETENTION FACILITY - FMPC

October 1, 1987

FEED MATERIALS PRODUCTION CENTER

WESTINGHOUSE MATERIALS COMPANY OF OHIO
P.O. Box 398704
Cincinnati, Ohio 45239-8704

REGULATORY COMPLIANCE
ENVIRONMENTAL COMPLIANCE
J. R. McDonald

WASTE REMEDIATION AND ENVIRONMENTAL ENGINEERING
FLUID WASTE SYSTEMS ENGINEERING
M. F. Albert
D. J. Brettschneider

Prepared for the
U. S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE

For Office Use Only
Check Appropriate Box(es)

___ Air Discharge

___ Water Discharge to New Source Treatment Works

___ Solid Waste Disposal Facility

___ Hazardous Waste Disposal Facility

For Office Use Only

PTI Application No. _____

Date Received _____

Premise No. _____

3002

OHIO ENVIRONMENTAL PROTECTION AGENCY
Application for Permit to Install

U.S. Department of Energy, Feed Materials Production Center
Applicant's Name

P.O. Box 398705
Mailing Address

Cincinnati,	Hamilton,	Ohio,	45239	(513)738-6200
City	County	State	Zip Code	Telephone Number

Mr. James A. Reafsnyder, Site Manager (513)738-6357
Person to contact (Name and Title and Telephone Number)

The facilities are to be located within the 1,052 acre DOE Feed Materials Production Center at 7400 Willey Road; approximately 1/2 mile west of route 128.
Location of Proposed Facility (State the location as completely and precisely as possible)*

Village of Fernald, Crosby Township,	Hamilton	45030
City or Township	County	Zip Code

Directions: A Permit to Install is required for new or modified sources of pollution under the provisions of OAC Rule 3745-31. An application cannot be considered complete unless all applicable questions are answered and the required information has been submitted. This application must be signed in accordance with OAC Rule 3745-31-04(B) or it cannot be accepted.

Applicants for permits involving air emissions or wastewater treatment facilities will be required to pay a permit to install fee as shown in Section 3745.11(B) and (C) of the Ohio Revised Code. This fee is payable fifteen days after the date of final issuance of the permit.

Name of new or modified source or facility: Stormwater/Spill Retention Facility

Product of new or modified source/facility: Improved Stormwater Effluent Quality

Will the proposed source/facility involve any of the following: Check all that apply.

A. ___ Air Discharge

B. X Wastewater Treatment Works

C. ___ Solid Waste Disposal Facility

D. ___ Hazardous Waste Disposal Facility

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*Example: "The source will be constructed on a 20 Acre plot to be located on Franklin Township Road No. 17, approximately 1 1/4 miles north of the intersection of State Route 99 and Franklin Township Road No. 17."

EPA 3150
6/8/82

The following information must be submitted on a separate piece of paper and attached to this application.

FOR ALL PERMITS TO INSTALL

3002

1. Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.

2. List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source/facility.

3. State the reason for the application. Is this a new installation, modification to an existing source/facility, reconstruction of an existing source/facility, or startup of a source/facility that has been permanently shutdown for _____ years? (State number of years)

4. Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.

5. Will the proposed source/facility comply with all rules, laws, and regulations of Ohio EPA and U.S. EPA?

FOR AIR POLLUTION SOURCES

6. State the amount of each air contaminant (actual emissions) from each source in pounds per hour and tons per year at maximum and average conditions.

7. Are the proposed sources required to comply with the following federal requirements?
   i. New Source Performance Standards (NSPS)
   ii. National Emission Standards for Hazardous Air Pollutants (NESHAPS)
   iii. Prevention of Significant Deterioration (PSD)
   iv. Appendix "S" - Emission Offset Policy

8. Will the proposed sources employ best available technology?

9. Will the proposed sources cause the significant degradation of air quality?

10. Will the proposed sources interfere with the attainment and maintenance of the ambient air quality standards?

11. Describe any source monitoring, emission monitoring, or control equipment monitoring devices to be installed by the applicant.

12. Will the proposed sources involve the use of asbestos, benzene, beryllium, mercury, or vinyl chloride?

13. Complete and attach an anticipated construction schedule for each proposed source. (See attached).

14. Please include the estimated cost of any air pollution control equipment to be installed on the proposed sources.

15. An appendix for each air contaminant source must accompany this application. From the following description of the appendices, determine which should accompany your application.

FOR WASTEWATER DISCHARGES

16. State the anticipated quality of all types of environmental pollutants to be discharged by the facility.

17. State in detail the method for disposal for all environmental pollutants listed in the question above. This should include a complete description of any control equipment to be employed.

18. If wastewater is to be discharged to a surface water, state the anticipated concentration (mg/l) and loading (lbs/day) in the discharge, and the effect this discharge will have on the surface water under critical conditions.

19. If wastewater is to be discharged to the groundwater, state the anticipated concentration (mg/l) and loading (lbs/day) in the wastewater, and the effect this wastewater will have on the groundwater.

20. If wastewater is to be discharged to a sewerage system, what will be the effect on the sewerage system and wastewater treatment system.

21. Describe any monitoring equipment to be installed at the facility.

22. Will the proposed source conform with area-wide waste management plans for wastewater treatment?

23. General plans for approval of the proposed source should be submitted to demonstrate compliance with OAC Rule 3745-31-05.

24. The following information should be included with the application (if applicable).

    i. Appendix G. Extended Aeration Wastewater Treatment Facility Data Sheet
    ii. Pump Station Data Sheet
    iii. Sanitary Sewer Data Sheet
    iv. Application for Approval of Plans for collection, treatment, and disposal of wastewater.

FOR SOLID WASTE DISPOSAL FACILITIES

25. State the anticipated quality of all types of environmental pollutants to be discharged by the facility.

26. State in detail the method for disposal for all environmental pollutants listed in the question above. This should include a complete description of any control equipment to be employed.

27. Describe any groundwater or surface stream monitoring systems to be installed at the facility.

28. State the local zoning requirements.

29. Will the proposed source conform with area-wide waste management plans for solid waste?

30. An Appendix F - Solid Wastes Disposal Facility must be included with this application.

Appendix A - Process: for sources not included in the other appendices.

Appendix B - Fuel-Burning Equipment: for any furnace, boiler, apparatus, and all appurtenances thereto, used in the process of burning fuel with the primary purpose of producing heat or power by indirect heat transfer.

Appendix C - Incinerator: for any equipment, machine, device, article, contrivance, structure or part of a structure used to burn refuse or to process refuse material by burning other than by open burning.

Appendix D - Surface Coating or Printing Operation: for a surface coating operation not included under Appendix K or for a printing operation.

Appendix E - Storage Tank: a storage tank for petroleum liquids.

Appendix H - Gasoline Dispensing Facility: any site where gasoline is dispensed to motor vehicle gasoline tanks from stationary storage tanks.

Appendix J - Loading Rack at a Bulk Gasoline Plant or Terminal: an operation for transferring gasoline to a delivery vessel.

Appendix K - Surface coating line: a coating line consists of one or more coating applicators, flash-off areas or ovens to be used for the following: an automobile or light-duty truck assembly plant; can manufacturing; coil-coating; fabric coating; large appliance coating; magnet wire coating; metal furniture coating; paper coating; vinyl coating.

Appendix L - Solvent Metal Cleaning: an operation employing solvent for cleaning metal surfaces; wipe-cleaning is excluded.

Appendix M - Fugitive Dust Emission Sources

General:

M1-1 - Plant Roadways and Parking Areas
M1-2 - Aggregate Storage Piles
M1-3 - Material Handling
M1-4 - Mineral Extraction

Iron and Steel Mills:

M2-1 - Coke Manufacturing
M2-2 - Iron Production
M2-3 - Steel Manufacture

M3 - Lime Plants
M4 - Power Plants
M5 - Grain Terminals
M6 - Country Grain Elevators
M7 - Gray Iron Foundries
M8 - Steel Foundries
M9 - Glass Manufacturing Plants
M10 - Fiberglass Manufacturing
M11 - Secondary Aluminum Processing Plants
M12 - Fertilizer Mixing/Blending Plants
M13 - Cement Manufacturing and Blending Plants
M14 - Ferroalloy Production
M15 - Metal Salvage Operations
M16 - Pulp and Paper Mills
M17 - Woodworking Operations
M18 - Aggregates Processing Plants
M19 - Coal Processing Plants
M20 - Brick and Related Clay Product Manufacturing Plants
M21 - Asphaltic Concrete Plants
M22 - Concrete Batching Plants
M23 - Sandblasting Operations
M24 - Petroleum Refineries
M25 - Agricultural Chemical Manufacturing Plants
M26 - Bulk Gasoline Terminals and Plants
M27 - Carbon Black Plants
M28 - Municipal Incineration
M29 - Salt Processing Operations
M30 - Galvanizing Plants

Appendix O - Dry Cleaning Facility

3002

Under OAC 3745-31-04, These signatures shall constitute personal affirmation that all statements or assertions of fact made in the application are true and complete, comply fully with applicable state requirements, and shall subject the signatory to liability under applicable state laws forbidding false or misleading statements.

James A. Reafsnyder 9/30/87

Authorized Signature (for facility) Date

James A. Reafsnyder

DOE Site Manager

Title

U.S. Department of Energy
Feed Materials Production Center
P.O. Box 398705 ~~Cincinnati, Ohio 45239~~

Address

EPA 3150
6/8/82

Revision 0

3002

APPLICATION FOR PERMIT TO INSTALL STORMWATER/SPILL RETENTION FACILITY - FMPC

October 1, 1987

FEED MATERIALS PRODUCTION CENTER

WESTINGHOUSE MATERIALS COMPANY OF OHIO
P.O. Box 398704
Cincinnati, Ohio 45239-8704

REGULATORY COMPLIANCE
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OAK RIDGE OPERATIONS OFFICE

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APPLICATION FOR PERMIT TO INSTALL

3002

Stormwater/Spill Retention Facility.

FOR ALL PERMITS TO INSTALL

1. Describe the product or service to be produced by the applicant along with a description of the proposed source/facility.

The Feed Materials Production Center (FMPC) is a government-owned facility. Currently, Westinghouse Materials Company of Ohio (WMCO) manages the FMPC under prime contract with the United States Department of Energy (DOE).

The FMPC is located near the unincorporated town of Fernald, Ohio, approximately 32 km (20 mi) northwest of Cincinnati, Ohio (see Figure 1 in Appendix A). FMPC production operations cover approximately 136 acres in the center of a 1,050 acre site (see Figure 2 in Appendix A). Several rural communities and commercial operators lie within a 1-5 km (0.6-3 mi) radius of the plant.

At the FMPC, various chemical and metallurgical processes are utilized to reduce uranium oxides, uranium fluorides, and recycle materials to uranium ingots and billets. These are extruded into tubular form on press facilities located at the RMI Company, Ashtabula, Ohio. Some extrusions are returned to the FMPC for fabrication into fuel cores and target elements. These are used in nuclear reactors at other DOE sites.

The FMPC Stormwater/spill Retention Basin (SWRB) will provide a two-chambered basin with a minimum design capacity of approximately 10.5 million gallons. The SWRB is capable of retaining the runoff from a 10-year, 24-hour rainfall event collected from the 160 acres (163 acres with the proposed SWRB expansion) of the FMPC process area (see Figure 4 in Appendix A for the area which is collected in the SWRB) having a composite runoff coefficient ("C") of 0.55 (0.56 with the proposed SWRB expansion) (see Appendix B). A 10-yr./24-hr. storm event is a depth of rainfall which will be equaled or exceeded and has a 10 percent chance of occurring during any given year. This provides for the total 136 acres from the process area and 24 acres (27 acres with the proposed SWRB expansion) from the adjacent parking lot to flow into this basin. This retention system is located south of the FMPC process area and the parking lot. (See Appendix A for a detailed report of the Stormwater Retention Basin.)

2. List the name and quantity of all materials and chemicals (solid, liquid, or gaseous) that will be used or produced by the source/facility.

No chemicals will be used or produced in the subject facility. This facility will produce a solid waste material from the settling of suspended solids in the stormwater. Sediment inflow to the SWRB will depend on the stormwater runoff rate. Much of this sediment will settle and accumulate in the basin and will be cleaned out on a scheduled basis. The maximum solids settling in the basins is estimated at 16,300 lbs/day (7400 kg/day) worst case (during the 10 year design event), 425 lbs/day or 156,000 lbs/yr. (192 kg/day or 71,000 kg/yr.) average.

3. State the reason for the application. Is this a new installation, modification to an existing source/facility, reconstruction of an existing source/facility, or start-up of a source/facility that has been permanently shutdown for NA years (State number of years).

A 6.5 million gallon stormwater retention basin, including a 577,000 gallon emergency spill basin (approximately 200,000 gallons available for spills when empty), was constructed at the FMPC and put into operation in November 1986. A new minimum 4.0 million gallon expansion is to be installed for a total of a minimum of 10.5 million gallons. This application is for the entire minimum 10.5 million gallon system. (See Appendix I for calculation of retention volumes and Appendixes J and K for drawings of the existing and proposed SWRB chambers.)

4. Has a previous Ohio EPA application or plan submission been filed for this source/facility? If so, state the date and type of the application previously submitted.

The original Permit to Install (PTI) application for the basin was submitted to the Ohio EPA on April 11, 1984 as part of several water pollution upgrade projects under the title of "Water Pollution Control Project". A separate PTI application entitled "Coal Pile Runoff Collection and the Stormwater/Spill Retention Facility - FMPC" was submitted in November 26, 1986 (Number 05-1043). The portion of the PTI covering the Stormwater Retention Basin (SWRB) was reviewed and a modification was requested. The modification requested was to expand the existing SWRB to retain a 10-yr./24-hr. storm event from the combined FMPC process and parking lot areas. The section concerning the FMPC Coal Pile runoff collection was removed from the previous PTI submittal. Therefore, this application is for the SWRB only.

5. Will the proposed source/facility comply with all rules, laws and regulations of Ohio EPA and U. S. EPA?

The proposed facilities have been designed to comply with all applicable rules, laws, regulations of the Ohio EPA and U. S. EPA, and the terms and conditions of NPDES Permit No. OH 0009580. In particular, this document satisfies the requirements stated in Order numbers 6 and 8 of the OEPA's "Findings and Orders" issued on June 26, 1987.

6-15. Not applicable (For Air Discharges, only).

FOR WASTEWATER DISCHARGES

16. State the anticipated quantity of all types of environmental pollutants to be discharged by the facility.

16.1 Water

The stormwater/spill retention basin pumps have a combined pumpout rate of approximately 300 gpm. Approximately 100 million gallons of water (average 190 gpm) is expected to be pumped to Manhole No. 175 from the SWRB based on an average yearly rainfall of approximately 40 inches, an average runoff coefficient of 0.56 (see Appendix B), and a drainage area of 163 acres. The expected water quality of basin effluent can be currently based on a "worst case" scenario by equating water quality of discharges from the pumping operations that have occurred from the existing basin during the period from November 1986 to April of 1987 (see Table 1 in Appendix C). The average Total Suspended Solids (TSS) value of the discharge water of the basin during this time period was 41 mg/L (see Appendix C). From the 1986 NPDES data, the average oil and grease value was less than 5 mg/L and the pH varied from a minimum of 7.4 to a maximum of 8.3.

Any overflow of the SWRB will be at the overflow spillway located at the east-southeast end of the existing west chamber. Since the construction of the west chamber the SWRB has overflowed three times (November 26, 1986, December 1-3, 1986, and July 13, 1987). The average effluent discharge was 78 mg/L, 23 mg/L, and 49 mg/L for the November 26, 1986, December 1-3, 1986, and the July 13, 1987 events, respectively. The estimated frequency of overflow of the expanded SWRB is expected to be once every 1 to 2 years due to sequential rainfall events. The TSS effluent quality during these future overflows is expected to be less than the 100 mG/L maximum NPDES discharge limit for point 002.

16.2 Solid Waste

Sediment inflow to the SWRB will depend on the stormwater runoff rate. Much of this sediment will settle and accumulate in the basin and will be cleaned out on a scheduled basis. The maximum solids settling in the basins is estimated at 16,300 lbs/day (7400 kg/day) worst case (during the 10 year design event), 425 lbs/day or 156,000 lbs/yr. (192 kg/day or 71,000 kg/yr.) average.

17. State in detail the method for disposal for all environmental pollutants listed in the question above. This should include a complete description of any control equipment to be employed.

17.1 Water

All retained stormwater, except spills, will be pumped to Manhole No. 175 (Outfall Number 001) and discharged to the Great Miami River. Spills will be isolated into one of the two large chambers (existing (west) or proposed (east)) and will be pumped back to the General Sump for treatment.

17.2 Solid Waste

Sediment will be removed from the basin, dewatered, and drummed. Based on analytical results of sampling prior to removal, the sediment will either be furnaced for uranium recovery or processed for off-site disposal as a low-level radioactive waste. In the eventuality that the radioactivity level of these sediments is below the criteria for low-level radioactive waste, they will be disposed of at the FMPC. (See Appendix A for a more complete description.)

18. If wastewater is to be discharged to a surface water, state the anticipated concentration (mg/l) and loading (lbs./day) in the discharge, and the effect this discharge will have on the surface water under critical conditions.

The new facility will intercept the discharge of stormwater to Paddys Run and divert this flow to the Great Miami River. The mass of the Total Suspended Solids (TSS) carried off-site by the stormwater will be reduced because of the clarifying capabilities of the new Stormwater/Spill Retention Basin. However, the addition of this flow to the FMPC discharge to Manhole No. 175 will increase its TSS loading. The average TSS concentration of the stormwater after 24-hour quiescent settling (achieved by proposed operating plan which alternates filling and subsequent 24-hour quiescent settling and then pumpout of each of the two chambers) should be approximately 30 - 40 mG/L.

The average FMPC total effluent flow (at Manhole No. 175) is anticipated to be approximately 0.86 MGD with a TSS concentration of approximately 35 mG/L (see Appendix F for itemized flow and TSS estimate). Under these conditions the TSS loading should be approximately 244 lbs/day (111 kg/day). When the average is compared with that of the Great Miami River, about 3686 cubic feet per second (cfs) (2382 MGD) (see Appendix E), it becomes apparent that a 2770-fold dilution occurs. Even under conditions when river flow can fall as low as 430 cfs (284 MGD) the volume ratio is expected to be large enough that the discharge will have minimal impact on the river water quality (see Appendix E for Great Miami River Data).

19. If wastewater is to be discharged to the groundwater, state the anticipated concentration (mg/l) and loading (lbs./day) in the wastewater, and the effect this wastewater will have on the groundwater.

The collected stormwater runoff in the SWRB is not to be discharged to the groundwater. In order to satisfy this requirement, a dual liner system has been incorporated into the design/construction of the SWRB chambers and the Emergency Spill Basin (ESB). The outer liner consists of 18 inches of a bentonite and soil mixture. The inner liner consists of an oil/solvent resistant, synthetic flexible membrane liner (FML). An underdrain collection system has been provided between the liners so that any leakage through the FML can be collected, monitored and pumped back into each individual chamber.

20. If wastewater is to be discharged to a sewerage system, what will be the effect on the sewerage and wastewater treatment system?

There will be no wastewater discharge from this new facility to the FMPC sewage treatment plant or any Publicly Owned Treatment Works (POTW).

21. Describe any monitoring equipment to be installed at the facility.

No additional monitoring equipment has been provided in the installation of the SWRB project. All necessary sample collection and flow measuring equipment is already in place or to be provided by other projects. The FMPC storm sewer system is currently protected by high/low pH alarms.

Nevertheless, additional monitoring equipment is desirable and will be provided by other projects. A Project Authorization (number 00-87102) for new monitoring equipment has been prepared and design work has begun. The projected timetable for the completion and installation of this equipment is in 1988 and may not be in place with the completion of the installation of the SWRB. The following paragraphs describe the additional monitoring equipment.

Additional monitoring equipment for the SWRB will most likely consist of two refrigerated samplers. One will be located at the 6-inch pumpout discharge line of the basin and the other at the overflow spillway (NPDES permit 002). The sampler for the pumpout discharge will draw a sample which is proportional to the outlet flow. The sampler at the outfall 002 will draw a sample when an overflow is occurring.

A vortex shedding flow meter is planned to be installed on the 6-inch pumpout discharge line to provide flow measurement. In addition a flow indicator and recorder, temperature element and transmitter, temperature indicator and recorder, conductivity element and transmitter, conductivity indicator and recorder, pH element and transmitter, pH indicator/recorder, suspended solids transmitter, indicator, recorder, and instrument power supplies is planned to be located at the pumpout monitoring point. The instruments shall be mounted in a local control panel. The alarm contacts from the instruments shall be transmitted to the Water Treatment Plant through a new telephone line service. The alarms will be monitored on a new annunciator located at the plant.

22. Will the proposed source conform with area-wide waste management plans for wastewater treatment?

The new facilities are compatible with the "Comprehensive Water Quality Report for the Lower Mainstream of the Great Miami River (River Mile 92.5 - 0.9) Montgomery, Warren, Butler, and Hamilton Counties, Ohio." This report is dated August, 1982 (Revised September, 1984) and was prepared by the Ohio EPA, Division of Water Pollution Control, Water Quality Management Section.

23. General plans for approval of the proposed source should be submitted to demonstrate compliance with OAC Rule 3745-31-05.

See accompanying report for plan approval (Appendix A).

24. The following information should be included with the application (if applicable).

---

i. Appendix G. Extended Aeration Wastewater Treatment Facility Data Sheet - not applicable.
ii. Pump Station Data Sheet - not applicable.
iii. Sanitary Sewer Data Sheet - not applicable.
iv. Application for Approval of Plans for Collection, Treatment and Disposal of Wastewater - not applicable.

OHIO ENVIRONMENTAL PROTECTION AGENCY

APPLICATION FOR APPROVAL OF PLANS FOR TREATMENT AND DISPOSAL OF WASTEWATER

3002

1. a) Name of facility U.S. DOE Feed Materials Production Center (FMPC)

b) Address 7400 Willey Road, Fernald, Ohio ZIP 45030

c) Location of discharge Great Miami River

d) Owner U.S. Department of Energy-Oak Ridge Operations Office

e) Address P.O. Box E, Oak Ridge, Tennessee ZIP 37831

f) Responsible official Mr. James A. Reafsnyder, Sie Manager Phone (513)738-6357

2. Reason for project To provide 10-year, 24-hour rainfall event runoff retention for the FMPC process area as required by Order No. 6, OEPA Findings and Orders, issued June 26, 1987.

3. a) Designed by Westinghouse Materials Company of Ohio/Lockwood Greene Engineers In

b) Address P.O. Box 398704, Cincinnati, Ohio ZIP 45239

c) Responsible official Dr. William A. Weinreich, Vice President & Technical Director Phone (513)738-6711

4. Construction: begin July, 1988 complete October, 1988

Operation: start November, 1988 compliance December, 1988

5. Operator of facility U.S. Department of Energy

6. Cost of completed treatment and disposal system $2,500,000 (Estimated Cost) *

7. Documents submitted with this application

X Report

X Area map of site and point(s) of discharge

Specifications

X Block diagram of treatment system

X Engineering drawings (provide titles and page numbers See drawing index

8. This treatment system has been designed for 10.5 million gallon retention capacity**
(10-year, 24-hour rainfall incident 4.1 inches)

9. This treatment system has been designed to produce the following effluent limits. (Daily Avg./Daily Max.)

LOCATION 001	LOCATION 002
TSS:20ppm, 40ppm	TSS:30ppm, 100ppm
Oil & Grease:15ppm	Oil & Grease:15ppm
Res. Cl:0.10ppm	

10. Signature James A. Reafsnyder Title Site Manager Date 9/30/87
James A. Reafsnyder

*If the owner at the time of application, construction and/or operation is not the same, please explain on attachment.

TO BE COMPLETED BY OHIO EPA DISTRICT OFFICES

Date received _____ By _____ Fee $ _____ PA# _____

New facility ____ Public ____ Treatment ____ Pre-treatment ____

Modify existing ____ Semi-public ____ Collection ____ Soil ____

Replace existing ____ Industrial ____ Disposal ____ Other ____

OEPA FORM 4960 See reverse side for instructions

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* $1,450,000 existing SWRB and $1,050,000 SWRB expansion.

** 6.5 million gallon existing SWRB and 4.0 million gallon SWRB expansion.

3002

INSTRUCTIONS FOR FILLING OUT APPLICATION FORM

Item 1. a, b — Name and address of project. If project does not have a name, use a relevant reference, such as "Market Street sanitary sewer" or "Howard Johnson's Wastewater Treatment Plant," and address or location of project.

1. c — Name of water body, sewer, drain, or treatment works receiving the discharge.

1. d, e — Corporate name and address of owner.

1. f — Name, title, and telephone number of the person responsible for providing personnel and budget to operate facility.

2. Briefly state why the facility was or is to be installed. If the facility has been ordered to be constructed by Ohio EPA, report date of orders.

3. Name, address, and name of the organization and official technically responsible for the design of the project.

4. Dates should reflect whether the facility is proposed, under construction, or has been completed.

5. Industrial: Name of the operating company, etc., if other than the one named in 1 a, d, f and 3 a, c above. Otherwise , specify which by reference.
Public or Semi-Public: Name and class license, if known, of operator in responsible charge and employment status (i.e., full-time, part-time, or contract).

6. Total cost of work relating to this application. Indicate whether estimated or actual cost.

7. In the case of industrial waste treatment facilities, refer to "Instructions for the Submission of Plans for Industrial Waste Treatment Facilities" (available from district offices).

8. Design flow.

9. Industrial: Show design monthly average/daily maximum effluent limits.
Public or Semi-Public: Show design 30 day average/7 day average effluent limits.

10. Signature of person authorized by the owner to submit plans.

FEE WORKSHEET

PAYER: NLO Inc.

PROJECT NAME & COUNTY: Installation of the Stormwater/Spill Retention Facility
Feed Materials Production Center
Hamilton County

ESTIMATED COST: $2,500,000 *

MULTIPLIED BY 0.2%(0.002): $5,000

SUBTOTAL: $5,000

PLUS $100.00: $5,100

PLAN FEE DUE: $5,000
(Not to exceed $5,000)

PERMIT TO INSTALL APPLICATION FEE: $15.00

TOTAL FEE DUE: $5,015 **

*	Existing SWRB	$1,450,000
	SWRB Expansion	1,050,000
	Total Estimated Cost	$2,500,000

** The original PTI Application for the subject project was submitted April 11, 1984, (Ohio EPA No. 05-1043) and revised November 28, 1987. The required Plan Review and Application Fee, $5,015.00, was paid with the original submitted by NLO Inc. Check No. 037843.

3002

APPENDIX A

REPORT

OF

INSTALLATION OF THE STORMWATER/SPILL RETENTION FACILITY

FOR OHIO ENVIRONMENTAL PROTECTION AGENCY

U. S. DEPARTMENT OF ENERGY
FEED MATERIALS PRODUCTION CENTER
FERNALD, OHIO

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APPENDIX A - REPORT OF INSTALLATION OF THE STORMWATER/SPILL RETENTION FACILITY

A SUMMARY

B DESCRIPTION OF WASTE GENERATING PROCESS

C DESCRIPTION OF EXISTING WASTE TREATMENT FACILITIES
- C.1 Sitewide Process Waste Treatment
- C.2 Stormwater Runoff

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- D.1 Settling Basins for the Stormwater Drainage
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A. SUMMARY

The U. S. Department of Energy, Feed Materials Production Center (FMPC) has been required by the Ohio EPA and NPDES Permit No. OH 0009580 to provide facilities that will reduce the discharge of suspended solids and eliminate/minimize stormwater runoff to Paddys Run. The permit discharge limitations of concern are:

Outfall Serial Number 001 - Great Miami River

Characteristic	Daily Avg.	Daily Max.
Suspended Solids (TSS)	20 ppm	40 ppm
pH	---	6.5 - 9.0
Oil & Grease (O & G)	---	15 ppm
Total Residual Chlorine (Cl)	---	0.1 ppm

Outfall Serial Number 002 - Paddys Run

Characteristic	Daily Avg.	Daily Max.
Suspended Solids (TSS)	30 ppm	100 ppm
pH	---	6.5 - 9.0
Oil & Grease (O & G)	---	15 ppm

The new facility which is described in this report will provide for process area and parking lot stormwater/spill retention as described in Order number 6 of the OEPA's "Findings and Orders", issued June 26, 1987. Wastewater effluent from the Stormwater/Spill Retention Basin (SWRB) is subsequently mixed with all other FMPC effluent streams and discharged, via Manhole No. 175, to the Great Miami River. Sediment from the Stormwater Retention Basin will be allowed to accumulate for periodical removal and disposal in an approved manner.

B. DESCRIPTION OF WASTE GENERATING PROCESS

The FMPC is located near the unincorporated town of Fernald, Ohio, approximately 32 km (20 mi) northwest of Cincinnati, Ohio (Figure 1). FMPC production operations cover approximately 136 acres in the center of a 1,050 acre site (Figure 2). Several rural communities and commercial operators lie within a 1-5 km (0.6-3 mi) radius of the plant.

The FMPC is a large-scale, fully integrated facility for producing high purity uranium metal having several standard isotopic assays. This uranium is used in the fabrication of fuel cores and target elements for nuclear reactors operated by the United State Department of Energy (DOE). Although some derby metal (primary reduction product) is shipped directly to other DOE facilities most of the production is cast into ingots, which are center-drilled and surface-machined for extrusion into tubes on the DOE extrusion press facilities located at the RMI Company, Ashtabula, Ohio. Some extrusions are returned to the FMPC, where tube blanks undergo heat treating and fabrication into target element cores for use at other DOE facilities.

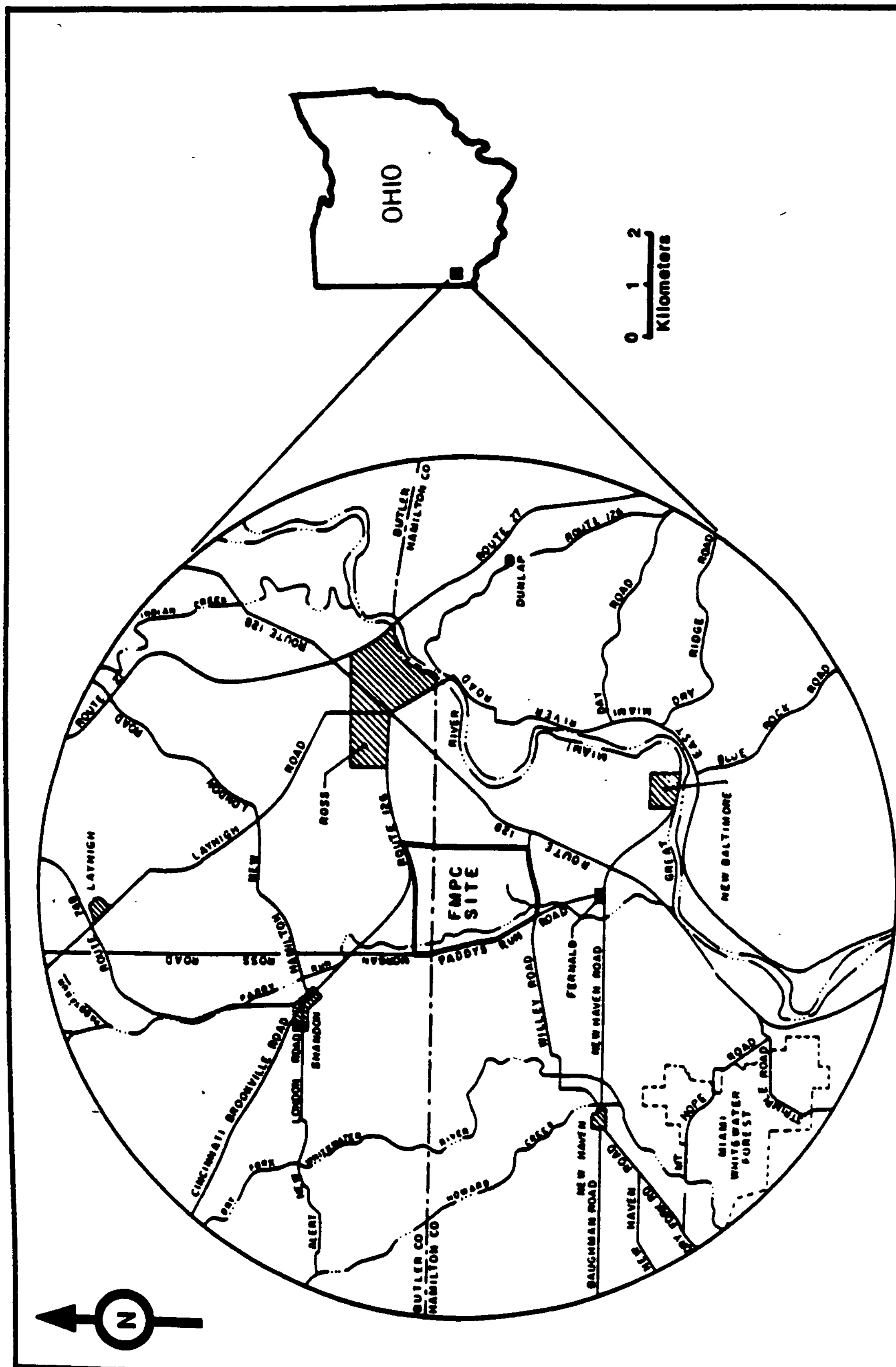


FIGURE 1: FMPC Area Map

Water Pollution Control System at FMPC

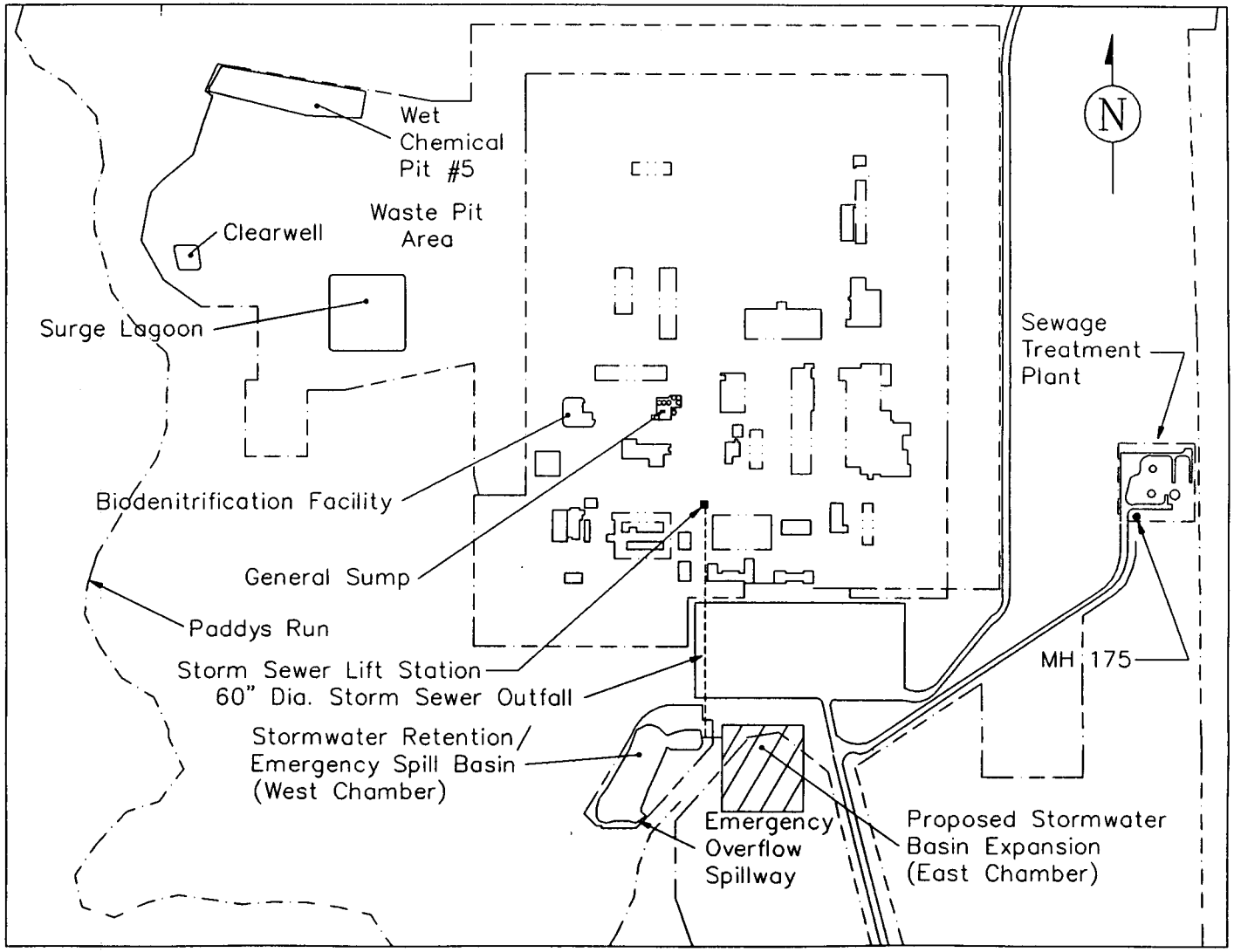


Figure 2. FMPC Site Map

This map is not drawn to scale.

A wide variety of chemical and metallurgical processes are utilized at the FMPC for the conversion of uranium oxides, fluorides and recycle materials to machined uranium ingots and billets. Large-scale chemical operations at the FMPC consist of dissolving uranium recycle materials in nitric acid to produce a uranyl nitrate hexahydrate (UNH) feed solution for solvent extraction purification. Purified UNH solution is concentrated by evaporation and then thermally denitrated to uranium trioxide (UO3), or orange oxide. Orange oxide is converted to uranium tetrafluoride (UF4), commonly called green salt, for reduction to metal.

Metal processing steps begin with the conversion of green salt to elemental uranium (derby metal) by reducing UF4 with magnesium metal. Metallic scrap and briquettes, recycled from subsequent fabrication operations, are combined with derby metal and melted in a graphite crucible. At the proper temperature, the melt is bottom-poured to a preheated graphite mold to form ingots, varying in weight, size and shape according to their ultimate use. The ingots are machined for extrusion into tubes at the RMI Company. Some tubes are returned to the FMPC for cropping.

Wastewaters generated by the above operations include raffinate from extraction purification, filtrates from solids recovery, spent acids and acidic rinse waters from pickling, and spent coolants from machining, washdown water, contaminated rainwaters, and other miscellaneous waste streams generated from each of the chemical and metals plants.

C. DESCRIPTION OF EXISTING WASTE TREATMENT FACILITIES

Since the beginning of production operations in 1952, the FMPC has operated various waste treatment facilities in order to minimize the impact of site operations on the surrounding area and receiving streams. The waste treatment facilities which will be affected by the proposed installation are shown in Figure 3.

C.1 Sitewide Process Waste Treatment

Currently, process wastewater treatment at the FMPC begins with precipitation/filtration of waste streams for uranium recovery within the individual plant treatment systems (A) (see Figure 3) which consists of the refinery, chemical and metal production plants. The effluent (B) from each plant is collected at the General Sump (C) for further pH adjustment, flocculation and settling. Clear decant (D) is pumped to Manhole No. 175 (E) for discharge through a 4200 ft. underground gravity flow pipe to the plant outfall (F) in the Great Miami River. The tank heels (G) containing precipitated and settled solids, are pumped to Plant 8 (H) for filtration on rotary vacuum precoat filters.

Solids (I) which contain low, nonrecoverable concentrations of uranium are processed in accordance with low-level waste regulations of the DOE. The clarified filtrate (J) is pumped to the Biodenitrification Surge Lagoon. The waste stream is then

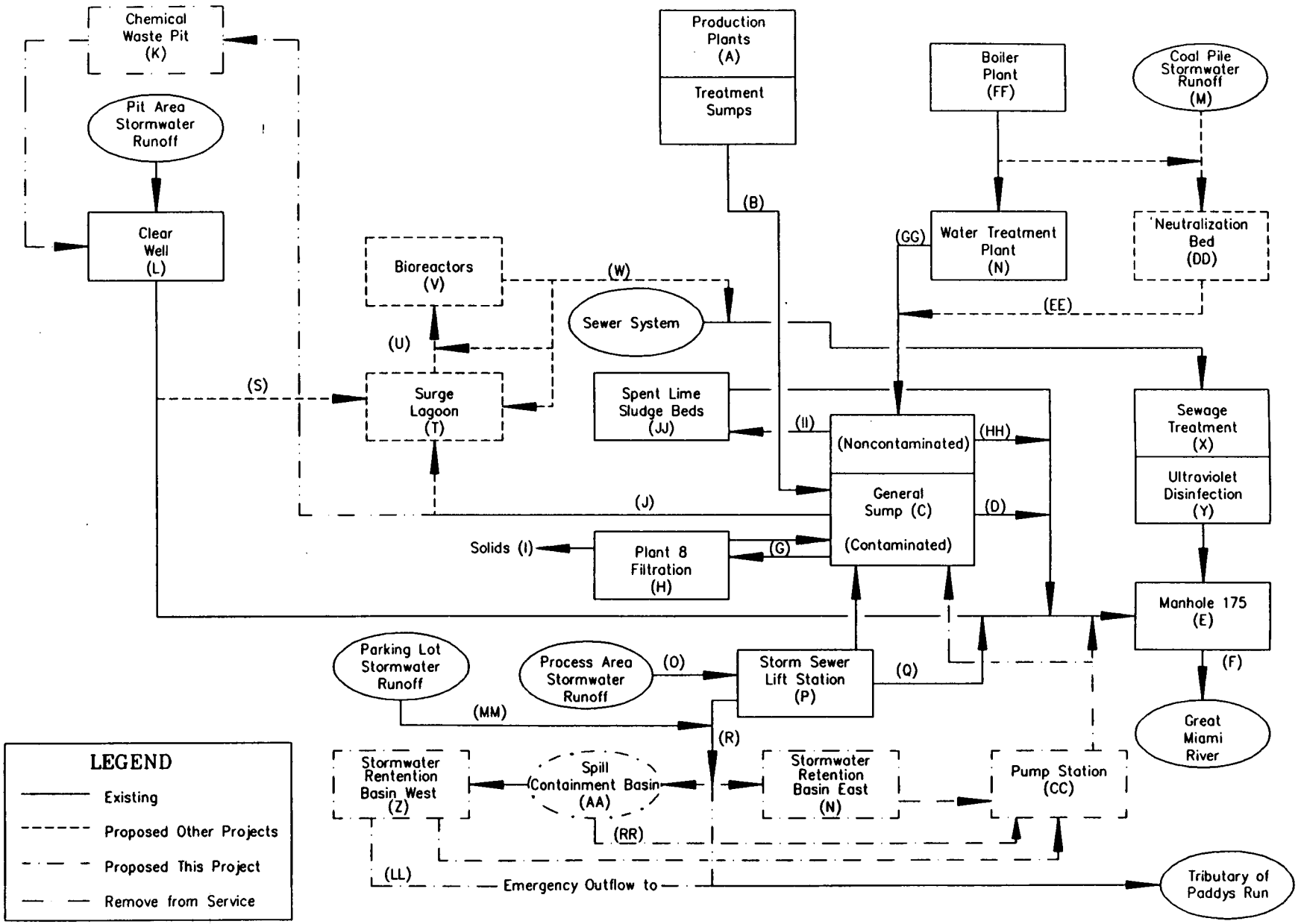


Figure 3. FMPC Waste Treatment Flow Diagram

pumped to the Biodenitrification (BDN) Facility (V) for nitrate removal. Effluent (W) from the BDN Facility is then treated for TSS and Biochemical Oxygen Demand in the FMPC Sewage Treatment Plant (X). The treated wastewater is then sent to Manhole No. 175 for discharge.

C.2 Stormwater Runoff

The FMPC storm sewer system presently collects and conveys stormwater runoff from the plant process area (O) and from the parking lot areas (MM) shown in Figure 4. Stormwater runoff (O) collected from the plant process area flows by gravity to Manhole No. 34. During dry periods or minimal rainfall events, water collected in the process area sewers is intercepted by the Storm Sewer Lift Station (SSLS) pumps (P) and transferred to the Great Miami River via monitoring Manhole No. 175 (E). When a rainfall event causes the collected water quality to be threatened by higher than normal Total Suspended Solids (TSS), the SSLS pumps are temporarily shut off. This facilitates the gravity flow of all collected water to the Storm Water Retention Basin (AA, Z, and N). Flow in the sewer system may be either lifted and pumped to discharge location Manhole No. 175 (E), or allowed to continue flowing by gravity to Storm Sewer Outfall (R), or both, depending on the quantity and quality of runoff generated from a particular storm event.

Runoff from parking lot areas (MM) drains directly to the Storm Sewer Outfall (R) (shown in Figures 2 and 3). The Storm Sewer Outfall (R) was previously a discharge point to a tributary of Paddys Run and is presently discharged into the SWRB (Z). It was designated a National Pollution Discharge Elimination System (NPDES) permit discharge point No. 002. A three year summary of NPDES sampling data for discharge point 002 is presented in Table 1.

Table 1.
NPDES Sampling Data for Discharge Point 002

	1984			1985			1986		
Parameter(mg/l)	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
pH*	7.4	8.5	NA	7.5	8.3	NA	7.4	8.3	NA
TSS	<2	64	8	<2	175	15	<2	223	<21
O&G	<5	17	5	<5	<5	<5	<5	15	<5

*Standard units.

In the Fall of 1986, the FMPC constructed a 6.5 million gallon Stormwater Retention Basin (SWRB) near the discharge of the Storm Sewer Outfall. The existing SWRB (Z) serves as a

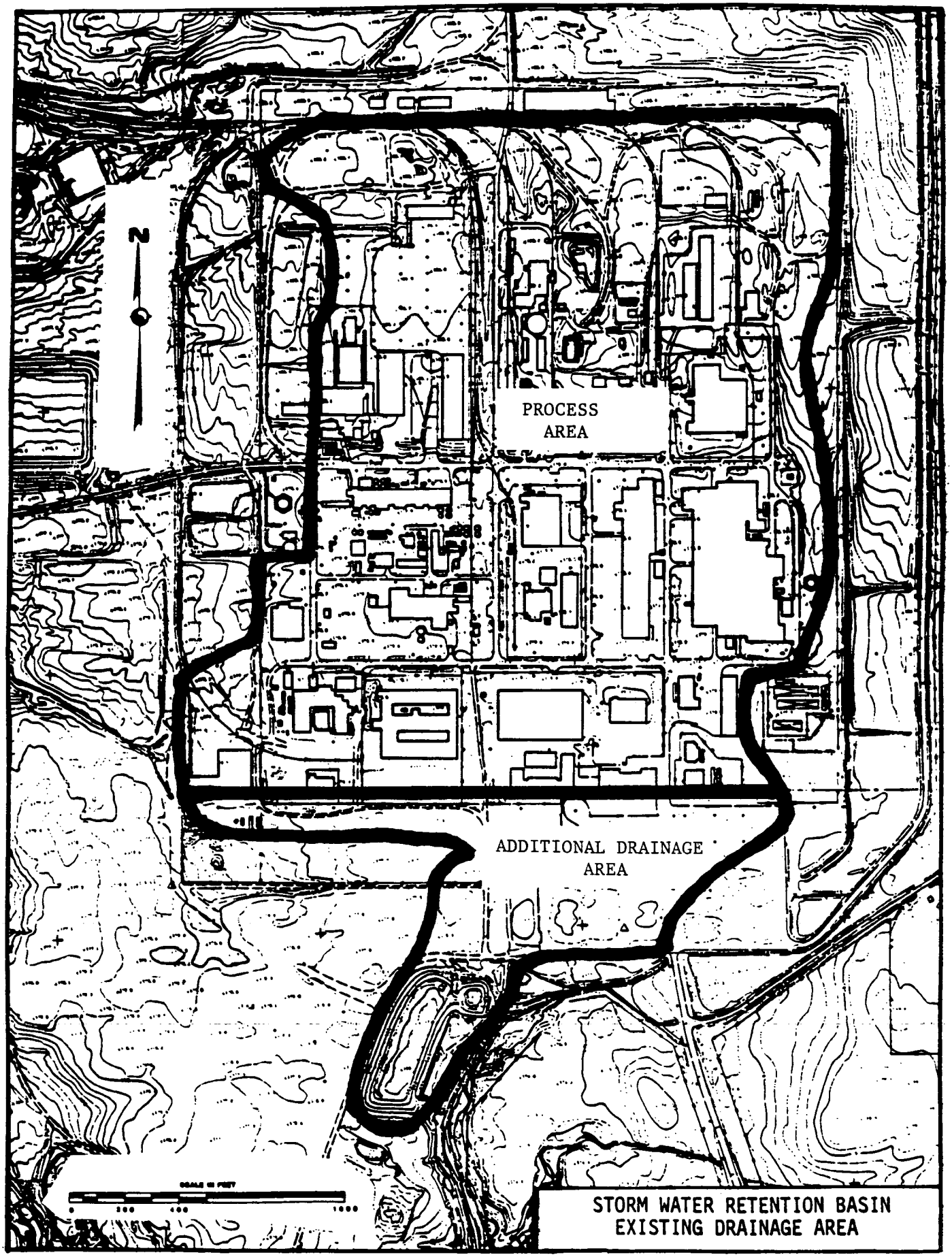

N
PROCESS
AREA
ADDITIONAL DRAINAGE
AREA
STORM WATER RETENTION BASIN
EXISTING DRAINAGE AREA

Figure 4

collection/retention reservoir for stormwater runoff and also as a solids settling basin. Outflow from the basin is accomplished by pumping to the Great Miami River via monitoring Manhole No. 175. Effluent from Manhole No. 175 is continuously sampled in accordance with FMPC NPDES permit requirements. Manhole No. 175 is designated as NPDES discharge point No. 001. The overflow from the existing basin is NPDES discharge point 002. The present stormwater retention system is capable of storing approximately 6.5 million gallons of stormwater runoff which approximates a 2-yr./24-hr. stormwater runoff event (with pumpout) at the FMPC. Ohio EPA has required that this system be expanded to control a 10-yr./24-hr. storm event.

D. DESCRIPTION OF FACILITIES

The new facility will consist of expanding the existing Stormwater Retention Basin. The expansion provides for additional retention and settling of stormwater/process spills.

D.1 Settling Chambers for the Storm Water Drainage

D.1.1 Constructed Facilities

Settling chambers (AA) and (Z) were provided to control suspended solids, catch any process spills in order to recycle the spills directly back to the General Sump for reprocessing, and to retain/prevent storm drainage from the FMPC manufacturing areas and parking lots from entering a tributary leading to Paddys Run.

The storage capacity of the existing process area Stormwater Retention Basin is approximately 6.5 million gallons. The volume of the existing system is comprised of a 577,000 gallon Emergency Spill Basin (ESB), a 5.71 million gallon settling chamber, and 200,000 gallons in the partially surcharged storm sewer collection system. The Emergency Spill Basin (AA) is constructed in series with and is located upstream from the larger settling chamber (Z). The ESB receives all incoming storm water runoff (BB). When inflow exceeds approximately 200,000 gallons, excess storm water will overflow a weir (see Appendix I, ESB elevation 560) to the larger settling chamber (Z). Collected stormwater is discharged by gravity from the basins by means of individual floating outlet structures connected to a common pump sump. The existing SWRB was placed into full operation in early November 1986.

The existing chamber and the ESB have a double liner system. The inner liner (the liner in direct contact with the water) is an ultraviolet light and oil/solvent resistant, synthetic flexible membrane liner (FML). The outer liner is 18 inches of a bentonite and soil mixture. Between the liners there are underdrain collection systems. The underdrain system collects and detects

any leakage through the synthetic liner. Any underdrain flow drains by gravity to an inspection sump where it is collected and pumped back into the SWRB. This system serves to virtually eliminate the potential for any environmental impact to groundwater or to Paddys Run due to leakage through the flexible membrane liner. The liner system is designed to prevent leakage, however, a value of 40 gallons/acre/day is established as a threshold for repair. If leakage exceeds this quantity, leak detection measures will be initiated and the source(s) repaired. Gas vents are located on 50 foot centers around each of the chambers. The gas vents will release any underground or trapped gases which may tend to lift the liner.

A perched groundwater table exists in the area where the SWRB is located. Because of this, the SWRB has collection piping and a granular drain system installed around the perimeter beneath the bentonite and soil mixture underliner to intercept and collect the groundwater flow. All collected groundwater is pumped into the SWRB.

D.1.2 Facilities to be Constructed

The combined process area and parking lot area consist of approximately 163 acres with a composite runoff coefficient of 0.56 (see Appendix B). The estimated runoff volumes from the 163 acre area for various 24-hour storm events are listed in Table 2.

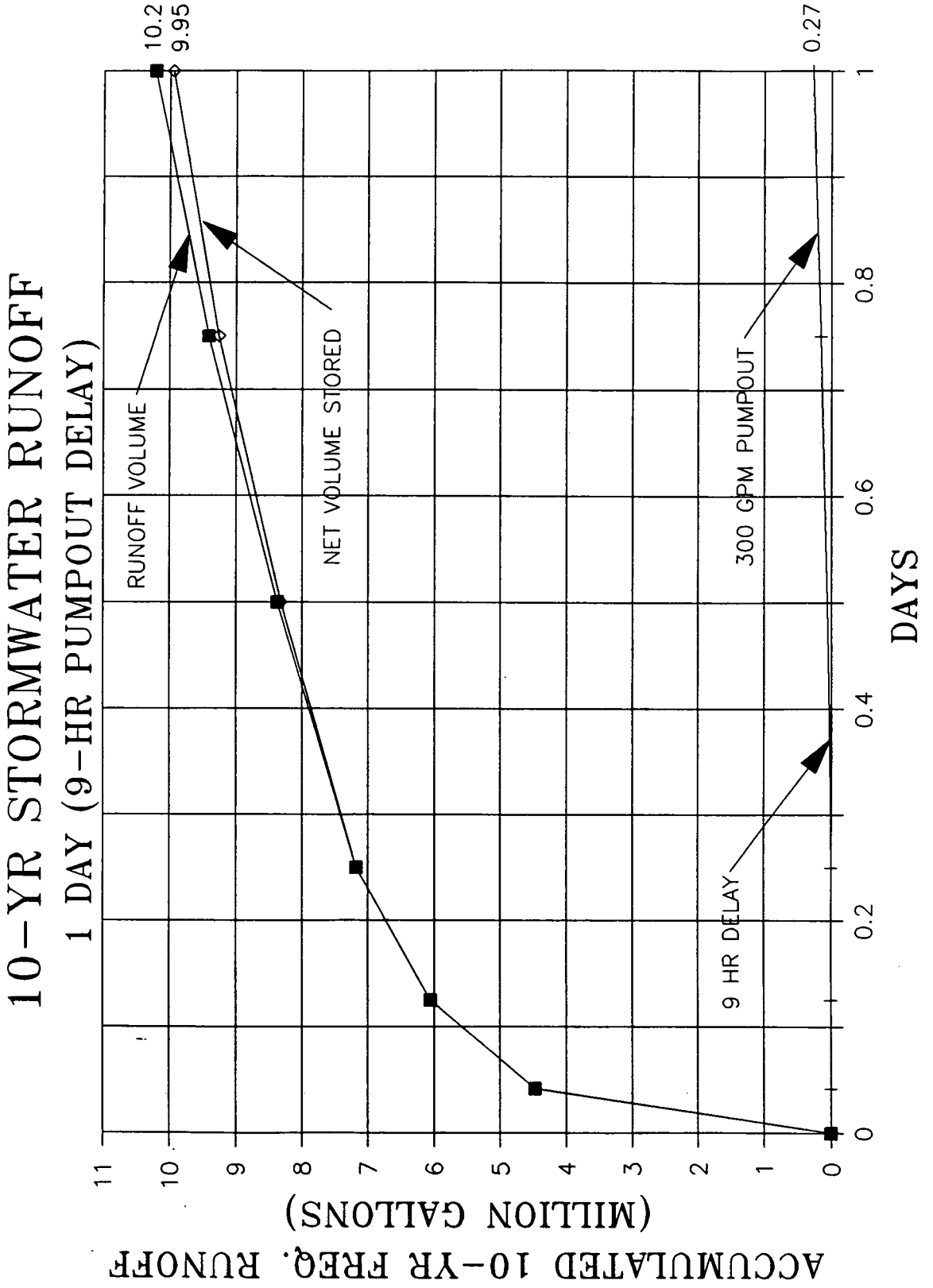
Table 2.
Calculated Runoff Volumes for Various 24-Hour Rainfall Events

Storm Frequency (Year)	24-Hour Rainfall* (Inches)	Runoff Volume Existing SWRB (Million Gallons)	Runoff Volume Expanded SWRB (Million Gallons)
1	2.5	5.97	6.23
2	3.0	7.16	7.48
5	3.6	8.59	8.98
10	4.1	9.78	10.22

*See Appendix G

Figure 5 shows the estimated 10-year, 24-hour storm runoff event from the 163 acre FMPC area (conservatively assumes the peak one-hour rainfall occurs during the first hour of rainfall, see Appendix H for calculation to develop Figure 5). The storage volume required is 10.2 million gallons with no pumping and 9.95 million gallons with a 9 hour pumping delay (minimum time to fill the SWRB to the sluice gate height) and then 300 gpm pumping. Therefore, the SWRB will be sized for a minimum of the 10-yr./24-hr. runoff curve which is 10.2 million gallons plus a

FIGURE 5


10-YR STORMWATER RUNOFF
1 DAY (9-HR PUMPOUT DELAY)
ACCUMULATED 10-YR FREQ. RUNOFF
(MILLION GALLONS)
DAYS
RUNOFF VOLUME
NET VOLUME STORED
300 GPM PUMPOUT
9 HR DELAY
10.2
9.95
0.27
0
1
2
3
4
5
6
7
8
9
10
11
0
0.2
0.4
0.6
0.8
1

sediment accumulation volume of 0.30 million gallons or 0.15 million gallons for each chamber (see "Study of Solids Loading and Solids Settling in the FMPC Biodenitrification Surge Lagoon and Stormwater Retention Basin", issued to OEPA June 1, 1987 in response to Order 4 of the OEPA's Findings & Orders) for a total of 10.5 million gallons. The expansion of the Stormwater Retention Basin will be accomplished by constructing a second parallel chamber adjacent to and east of the existing basin having a minimum volume of 4.0 million gallons. This expansion will result in a minimum net storage capacity of 10.5 million gallons (4.0 MG (minimum) + 6.3 MG + 0.2 MG = 10.5 MG (minimum)).

The proposed basin expansion will also have a double-liner system. The inner liner (the liner in direct contact with the water) will be a flexible membrane liner. The outer liner will be 18 inches of a bentonite and soil mixture. Between the two liners will be an underdrain system. The collection system will detect and collect any leak in the synthetic liner. The underdrain water will flow by gravity to a new sump where it can be monitored before being pumped back into the new chamber. The liner will be an ultraviolet light and oil solvent resistant, synthetic liner. The liner system is designed to prevent leakage, however, a value of 40 gallons/acre/day is established as a threshold for repair. If leakage exceeds this quantity, leak detection measures will be initiated and the source(s) repaired. Water collected will be removed from the new chamber via a floating outlet structure. Discharged water will flow by gravity to the existing pump sump located to the north of the existing west chamber.

A perched groundwater table exists in the area where the proposed SWRB expansion is to be located. Therefore, the new chamber will be provided with a groundwater interception system. All collected groundwater will be pumped into the new chamber. Gas vents will be installed around the basin perimeter.

Recent tests (see "Study of Solids Loading and Solids Settling in the FMPC Biodenitrification Surge Lagoon and Stormwater Retention Basin", issued to OEPA June 1, 1987) have indicated that approximately 24 hours of quiescent settling time is required to obtain an effluent level of 30 - 40 ppm TSS. Therefore, in order to achieve maximum removal of TSS from the incoming runoff water, the proposed basin expansion will be constructed to operate in parallel with the existing basin. Shutoff gates will be installed at the entrances to each of the two large chambers. The height of the gates will be set to allow automatic overflow of the full 60 inch incoming pipe flow to either chamber upon filling of the first chamber to the height of the sluice gate. After one chamber is filled to a level which results in overflow to the other chamber, the first chamber's gate will be closed and the second chamber's gate opened. The first chamber will then be allowed to remain quiescent for 24 hours before pumpout begins. During large storm events, once the second chamber's water level reaches that of the first chamber, the chambers will begin to continue filling

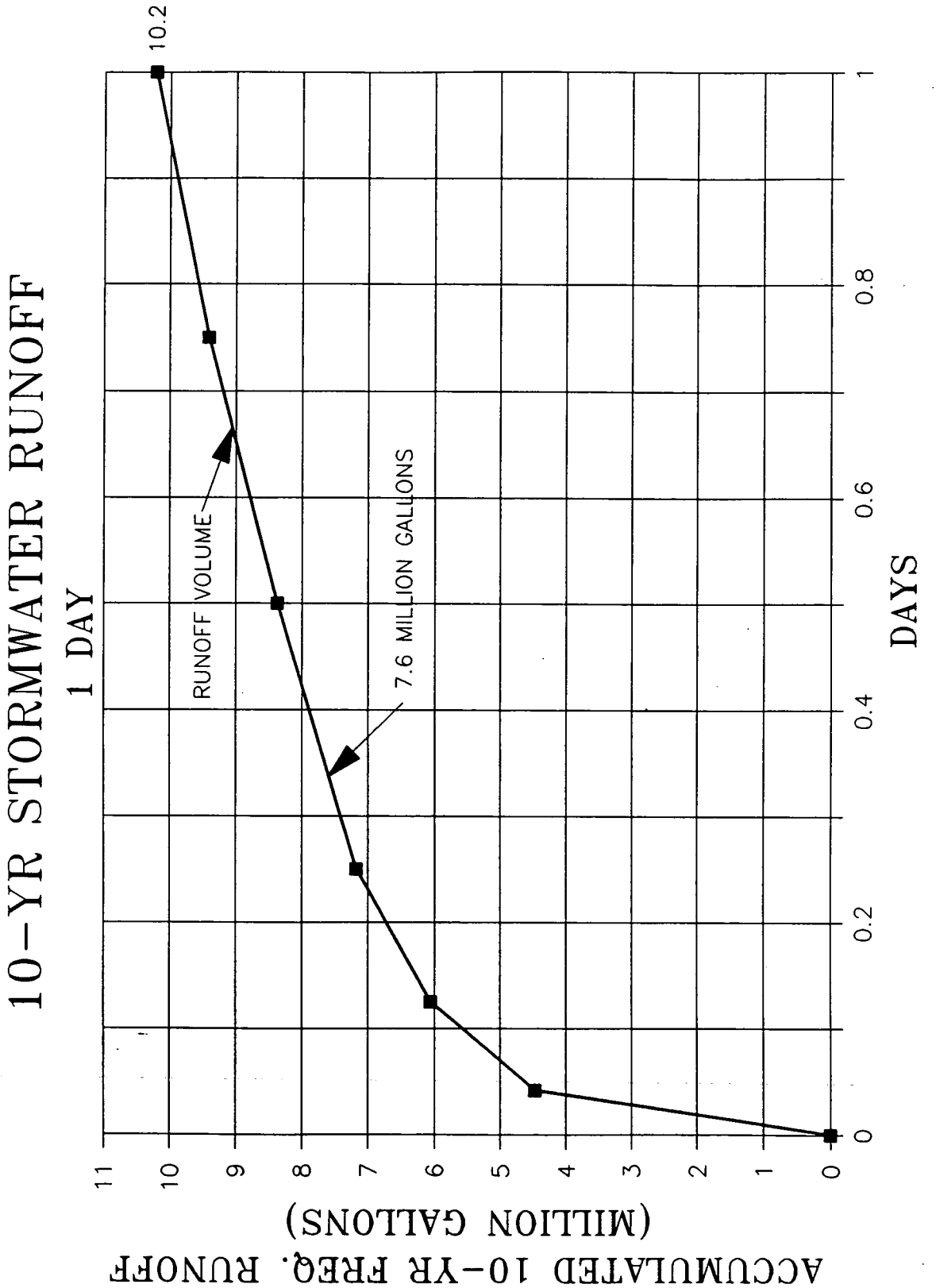
simultaneously. At this point, discharge pumping will begin simultaneously from both chambers at a combined outflow rate of 300 gpm. Since water will be pumped from each chamber at the same time, the surface overflow rate for the floating outlet structures will be reduced by one-half compared to the existing chamber. Reducing the surface overflow rate combined with allowing some quiescent settling of the first flush of runoff accumulated in the initial chamber should decrease the level of TSS in the water that is being pumped compared to that which presently exists.

The estimated capacity of the sixty (60) inch storm sewer line (the discharge pipe into the SWRB) is 135 cubic feet per second. The design height of the sluice gates will be based on the clearance required to flow 135 cubic feet per second over the top of an individual gate. The height of the wake caused by this rate of water flowing over the top of the gate is estimated to be 2.7 feet. Therefore, the top of the half gates will be approximately 2.7 feet below the crown of the 60 inch main. The volume of water that will be contained in both basins at the height of the top of the half gates is estimated to be approximately 7.6 million gallons (see Appendix I, elevation 562.5 ft.). Locating 7.6 million gallons on the FMPC 10-yr./24-hr. stormwater runoff curve, Figure 6, shows that it will take a minimum of approximately 0.37 days (9 hours) to fill both basins to the height of the top of the sluice gates. At this point the discharge pumps will be turned on.

D.2 Operation and Maintenance

D.2.1 Operation of the SWRB The operation of basins will be assisted by the sluice gates installed by the entrances to each chamber. The normal operation will be to have one chamber's sluice gate in place allowing all stormwater/spills to flow to the other chamber. At some point, when either pumpout of the other basin has been completed, or during large storms, after the initial chamber has been filled to a level which results in overflow to the second chamber, the first chamber's gate will be closed and the second chamber's gate opened. The first chamber will then be allowed to remain quiescent for 24 hours before pumpout begins. If, during large storm events, the second chamber's water level reaches that of the first chamber's level before the 24-hour quiescent period has been completed, the chambers will begin to continue filling simultaneously. At this point, discharge pumping will be initiated simultaneously from both basins at a combined outflow rate of 300 gpm. Since water will be pumped from each basin at the same time, the surface overflow rate will be reduced by one-half compared to the existing basin. Reducing the surface overflow rate should decrease the level of TSS in the water that is being pumped. If both chambers fill beyond their design capacity, an overflow will occur at the existing west chamber's overflow spillway. At that point, the west basin's pumpout will be stopped and all pumpout outflows will be taken from the more quiescent eastern chamber.

FIGURE 6


10-YR STORMWATER RUNOFF
1 DAY
RUNOFF VOLUME
7.6 MILLION GALLONS
10.2
ACCUMULATED 10-YR FREQ. RUNOFF
(MILLION GALLONS)
DAYS
0
1
2
3
4
5
6
7
8
9
10
11
0
0.2
0.4
0.6
0.8
1

Any spill that may occur will be isolated and contained in one of the two chambers (by the use of the sluice gates) and then pumped to the General Sump for treatment. The proposed construction and operation of the basins in parallel will provide for better spill control than the existing design.

The Storm Basin Transfer Pump Station has the ability to withdraw from any, all, or a combination of the three basins by the use of the sluice gates that cover the inlet pipes to the sump. When a basin is to be emptied, the gate to the appropriate inlet pipe to the sump will be opened. Water will flow by gravity from the respective chamber's 'floating inlet structure' to the Storm Basin Transfer Pump Sump. The sump's pump will discharge this water at a rate of approximately 300 gpm to Manhole No. 175 where it will flow by gravity to the Great Miami River.

D.2.2 Solids Loading. The estimated net solids loading in the SWRB is based on the average of the approximately 40 inches of yearly rainfall experienced in Hamilton County, Ohio. Based on a composite stormwater runoff coefficient of 0.56, the yearly volume of stormwater runoff collected in the SWRB is calculated to be approximately 100 million gallons. The calculated solids loading in the SWRB, based on an average influent TSS of 226 ppm and an average effluent TSS of 30 - 40 ppm, yields a total solids loading of 156,000 lbs./year (71,000 kg/yr.).

D.2.3 Proposed Solids Removal Methods. During the readiness review for the Stormwater Retention Basin in September, 1986, a plan was initiated for determining a technique for removal of lagoon sludges. Methods investigated were limited to those which would not disturb the integrity of the synthetic flexible membrane liners.

Visits to observe various types of hydraulic dredges in operation were made to gain the information necessary for preparation of a plan of action for acquiring sludge removal equipment at the FMPC.

A test will most likely be made to clean out the basin on a demonstration test basis. Once the demonstration test is completed, a decision will be made on whether to purchase equipment similar to the equipment used in the demonstration test or to continue subcontracting this work. The demonstration test will most likely use the following BADT (best available demonstrated technology) facilities for sediment removal:

- Mini-dredge for withdrawing sediments in a slurry form,
- Portable trailer mounted slurry treatment system consisting of:
  - Gravity Settler for solids settling, and

- Belt Filter Press and auxiliary equipment for sludge dewatering.

D.2.3.1 Mini-Dredge. The mini-dredge is a compact, portable machine designed to hydraulically withdraw sediments from lagoons. The mini-dredge consists of two steel flotation pontoons a diesel engine, a centrifugal pump, a horizontal auger-cutter assembly, a control center, and related equipment.

A hydraulically operated boom lowers the auger-cutter assembly into the material to be withdrawn. The auger-cutter assembly dislodges and delivers the material to a submersible pump which is mounted on the boom directly behind the auger-cutter assembly. The pump serves to optimize the solids/liquid ratio and permits the pumping of concentrated slurries. The centrifugal pump adds "pressure" energy to the slurry mixture when confined in a pipeline. The slurry mixture is conveyed through a pipeline to a portable trailer mounted slurry treatment system located at the side of the lagoon.

D.2.3.2 Portable Trailer Mounted Slurry Treatment System. A portable slurry treatment system is proposed for processing the mixture of solids and liquid removed from the lagoons. The treatment system will be mounted on a flatbed or lowboy trailer. The system will be moved to each lagoon as required by the maintenance schedule described herein. The system will consist principally of a gravity settler for solids settling and a belt filter press with auxiliary support equipment for solids dewatering. A preliminary description of the system follows.

D.2.3.2.1 Gravity Settler. A gravity settler will provide for solids settling. A compact lamella gravity settler is visualized. With the lamella inclined plate concept, the effective settling area becomes the area of each plate projected on a horizontal surface. As a result, tenfold settling area becomes available in the settler. Because it has significantly better design features by virtue of its available settling area it is small enough to be trailer mounted.

The feed stream from the mini-dredge is introduced into the lamella gravity settler by means of a feed duct to the feed box, which is a bottomless channel between plate sections. The feed is distributed across the width of the plates and then flows upward under laminar flow conditions. The solids settle on the plates while the supernatant exits from the plates through orifice holes. The solids, meanwhile, slide down the plates into the sludge hopper.

In addition, coagulants and/or flocculating aids will be used. A flash mix and/or flocculation tank will be mounted adjacent to the feed duct. Settled sludge will be transferred to a sludge surge tank supernatant will be returned to the lagoon.

D.2.3.2.2 Belt Filter Press. Sludge from the sludge surge tank will be pumped to a belt filter press for dewatering. The belt filter press dewaters sludge by utilizing three distinct steps. The first step is polymer conditioning. The second step is gravity drainage where the flocculated sludge is gently distributed onto a moving belt. The third step is pressure dewatering where the gravity drained sludge is sandwiched between two belts. The sludge is passed over a series of decreasing diameter rolls which gradually increase the pressure and shear force exerted on the sludge for maximum water release. After cake discharge, the belts are washed and the cycle is repeated.

D.2.4 Maintenance of the SWRB. The maintenance of the SWRB is based on cleanout when the accumulated sediments reach an average depth of approximately six (6) inches. This represents a volume of approximately 150,000 gallons of sediment in each chamber. The dry solids content of the sediment has been estimated to be approximately 15%. With these factors in mind, the amount of sediment that will accumulate in a given year is approximately 118,000 gallons. These accumulation rates therefore require a cleanout frequency of approximately 2 years, once the new basin addition is constructed. Since the basins will operate in parallel, one basin can be taken off-line during cleanout.

The solids removed from the SWRB may, or may not, be treated as a low level radioactive waste. A guideline for acceptable on site soil contamination has not yet been agreed upon between the FMPC, Ohio EPA, and U.S. EPA. When this guideline is set, it will be used to determine the method for SWRB solids disposal. If the uranium concentration level in the drums of sludge collected from the portable dewatering system is above the agreed upon FMPC Guideline for soils, the sludge will be treated as a low level radioactive waste and disposed of at an approved low level waste burial site. If the uranium concentration level is less than this guideline for soils, the sludge will be deposited on-site. The removed solids will be tested for EP toxicity if they are found to be acceptable by uranium standards for disposal on-site.

E. AUXILIARY FACILITIES

E.1 Storm Basin Transfer Pump Station

The Storm Basin Transfer Pump Station is provided with two pumps. The average pumpout rate is approximately 300 gpm with both pumps operating. The pump station is located on the north side of the existing basin, west of the 60 inch inflow line.

E.2 West (Existing) Storm Basin Underdrain Pump Station

The Storm Basin Underdrain Pump Station for the existing facility has two pumps. Each is designed to discharge 100 gpm. Startup controls are manual. The underdrain pump station is located to the east of the main existing basin, south of the existing ESB. The underdrain pump sump contains any collected underdrain flow as well as any collected perched groundwater. The inflow waters have been, and will continue to be, pumped back into the basin.

E.3 East (Proposed Expansion) Storm Basin Underdrain Pump Station

The underdrain pump station for the proposed east chamber will have two sections. One section will collect any underdrain water and the second section will collect any groundwater. The collected waters will be pumped back into the basin. One pump will be located in each section. The wall dividing the two sections will be at a height which will allow overflow to the other section in the event of a pump failure. Each pump is designed to discharge at 100 gpm. Startup controls are manual. The underdrain pump station for the proposed expansion will be constructed north of the chamber.

DRAWING INDEX

3002

Drawing No.	Revision No.	Title
General		
18B-1920-X-00262	0	Cover Sheet
Existing Stormwater Retention Basin		
18B-1920-G-00348	3	Plans - Basins & Piping
18B-1920-G-00349	1	Storm Basin Cross - Sections
18B-1920-G-00350	2	Storm Basin Cross - Sections
18B-1920-P-00351	0	Plans & Sections - Storm Transfer & Underdrain Pump Stations
18B-1920-P-00352	0	Storm Basin Force Main
18B-1920-S-00353	0	Storm Transfer and Underdrain Pump Stations - Plans & Sections
18B-1920-S-00354	0	Inspection Sump Plant Sections
Proposed Stormwater Retention Basin Expansion		
C001	0	Project Location and Drawing Index
C002	0	Site Layout Plan
C003	0	Grading & Drainage Plan
C004	0	Utility Plan
C005	0	Basin Sections
C007	0	Flexible Membrane Liner Details
C010	0	Stormwater Structure Details- 1 of 2
C011	0	Stormwater Structure Details- 1 of 2

APPENDIX B

CALCULATIONS OF COMPOSITE RUNOFF COEFFICIENT "C"

Department of Energy
Oak Ridge Operations
P. O. Box E
Oak Ridge, Tennessee 37831

3002

April 29, 1987

Mr. Thomas A. Winston, District Chief
Southwest District Office
Ohio Environment Protection Agency
7 East Fourth Street
Dayton, Ohio 45402-2086

Dear Mr. Winston:

ACTION ITEM - MARCH TECHNICAL INFORMATION EXCHANGE MEETING

During the subject meeting, we were requested to provide information on the methods used to compute average runoff coefficients for the FMPC site.

Attachment 1 provides typical runoff coefficients with a summary of the existing surface areas which drain into the FMPC Stormwater Retention Basin. Attachment 2 provides our calculations indicating the combined average runoff coefficient for the area draining to the FMPC Stormwater Retention Basin. As you are aware, we have used an average runoff coefficient (C) of 0.55 for calculating runoff flows to the basin.

Advise if you have any questions on this letter.

Sincerely,

James A. Reafsnyder
Site Manager

Attachments:
As stated above

cc w/attach:
Julie Gryzb, OEPA
Graham Mitchell, OEPA
Doyle Brown, ER-121, ORO
Margaret Wilson, SE-31, ORO
Susan Castle, WMCO
Bob Conner, WMCO
Bob Weidner, NLO

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ATTACHMENT 1

RUNOFF COEFFICIENT

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Industrial	
Light	0.50 to 0.80
Heavy	0.60 to 0.90
Railroad Yard	0.20 to 0.35
Lawns	
Flat 2%	0.13 to 0.17
Average 2-7%	0.18 to 0.22
Steep 7%	0.25 to 0.35

Surface Area

Paved - incl. roofs	76.0 acres
Grassed - incl. gravel	80.2 acres
Basin - plastic & grassed	3.6 acres
Total	159.8 acres

Note: Areas based existing drawings - future expansion not included.

ATTACHMENT 2

COMBINED RUNOFF COEFFICIENT

$$\frac{76}{159.8}(.8) + \frac{80.2}{159.8}(.3) + \frac{3.6}{159.8}(.95)$$

$$0.380 + 0.151 + 0.021 = 0.552$$

$$\text{use } C = 0.55$$

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Revised Runoff Coefficient for the expanded SWRB

Basin Expansion

Estimated Surface Area	3 acres
Estimated Runoff Coefficient	0.95

Net Results

Total Surface area	162.8 acres
Estimated Runoff Coefficient	

$$\frac{76}{162.8}(0.8) + \frac{80.2}{162.8}(0.3) + \frac{6.6}{162.8}(0.95) = 0.559$$

Therefore, for the expanded SWRB use "C" = 0.56

APPENDIX C

EXISTING STORMWATER RETENTION BASIN

PUMPOUT DATA

TABLE I

3002

EVENT DATE	SWRB TOTAL SUSPENDED SOLIDS PARTS/MILLION	ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	SWRB + ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	WEATHER CONDITIONS	24 - HOUR PRECIPITATION INCHES	EVENT DURATION HOURS
11-03-86				TRACE PPT		1.50
11-04-86				RAIN	0.24	11.50
11-05-86				RAIN	0.48	22.50
11-06-86						
11-07-86	20.00		20.00			
11-08-86	18.00		18.00	RAIN	0.06	1.00
11-09-86						
11-10-86						
11-11-86	16.00		16.00	RAIN	0.26	7.00
11-12-86						
11-13-86		27.00	27.00	RAIN		14.00
11-14-86	12.00		12.00	RAIN		5.50
11-15-86	7.00		7.00	RAIN		7.50
11-16-86						
11-17-86						
11-18-86	6.00		6.00	RAIN		5.50
11-19-86						
11-20-86					0.25	
11-21-86						
11-22-86						
11-23-86					0.08	
11-24-86						
11-25-86					0.78	
11-26-86					1.51	
11-27-86						
11-28-86						
11-29-86						
11-30-86						
12-01-86	80.00		80.00	RAIN	0.88	11.50
12-02-86				RAIN	1.00	13.75
12-03-86	64.00		64.00	TRACE PPT		0.00
12-04-86	73.00		73.00			
12-05-86	68.00		68.00			
12-06-86	49.00		49.00			
12-07-86						
12-08-86						
12-09-86	38.00		38.00	RAIN	0.50	NOT RECOR
12-10-86	35.00		35.00			
12-11-86	43.00		43.00			
12-12-86	44.00		44.00			
12-13-86	40.00		40.00			
12-14-86						
12-15-86						
12-16-86	31.00		31.00			

TABLE I

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EVENT DATE	SWRB TOTAL SUSPENDED SOLIDS PARTS/MILLION	ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	SWRB + ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	WEATHER CONDITIONS	24 - HOUR PRECIPITATION INCHES	EVENT DURATION HOURS
12-17-86	30.00		30.00			
12-18-86	30.00		30.00			
12-19-86	27.00		27.00			
12-20-86		8.00	8.00			
12-21-86						
12-22-86	16.00		16.00			
12-23-86				TRACE PPT		1.00
12-24-86					0.28	
12-25-86				RAIN		13.00
12-26-86						
12-27-86						
12-28-86						
12-29-86				SNOW		1.50
12-30-86				TRACE SNO	0.06	6.00
12-31-86		10.00	10.00			
01-01-87						
01-02-87		11.00	11.00	FLURRIES	0.02	3.00
01-03-87						
01-04-87						
01-05-87						
01-06-87						
01-07-87						
01-08-87		2.00	2.00		0.08	
01-09-87				RAIN+SNOW	0.09	8.00
01-10-87				RAIN+SNOW		7.00
01-11-87		23.00	23.00			
01-12-87						
01-13-87						
01-14-87						
01-15-87		46.00	46.00	RAIN		2.00
01-16-87						
01-17-87					0.14	
01-18-87		10.00	10.00	RAIN+FLUR	0.33	9.50
01-19-87				SNOW FLUR		0.50
01-20-87	55.00		55.00			
01-21-87	88.00		88.00			
01-22-87				SNOW	0.01	10.00
01-23-87						
01-24-87						
01-25-87						
01-26-87						
01-27-87				TRACE SNO		3.75
01-28-87		8.00	8.00			
01-29-87				RAIN	0.15	9.00

TABLE I

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EVENT DATE	SWRB TOTAL SUSPENDED SOLIDS PARTS/MILLION	ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	SWRB + ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	WEATHER CONDITIONS	24 - HOUR PRECIPITATION INCHES	EVENT DURATION HOURS
01-30-87				TRACE PPT		0.00
01-31-87						
02-01-87		45.00	45.00	TRACE PPT		4.75
02-02-87				RAIN	0.02	3.00
02-03-87						
02-04-87						
02-05-87						
02-06-87						
02-07-87						
02-08-87				SNOW	0.03	1.00
02-09-87		50.00	50.00			
02-10-87						
02-11-87						
02-12-87						
02-13-87						
02-14-87						
02-15-87						
02-16-87				TRACE PPT		0.00
02-17-87				SNOW	0.10	8.00
02-18-87				TRACE PPT		0.00
02-19-87						
02-20-87						
02-21-87		15.00	15.00	RAIN+SNOW		5.00
02-22-87				TRACE PPT		0.50
02-23-87						
02-24-87						
02-25-87						
02-26-87						
02-27-87				RAIN+SLEE	0.40	20.50
02-28-87		25.00	25.00	RAIN	0.89	17.00
03-01-87	101.00		101.00	RAIN	0.33	19.00
03-02-87	117.00		117.00			
03-03-87	105.00		105.00			
03-04-87	109.00		109.00			
03-05-87	93.00		93.00	TRACE PPT		0.00
03-06-87	78.00		78.00			
03-07-87	69.00		69.00			
03-08-87	63.00		63.00			
03-09-87	51.00		51.00			
03-10-87		19.00	19.00			
03-11-87						
03-12-87						
03-13-87						
03-14-87						

TABLE I

3002

EVENT DATE	SWRB TOTAL SUSPENDED SOLIDS PARTS/MILLION	ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	SWRB + ESB TOTAL SUSPENDED SOLIDS PARTS/MILLION	WEATHER CONDITIONS	24 - HOUR PRECIPITATION INCHES	EVENT DURATION HOURS
03-15-87				RAIN	0.33	8.00
03-16-87	22.00		22.00			
03-17-87	21.00		21.00			
03-18-87		22.00	22.00	RAIN	0.47	7.50
03-19-87	19.00		19.00	RAIN	0.15	4.50
03-20-87	36.00		36.00			
03-21-87	13.00		13.00			
03-22-87	7.00		7.00			
03-23-87	18.00		18.00			
03-24-87						
03-25-87	18.00		18.00	RAIN	0.24	5.25
03-26-87	18.00		18.00			
03-27-87		26.00	26.00			
03-28-87	12.00		12.00			
03-29-87				RAIN	0.23	7.75
03-30-87	28.00		28.00	RAIN+SNOW	1.10	23.00
03-31-87	39.00		39.00			
04-01-87	40.00		40.00			
04-02-87	40.00		40.00			
04-03-87	33.00		33.00			
04-04-87	24.00		24.00			
04-05-87	22.00		22.00			
04-06-87	23.00		23.00			
04-07-87	22.00		22.00			
04-08-87	25.00		25.00			
SUM	2156.00	347.00	2503.00		11.49	
	PARTS/MIL	PARTS/MIL	PARTS/MIL		INCHES	
AVERAGE	41.46	21.69	36.81		0.36	

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APPENDIX D

PRECIPITATION

CINCINNATI (GREATER CINCINNATI AIRPORT), OHIO

PRECIPITATION (inches)

CINCINNATI. (GREATER CINCINNATI AIRPORT) OHIO

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL
1956	2.50	5.32	4.19	4.09	7.04	4.98	3.90	2.31	2.29	1.54	1.91	2.56	43.83
1957	3.08	2.79	1.44	5.62	5.74	2.68	2.44	3.74	3.20	2.34	6.25	5.98	45.30
1958	2.34	0.61	1.73	3.49	5.33	5.19	7.54	2.52	3.67	1.46	2.67	0.68	37.23
1959	7.61	3.18	2.52	2.33	2.92	5.85	2.77	1.80	1.88	3.05	4.04	3.03	40.98
1960	2.48	3.49	1.14	1.32	3.22	6.16	3.15	5.21	1.07	4.00	2.33	1.73	35.30
1961	1.87	3.56	4.76	2.81	7.31	2.28	5.11	1.07	0.97	1.88	3.36	3.39	38.37
1962	3.98	5.58	4.25	1.26	3.64	4.40	8.36	2.14	2.67	2.87	2.37	1.36	42.88
1963	2.04	1.09	9.91	2.01	2.73	1.59	4.34	1.83	0.18	0.25	0.94	1.08	27.99
1964	2.88	1.98	12.18	6.73	1.13	4.32	2.56	2.25	1.65	0.59	2.69	4.92	43.88
1965	3.11	5.07	2.86	4.90	1.46	0.95	4.42	3.24	6.06	3.81	1.26	1.19	38.33
1966	3.84	3.73	1.22	5.38	2.42	2.52	4.06	4.31	3.13	0.57	4.18	3.31	38.67
1967	0.75	1.86	3.63	3.56	5.64	1.72	4.99	0.77	1.79	2.65	3.84	3.94	35.24
1968	1.79	0.64	4.28	3.47	9.48	2.43	7.50	2.26	2.16	1.35	3.21	4.01	42.54
1969	4.64	1.27	1.42	3.59	2.05	4.91	3.28	2.15	2.87	1.53	3.67	2.59	33.97
1970	1.27	1.68	4.71	7.19	1.88	5.73	3.47	2.96	3.87	2.44	2.29	3.32	40.81
1971	2.47	5.89	2.55	1.04	3.31	5.18	3.70	3.45	6.56	1.44	1.68	3.39	40.66
1972	1.96	2.20	3.68	5.89	6.02	2.41	1.50	2.64	5.96	2.55	6.26	4.23	45.30
1973	1.79	1.58	6.11	5.81	3.46	6.27	7.16	2.62	2.63	4.39	4.95	2.66	49.43
1974	3.65	1.63	4.39	5.08	5.53	4.38	3.82	5.75	4.44	1.07	4.19	2.83	46.76
1975	4.05	3.38	6.76	4.16	3.11	5.09	1.62	1.97	3.64	4.59	2.50	3.36	44.23
1976	3.00	2.37	2.14	1.21	1.80	5.94	2.33	4.36	1.95	3.85	0.83	0.51	30.29
1977	1.90	1.29	4.52	4.16	1.53	7.36	1.90	5.45	1.80	3.74	3.90	4.00	41.55
1978	4.52	0.25	1.99	2.28	5.30	6.63	6.86	4.41	0.43	5.03	2.67	6.46	46.83
1979	3.68	3.77	2.05	4.90	4.00	5.92	5.49	4.90	8.61	1.77	4.86	2.91	52.76
1980	2.26	1.04	4.50	1.96	4.59	4.13	5.51	4.19	1.83	3.28	2.58	1.26	37.13
1981	0.57	3.86	1.72	5.05	5.07	3.34	3.66	2.15	1.47	2.33	2.94	2.39	34.55
1982	7.17	1.17	4.67	2.18	4.60	3.61	2.44	7.71	1.27	0.99	5.08	4.25	45.14
1983	1.56	1.14	2.02	4.84	8.89	2.23	1.96	3.23	1.22	8.60	4.20	2.84	42.72
1984	0.75	2.40	3.61	4.88	4.83	2.11	2.57	3.30	3.50	3.85	6.00	4.21	42.00
1985	1.68	2.25	6.90	1.34	6.18	4.55	3.59	2.02	0.76	5.83	7.51	1.52	44.13
Record Mean	3.33	2.77	3.91	3.56	3.99	4.02	4.09	3.04	2.80	2.74	3.45	3.02	40.73

APPENDIX E

GREAT MIAMI RIVER DATA

The Water Conservation Subdistrict
of the Miami Conservancy District

GREAT MIAMI RIVER AT HAMILTON
MEAN DISCHARGE, CUBIC FEET PER SECOND (cfs)
1967-1986

Year	Annual Mean Discharge[1]	Range of Monthly Mean Discharge Maximum	Month	Minimum	Month
1967	3,536	9,843	Mar	439	Sept
1968	3,470	9,945	May	670	Oct
1969	3,567	7,971	Jan	733	Oct
1970	2,887	10,140	Apr	560	Sept
1971	2,391	9,078	Feb	574	Aug
1972	4,389	10,500	Apr	717	Aug
1973	4,944	11,150	Mar	1,239	Sept
1974	3,799	9,596	Jan	910	Oct
1975	4,336	12,300	Feb	1,213	Nov
1976	2,277	7,981	Feb	516	Dec
1977	2,247	9,346	Dec	434	Jan
1978	3,611	13,520	Mar	1,108	Oct
1979	5,299	8,944	Mar	2,309	June
1980	4,218	9,869	Mar	1,060	Nov
1981	3,284	8,073	June	923	Jan
1982	4,469	12,620	Feb	658	Oct
1983	3,048	8,925	May	449	Sept
1984	3,653	10,130	Apr	733	Sept
1985	3,302	7,685	Nov	524	Sept
1986	4,499	8,948	Feb	928	Aug

[1] Average

APPENDIX F

ITEMIZED FLOW AND ESTIMATED TOTAL SUSPENDED SOLIDS

ITEMIZED FLOW AND ESTIMATED TOTAL SUSPENDED SOLIDS

SOURCE	FLOW (GPM)	TSS (mG/L)	TOTAL MASS (kG/DAY)
SEWAGE TREATMENT PLANT WITH BIODENITRIFICATION DEMONSTRATION UNIT*	220	45	54.0
GENERAL SUMP	40	10	2.2
STORM SEWER LIFT STATION	180	20	19.6
STORMWATER RETENTION BASIN**	160	40	34.9
TOTAL FLOW	600 (0.86 MGD)	TOTAL kG/DAY	110.7

ESTIMATED AVERAGE = 34 mG/L

*See Figure 5 of the FMPC NPDES Compliance Strategy Document, issued August 31, 1987.

**Note, some of the stormwater runoff is intercepted by the Storm Sewer Lift Station.

APPENDIX G

RAINFALL DATA FOR 24-HOUR RAINFALL AMOUNTS

U. S. DEPARTMENT OF COMMERCE

WEATHER BUREAU

3002

TECHNICAL PAPER NO. 25

Rainfall Intensity-Duration-Frequency Curves

For Selected Stations in the

United States, Alaska, Hawaiian Islands, and Puerto Rico

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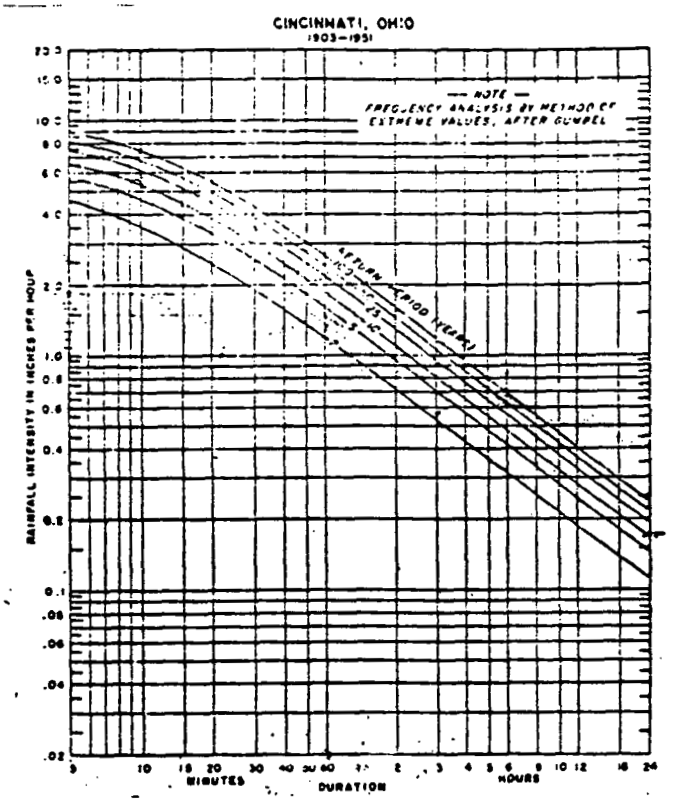
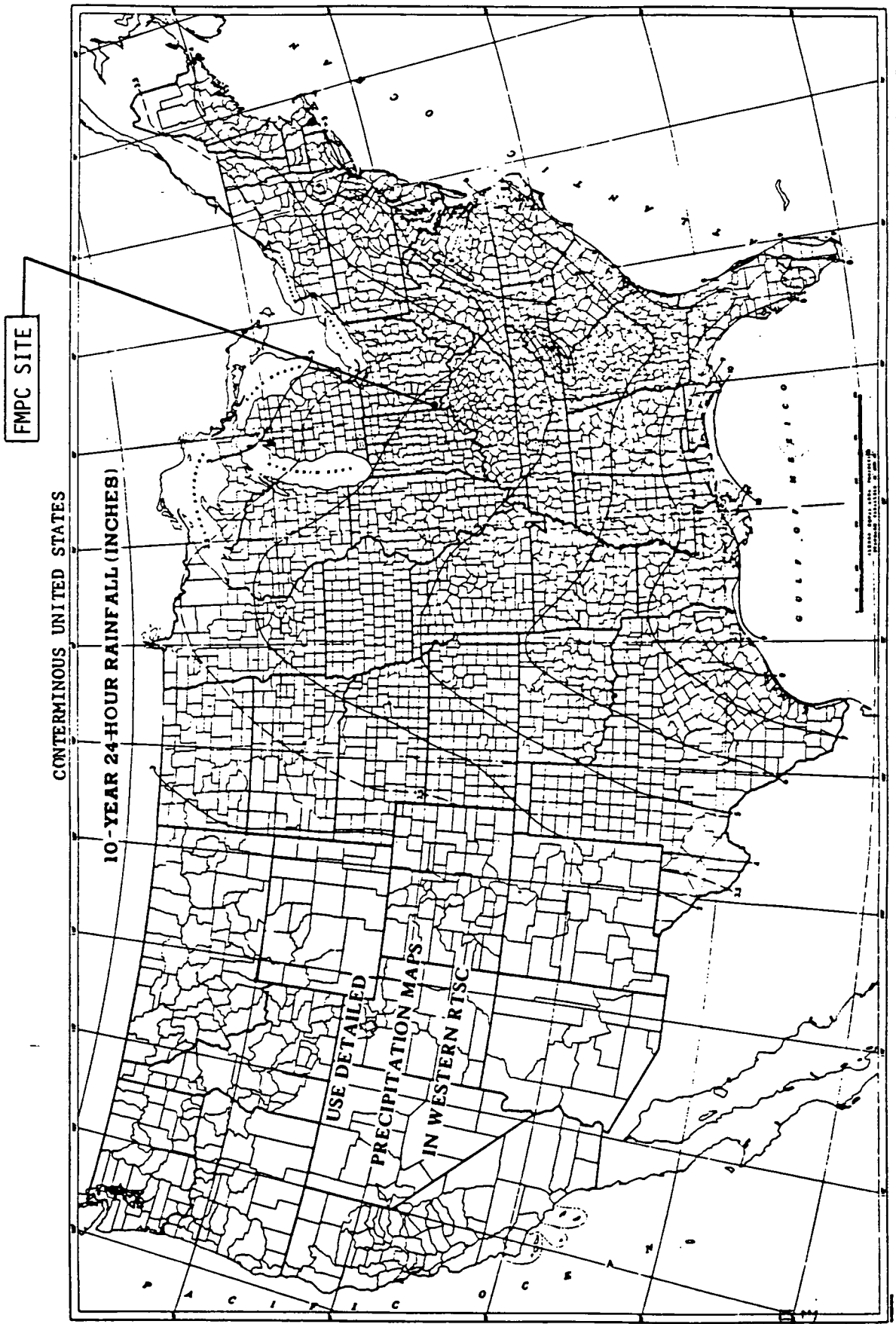
RAINFALL INTENSITY-DURATION-FREQUENCY CURVES





Prepared by U. S. Weather Bureau

TABLE OH-1

OHIO
24-HOUR RAINFALL (inches)

County	Frequency 1	2	5	10	25	50	100
Adams	2.5	2.8	3.5	4.0	4.6	5.0	5.5
Allen	2.3	2.7	3.3	3.8	4.3	4.8	5.2
Ashland	2.2	2.4	3.1	3.5	4.0	4.5	4.7
Ashtabula	2.1	2.3	3.0	3.5	4.0	4.5	4.7
Athens	2.3	2.5	3.3	3.8	4.3	4.7	4.9
Auglaize	2.4	2.7	3.4	3.9	4.4	4.9	5.2
Belmont	2.2	2.5	3.2	3.7	4.3	4.7	4.9
Brown	2.5	2.9	3.6	4.1	4.7	5.1	5.6
Butler	2.5	2.9	3.6	4.1	4.7	5.2	5.6
Carroll	2.2	2.4	3.1	3.6	4.1	4.6	4.8
Champaign	2.4	2.7	3.4	3.9	4.4	4.9	5.2
Clark	2.4	2.7	3.4	3.9	4.5	4.9	5.3
Clermont	2.5	2.9	3.6	4.1	4.7	5.1	5.6
Clinton	2.5	2.8	3.5	4.0	4.6	5.0	5.4
Columbiana	2.2	2.4	3.2	3.7	4.2	4.6	4.8
Coshocton	2.2	2.4	3.2	3.6	4.1	4.6	4.8
Crawford	2.2	2.5	3.2	3.6	4.1	4.6	4.8
Cuyahoga	2.1	2.2	3.0	3.4	3.9	4.4	4.6
Darke	2.4	2.8	3.5	4.0	4.5	5.0	5.5
Defiance	2.3	2.6	3.3	3.8	4.3	4.8	5.1
Delaware	2.3	2.5	3.3	3.7	4.2	4.7	4.9
Erie	2.2	2.4	3.1	3.5	3.9	4.4	4.7
Fairfield	2.3	2.5	3.3	3.7	4.3	4.7	4.9
Fayette	2.4	2.7	3.4	3.9	4.5	4.9	5.2
Franklin	2.3	2.6	3.3	3.8	4.3	4.7	5.0
Fulton	2.2	2.6	3.2	3.7	4.2	4.6	5.0
Gallia	2.4	2.6	3.4	3.8	4.4	4.9	5.1
Geauga	2.1	2.3	3.0	3.5	3.9	4.4	4.6
Greene	2.4	2.8	3.5	4.0	4.6	5.0	5.4
Guernsey	2.2	2.4	3.2	3.7	4.2	4.6	4.8
Hamilton	2.5	3.0	3.6	4.1	4.8	5.2	5.7
Hancock	2.3	2.6	3.3	3.7	4.2	4.7	5.0
Hardin	2.3	2.7	3.3	3.8	4.3	4.8	5.1
Harrison	2.2	2.4	3.2	3.7	4.2	4.7	4.9
Henry	2.3	2.6	3.3	3.7	4.2	4.7	5.0
Highland	2.5	2.8	3.5	4.0	4.6	5.0	5.4
Hocking	2.3	2.5	3.3	3.8	4.3	4.8	4.9
Holmes	2.2	2.4	3.1	3.5	4.0	4.5	4.7
Huron	2.2	2.4	3.1	3.5	4.0	4.5	4.7
Jackson	2.4	2.6	3.4	3.8	4.4	4.9	5.1
Jefferson	2.2	2.5	3.2	3.7	4.2	4.7	4.9
Knox	2.2	2.4	3.2	3.6	4.1	4.6	4.8
Lake	2.1	2.2	3.0	3.4	3.9	4.4	4.6
Lawrence	2.4	2.7	3.4	3.9	4.5	4.9	5.2
Licking	2.3	2.5	3.2	3.7	4.2	4.6	4.8
Logan	2.3	2.7	3.4	3.8	4.4	4.8	5.2

THE FMPC SITE IS LOCATED ON THE BOARDER BETWEEN HAMILTON AND BUTLER COUNTIES

Ohio 24-Hour Rainfall (inches)-Con't

	Frequency						
County	1	2	5	10	25	50	100
Lucas	2.2	2.5	3.2	3.6	4.1	4.6	4.9
Lorain	2.1	2.3	3.0	3.4	3.9	4.4	4.6
Madison	2.4	2.7	3.4	3.9	4.4	4.8	5.1
Mahoning	2.2	2.4	3.1	3.6	4.1	4.6	4.8
Marion	2.3	2.6	3.2	3.7	4.4	4.7	4.9
Medina	2.1	2.3	3.0	3.5	3.9	4.4	4.6
Meigs	2.3	2.6	3.3	3.8	4.4	4.8	5.0
Mercer	2.4	2.8	3.4	3.9	4.5	5.0	5.4
Miami	2.4	2.8	3.5	4.0	4.5	5.0	5.4
Monroe	2.3	2.5	3.3	3.8	4.3	4.8	5.0
Morgan	2.3	2.5	3.2	3.7	4.2	4.7	4.9
Morrow	2.3	2.5	3.2	3.6	4.1	4.6	4.8
Montgomery	2.5	2.8	3.5	4.0	4.6	5.0	5.5
Muskingum	2.2	2.4	3.2	3.6	4.2	4.6	4.8
Noble	2.3	2.5	3.2	3.7	4.2	4.7	4.9
Ottawa	2.2	2.5	3.1	3.6	4.0	4.5	4.8
Paulding	2.3	2.7	3.4	3.8	4.4	4.8	5.2
Perry	2.3	2.5	3.2	3.7	4.2	4.7	4.9
Pickaway	2.4	2.6	3.4	3.8	4.4	4.8	5.0
Pike	2.4	2.7	3.4	3.9	4.5	4.9	5.2
Portage	2.1	2.3	3.1	3.5	4.0	4.5	4.7
Preble	2.5	2.9	3.6	4.1	4.6	5.1	5.6
Putnam	2.3	2.7	3.3	3.8	4.3	4.8	5.1
Richland	2.2	2.4	3.1	3.6	4.0	4.5	4.7
Ross	2.4	2.7	3.4	3.9	4.4	4.9	5.1
Sandusky	2.2	2.5	3.1	3.6	4.1	4.5	4.8
Scioto	2.4	2.7	3.5	3.9	4.5	5.0	5.3
Seneca	2.2	2.5	3.2	3.6	4.1	4.6	4.8
Shelby	2.4	2.8	3.4	3.9	4.5	4.9	5.3
Stark	2.2	2.3	3.2	3.6	4.0	4.5	4.7
Summit	2.1	2.3	3.0	3.5	3.9	4.4	4.6
Trumbull	2.1	2.4	3.1	3.6	4.1	4.6	4.7
Tuscarawas	2.2	2.4	3.1	3.6	4.1	4.6	4.8
Union	2.3	2.6	3.3	3.8	4.3	4.8	5.0
Van Wert	2.3	2.7	3.4	3.9	4.4	4.9	5.3
Vinton	2.3	2.6	3.3	3.8	4.4	4.8	5.0
Warren	2.5	2.9	3.5	4.0	4.7	5.1	5.5
Washington	2.3	2.5	3.3	3.8	4.3	4.7	5.0
Wayne	2.2	2.3	3.2	3.5	4.0	4.5	4.7
Williams	2.3	2.6	3.3	3.8	4.3	4.7	5.1
Wood	2.2	2.6	3.2	2.7	4.2	4.6	4.9
Wyandot	2.3	2.6	3.2	3.7	4.2	4.7	4.9

Source: U.S. Department of Commerce, Weather Bureau, "Technical Paper No. 40, Rainfall Frequency Atlas of the United States", May, 1961.

APPENDIX H

ACCUMULATED STORMWATER RUNOFF CALCULATIONS

THE ACCUMULATED 10-YEAR FREQUENCY RUNOFF VOLUME WAS CALCULATED USING THE RAINFALL-INTENSITY-DURATION CURVE FOR CINCINNATI, OHIO, PREPARED BY THE U.S. WEATHER BUREAU AND SHOWN ON THE PREVIOUS PAGE. THE INDIVIDUAL POINTS WERE CALCULATED IN THE FOLLOWING MANNER:

1. The rainfall intensity in inches per hour was read from the curve for the corresponding storm duration using a return period of 10 years.

2. The value read is multiplied by the corresponding duration to give the total inches of rainfall which has occurred since the beginning of the storm (assumes worst case of storm peak occurs at the beginning of the storm).

3. Inches of rainfall is multiplied by:
   a. Area of drainage basin (163 acres)
   b. Drainage basin composite runoff factor (0.56)
   c. Proper conversion factors to give answer in million gallons.

EXAMPLE:

Duration = 1 hour
From chart - intensity is 1.8 inches per hour

Volume of Runoff =
1.8 in/hr. x 1 hr. x ft./12 in x 163 acres x 43560 ft./acre x 0.56 x 7.48 gal/cu.ft. =

4.46 Million gallons

APPENDIX I

CALCULATIONS OF RETENTION VOLUMES

SWRB STAGE-STORAGE

EXISTING (WEST) LARGE BASIN						EXISTING SPILL BASIN					TOTAL EST
HEIGHT (FEET)	ELEVATION (FEET)	WIDTH (FEET)	LENGTH (FEET)	VOLUME (CF)	VOLUME (GAL)	HEIGHT (FEET)	WIDTH (FEET)	LENGTH (FEET)	VOLUME (CF)	VOLUME (GAL)	EXISTING (GAL)
0	554	114.4	464	0	0	554	54	57	0	0	0
0.5	554.5	117.4	467	0	0	554.5	57	60	0	0	0
1	555	120.4	470	19594.8	146578.9	555	60	63	0	0	146578.9
1.5	555.5	123.4	473	48322.6	361477.2	555.5	63	66	1239.25	9270.209	370747.4
2	556	126.4	476	77954	583134.8	556	66	69	3415	25545.90	608680.8
2.5	556.5	129.4	479	108489	811551.9	556.5	69	72	5793.25	43336.40	854888.3
3	557	132.4	482	139927.6	1046728.	557	72	75	8374	62641.70	1109370.
3.5	557.5	135.4	485	172269.8	1288664.	557.5	75	78	11157.25	83461.80	1372126.
4	558	138.4	488	205515.6	1537359.	558	78	81	14143	105796.7	1643156.
4.5	558.5	141.4	491	239665	1792814.	558.5	81	84	17331.25	129646.4	1922460.
5	559	144.4	494	274718	2055027.	559	84	87	20722	155010.9	2210038.
5.5	559.5	147.4	497	310674.6	2324001.	559.5	87	90	24315.25	181890.2	2505891.
6	560	150.4	500	347534.8	2599734.	560	90	93	28111	210284.3	2810018.
ESB OVERFLOWS TO THE SWRB AT ELEVATION 560											
6.5	560.5	153.4	503	385298.6	2882226.	560.5	93	96	32109.25	240193.2	3122419.
7	561	156.4	506	423966	3171477.	561	96	99	36310	271616.9	3443094.
7.5	561.5	159.4	509	463537	3467488.	561.5	99	102	40713.25	304555.4	3772043.
8	562	162.4	512	504011.6	3770258.	562	102	105	45319	339008.7	4109267.
8.5	562.5	165.4	515	545389.8	4079788.	562.5	105	108	50127.25	374976.8	4454765.
APPROXIMATE ELEVATION OF THE PROPOSED SLUICE GATES											
9	563	168.4	518	587671.6	4396077.	563	108	111	55138	412459.8	4808537.
9.5	563.5	171.4	521	630857	4719125.	563.5	111	114	60351.25	451457.5	5170583.
10	564	174.4	524	674946	5048933.	564	114	117	65767	491970.0	5540903.
10.5	564.5	177.4	527	719938.6	5385500.	564.5	117	120	71385.25	533997.3	5919498.
11	565	180.4	530	765834.8	5728827.	565	120	123	77206	577539.4	6306366.
OVERFLOW SPILLWAY ELEVATION AT 565											
11.5	565.5	183.4	533	812634.6	6078913.	565.5	123	126	83229.25	622596.4	6701509.
12	566	186.4	536	860338	6435758.	566	126	129	89455	669168.1	7104926.
12.5	566.5	189.4	539	908945	6799363.	566.5	129	132	95883.25	717254.6	7516617.
13	567	192.4	542	958455.6	7169727.	567	132	135	102514	766855.9	7936583.
13.5	567.5	195.4	545	1008869.	7546850.	567.5	135	138	109347.2	817972.1	8364822.
14	568	198.4	548	1060187.	7930733.	568	138	141	116383	870603.0	8801336.
14.5	568.5	201.4	551	1112409	8321375.	568.5	141	144	123621.2	924748.7	9246124.

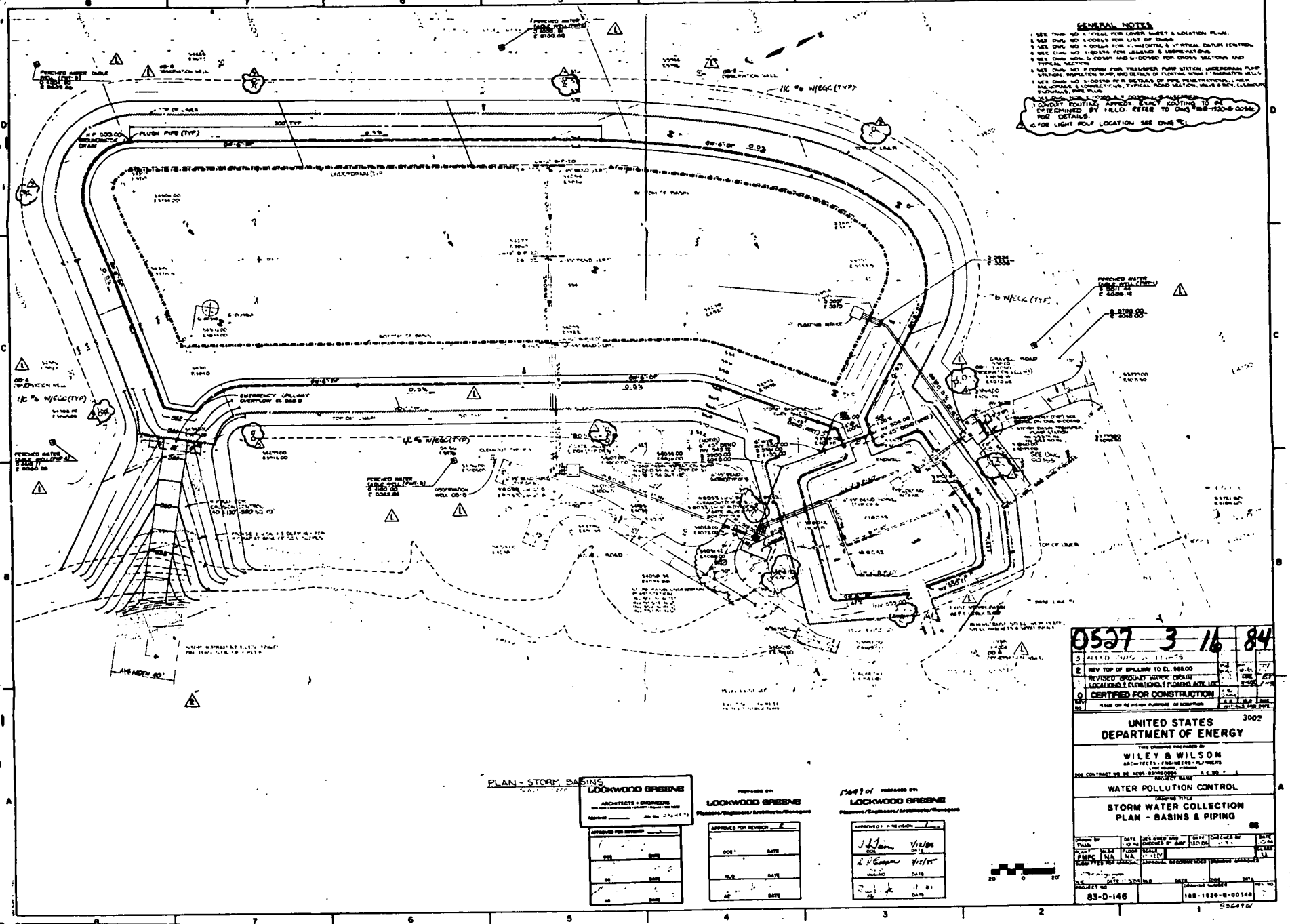
SWRB EXPANSION STAGE-STORAGE

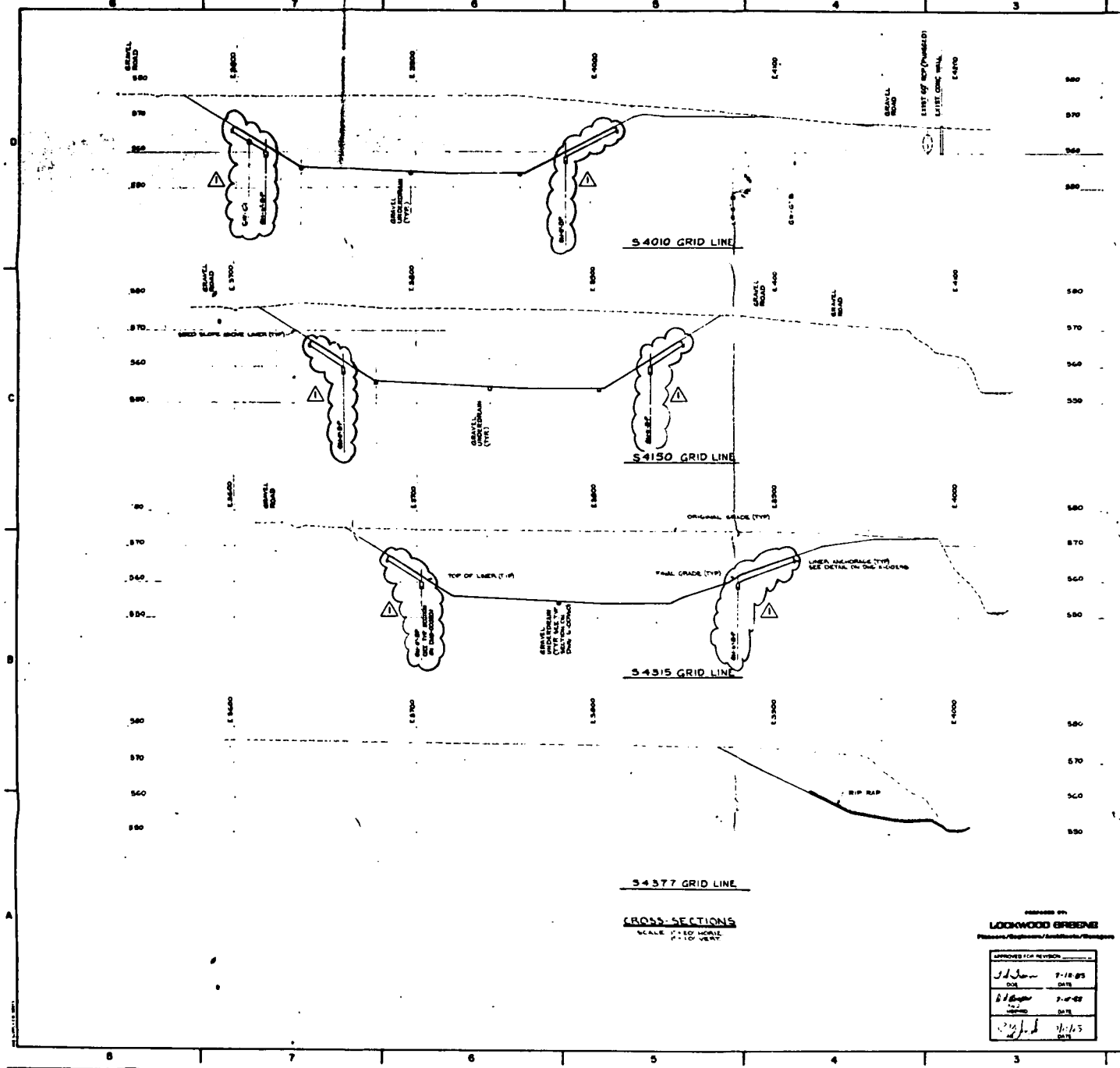
PROPOSED EXPANSION (EAST) BASIN

HEIGHT (FEET)	ELEVATION (FEET)	WIDTH (FEET)	LENGTH (FEET)	VOLUME (CF)	VOLUME (GAL)	ELEVATION (FEET)	TOTAL VOLUME (GAL)	SUBMERGED PIPE (APPRX GAL)	SYSTEM TO (GAL)
-0.5	554	0	0	0	0	554	0		0
0	554.5	186	225	0	0	554.5	0		0
0.5	555	189	228	0	0	555	146578.9		146578.9
1	555.5	192	231	43083	322282.3	555.5	693029.8		693029.8
1.5	556	195	234	65549.25	490341.1	556	1099021.		1099021.
2	556.5	198	237	88632	663011.6	556.5	1517900.		1517900.
2.5	557	201	240	112331.2	840293.9	557	1949664.		1949664.
3	557.5	204	243	136647	1022187.	557.5	2394313.		2394313.
3.5	558	207	246	161579.2	1208693.	558	2851849.		2851849.
4	558.5	210	249	187128	1399811.	558.5	3322271.		3322271.
4.5	559	213	252	213293.2	1595540.	559	3805579.		3805579.
5	559.5	216	255	240075	1795881.	559.5	4301772.		4301772.
5.5	560	219	258	267473.2	2000833.	560	4810852.	0	4810852.
6	560.5	222	261	295488	2210397.	560.5	5332817.	20000	5352817.
6.5	561	225	264	324119.2	2424574.	561	5867668.	40000	5907668.
7	561.5	228	267	353367	2643361.	561.5	6415405.	60000	6475405.
7.5	562	231	270	383231.2	2866761.	562	6976028.	80000	7056028.
8	562.5	234	273	413712	3094772.	562.5	7549537.	100000	7649537.
APPROXIMATE ELEVATION OF THE SLUICE GATES									
8.5	563	237	276	444809.2	3327395.	563	8135932.	120000	8255932.
9	563.5	240	279	476523	3564630.	563.5	8735213.	140000	8875213.
9.5	564	243	282	508853.2	3806476.	564	9347380.	160000	9507380.
10	564.5	246	285	541800	4052934.	564.5	9972432.	180000	10152432
10.5	565	249	288	575363.2	4304004.	565	10610371	200000	10810371
OVERFLOW SPILLWAY ELEVATION AT 565									
11	565.5	252	291	609543	4559686.	565.5	11261195	200000	11461195
11.5	566	255	294	644339.2	4819979.	566	11924906	200000	12124906
12	566.5	258	297	679752	5084884.	566.5	12601502	200000	12801502
12.5	567	261	300	715781.2	5354401.	567	13290984	200000	13490984
13	567.5	264	303	752427	5628530.	567.5	13993352	200000	14193352
13.5	568	267	306	789689.2	5907270.	568	14708606	200000	14908606
14	568.5	270	309	827568	6190622.	568.5	15436746	200000	15636746

APPENDIX J

DRAWINGS FOR EXISTING STORMWATER RETENTION BASIN (WEST CHAMBER)


GENERAL NOTES
CONDUIT ROUTING APPROX. EXACT ROUTING TO BE DETERMINED BY FIELD. REFER TO DWG 188-1920-6-00146 FOR DETAILS.
FOR LIGHT POLE LOCATION SEE DWG
PLUSH PIPE (TYP)
EMERGENCY VALLEY OVERFLOW EL 948.0
FLOATING BRIDGE
GRAVEL ROAD
PERCHED WATER
OBSERVATION WELL
0527 3 16 84
REV TOP OF SPILLWAY TO EL. 948.00
REVISED GROUND WATER DRAIN LOCATIONS & ELEVATIONS, FLOATING BOX LOC
CERTIFIED FOR CONSTRUCTION
UNITED STATES DEPARTMENT OF ENERGY
WILEY & WILSON
WATER POLLUTION CONTROL
STORM WATER COLLECTION PLAN - BASINS & PIPING
83-D-146
188-1920-6-00146
PLAN - STORM BASINS
LOCKWOOD GREENE



GENERAL NOTES

1. SEE DWG. NO. S-0016A/1 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. S-0016A/2 FOR LIST OF DWGS.
3. SEE DWG. NO. S-0016A/3 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. S-0016A/4 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NO. S-0016B/1 FOR PLAN OF STORM WATER.
6. SEE DWG. NO. S-0016B FOR DETAILS OF LINER, ANCHORAGE, & CONNECTIONS.
7. SEE DWG. NO. S-0016B FOR TYPICAL SECTION.

0527 3 16 84

NO.	REVISION	DRAWN	CHECKED	DATE
1	RELOCATED GW DRAINS			
0	CERTIFIED FOR CONSTRUCTION			

UNITED STATES DEPARTMENT OF ENERGY

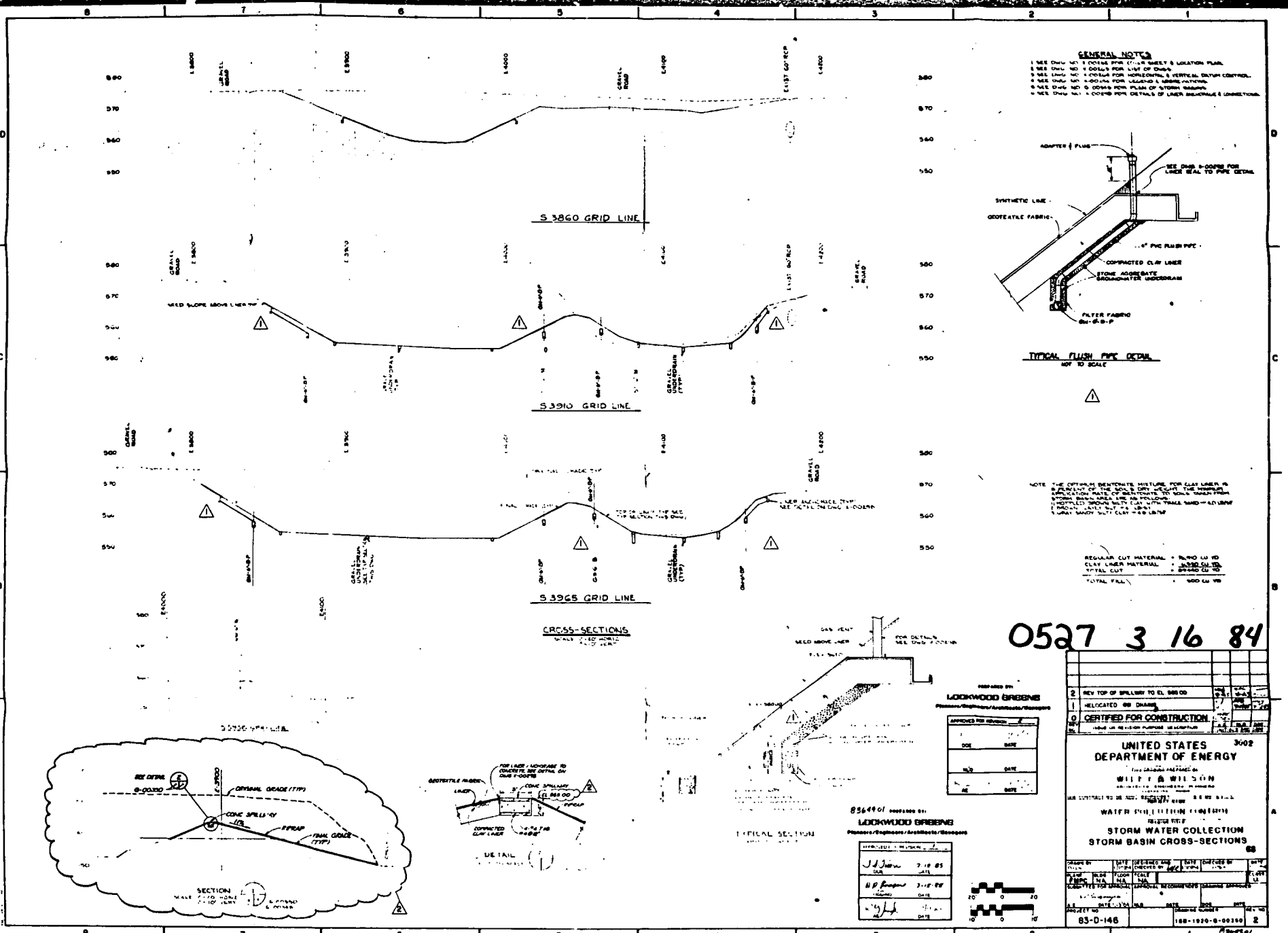
WILEY & WILSON
ARCHITECTS · ENGINEERS · PLANNERS

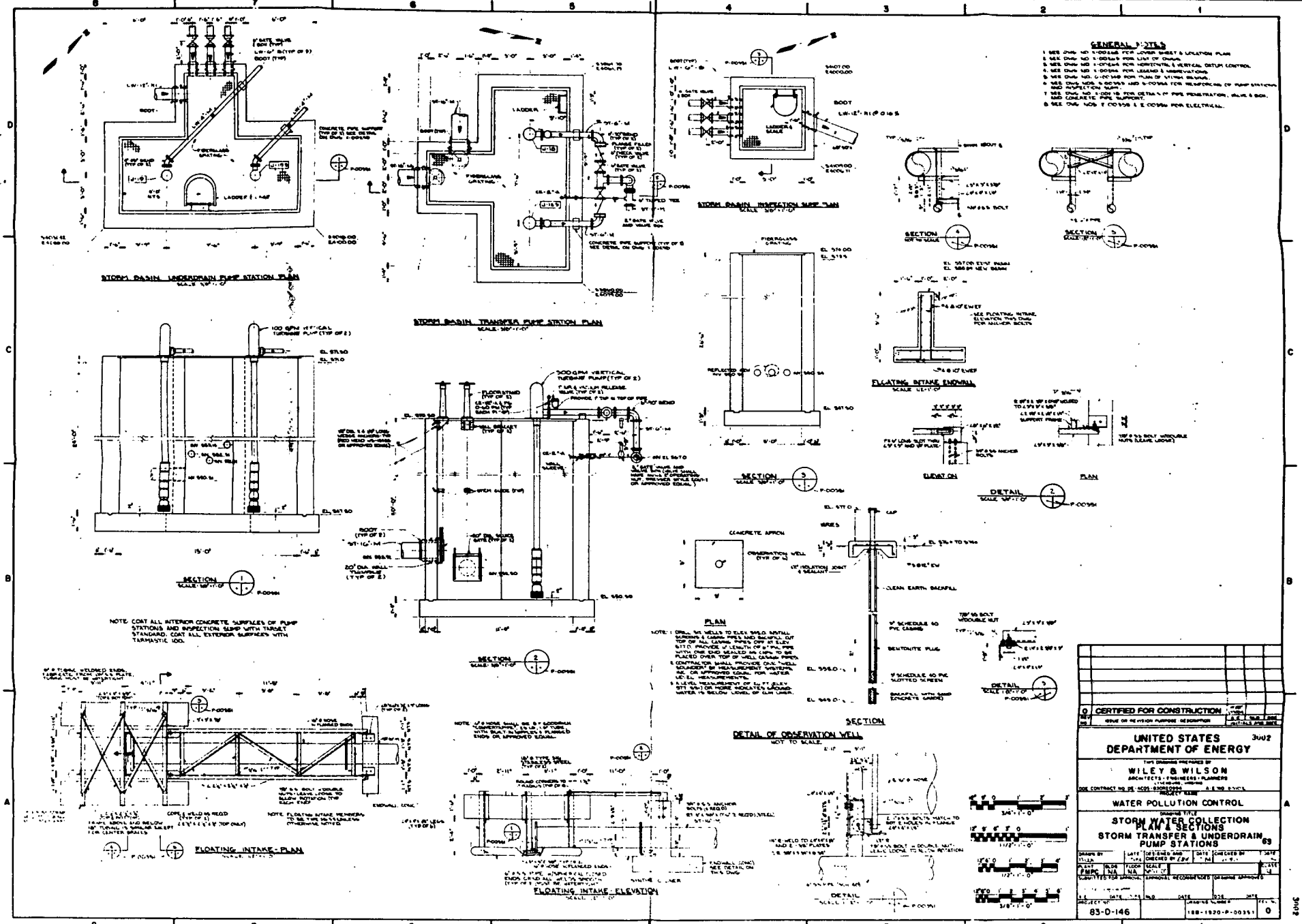
WATER POLLUTION CONTROL

STORM WATER COLLECTION
STORM BASIN CROSS-SECTIONS

83-D-146

LOCKWOOD GREENE


GENERAL NOTES
S 3860 GRID LINE
S 3910 GRID LINE
S 3965 GRID LINE
CROSS-SECTIONS
TYPICAL FLUSH PIPE DETAIL
NOT TO SCALE
SYNTHETIC LINE
GEOTEXTILE FABRIC
COMPACTED CLAY LINER
STONE AGGREGATE GROUNDWATER UNDERDRAIN
FILTER FABRIC
REGULAR CUT MATERIAL
CLAY LINER MATERIAL
TOTAL CUT
TOTAL FILL
0527 3 16 84
REV TOP OF SPILLWAY TO EL 986.00
RELOCATED GW DRAINS
CERTIFIED FOR CONSTRUCTION
LOCKWOOD GREENE
UNITED STATES
DEPARTMENT OF ENERGY
WILEY & WILSON
WATER POLLUTION CONTROL
STORM WATER COLLECTION
STORM BASIN CROSS-SECTIONS
83-D-146
188-1020-0-00350
2
SECTION
DETAIL
TYPICAL SECTION


GENERAL NOTES
STORM BASIN UNDERDRAIN PUMP STATION PLAN
STORM BASIN TRANSFER PUMP STATION PLAN
STORM BASIN INSPECTION SUMP PLAN
SECTION
FLOATING INTAKE ENDWALL
ELEVATION
PLAN
DETAIL
NOTE: COAT ALL INTERIOR CONCRETE SURFACES OF PUMP STATIONS AND INSPECTION SUMP WITH TARGET STANDARD. COAT ALL EXTERIOR SURFACES WITH TARMASTIC 100.
DETAIL OF OBSERVATION WELL
NOT TO SCALE.
FLOATING INTAKE-PLAN
FLOATING INTAKE-ELEVATION
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WILEY & WILSON
WATER POLLUTION CONTROL
STORM WATER COLLECTION
PLAN & SECTIONS
STORM TRANSFER & UNDERDRAIN
PUMP STATIONS
83-D-146
188-1920-P-00351
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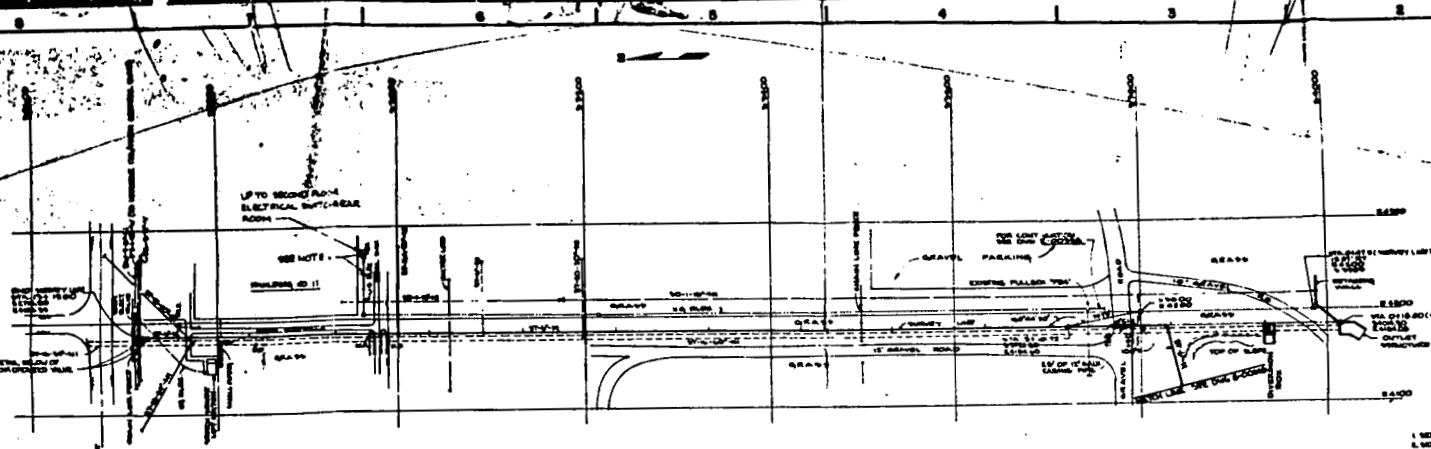
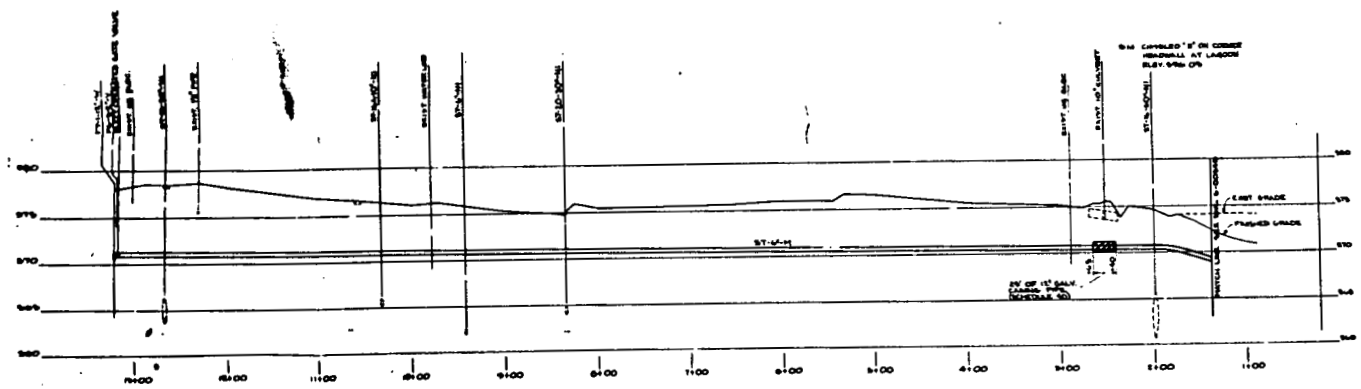
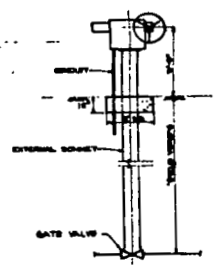


PLAN
SCALE: 1"=50'



PROFILE
SCALE: 1"=5' VERTICAL
1"=50' HORIZONTAL



DETAIL OF MOTOR OPERATING VALVE
NOT TO SCALE

GENERAL NOTES

1. SEE DWG. NO. S-0010-A FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. S-0010-B FOR LIST OF DWGS.
3. SEE DWG. NO. S-0010-C FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. S-0010-D FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NO. S-0010-E FOR PLAN OF WORK SHEETS.
6. EXISTING ELECTRICAL DUCT BANK FROM THE EXISTING UNDERGROUND ELECTRICAL MANHOLE OUTSIDE BUILDING 11 TO EXISTING PULLEN TRAY UNDERGROUND TO A PLASTIC CONDUIT, ROUTE IN UNDERGROUND 4" PVC STEEL CONDUIT FROM THE ELECTRICAL MANHOLE DIRECTLY BELOW EXISTING PULLEN TRAY TO THE EXTERIOR WALL TO THE SECOND FLOOR ELECTRICAL SWITCHGEAR ROOM. UNDERGROUND TO LIFTSTATION AND 6" JUMPER TO THE SUB-PANEL ON THE SWITCHGEAR LOCATED 5 FT FROM THE WALL. MOUNT A 120 MHF CIRCUIT BREAKER ON THE SOUTH END OF THE SWITCHGEAR AND BRANCH THE LINE NOW OF THE LIFTSTATION TO THE SWITCHGEAR SUB-PANEL. INSTALL A 120V, 30 THE STORM LAGOON HIGH CONTROL SENSOR BY USE OF THE ABOVE DUCT BANK.

0	CERTIFIED FOR CONSTRUCTION	
REV.	ISSUE OR REVISION PURPOSE - DESCRIPTION	

UNITED STATES
DEPARTMENT OF ENERGY

WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA

WATER POLLUTION CONTROL

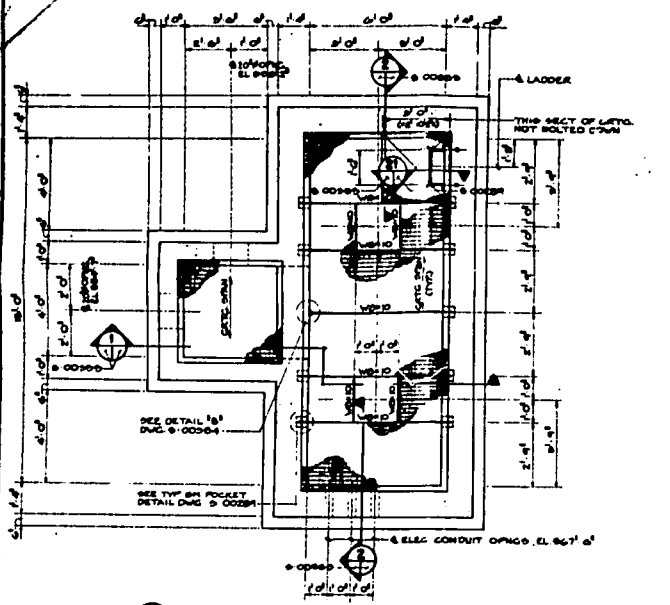
STORM WATER COLLECTION
STORM BASIN FORCE MAIN

DRAWN BY: WILLIAM WALKER | DATE: 10/24/78 | DESIGNED BY: Jim | DATE: 10/24/78 | CHECKED BY: [illegible] | CONTRACT NO. L1

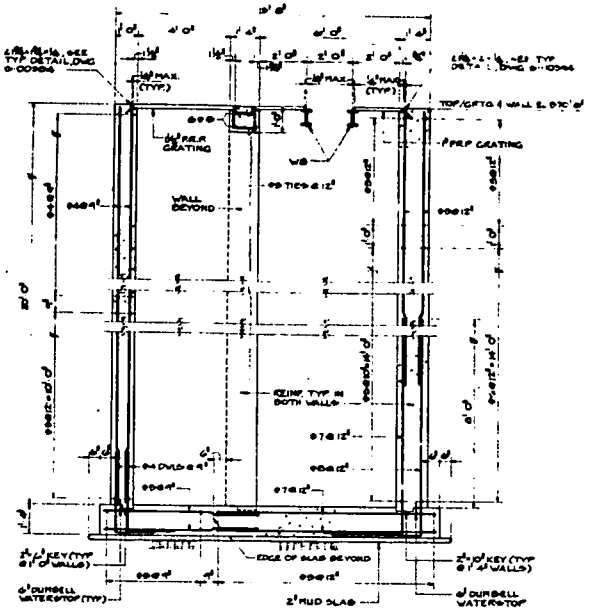
APPROVED FOR ENGINEERING: [illegible] | APPROVED FOR CONSTRUCTION: [illegible]

DATE: 10/24/78 | DATE: [illegible]

PROJECT NO. 83-D-146 | DRAWING NUMBER 100-1020-P-00060 | REV. 0



PLAN • TRANSFER PUMP STATION SCALE: 1/4"=1'-0"



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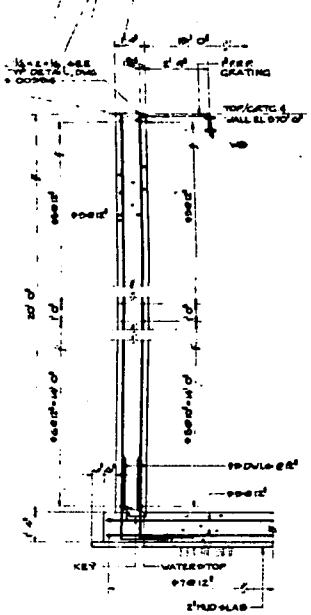
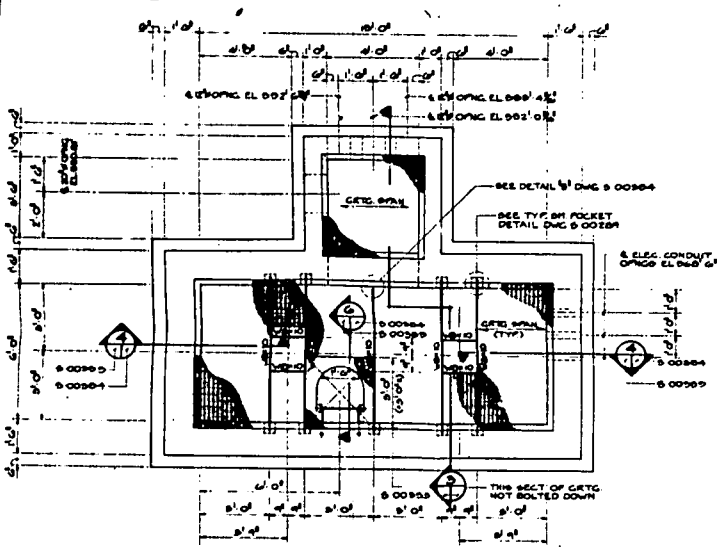


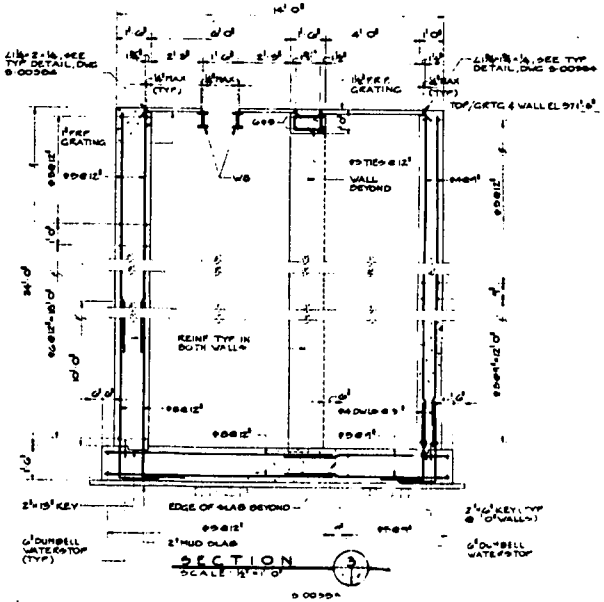
SECTION 2 SCALE: 1/2"=1'-0"

NOTES:

1. SEE DWG. No. X-00265 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. No. X-00267 FOR LIST OF DWGS.
3. SEE DWG. No. S-00287 FOR STRUCTURAL GENERAL NOTES.
4. SEE DWG. No. S-00540 FOR LOCATION OF STRUCTURES.
5. SEE DWG. No. S-00581 FOR TYP. BEAM POCKET DETAIL, TYP. WALL OPENING DETAIL, TYP. WALL CONSTRUCTION JOINT DETAIL & TYP. CORNER REINFORCING DETAIL.
6. SEE DWG. No. S-00564 FOR TYP. GRTG ANGLE DETAIL.
7. SEE DWG. No. E-00585 FOR ELECTRICAL CONDUIT OPENINGS.
8. SEE DWG. No. X-00240 FOR PIPE SLEEVE DETAILS.



PLAN • UNDERDRAIN PUMP STATION SCALE: 1/4"=1'-0"



SECTION 3 SCALE: 1/2"=1'-0"

REV. NO.	ISSUE OF REVISION PURPOSE - DESCRIPTION	CHK.	APP.	DATE
0	CERTIFIED FOR CONSTRUCTION			

UNITED STATES DEPARTMENT OF ENERGY

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USE CONTRACT NO. DE-AC05-[illegible] A-E NO. 69198

PROJECT TITLE: WATER POLLUTION CONTROL

DRAWING TITLE: STORM WATER COLLECTION STORM TRANSFER AND UNDERDRAIN PUMP STATIONS – PLANS & SECTIONS

DRAWN BY: J.D.D. | DATE: [illegible] | DESIGNED BY: [illegible] | CHECKED BY: [illegible] | DATE: [illegible] | DRAWN BY: [illegible] | CHECKED BY: [illegible] | DATE

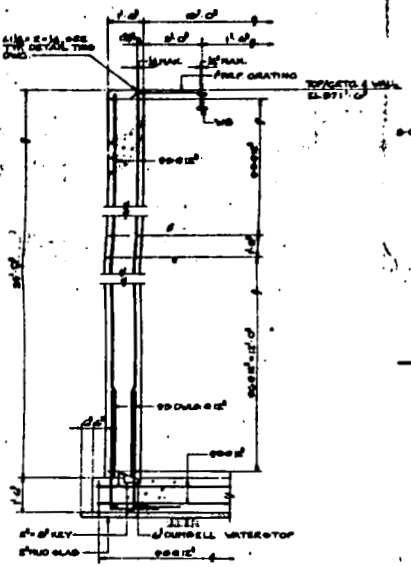
PLANT ENG. N/A | PLANT MGR. N/A | PROJECT ENGR. N/A

SUBMITTED FOR APPROVAL: | APPROVAL RECOMMENDED: | DRAWING APPROVED:

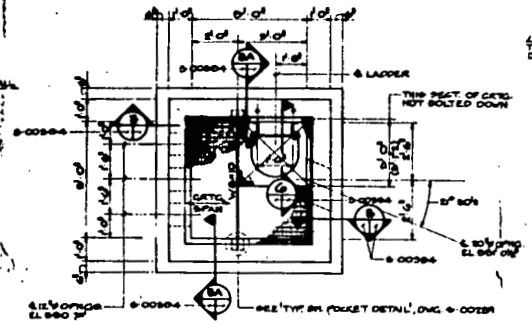
A.E. | DATE | CONSTR. MGR. | DATE | CUST. | DATE

PROJECT NO. 83-D-146 | DRAWING NUMBER 100-1020-S-00563 | REV. NO. 0

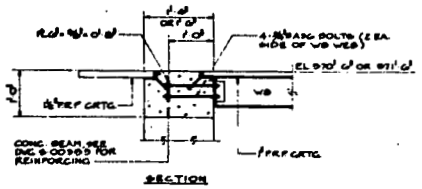
31012



SECTION 4
SCALE: 1/2" = 1'-0"

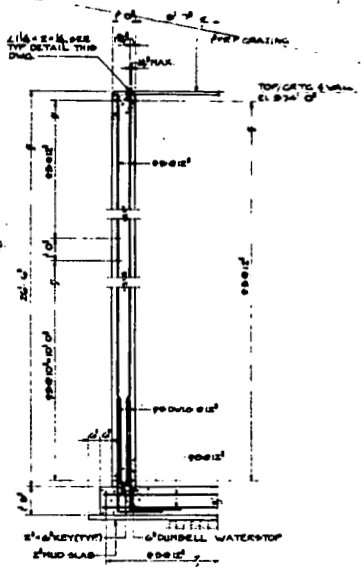


PLAN • INSPECTION SUMP SCALE: 1/2" = 1'-0"

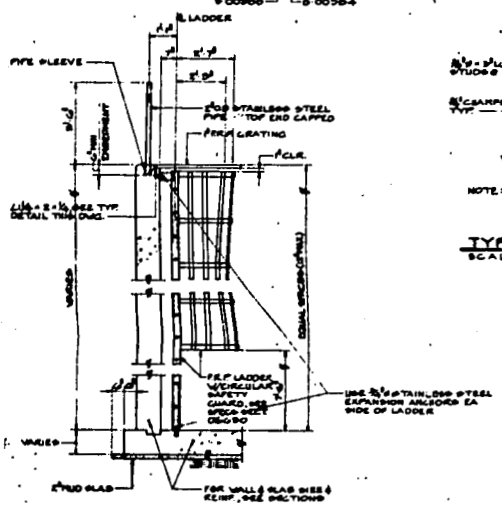


SECTION

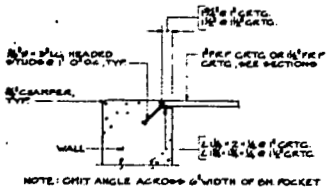
DETAIL 'B'
SCALE: 1" = 1'-0"



SECTION 5 5A
SCALE: 1/2" = 1'-0"



SECTION 6
SCALE: 1/2" = 1'-0"



NOTE: CHIT ANGLE ACROSS 6" WIDTH OF BM POCKET

SECTION

TYP CHRD ANGLE DETAIL
SCALE: 1/2" = 1'-0"

NOTES:

1. SEE DWG. No. 4-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. No. 4-00269 FOR LIST OF DWGS.
3. SEE DWG. No. 5-00287 FOR STRUCTURAL GENERAL NOTES.
4. SEE DWG. No. G-00948 FOR LOCATION OF STRUCTURES.
5. SEE DWG. 5-00289 FOR TYP. BEAM POCKET DETAIL, TYP. WALL OPENING DETAIL, TYP. WALL CONSTRUCTION JOINT DETAIL & TYP. CONC. BM REINFORCING DETAIL.
6. SEE DWG. No. E-00999 FOR ELECTRICAL CONDUIT OPENINGS.
7. SEE DWG. No. 4-00918 FOR PIPE SLEEVE DETAILS.

0	CERTIFIED FOR CONSTRUCTION	
NO.	ISSUE OR REVISION NUMBER—DESCRIPTION	

UNITED STATES
DEPARTMENT OF ENERGY

WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA

WATER POLLUTION CONTROL

STORM WATER COLLECTION
INSPECTION SUMP
PLAN AND SECTIONS

DRAWN BY	DATE	DESIGNED BY	DATE	CHECKED BY	DATE
J.D.S.					

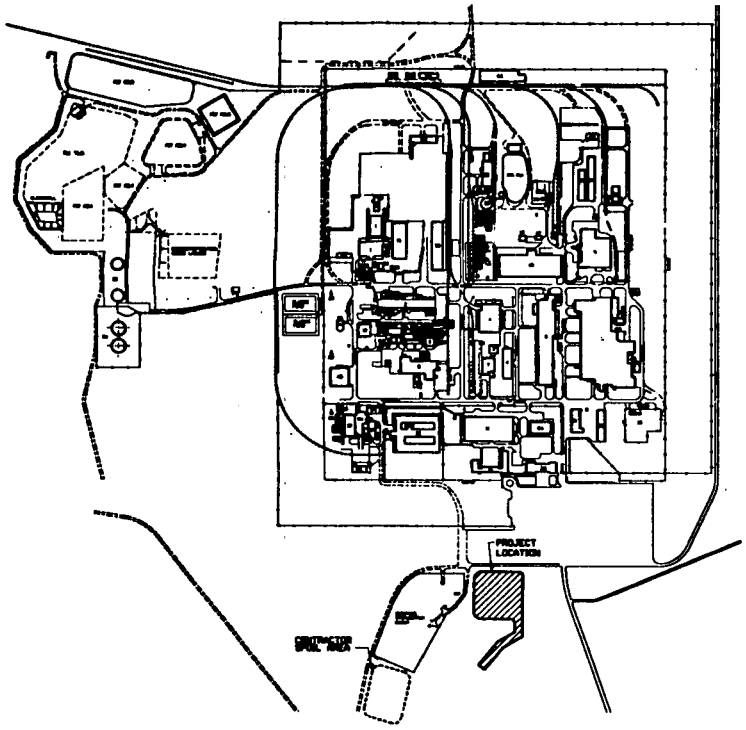
SCALE	DATE	DESIGN	DRAWN	SCALE
1/2" = 1'-0"	N/A	N/A	N/A	

SUBMITTED FOR APPROVAL: ENGINEER | ENGINEERING MANAGER | DESIGNER DIVISION

83-D-146 | 400-1020-S-00904 | 0

APPENDIX K

DRAWINGS FOR THE PROPOSED STORMWATER RETENTION BASIN EXPANSION (EAST CHAMBER)



FMPC - PROJECT LOCATION MAP

SCALE: 1"=300'

STORMWATER RETENTION BASIN EXPANSION

FEED MATERIAL PRODUCTION CENTER
FERNALD, OHIO

DRAWING INDEX

C001	PROJECT LOCATION AND DRAWING INDEX
C002	SITE LAYOUT PLAN
C003	GRADING & DRAINAGE PLAN
C004	UTILITY PLAN
C005	BASIN SECTIONS
C006	DRAINAGE CHANNEL RELOCATION PLAN & DETAILS
C007	FLEXIBLE MEMEBRANE LINER DETAILS
C008	INSPECTION SUMP DETAILS
C009	MISCELLANEOUS FENCING, SAFETY, AND SIGNING DETAILS
C010	STORMWATER STRUCTURE DETAILS - 1 OF 2
C011	STORMWATER STRUCTURE DETAILS - 2 OF 2

REV. NO.	REVISION DESCRIPTION	DATE	BY	CHECKED	APP.
B	REVISED FOR DOE REVIEW				
A	ISSUED FOR DOE REVIEW				

UNITED STATES DEPARTMENT OF ENERGY

LOCKWOOD GREENE

STORMWATER RETENTION BASIN EXPANSION

PROJECT LOCATION AND DRAWING INDEX

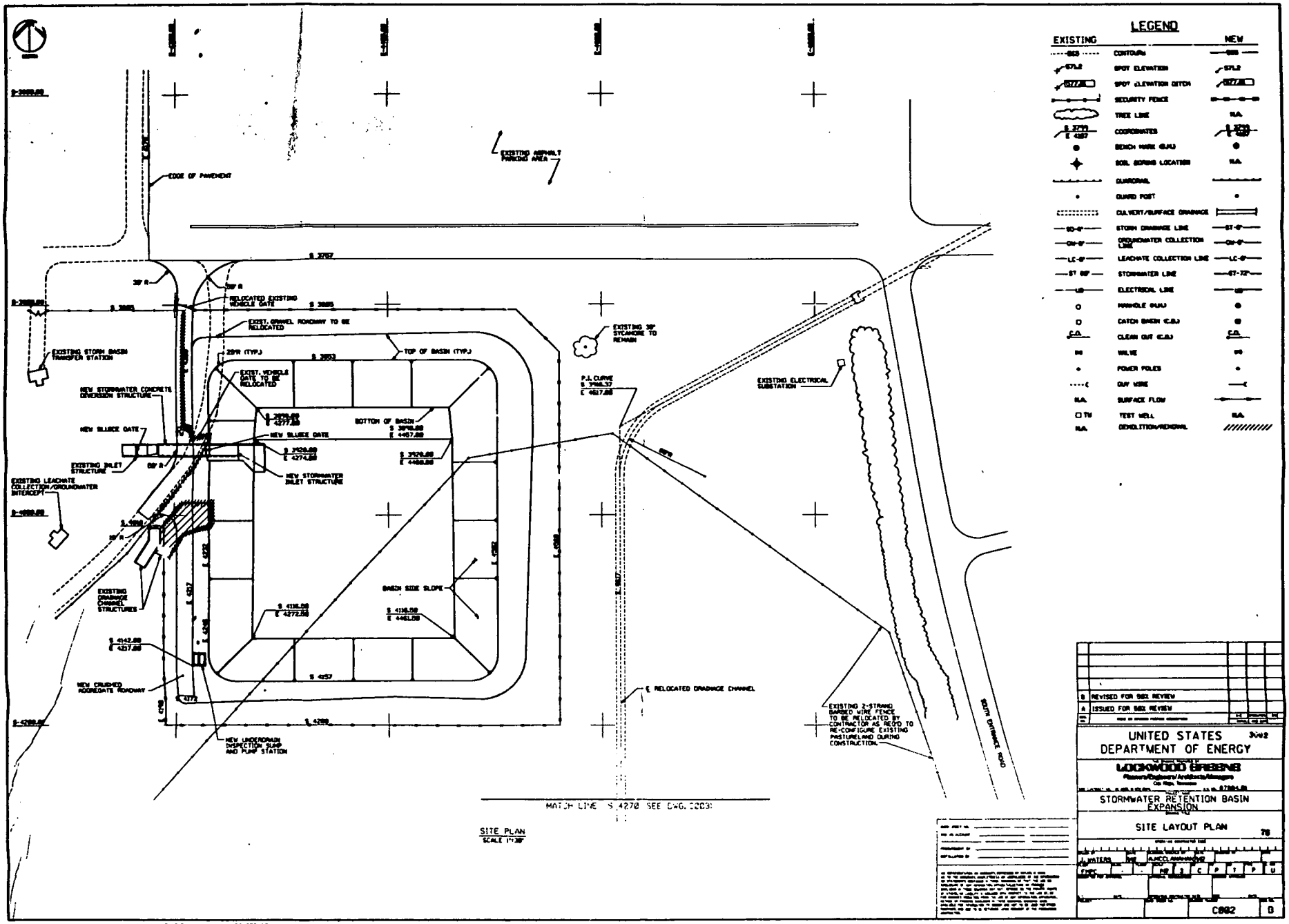
A.McCLANAHAN | A.McCLANAHAN

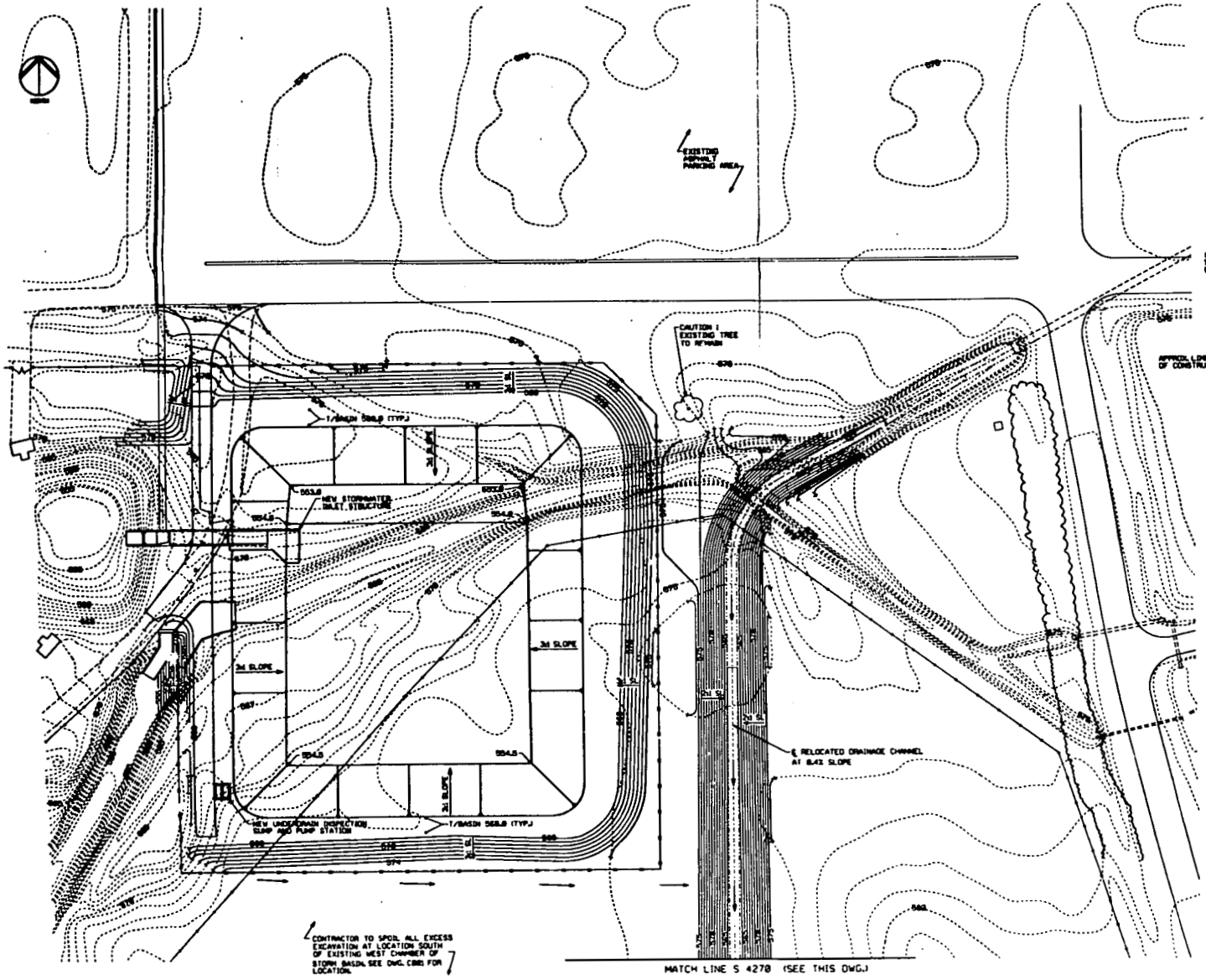
FMPC | NEP | 3 | C | P | T | P | U

C001 | B

3002

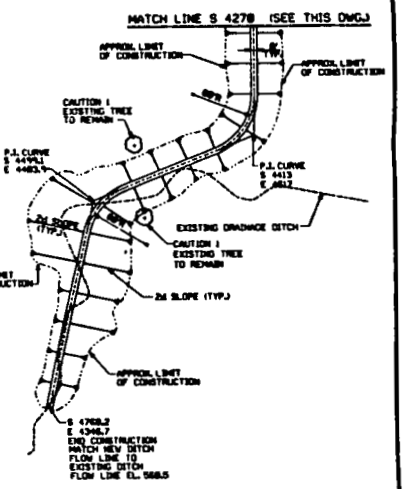
FILE NAME: 0241(20)TS0784BC.TB


EXISTING ASPHALT PARKING AREA
EDGE OF PAVEMENT
RELOCATED EXISTING VEHICLE GATE
EXIST. GRAVEL ROADWAY TO BE RELOCATED
EXISTING STORM BASIN TRANSFER STATION
NEW STORMWATER CONCRETE DIVERSION STRUCTURE
NEW SLUICE GATE
EXISTING INLET STRUCTURE
EXISTING LEACHATE COLLECTION/GROUNDWATER INTERCEPT
EXISTING DRAINAGE CHANNEL STRUCTURES
NEW CRUSHED AGGREGATE ROADWAY
NEW UNDERDRAIN INSPECTION SUMP AND PUMP STATION
TOP OF BASIN (TYP.)
EXIST. VEHICLE GATE TO BE RELOCATED
BOTTOM OF BASIN
NEW STORMWATER INLET STRUCTURE
BASIN SIDE SLOPE
EXISTING 30" SYCAMORE TO REMAIN
P.I. CURVE
EXISTING ELECTRICAL SUBSTATION
℄ RELOCATED DRAINAGE CHANNEL
EXISTING 2-STRAND BARBED WIRE FENCE TO BE RELOCATED BY CONTRACTOR AS REQ'D TO RE-CONFIGURE EXISTING PASTURELAND DURING CONSTRUCTION
SOUTH ENTRANCE ROAD
MATCH LINE S 4270 SEE DWG. C003
SITE PLAN
SCALE 1"=30'
LEGEND
EXISTING
NEW
CONTOURS
SPOT ELEVATION
SPOT ELEVATION DITCH
SECURITY FENCE
TREE LINE
COORDINATES
BENCH MARK (B.M.)
SOIL BORING LOCATION
GUARDRAIL
GUARD POST
CULVERT/SURFACE DRAINAGE
STORM DRAINAGE LINE
GROUNDWATER COLLECTION LINE
LEACHATE COLLECTION LINE
STORMWATER LINE
ELECTRICAL LINE
MANHOLE (M.H.)
CATCH BASIN (C.B.)
CLEAN OUT (C.O.)
VALVE
POWER POLES
GUY WIRE
SURFACE FLOW
TEST WELL
DEMOLITION/REMOVAL
B REVISED FOR 90% REVIEW
A ISSUED FOR 90% REVIEW
UNITED STATES DEPARTMENT OF ENERGY
LOCKWOOD GREENE
STORMWATER RETENTION BASIN EXPANSION
SITE LAYOUT PLAN
C002
B



GRADING PLAN
SCALE: 1"=30'

GENERAL NOTES



DRAINAGE CHANNEL LAYOUT PLAN
SCALE: 1"=50'

REV. NO.	DESCRIPTION	DATE	BY	CHK'D
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

UNITED STATES DEPARTMENT OF ENERGY

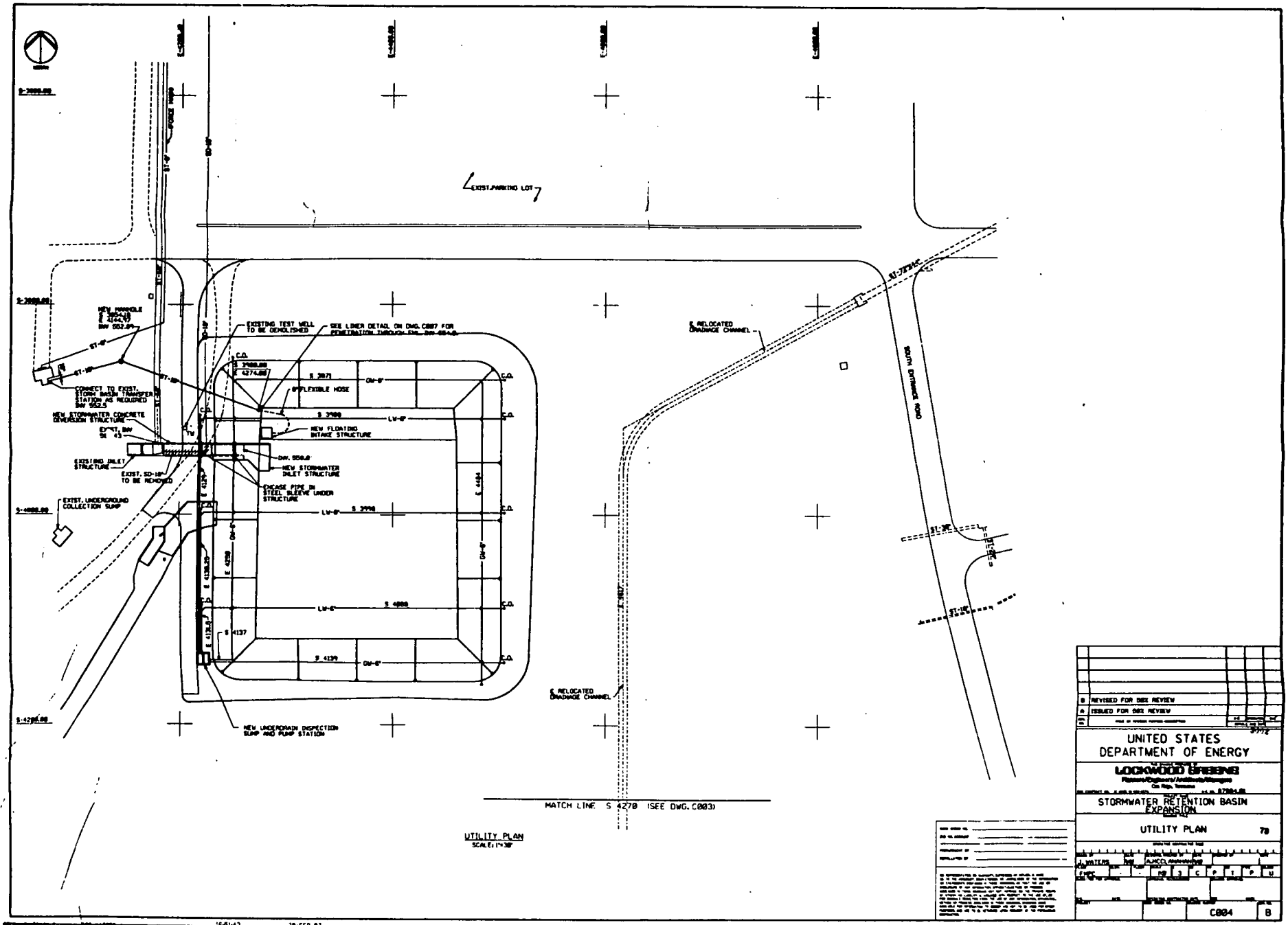
LOCKWOOD GREENE
Planners/Designers/Architects/Managers
Oak Ridge, Tennessee

STORMWATER RETENTION BASIN EXPANSION

GRADING AND DRAINAGE PLAN

C003 B

3002



UTILITY PLAN
SCALE: 1"=30'

B	REVISED FOR DOE REVIEW
A	ISSUED FOR DOE REVIEW

UNITED STATES
DEPARTMENT OF ENERGY

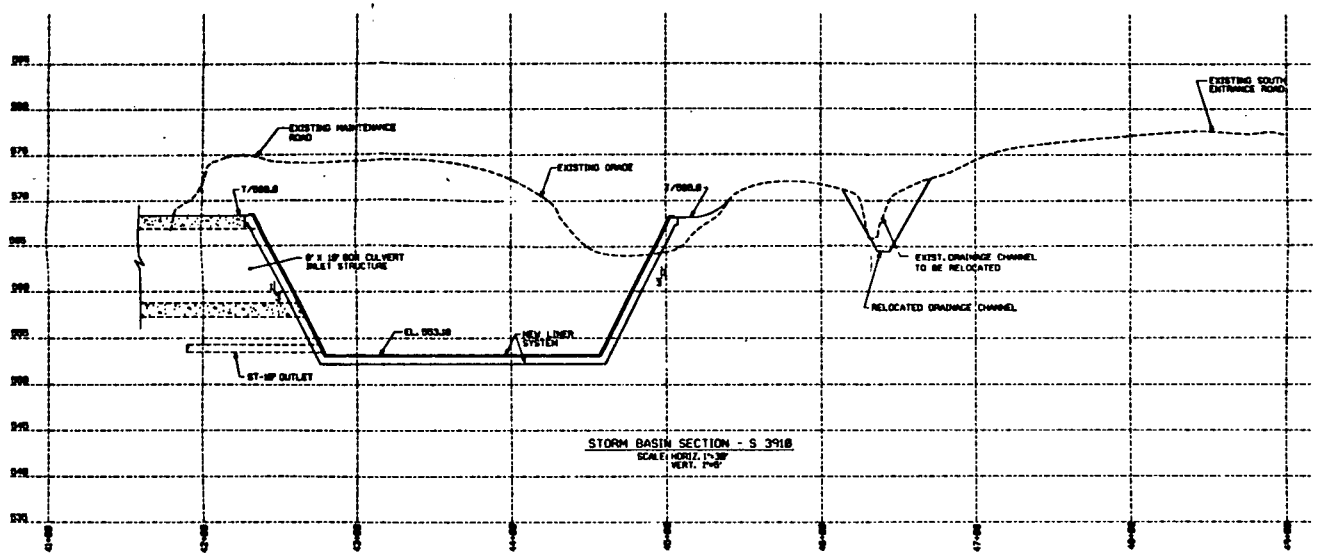
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

STORMWATER RETENTION BASIN EXPANSION

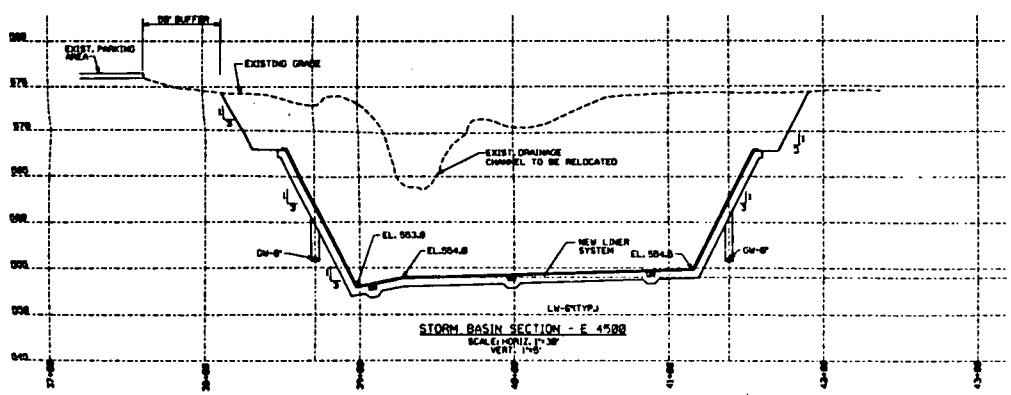
UTILITY PLAN 78

J. WATERS
A.H.COLANANNINO

C004 B



STORM BASIN SECTION - S 3918
SCALE: HORIZ. 1"=30'
VERT. 1"=5'



STORM BASIN SECTION - E 4500
SCALE: HORIZ. 1"=30'
VERT. 1"=5'

REV. NO.	DESCRIPTION	DATE	DRAWN BY	CHK'D BY
B	REVISED FOR 90% REVIEW			
A	ISSUED FOR 90% REVIEW			

UNITED STATES DEPARTMENT OF ENERGY 3062

LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

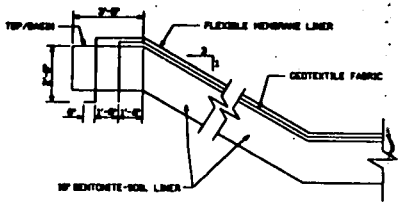
STORMWATER RETENTION BASIN EXPANSION

BASIN SECTIONS 78

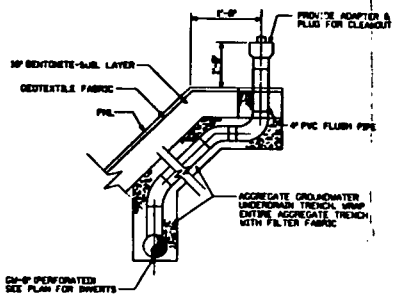
J. WATERS | J. MCCLANAHAN

FMPC - - 00 3 C P 1 P U

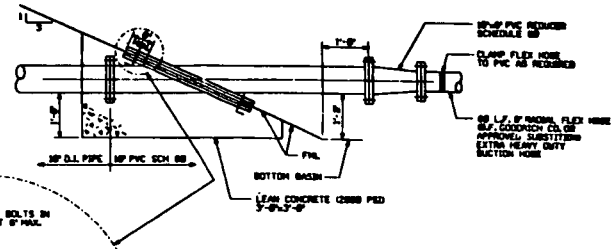
C005 B



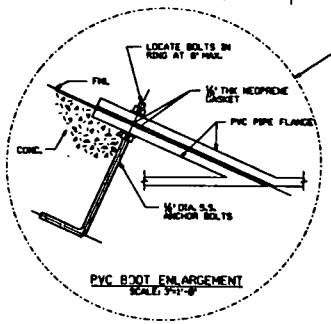
TYPICAL FLEXIBLE MEMBRANE LINER DETAIL
NOT TO SCALE



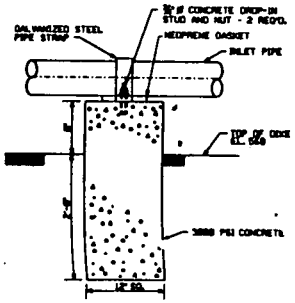
TYPICAL GROUNDWATER COLLECTION TRENCH DETAIL
NOT TO SCALE



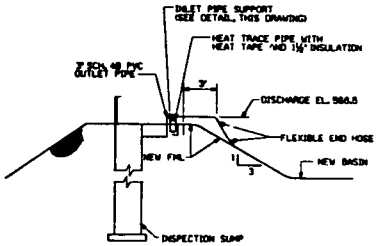
OUTLET PIPE PENETRATION DETAIL
SCALE: 1"=1'-0"



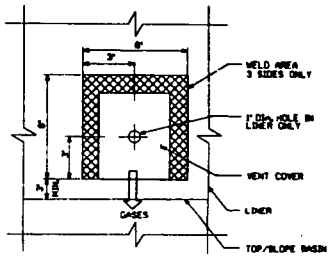
PVC BOOT ENLARGEMENT
SCALE: 3"=1'-0"



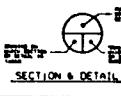
INLET PIPE SUPPORT DETAIL
NOT TO SCALE



INSPECTION SUMP OUTLET DETAIL
NOT TO SCALE



TYPICAL GAS VENT DETAIL
NOT TO SCALE



SECTION & DETAIL KEY

B	REVISED FOR DOE REVIEW	
A	ISSUED FOR DOE REVIEW	

UNITED STATES
DEPARTMENT OF ENERGY

LOCKWOOD GREENE
Planners/Engineers/Architects/Managers

STORMWATER RETENTION BASIN EXPANSION

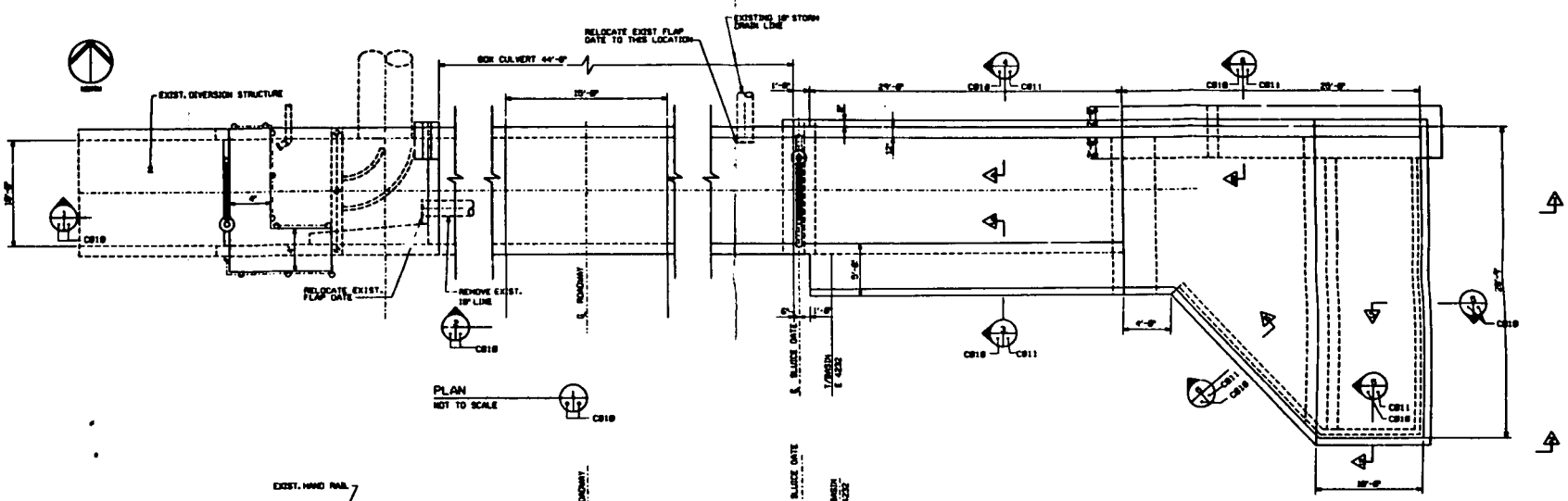
FLEXIBLE MEMBRANE LINER DETAILS

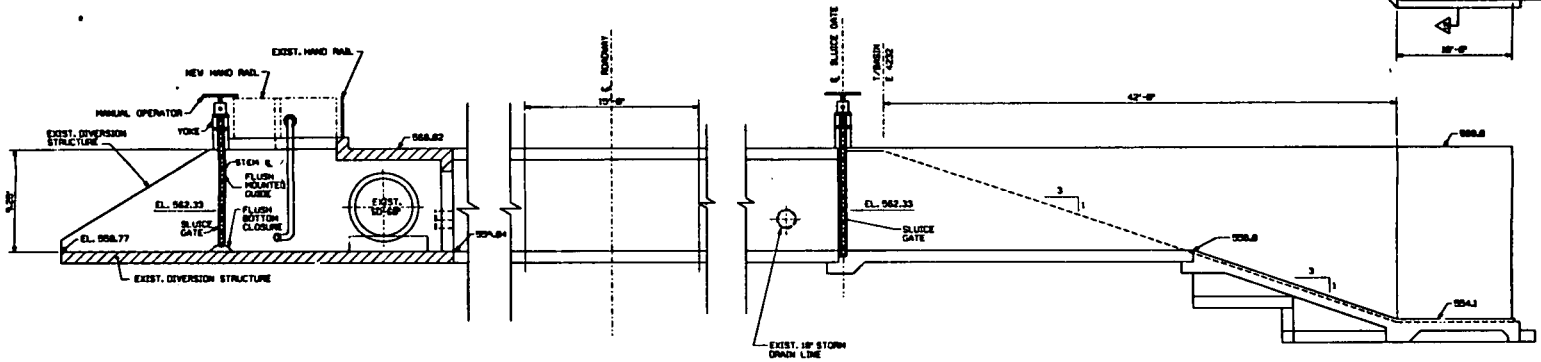
J. WATERS | MD | R. MCCLANAHAN | VM

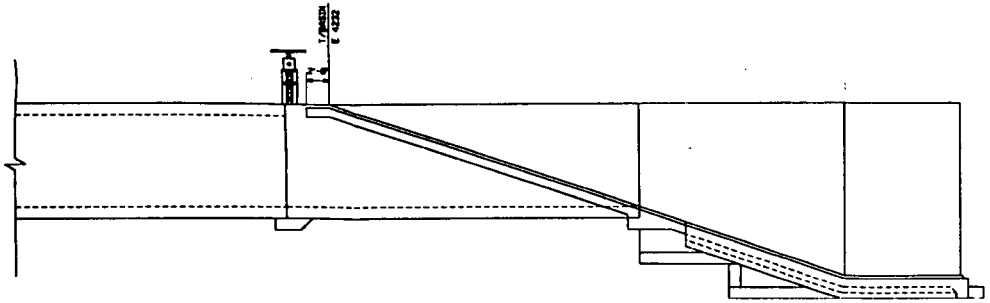
FMPC | 3 | C | P | T | P | U

C007 | B

RIF : ME: 1786407C JEFF WATERS 13:14:45 29-SEP-97







SECTION & DETAIL KEY

B	REVISED FOR 90% REVIEW
A	ISSUED FOR 90% REVIEW

UNITED STATES
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LOCKWOOD GREENE

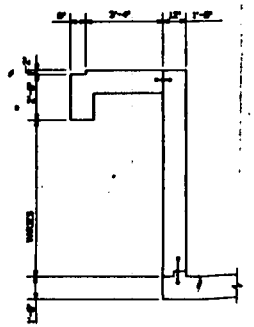
STORMWATER RETENTION BASIN EXPANSION

STORMWATER STRUCTURE DETAILS-1 OF 2

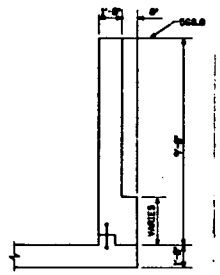
R. TAYLOR | VIS | A. KOLLAMPARAMBIL | VIS

C010 | B

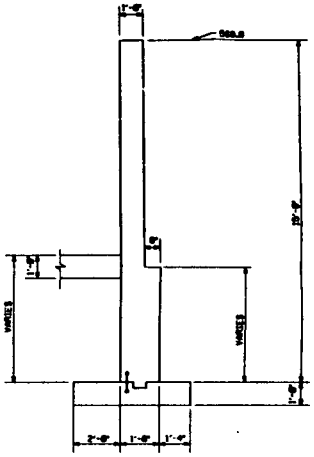
FILE NAME



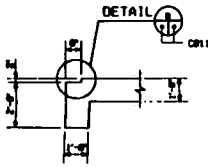
DETAIL
SCALE: 1/4"=1'
C010 C011



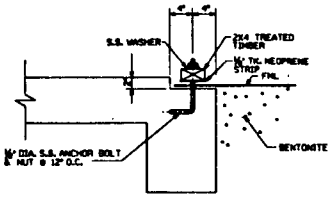
DETAIL
SCALE: 1/4"=1'
C010 C011



DETAIL
SCALE: 1/4"=1'
C010 C011



DETAIL
SCALE: 1/4"=1'
C011 C011



ANCHOR DETAIL
NOT TO SCALE

SECTION & DETAIL KEY

REV.	DESCRIPTION	DATE
B	REVISED FOR 50% REVIEW	
A	ISSUED FOR 50% REVIEW	

UNITED STATES DEPARTMENT OF ENERGY

LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

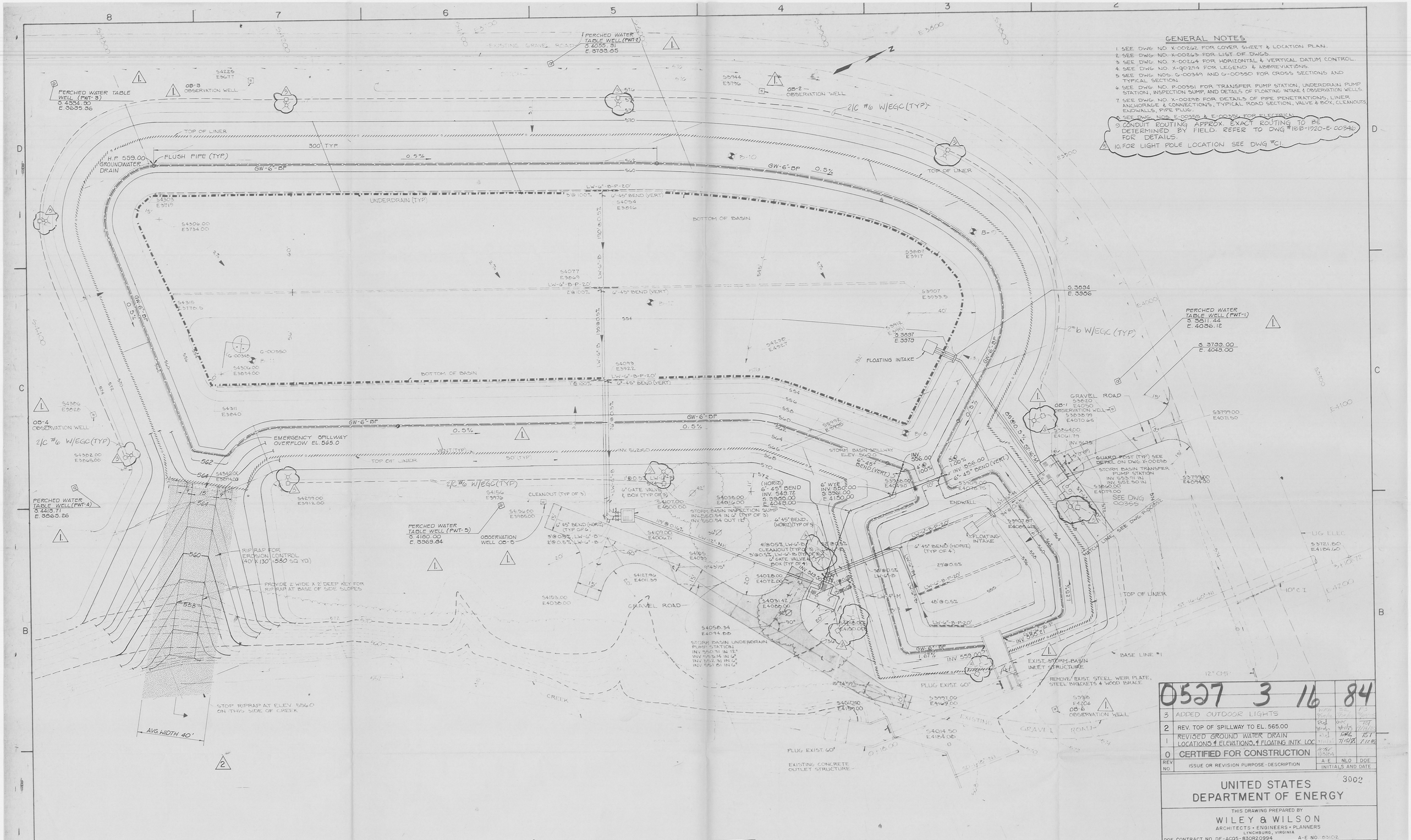
STORMWATER RETENTION BASIN EXPANSION

STORMWATER STRUCTURE DETAILS-2 OF 2

R. TAYLOR | VSF | A. MCCLANAHAN | VSF

FNPC | 3 | C | F | I | P | U

C011 | B



GENERAL NOTES

1. SEE DWG. NO. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. X-00263 FOR LIST OF DWGS.
3. SEE DWG. NO. X-00264 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. X-90294 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NOS. G-00349 AND G-00350 FOR CROSS SECTIONS AND TYPICAL SECTION.
6. SEE DWG. NO. P-00351 FOR TRANSFER PUMP STATION, UNDERDRAIN PUMP STATION, INSPECTION SUMP, AND DETAILS OF FLOATING INTAKE & OBSERVATION WELLS.
7. SEE DWG. NO. X-00298 FOR DETAILS OF PIPE PENETRATIONS, LINER ANCHORAGE & CONNECTIONS, TYPICAL ROAD SECTION, VALVE & BOX, CLEANOUTS, ENDWALLS, PIPE PLUG.
8. SEE DWG. NOS. E-00355 & E-00351 FOR ELECTRICAL.
9. CONDUIT ROUTING APPROX. EXACT ROUTING TO BE DETERMINED BY FIELD. REFER TO DWG #18B-1920-E-00346 FOR DETAILS.
10. FOR LIGHT POLE LOCATION SEE DWG #C1.

PLAN - STORM BASINS
SCALE: 1"=20'

REV NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	NLO	DOE
		INITIALS AND DATE		
3	ADDED OUTDOOR LIGHTS			
2	REV. TOP OF SPILLWAY TO EL. 565.00			
1	REVISED GROUND WATER DRAIN LOCATIONS & ELEVATIONS, & FLOATING INTK. LOC.			
0	CERTIFIED FOR CONSTRUCTION			

0527 3 16 84

LOCKWOOD GREENE
ARCHITECTS • ENGINEERS
NEW YORK • SPARTANBURG • ATLANTA • DALLAS • OAK RIDGE
Approved 3002 Job. No. 83649.01

APPROVED FOR REVISION 3
DOE — DATE 9/26/86
OC — DATE 9/26/86
AE — DATE 9/26/86

PREPARED BY:
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
APPROVED FOR REVISION 2
DOE — DATE
NLO — DATE
AE — DATE 7/14/85

83649.01 PREPARED BY:
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
APPROVED FOR REVISION 1
DOE — DATE 7/12/85
NLO — DATE 7/5/85
AE — DATE 7/12/85

UNITED STATES
DEPARTMENT OF ENERGY

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA
DOE CONTRACT NO. DE-AC05-83OR20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION
PLAN - BASINS & PIPING

66

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
FALK	1/10/84	BHR	1/10/84		1/10/84

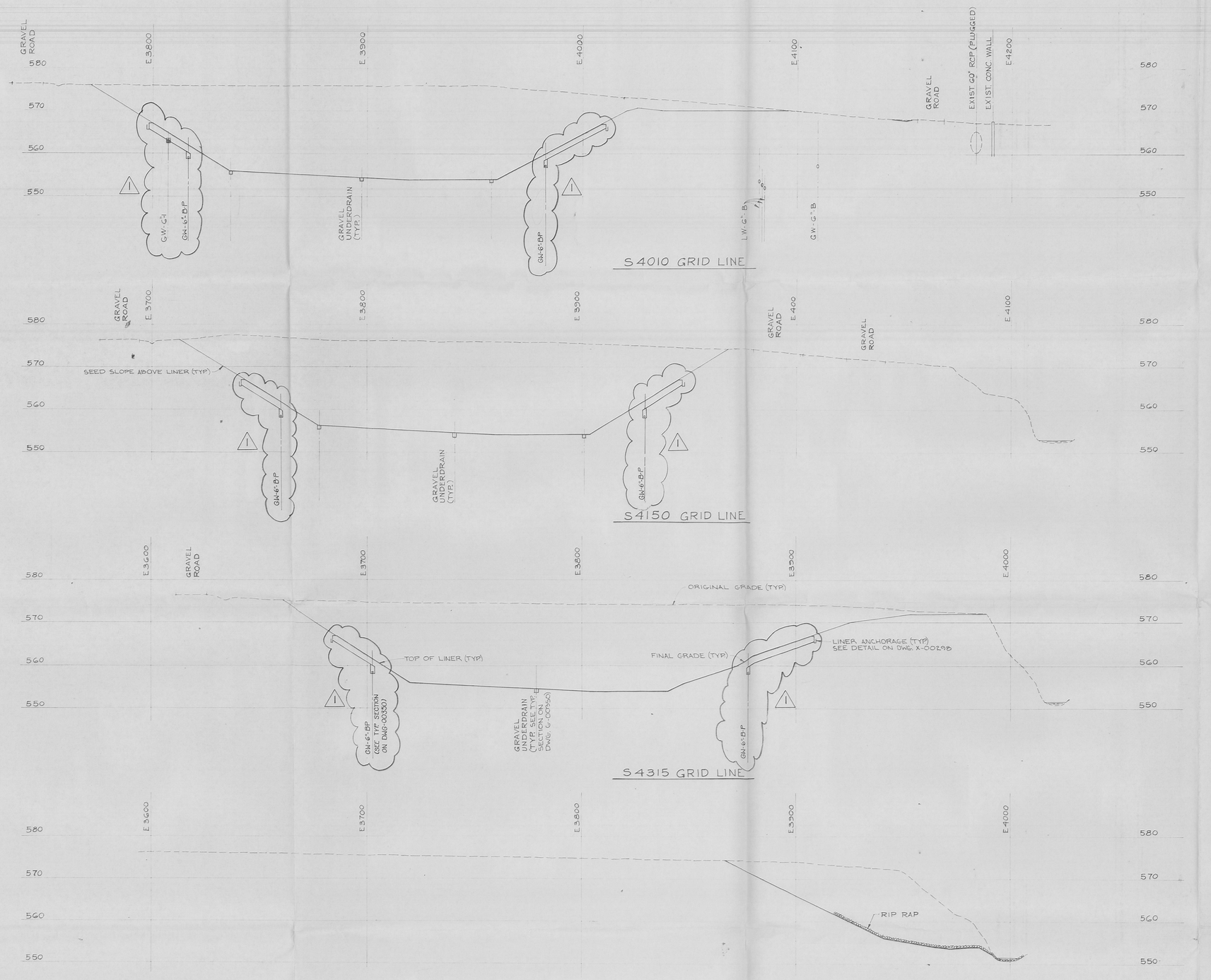
PLANT	BLDG.	FLOOR	SCALE	CLASS
FMPC	NA	NA	1" = 20'	U

SUBMITTED FOR APPROVAL		APPROVAL RECOMMENDED		DRAWING APPROVED	
A-E	DATE 1/13/84	NLO	DATE	DOE	DATE

PROJECT NO.	DRAWING NUMBER	REV NO
83-D-146	18B-1920-G-00348	3

3002

83649.01



CROSS-SECTIONS

SCALE: 1" = 20' HORIZ.
1" = 10' VERT.

GENERAL NOTES

1. SEE DWG. NO. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. X-00263 FOR LIST OF DWGS.
3. SEE DWG. NO. X-00264 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. X-00294 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NO. G-00348 FOR PLAN OF STORM BASINS.
6. SEE DWG. NO. X-00298 FOR DETAILS OF LINER ANCHORAGE & CONNECTIONS.
7. SEE DWG. NO. G-00350 FOR TYPICAL SECTION.

PREPARED BY:
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers

APPROVED FOR REVISION	
J.A. Dixon	7-12-85
DOE	DATE
D.D. Engel NLO ~~UGO-ND~~	7-15-85
	DATE
R.M. Fenyk AE	7/12/85
	DATE

20' 0 20'
10' 0 10'

0527 3 16 84

REV NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	NLO	DOE
			INITIALS AND DATE	
1	RELOCATED GW DRAINS	RJL 7/12/85	RMF 7/12/85	TSI 7-12-85
0	CERTIFIED FOR CONSTRUCTION	WRE 1/13/84		

UNITED STATES
DEPARTMENT OF ENERGY

3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA

DOE CONTRACT NO. DE-AC05-830R20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION
STORM BASIN CROSS-SECTIONS

67

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
PHJr.	1/10/84	WRE	1/10/84	WRM	1/10/84

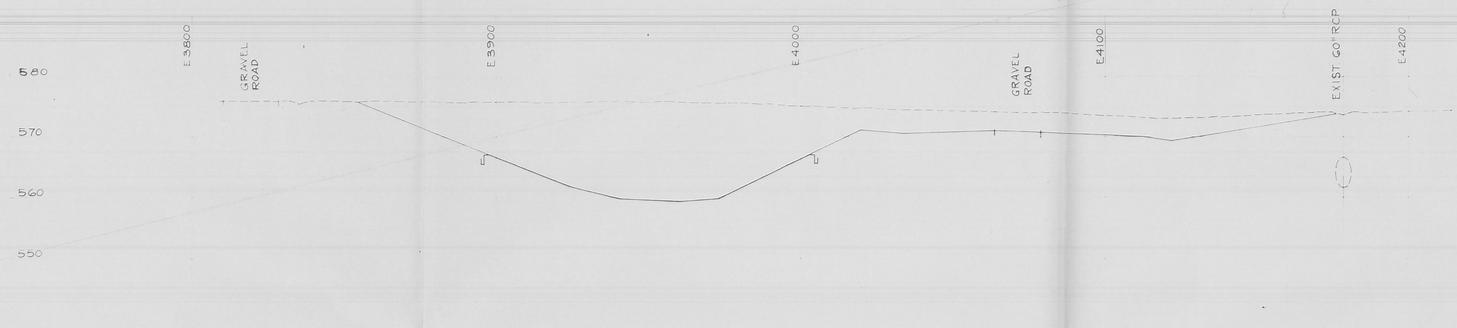
PLANT	BLDG	FLOOR	SCALE	CLASS
FMPC	NA	NA	NA	LL

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
WRE		
A-E DATE 1/13/84	NLO DATE	DOE DATE

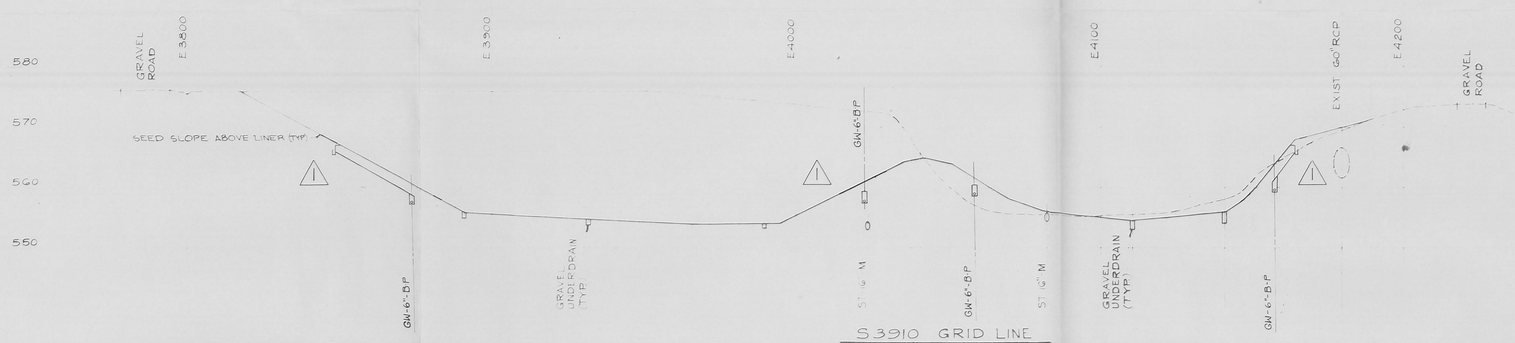
PROJECT NO.	DRAWING NUMBER	REV NO.
83-D-146	18B-1920-G-00349	1

A&E SUPPLY CO. 38411

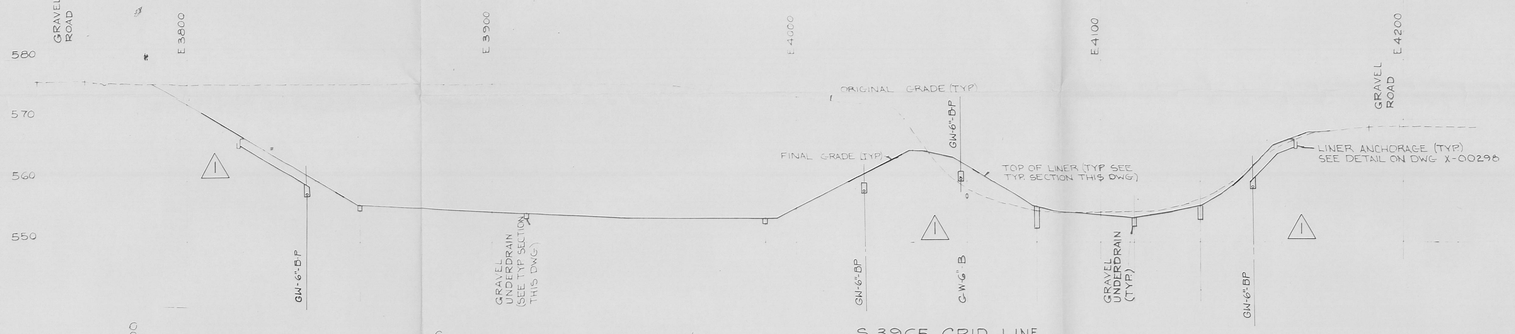
2002



S 3860 GRID LINE



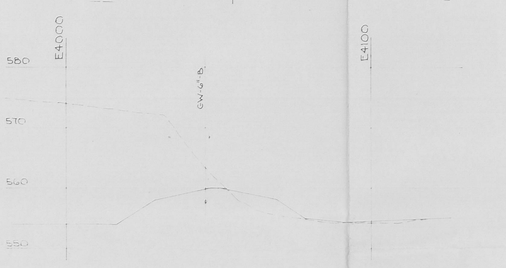
S 3910 GRID LINE



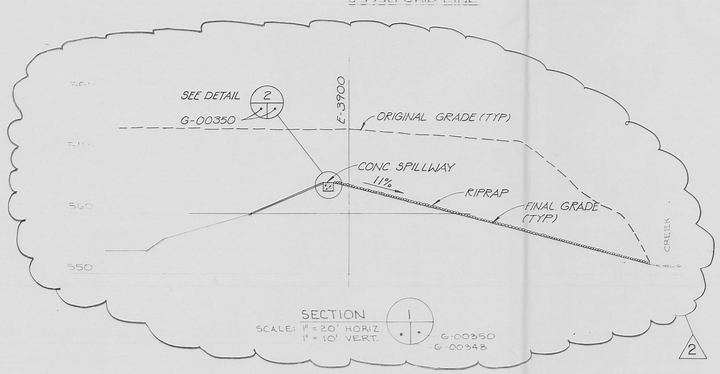
S 3965 GRID LINE

CROSS-SECTIONS

SCALE: 1" = 20' HORIZ.
1" = 10' VERT.



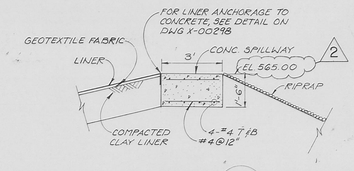
S 3938 GRID LINE



SECTION

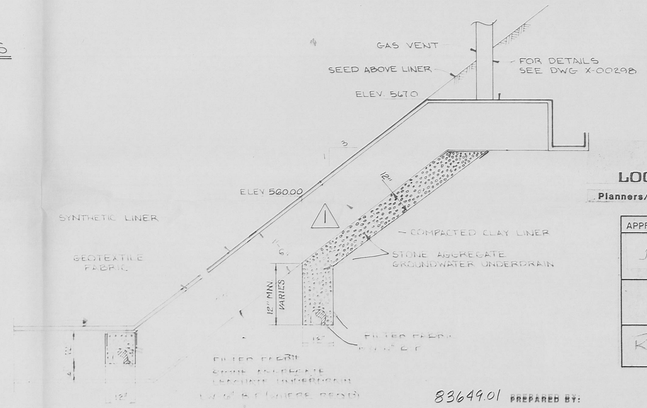
SCALE: 1" = 20' HORIZ.
1" = 10' VERT.

G-00350
G-00348



DETAIL 2

NOT TO SCALE — G-00350

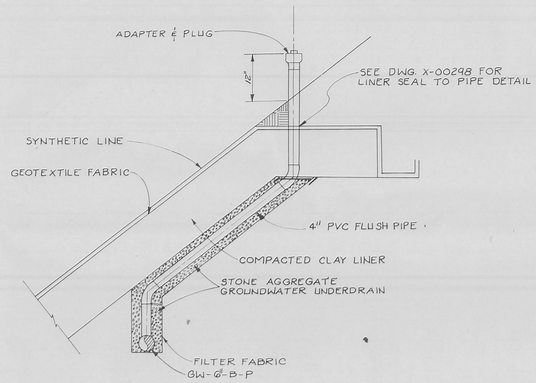


TYPICAL SECTION

NOT TO SCALE

GENERAL NOTES

1. SEE DWG NO X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG NO X-00263 FOR LIST OF DWGS.
3. SEE DWG NO X-00264 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG NO X-00294 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG NO G-00348 FOR PLAN OF STORM BASINS.
6. SEE DWG NO X-00298 FOR DETAILS OF LINER ANCHORAGE & CONNECTIONS.



TYPICAL FLUSH PIPE DETAIL

NOT TO SCALE

1

NOTE: THE OPTIMUM BENTONITE MIXTURE FOR CLAY LINER IS 8 PERCENT OF THE SOIL'S DRY WEIGHT. THE MINIMUM APPLICATION RATE OF BENTONITE TO SOILS TAKEN FROM STORM BASIN AREA ARE AS FOLLOWS:
1) MOTTLED BROWN SILTY CLAY WITH TRACE SAND → 4.0 LB/SF
2) BROWN CLAYEY SILT → 4.1 LB/SY
3) GRAY SANDY SILTY CLAY → 4.8 LB/SF

REGULAR CUT MATERIAL	=	76,910 CU YD
CLAY LINER MATERIAL	=	6,530 CU YD
TOTAL CUT	=	83,440 CU YD
TOTAL FILL	=	300 CU YD

0527 3 16 84

PREPARED BY:
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers

APPROVED FOR REVISION 2
J.S. Jison 7/14/85 — DOE DATE
NLO DATE
R. Lough 7/14/85 — AE DATE

83649.01 PREPARED BY:
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers

APPROVED FOR REVISION 1
J.S. Jison 7-12-85 — DOE DATE
D.P. Hooper 7-15-85 — NLO DATE
R.L. Lough 7/12/85 — AE DATE

20' 0 20'
10' 0 10'

REV NO	ISSUE OR REVISION PURPOSE DESCRIPTION	A E	NLO	DOE	DATE
2	REV. TOP OF SPILLWAY TO EL. 565.00	RCG 7/14/85	DPC 7/14/85	JSJ 7/14/85	
1	RELOCATED GW DRAINS	RCG 7/12/85	DPC 7/12/85	JSJ 7/12/85	
0	CERTIFIED FOR CONSTRUCTION	RCG 11/13/84			

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS · ENGINEERS · PLANNERS
LYNCHBURG, VIRGINIA

WIE CONTRACT NO. DE AC09 82UR20891 A E NO. 5205
PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION
STORM BASIN CROSS-SECTIONS

68

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
FHJr	1/10/84	[illegible]	1/10/84	[illegible]	1/10/84

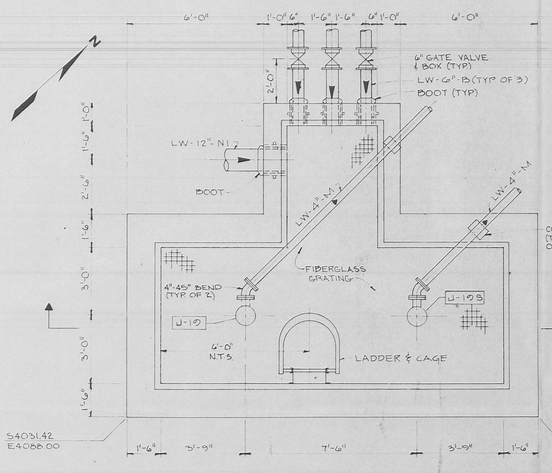
PLANT	BLDG	FLOOR	SCALE	CLASS
FMPC	NA	NA	NA	U

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E DATE 11/13/84	NLO DATE	DOE DATE

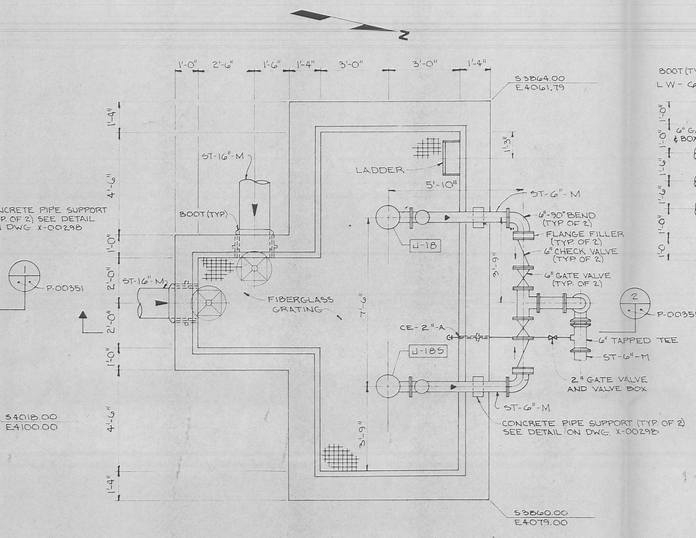
PROJECT NO.	DRAWING NUMBER	REV. NO.
83-D-146	18B-1920-G-00350	2

83649.01

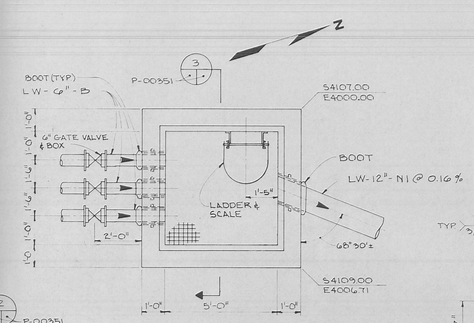
3002



STORM BASIN UNDERDRAIN PUMP STATION PLAN
SCALE: 3/8" = 1'-0"



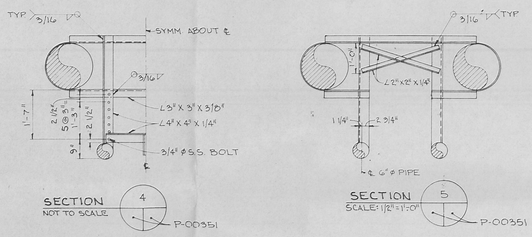
STORM BASIN TRANSFER PUMP STATION PLAN
SCALE: 3/8" = 1'-0"

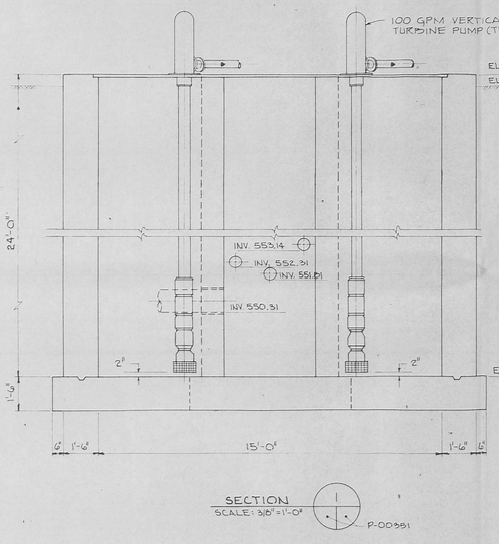


STORM BASIN INSPECTION SUMP PLAN
SCALE: 3/8" = 1'-0"

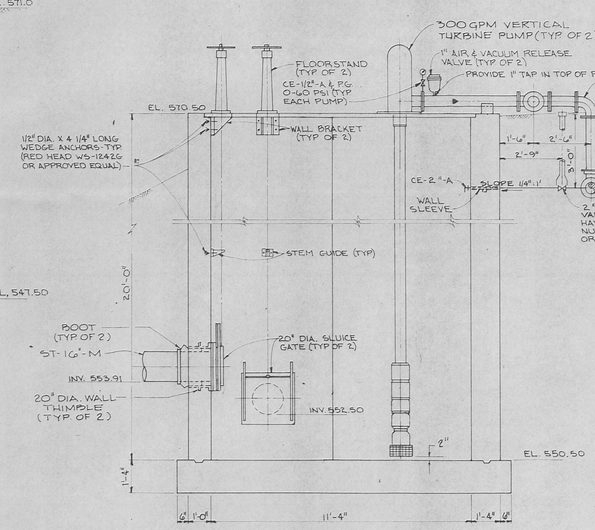
GENERAL NOTES

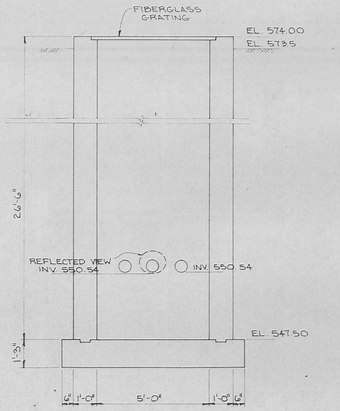
1. SEE DWG. NO. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. X-00263 FOR LIST OF DWGS.
3. SEE DWG. NO. X-00264 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. X-00294 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NO. G-00348 FOR PLAN OF STORM BASINS.
6. SEE DWG. NOS. S-00353 AND S-00354 FOR REINFORCING OF PUMP STATIONS AND INSPECTION SUMP.
7. SEE DWG. NO. X-00298 FOR DETAILS OF PIPE PENETRATION, VALVE & BOX, AND CONCRETE PIPE SUPPORT.
8. SEE DWG. NOS. E-00355 & E-00356 FOR ELECTRICAL.

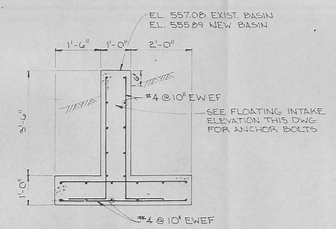




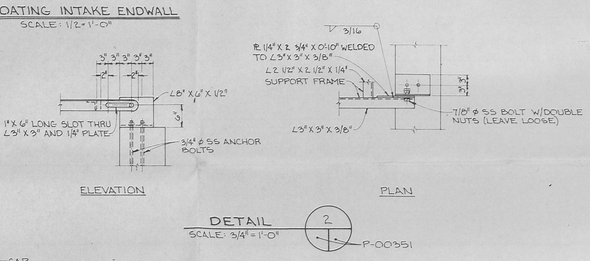
NOTE: COAT ALL INTERIOR CONCRETE SURFACES OF PUMP STATIONS AND INSPECTION SUMP WITH TARSET STANDARD. COAT ALL EXTERIOR SURFACES WITH TARMASTIC 100.

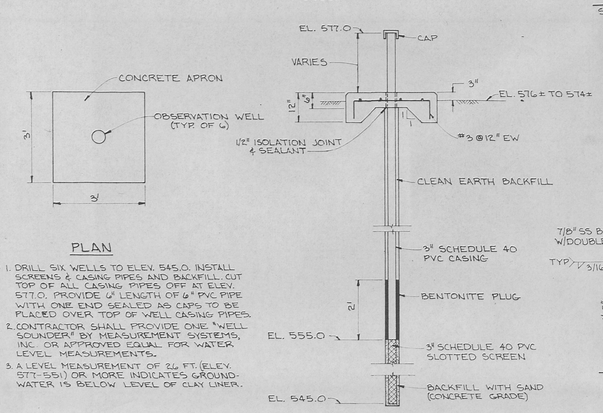






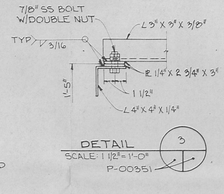
FLOATING INTAKE ENDWALL
SCALE: 1/2" = 1'-0"

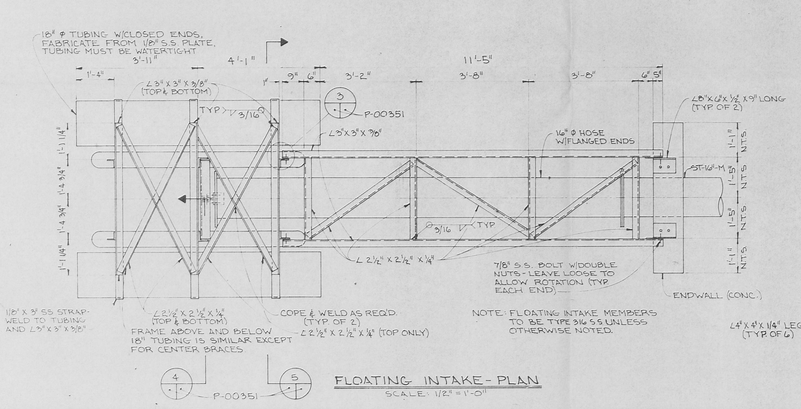




NOTE: 1. DRILL SIX WELLS TO ELEV. 545.0. INSTALL SCREENS & CASING PIPES AND BACKFILL. CUT TOP OF ALL CASING PIPES OFF AT ELEV. 577.0. PROVIDE 6" LENGTH OF 6" PVC PIPE WITH ONE END SEALED AS CAPS TO BE PLACED OVER TOP OF WELL CASING PIPES.
2. CONTRACTOR SHALL PROVIDE ONE "WELL SOUNDER" BY MEASUREMENT SYSTEMS, INC. OR APPROVED EQUAL FOR WATER LEVEL MEASUREMENTS.
3. A LEVEL MEASUREMENT OF 26 FT (ELEV. 577-551) OR MORE INDICATES GROUND-WATER IS BELOW LEVEL OF CLAY LINER.

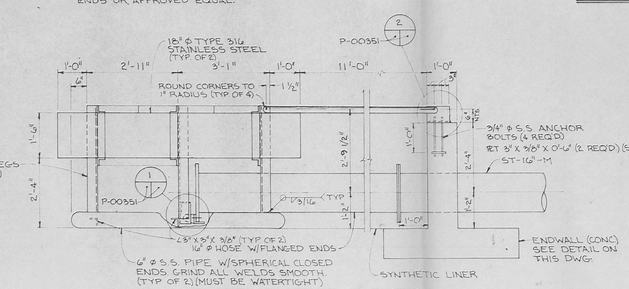
DETAIL OF OBSERVATION WELL
NOT TO SCALE.



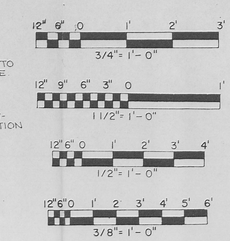


FLOATING INTAKE - PLAN
SCALE: 1/2" = 1'-0"

NOTE: 16" ϕ HOSE SHALL BE B.F. GOODRICH "CONVERTAPIPE", 25 LB., 1/8" TUBE, WITH BUILT-IN NIPPLES & FLANGED ENDS OR APPROVED EQUAL.



FLOATING INTAKE - ELEVATION
SCALE: 1/2" = 1'-0"



12" 6" 0 1' 2' 3'
3/4" = 1'-0"

12" 9" 6" 3" 0 1'
1 1/2" = 1'-0"

12" 6" 0 1' 2' 3' 4'
1/2" = 1'-0"

12" 6" 0 1' 2' 3' 4' 5' 6'
3/8" = 1'-0"

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E INITIALS	NLO	DOE
0	CERTIFIED FOR CONSTRUCTION		1/10/84	

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA
DOE CONTRACT NO. DE-AC05-83OR20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION PLAN & SECTIONS
STORM TRANSFER & UNDERDRAIN PUMP STATIONS 69

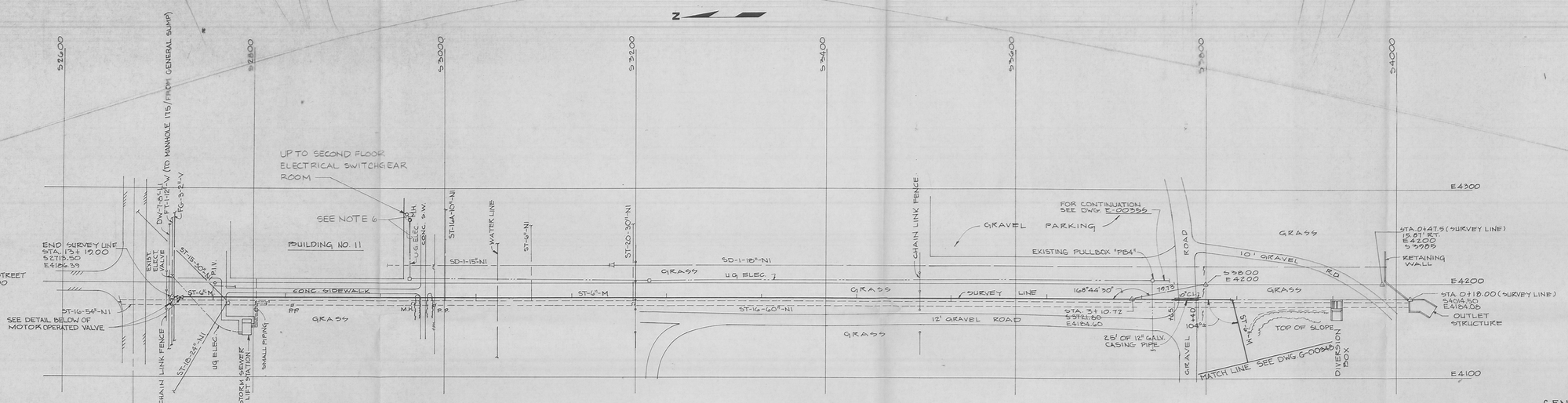
DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
FHJR	1/10/84	DMR	1/10/84	WEH	1/10/84

PLANT	BLDG	FLOOR	SCALE	CLASS
FMPC	NA	NA	3/8"=1'-0"	U

SUBMITTED FOR APPROVAL		APPROVAL RECOMMENDED		DRAWING APPROVED	
A-E	DATE 1/13/84	NLO	DATE	DOE	DATE

PROJECT NO.	DRAWING NUMBER	REV. NO.
83-D-146	18B-1920-P-00351	0

3002



STA. 13+19.0
TIE TO EXIST. STEEL PIPE, SCH. 40 (FT-1-12"-W)
REQ'D: 6" MOTOR OPERATED GATE VALVE (FLANGED)
6" WELDOLET WITH WELD NECK FLANGE ON OUTLET
CUT OUT PORTION OF EXIST. 12" & INSERT A 12" MOTOR OPERATED GATE VALVE (FLANGED) BY USING WELD NECK FLANGE ON EXISTING PIPE ON ONE SIDE & SLIP-ON FLANGE ON THE OTHER SIDE. WELD SLIP-ON FLANGE ON INSIDE & OUTSIDE.

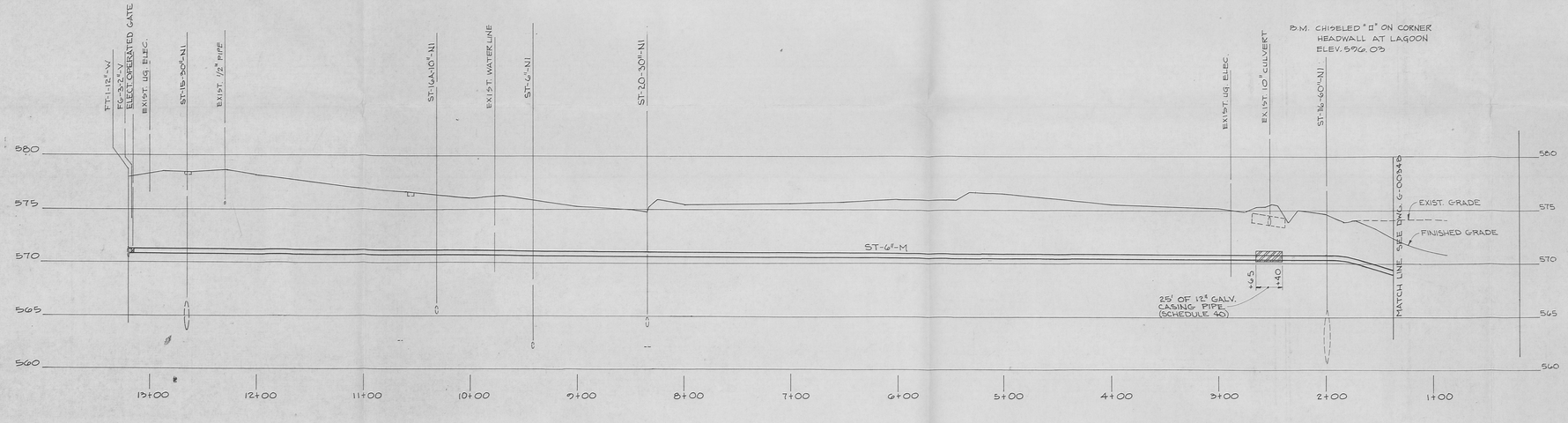
STA. 2+03± ℄ #1
REQ'D: 6" 90° BEND
6" 11¼° BEND
RESTRAIN PIPE ON EACH SIDE OF BENDS FOR 20' WITH RETAINER GLANDS.

PLAN

SCALE: 1" = 50'

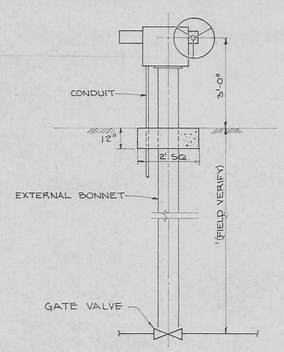
GENERAL NOTES

1. SEE DWG. NO. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. NO. X-00263 FOR LIST OF DWGS.
3. SEE DWG. NO. X-00264 FOR HORIZONTAL & VERTICAL DATUM CONTROL.
4. SEE DWG. NO. X-00294 FOR LEGEND & ABBREVIATIONS.
5. SEE DWG. NO. G-00348 FOR PLAN OF STORM BASING.
6. EXISTING ELECTRICAL DUCT BANK FROM THE EXISTING UNDERGROUND ELECTRICAL MANHOLE OUTSIDE BUILDING 11 TO EXISTING PULLBOX PB4 CONTAINS 2 SPARE 2" PLASTIC CONDUITS. ROUTE AN UNDERGROUND 2" RIGID STEEL CONDUIT FROM THE ELECTRICAL MANHOLE (30" BELOW GRADE) TO THE EXTERIOR WALL TO THE SECOND FLOOR ELECTRICAL SWITCHGEAR ROOM (ADJACENT TO CAFETERIA), AND OVERHEAD TO THE SOUTH END OF THE SWITCHGEAR LOCATED 5 FT. FROM THE WALL. MOUNT A 100 AMP CIRCUIT BREAKER ON THE SOUTH END OF THE SWITCHGEAR AND CONNECT THE LINE SIDE OF THE CIRCUIT BREAKER TO THE SWITCHGEAR BUS USING 3 #2/0 & 1 #6 EGC TO THE STORM LAGOON MAIN CONTROL STATION BY WAY OF THE ABOVE DUCT BANK.



PROFILE

SCALE: 1" = 5' VERTICAL
1" = 50' HORIZONTAL



DETAIL OF MOTOR OPERATED VALVE
NOT TO SCALE.

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	NLO	DOE
0	CERTIFIED FOR CONSTRUCTION	1/13/84	1/23/84	1/27/84
		INITIALS AND DATE		

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA
DOE CONTRACT NO. DE-AC05-83OR20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION
STORM BASIN FORCE MAIN
70

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
FHUK	1/10/84	DKR	1/10/84	WDH	1/10/84

PLANT	BLDG.	FLOOR	SCALE	CLASS
FMPC	NA	NA	NA	U

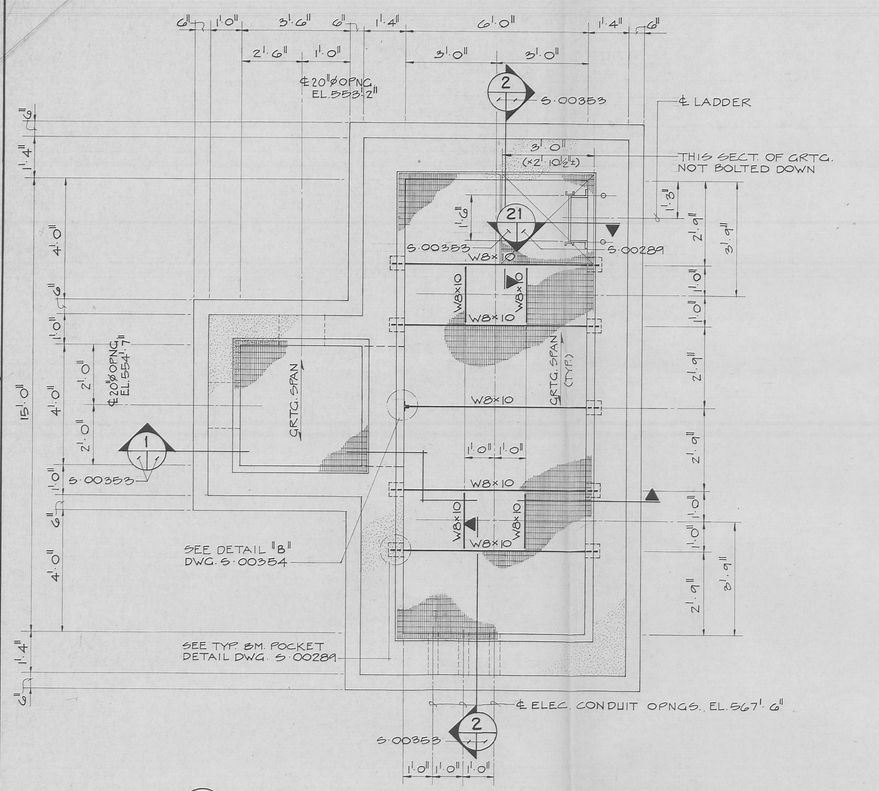
SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E DATE 1/13/84	NLO DATE 1/23/84	DOE DATE 1/27/84

PROJECT NO.	DRAWING NUMBER	REV. NO.
83-D-146	18B-1920-P-00352	0

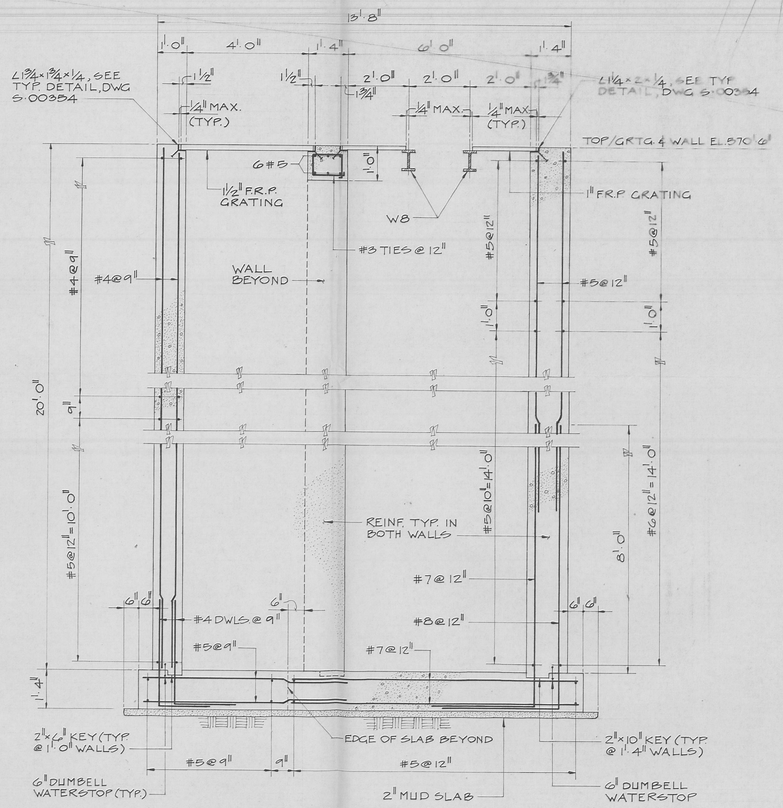
5' 0 5'
50' 0 50'

3002

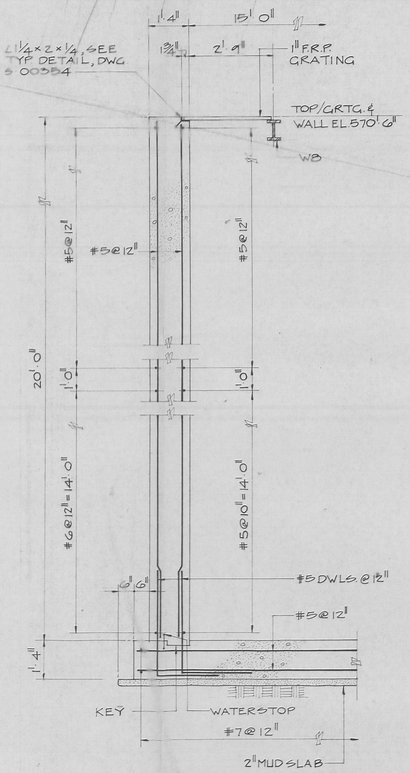
ABE SUPPLY CO. 58411



PLAN • TRANSFER PUMP STATION SCALE: ½"=1'-0"



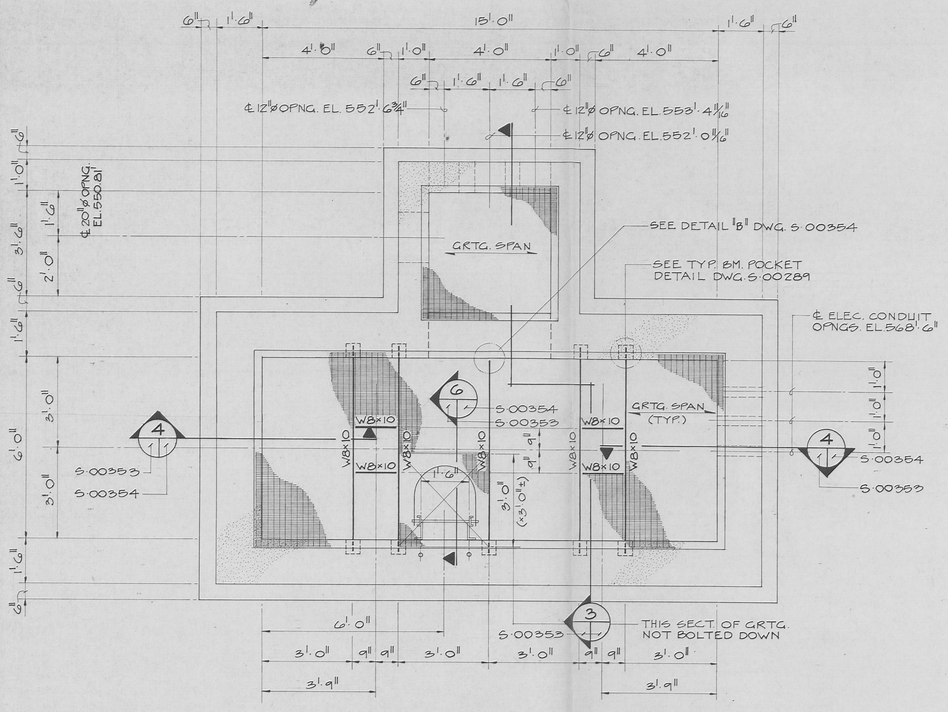
SECTION 1
SCALE: ½"=1'-0"
S-00353



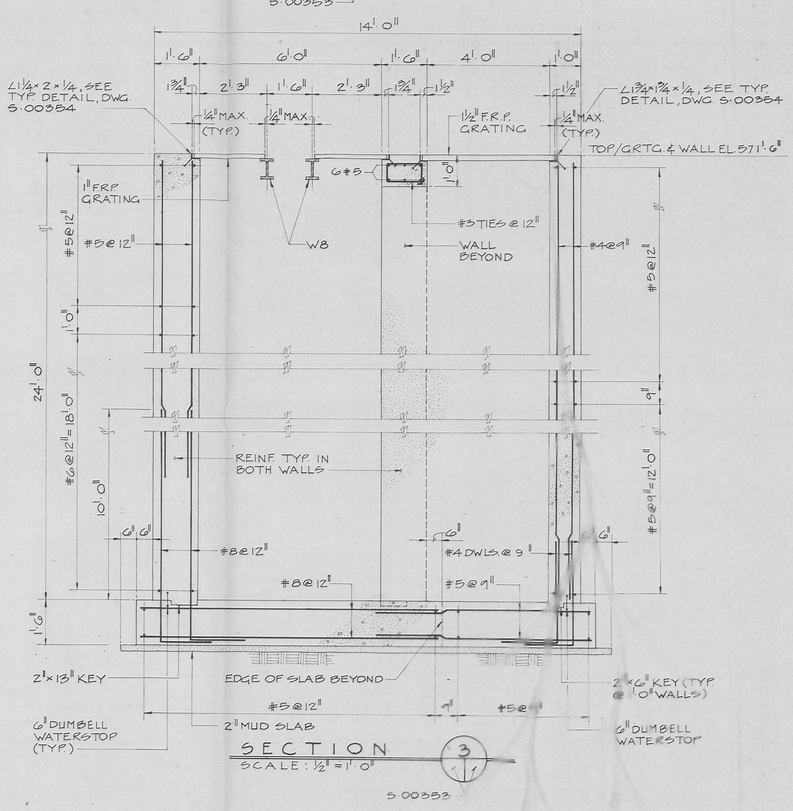
SECTION 2
SCALE: ½"=1'-0"
S-00353

NOTES:

1. SEE DWG. No. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. No. X-00263 FOR LIST OF DWGS.
3. SEE DWG. No. S-00287 FOR STRUCTURAL GENERAL NOTES.
4. SEE DWG. No. C-00348 FOR LOCATION OF STRUCTURES.
5. SEE DWG. No. S-00289 FOR TYP. BEAM POCKET DETAIL, TYP. WALL OPENING DETAIL, TYP. WALL CONSTRUCTION JOINT DETAIL & TYP. CORNER REINFORCING DETAIL.
6. SEE DWG. No. S-00354 FOR TYP. CURB ANGLE DETAIL.
7. SEE DWG. No. E-00355 FOR ELECTRICAL CONDUIT OPENINGS.
8. SEE DWG. No. X-00298 FOR PIPE SLEEVE DETAILS.



PLAN • UNDERDRAIN PUMP STATION SCALE ½"=1'-0"



SECTION 3
SCALE: ½"=1'-0"
S-00353

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	NLO	DOE
0	CERTIFIED FOR CONSTRUCTION	1/13/84	1/16/84	1/20/84

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA
DOE CONTRACT NO. DE-AC05-830R20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION 71
STORM TRANSFER AND UNDERDRAIN PUMP STATIONS - PLANS & SECTIONS

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
J.D.S.	1/10/84	S.A.C.	1/10/84	C.A.G.	1/10/84

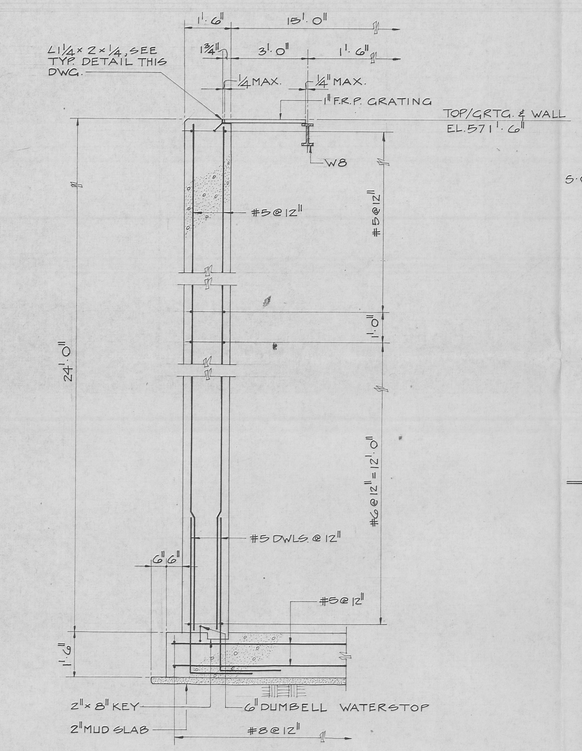
PLANT	BLDG.	FLOOR	SCALE	CLASS
FMPC	N/A	N/A	N/A	U

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E DATE 1/13/84	NLO DATE 2/6/84	DOE DATE 1/20/84

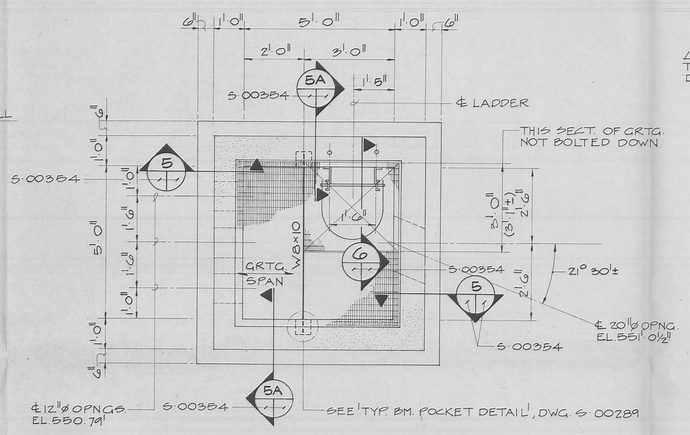
PROJECT NO.	DRAWING NUMBER	REV. NO.
83-D-146	18B-1920-S-00353	0

3002

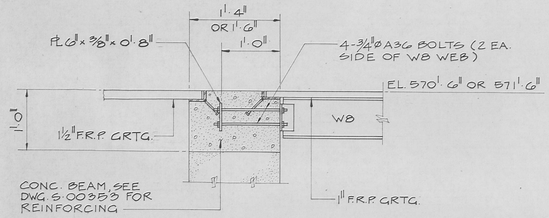
A&E SUPPLY CO. 58411



SECTION 4
SCALE: ½" = 1'-0"
S 00353 — S 00354

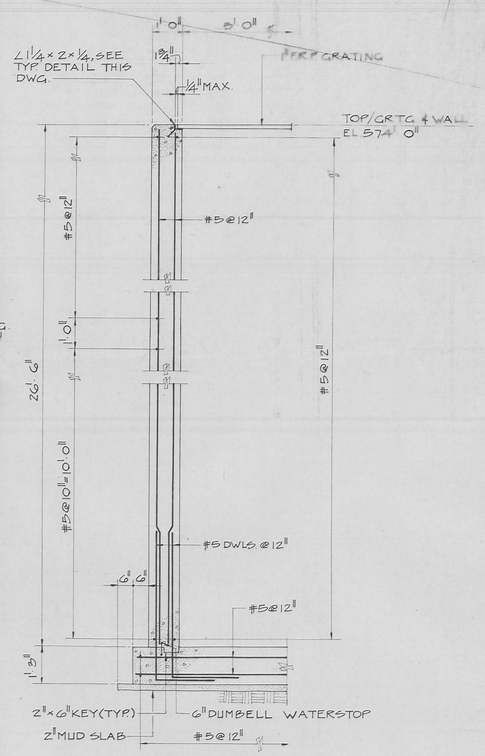


PLAN • INSPECTION SUMP SCALE: ½" = 1'-0"



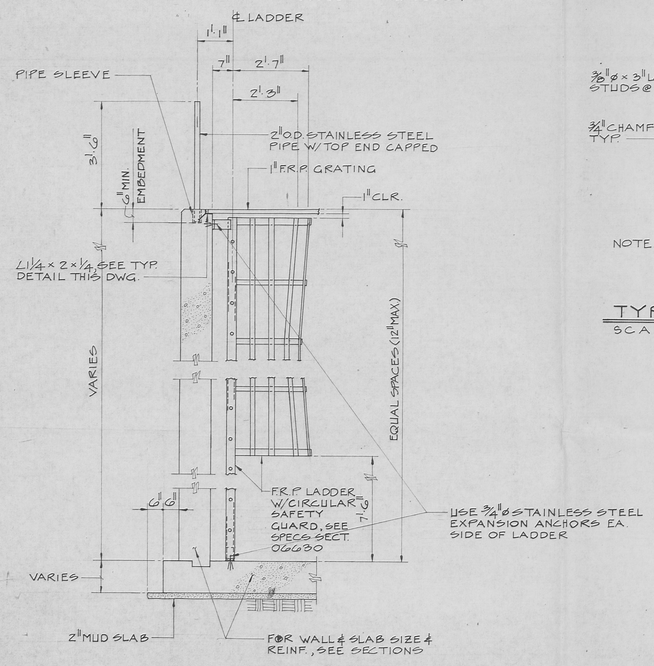
SECTION

DETAIL "B"
SCALE: 1" = 1'-0"

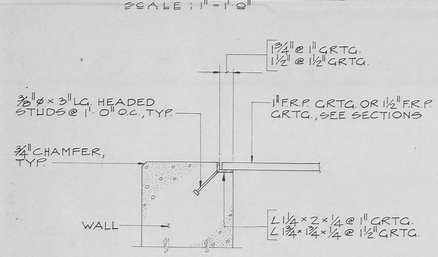


SHOWN — SIMILAR

SECTION 5 / 5A
SCALE: ½" = 1'-0"
S 00354 — S 00354



SECTION 6
SCALE: ½" = 1'-0"
S 00289, S 00353, S 00354 — S 00354



NOTE: OMIT ANGLE ACROSS 6" WIDTH OF BM. POCKET

SECTION

TYP. CURB ANGLE DETAIL
SCALE: 1½" = 1'-0"

NOTES:

1. SEE DWG. No. X-00262 FOR COVER SHEET & LOCATION PLAN.
2. SEE DWG. No. X-00263 FOR LIST OF DWGS.
3. SEE DWG. No. S-00287 FOR STRUCTURAL GENERAL NOTES.
4. SEE DWG. No. G-00348 FOR LOCATION OF STRUCTURES.
5. SEE DWG. S-00289 FOR TYP. BEAM POCKET DETAIL, TYP. WALL OPENING DETAIL, TYP. WALL CONSTRUCTION JOINT DETAIL & TYP. CORNER REINFORCING DETAIL.
6. SEE DWG. No. E-00355 FOR ELECTRICAL CONDUIT OPENINGS.
7. SEE DWG. No. X-00298 FOR PIPE SLEEVE DETAILS

REV NO	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	NLO	DOE
0	CERTIFIED FOR CONSTRUCTION	WBK 1/13/84	1/26/84	2/2/84

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
WILEY & WILSON
ARCHITECTS • ENGINEERS • PLANNERS
LYNCHBURG, VIRGINIA
DOE CONTRACT NO. DE-AC05-830R20994 A-E NO. 83102

PROJECT NAME
WATER POLLUTION CONTROL

DRAWING TITLE
STORM WATER COLLECTION
INSPECTION SUMP
PLAN AND SECTIONS 72

DRAWN BY	DATE	DESIGNED AND CHECKED BY	DATE	CHECKED BY	DATE
J.D.S.	1/10/84	SAC	1/10/84	C.A.G. WJH	1/10/84

PLANT	BLDG.	FLOOR	SCALE		CLASS
FMPC	N/A	N/A	N/A		U

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
W. H. Lingenfelter	C. W. Ostrander	R. W. Rucker
A-E DATE 1/13/84	NLO DATE 2/23/84	DOE DATE 2/28/84

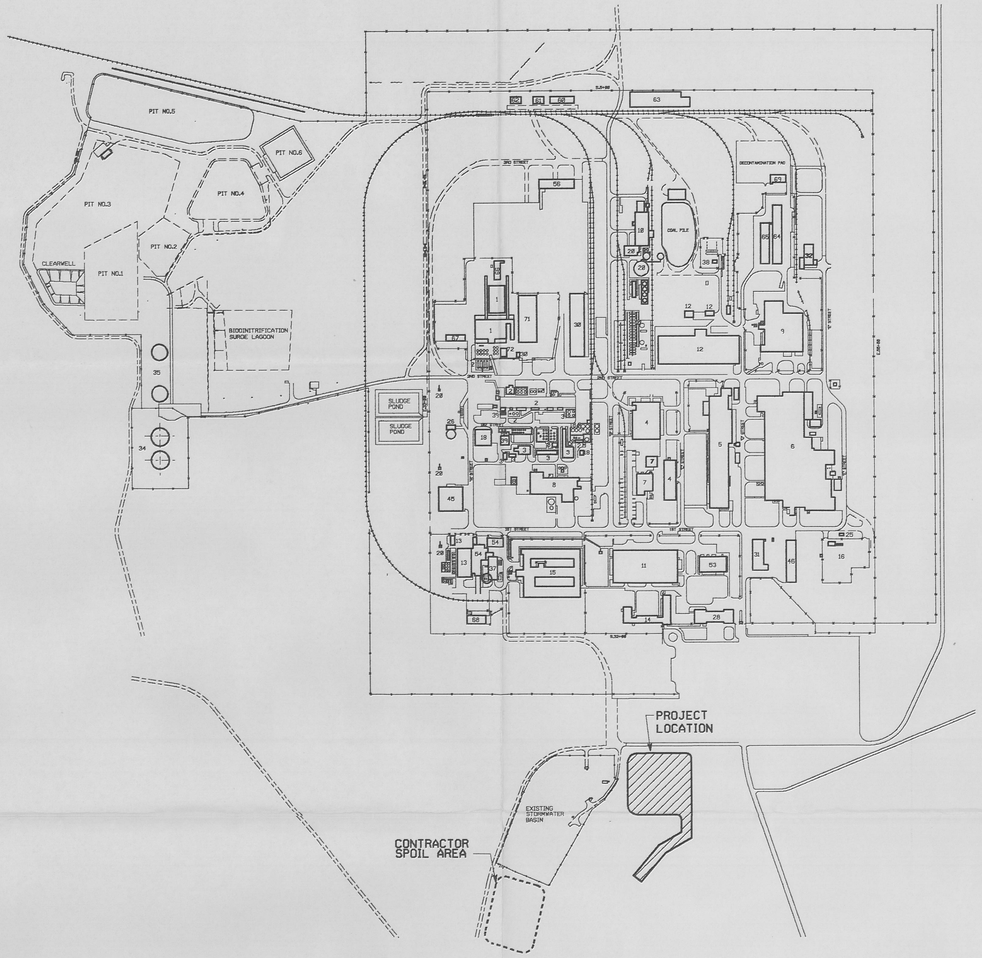
PROJECT NO.	DRAWING NUMBER	REV. NO.
83-D-146	18B-1920-S-00354	0

3002

A&E SUPPLY CO. 58411

STORMWATER RETENTION BASIN EXPANSION

FEED MATERIAL PRODUCTION CENTER
FERNALD, OHIO



FMPC - PROJECT LOCATION MAP

SCALE: 1"=300'

DRAWING INDEX

C001	PROJECT LOCATION AND DRAWING INDEX
C002	SITE LAYOUT PLAN
C003	GRADING & DRAINAGE PLAN
C004	UTILITY PLAN
C005	BASIN SECTIONS
C006	DRAINAGE CHANNEL RELOCATION PLAN & DETAILS
C007	FLEXIBLE MEMEBRANE LINER DETAILS
C008	INSPECTION SUMP DETAILS
C009	MISCELLANEOUS FENCING, SAFETY, AND SIGNING DETAILS
C010	STORMWATER STRUCTURE DETAILS - 1 OF 2
C011	STORMWATER STRUCTURE DETAILS - 2 OF 2

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
PROJECT LOCATION AND DRAWING INDEX 75

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
A.MCCLANAHAN	9/87	A.MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	1	48	49	50	TYPE	CLASS
FMPC	-	-	1"=300'	3	C	P	T	P	U

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

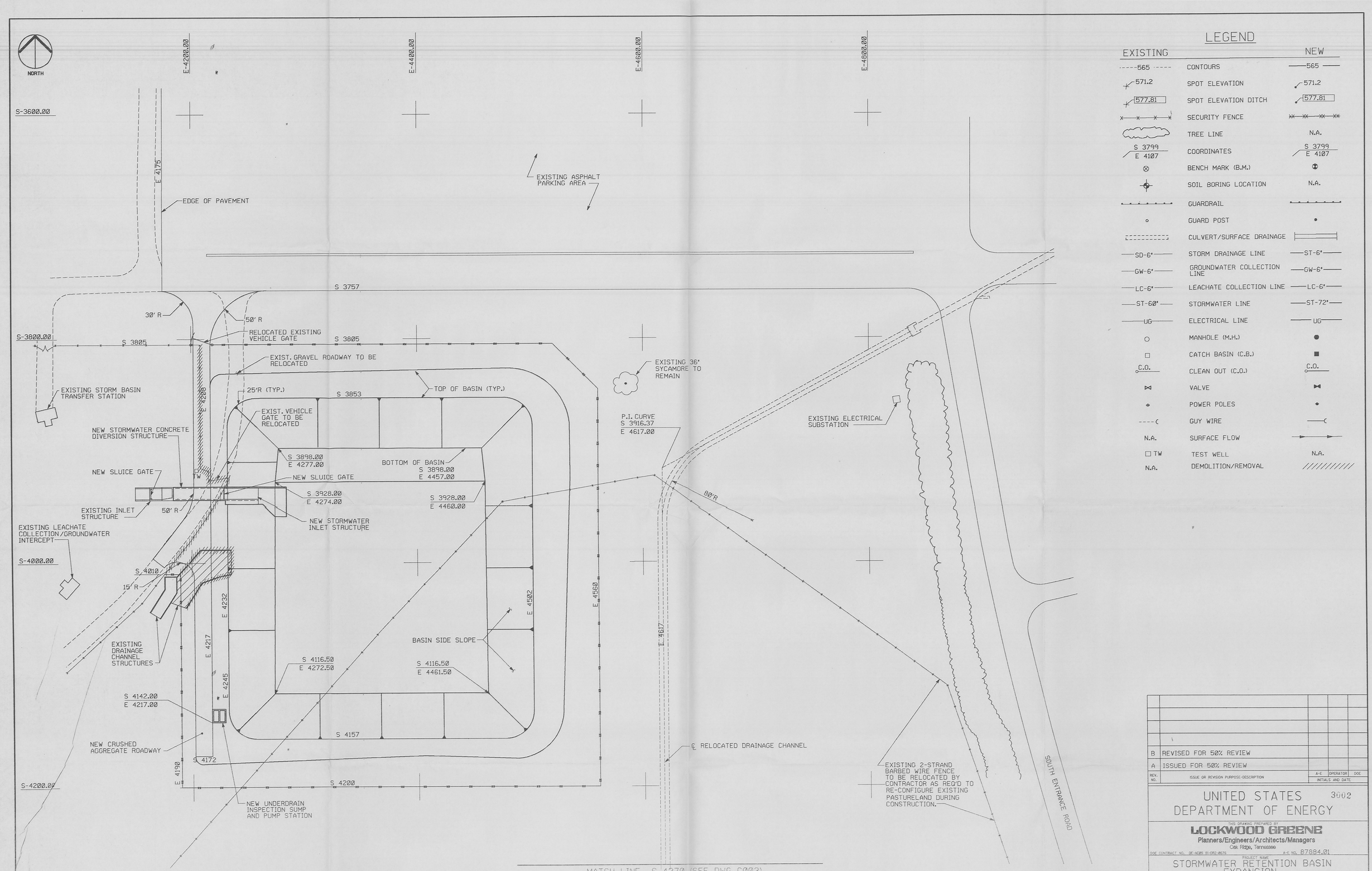
A-E DATE | OPERATING CONTRACTOR DATE | DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C001	B

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY, COMPLETENESS OR USEFULNESS OF THE INFORMATION OR STATEMENTS CONTAINED IN THESE DRAWINGS, OR THAT THE USE OR DISCLOSURE OF ANY INFORMATION, APPARATUS, METHOD OR PROCESS DISCLOSED IN THESE DRAWINGS MAY NOT INFRINGE ON THE PRIVATE RIGHTS OF OTHERS, NO LIABILITY IS ASSUMED WITH RESPECT TO THE USE OF, OR FOR DAMAGES RESULTING FROM THE USE OF ANY INFORMATION, APPARATUS, METHOD OR PROCESS DISCLOSED IN THESE DRAWINGS. DRAWINGS MADE AVAILABLE FOR INFORMATION TO BIDDER ARE NOT TO BE USED FOR OTHER PURPOSES, AND ARE TO BE RETURNED UPON REQUEST OF THE FORWARDING CONTRACTOR.

3002



SITE PLAN
SCALE 1"=30'

LEGEND

EXISTING		NEW
565	CONTOURS	565
571.2	SPOT ELEVATION	571.2
577.81	SPOT ELEVATION DITCH	577.81
	SECURITY FENCE	
	TREE LINE	N.A.
S 3799 / E 4107	COORDINATES	S 3799 / E 4107
	BENCH MARK (B.M.)	
	SOIL BORING LOCATION	N.A.
	GUARDRAIL	
	GUARD POST	
	CULVERT/SURFACE DRAINAGE	
SD-6"	STORM DRAINAGE LINE	ST-6"
GW-6"	GROUNDWATER COLLECTION LINE	GW-6"
LC-6"	LEACHATE COLLECTION LINE	LC-6"
ST-60"	STORMWATER LINE	ST-72"
UG	ELECTRICAL LINE	UG
	MANHOLE (M.H.)	
	CATCH BASIN (C.B.)	
C.O.	CLEAN OUT (C.O.)	C.O.
	VALVE	
	POWER POLES	
	GUY WIRE	
N.A.	SURFACE FLOW	
TW	TEST WELL	N.A.
N.A.	DEMOLITION/REMOVAL	

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY

3002

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
SITE LAYOUT PLAN

76

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J. WATERS	9/87	A.MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	44	45	50	TYPE	CLASS
FMPC	-	-	1"=30'	3	C	P	T P	U

SUBMITTED FOR APPROVAL — A-E — DATE
APPROVAL RECOMMENDED — OPERATING CONTRACTOR — DATE
DRAWING APPROVED — DOE — DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C002	B

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

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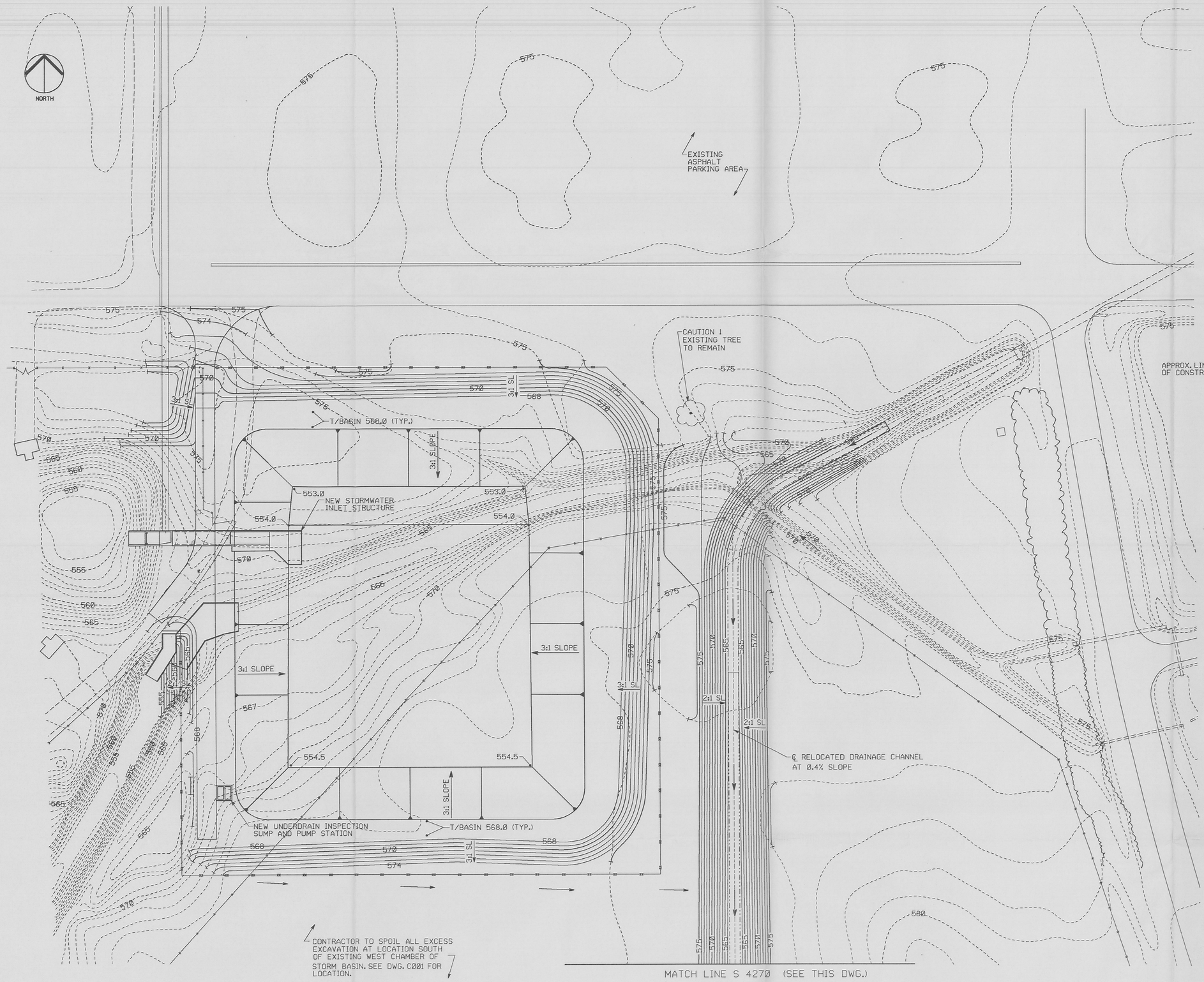
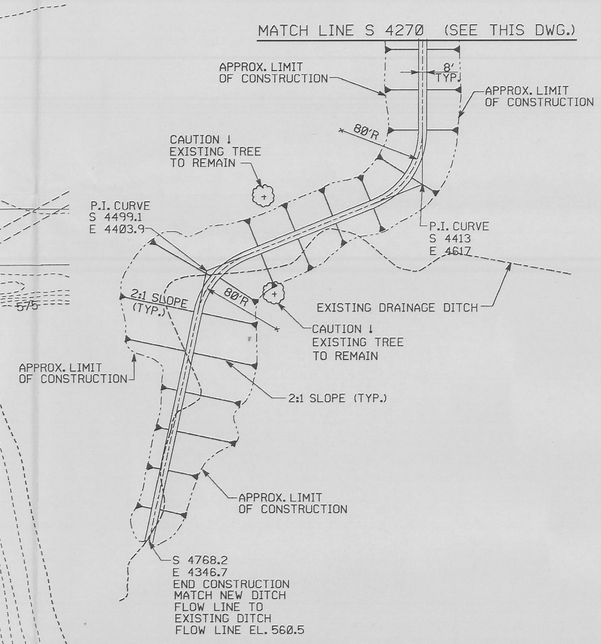


GRADING PLAN
SCALE: 1"=30'

GENERAL NOTES



DRAINAGE CHANNEL LAYOUT PLAN
SCALE: 1"=60'

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

INITIALS AND DATE

3002

UNITED STATES DEPARTMENT OF ENERGY

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05-81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
GRADING AND DRAINAGE PLAN 77

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J. WATERS	9/87	A.MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	1	48	49	50	TYPE	CLASS
FMPC	-	-	1"=30'	3	C	P	T	P	U

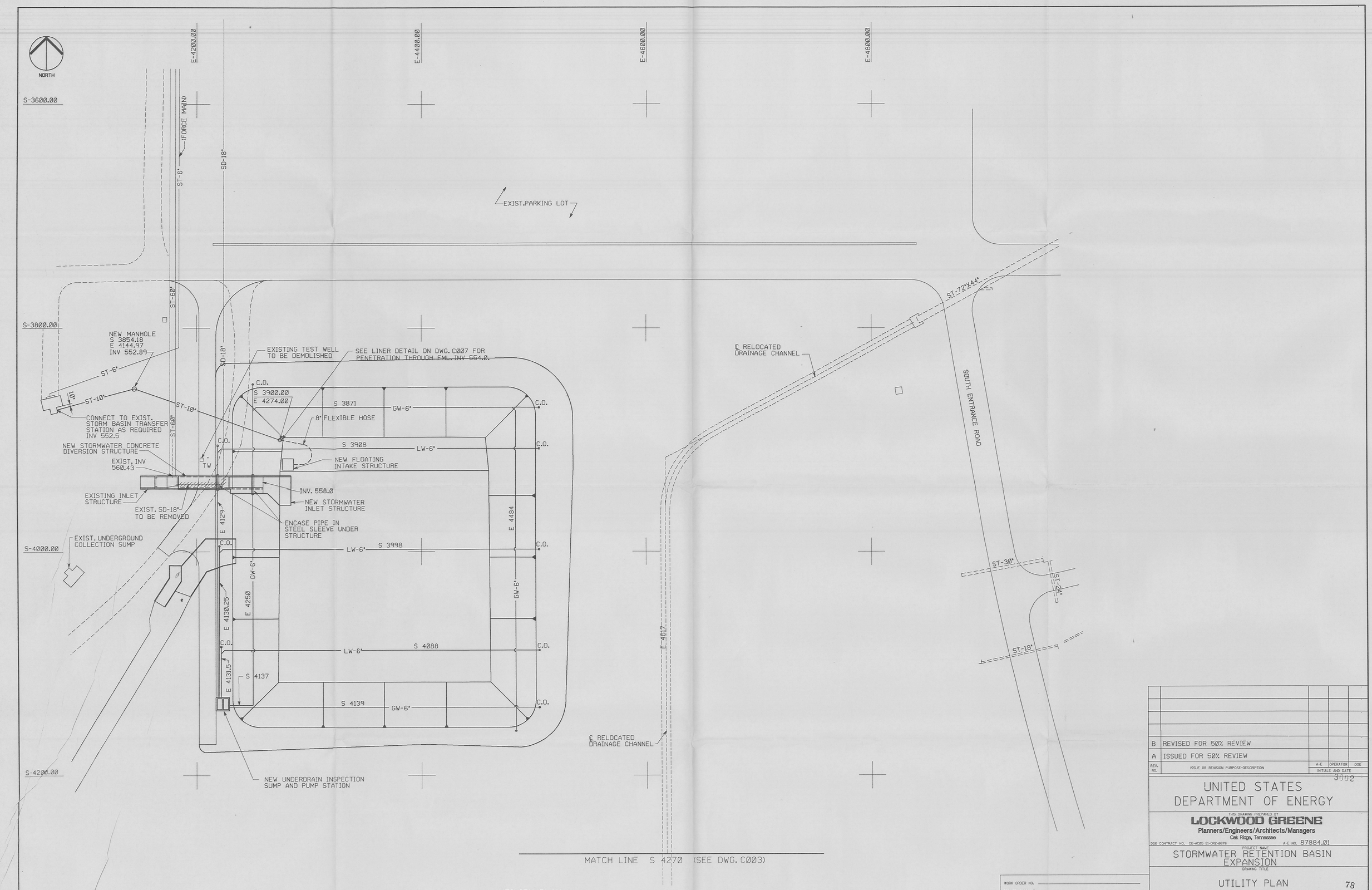
SUBMITTED FOR APPROVAL — A-E — DATE
APPROVAL RECOMMENDED — OPERATING CONTRACTOR DATE
DRAWING APPROVED — DOE — DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C003	B

3002

PRE NAME: I7884030 JEFF WATERS 15:43:12 29-SEP-87

FILE NAME DS4:[100,135]8788401C.003



UTILITY PLAN
SCALE: 1"=30'

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

INITIALS AND DATE

3002

UNITED STATES
DEPARTMENT OF ENERGY

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-80776 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
UTILITY PLAN 78

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J. WATERS	9/87	A.MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	1	48	49	50	TYPE	CLASS
FMPC	-	-	1"=30'	3	C	P	T	P	U

SUBMITTED FOR APPROVAL — A-E DATE
APPROVAL RECOMMENDED — OPERATING CONTRACTOR DATE
DRAWING APPROVED — DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C004	B

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

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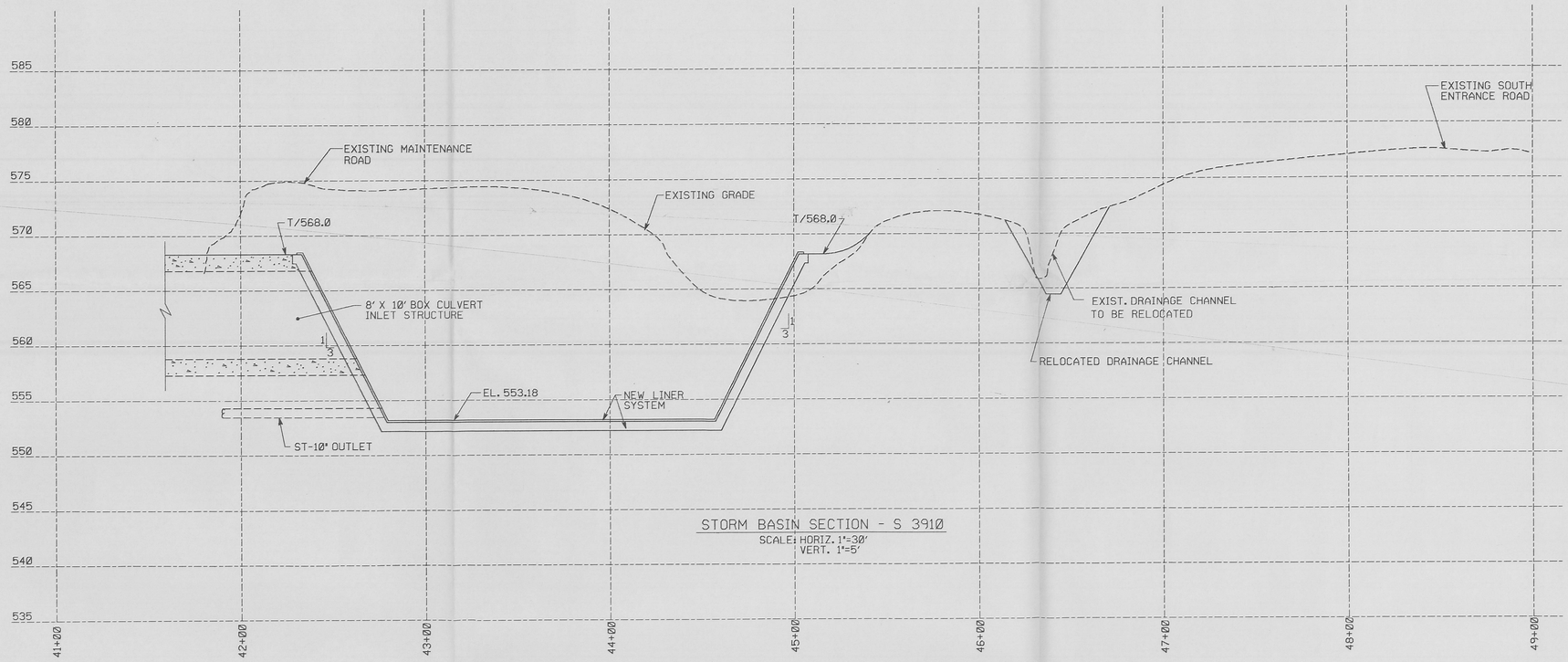
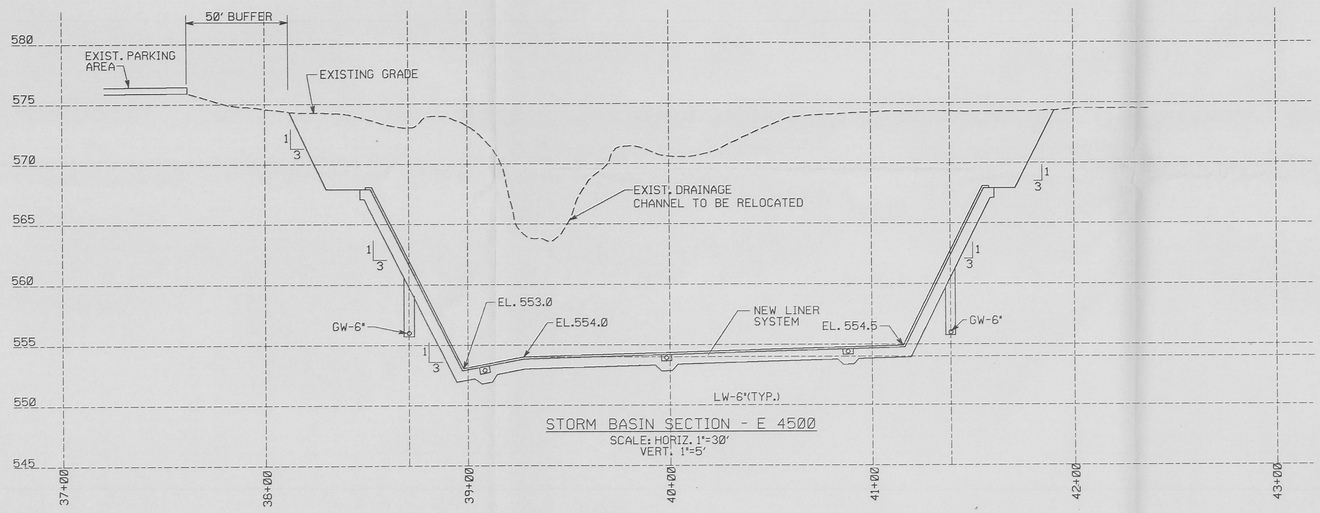
3002



STORM BASIN SECTION - S 3910

SCALE: HORIZ. 1"=30'
VERT. 1"=5'



STORM BASIN SECTION - E 4500

SCALE: HORIZ. 1"=30'
VERT. 1"=5'

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
		INITIALS AND DATE		
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

UNITED STATES
DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
BASIN SECTIONS 79

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J. WATERS	9/87	A.MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	3	46	49	50	TYPE	CLASS
FMPC	-	-	NOTED	3	C	P	T	P	U

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

A-E DATE | OPERATING CONTRACTOR DATE | DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C005	B

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

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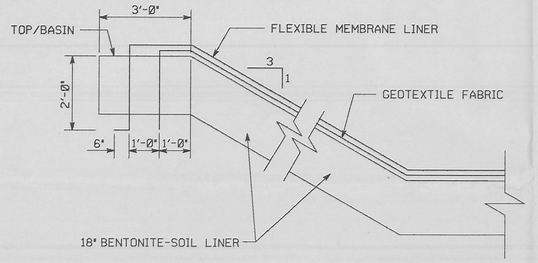
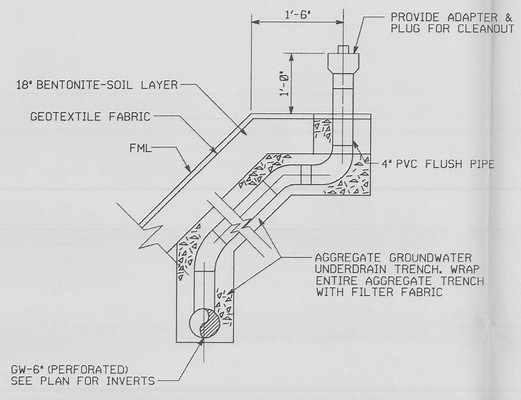
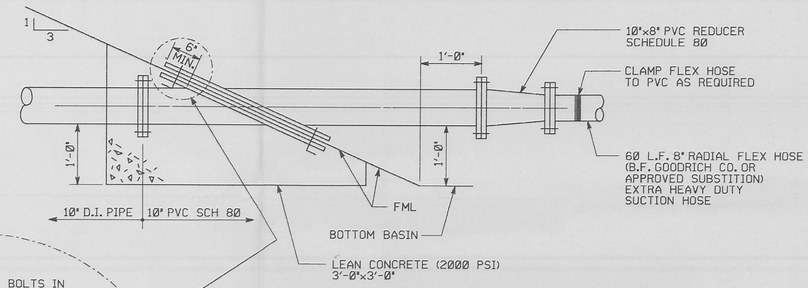
FILE NAME DS4:[100.13618788401C.011



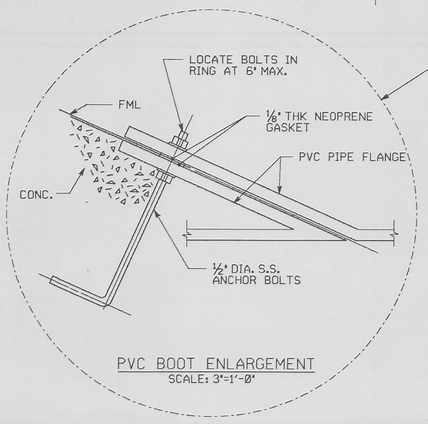
TYPICAL FLEXIBLE MEMBRANE LINER DETAIL
NOT TO SCALE



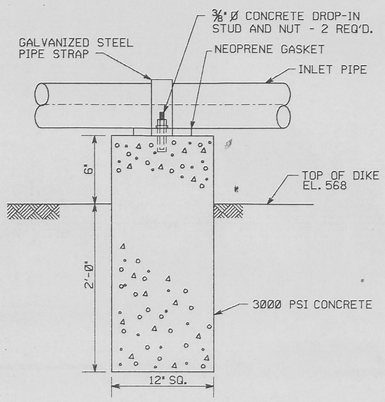
TYPICAL GROUNDWATER COLLECTION TRENCH DETAIL
NOT TO SCALE



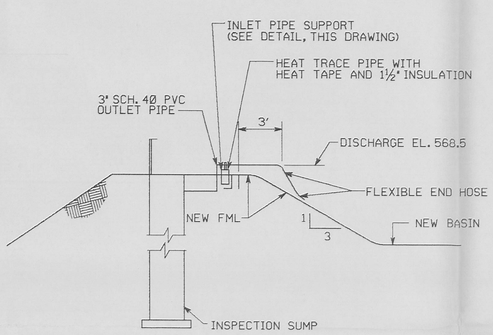
OUTLET PIPE PENETRATION DETAIL
SCALE: 1"=1'-0"



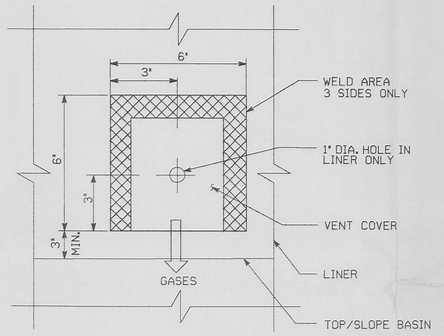
PVC BOOT ENLARGEMENT
SCALE: 3"=1'-0"



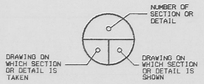
INLET PIPE SUPPORT DETAIL
NOT TO SCALE



INSPECTION SUMP OUTLET DETAIL
NOT TO SCALE



TYPICAL GAS VENT DETAIL
NOT TO SCALE



SECTION & DETAIL KEY

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
		INITIALS AND DATE		
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

3002

UNITED STATES
DEPARTMENT OF ENERGY

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
FLEXIBLE MEMBRANE LINER DETAILS 80

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

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OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
J. WATERS	9/87	A. MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	1	48	49	50	TYPE	CLASS
FMPC	-	-	NOTED	3	C	P	T	P	U

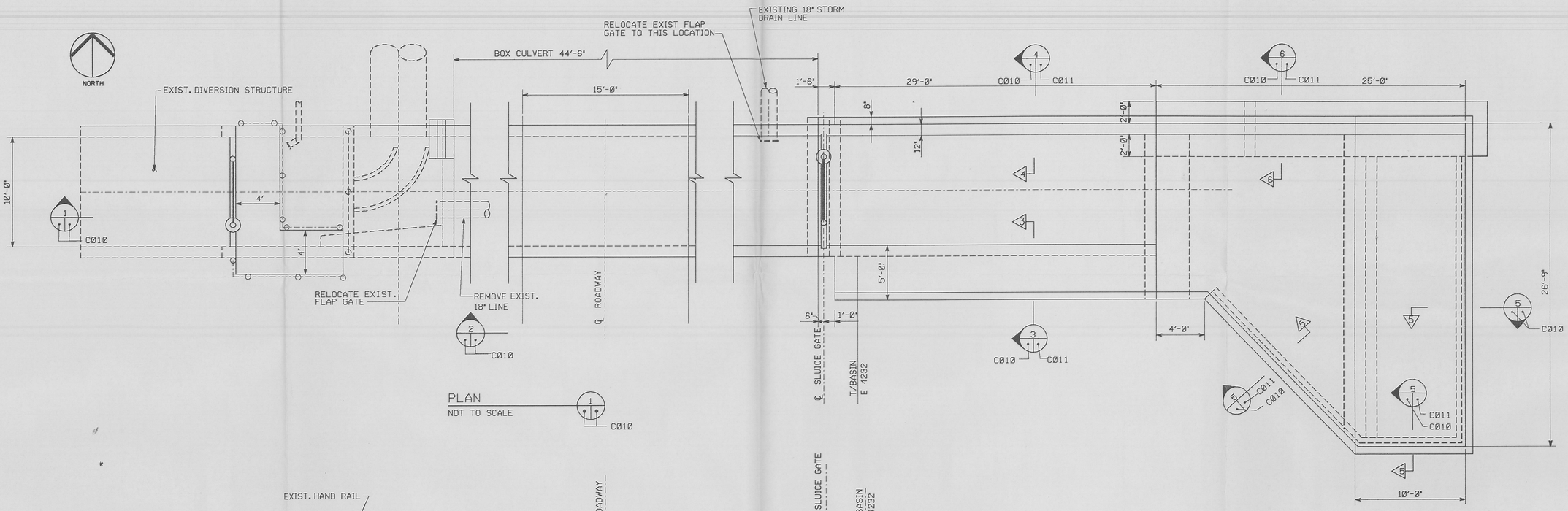
SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E DATE	OPERATING CONTRACTOR DATE	DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C007	B

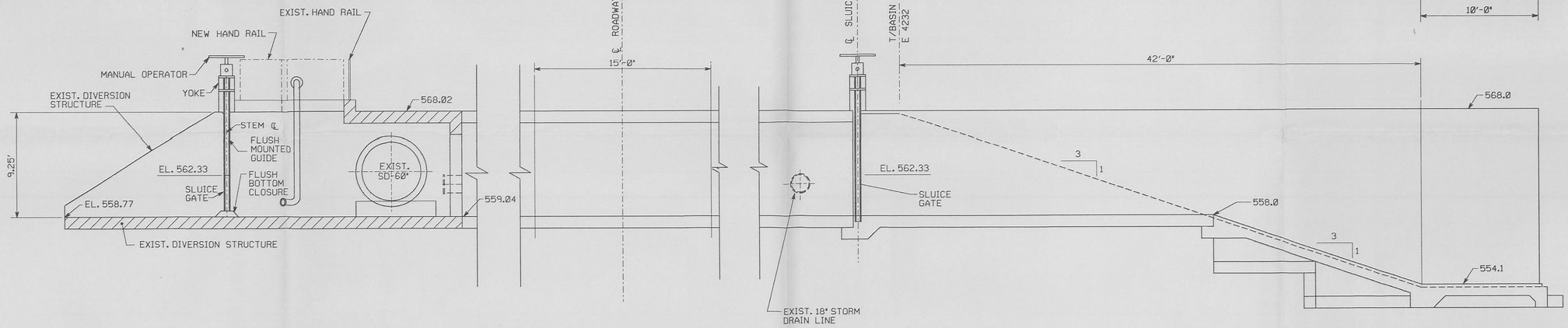
3002

PRF NAME: I788407C JEFF WATERS 11:14:45 29-SEP-87

FILE NAME OS4:[100.13518788401C.007



PLAN
NOT TO SCALE



SECTION
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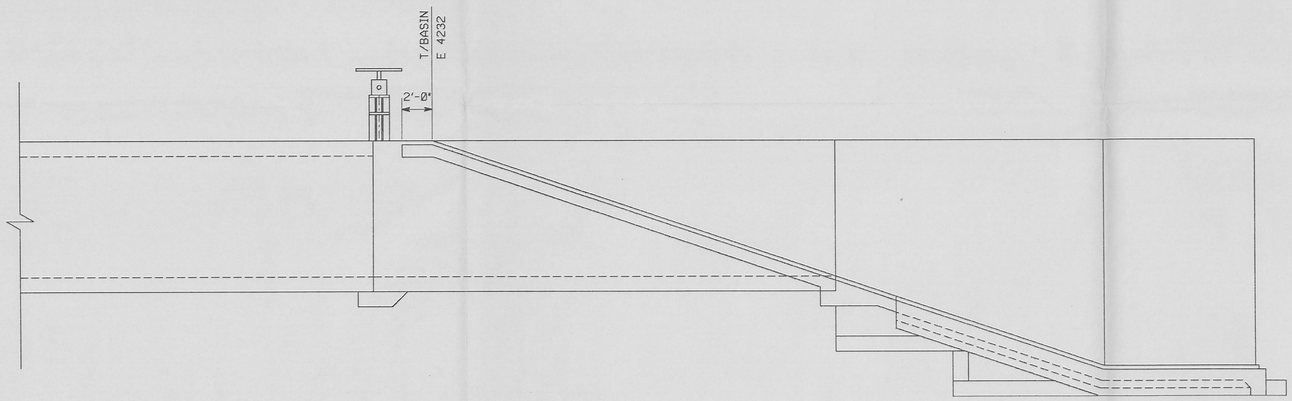

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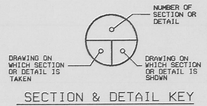

SECTION & DETAIL KEY

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
INSTALLATION BY

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REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
		INITIALS AND DATE		
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

3002

UNITED STATES
DEPARTMENT OF ENERGY

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05-81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION

DRAWING TITLE
STORMWATER STRUCTURE DETAILS-1 OF 2

81

OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
R. TAYLOR	9/87	A. MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	1	48	49	50	TYPE	CLASS
FMPC	-	-	NOTED	3	C	P	T	P	U

SUBMITTED FOR APPROVAL | APPROVAL RECOMMENDED | DRAWING APPROVED

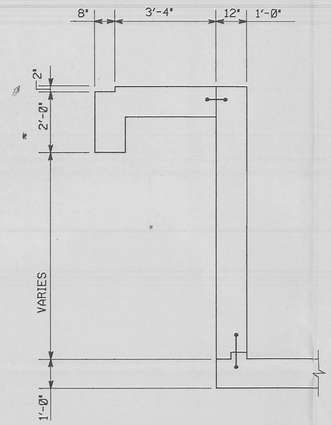
A-E DATE | OPERATING CONTRACTOR DATE | DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C010	B

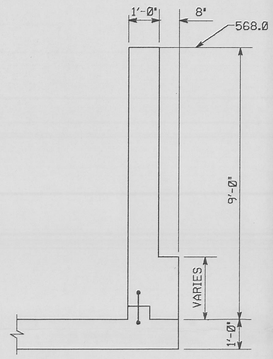
3002

PRF NAME: I78841 5C ROBIN TAYLOR 15:20:32 7-SEP-87

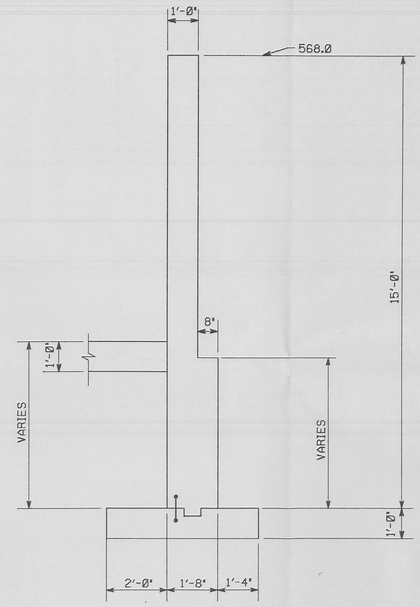
FILE NAME DS4:[100,135]87884 01C.015



DETAIL 3
SCALE: ½"=1'
C010 C011

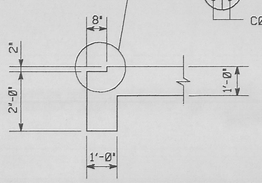


DETAIL 4
SCALE: ½"=1'
C010 C011

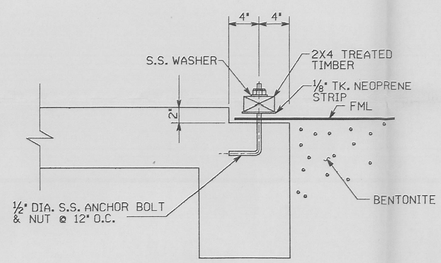


DETAIL 6
SCALE: ½"=1'
C010 C011

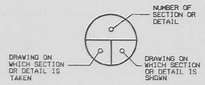
DETAIL B
C011



DETAIL 5
SCALE: ½"=1'
C010 C011



ANCHOR DETAIL B
NOT TO SCALE



SECTION & DETAIL KEY

REV. NO.	ISSUE OR REVISION PURPOSE-DESCRIPTION	A-E	OPERATOR	DOE
B	REVISED FOR 50% REVIEW			
A	ISSUED FOR 50% REVIEW			

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY 3002

THIS DRAWING PREPARED BY
LOCKWOOD GREENE
Planners/Engineers/Architects/Managers
Oak Ridge, Tennessee

DOE CONTRACT NO. DE-AC05 81-OR2-8676 A-E NO. 87884.01

PROJECT NAME
STORMWATER RETENTION BASIN EXPANSION 82

DRAWING TITLE
STORMWATER STRUCTURE DETAILS-2 OF 2

WORK ORDER NO.
2ND NO. ACCOUNT
PROCUREMENT BY
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OPERATING CONTRACTOR CODE

DRAWN BY	DATE	DESIGNED, CHECKED BY	DATE	CHECKED BY	DATE
R. TAYLOR	9/87	A. MCCLANAHAN	9/87		

PLANT	BLDG.	FLOOR	SCALE	I	49	49	SO	TYPE	CLASS
EMPC	-	-	NOTED	3	C	P	T	P	U

SUBMITTED FOR APPROVAL	APPROVAL RECOMMENDED	DRAWING APPROVED
A-E DATE	OPERATING CONTRACTOR DATE	DOE DATE

PROJECT	WORK ORDER NO.	DRAWING NUMBER	REV. NO.
		C011	B

3002