PHILIP ENVIRONMENTAL

Industrial Services Group
Midwest Region

January 7, 1999
Project 20178

Mr. David E. Mosby
Environmental Specialist
Missouri Department of Natural Resources
Division of Environmental Quality
205 Jefferson Street
Jefferson City, Missouri 65101

Dear Mr. Mosby:

Subject: Revisions to the Soil Remediation Design Plans and Specifications and Related Plan Documents - Wainwright Operable Unit - Valley Park, Missouri

On behalf of Wainwright Industries, Inc. (Wainwright), Philip Services Corporation (Philip) submits for your approval an addendum to the previously submitted plans for the ex situ soil vapor extraction system. The addendum includes design documents and related plans to reflect the currently proposed steam injection process as the proposed remedial action. A brief summary of the major document revisions that are required is included in the addendum included in Attachment 1.

If you have any questions or require additional information, please contact me at (618) 281-7173.

Sincerely yours,
PHILIP SERVICES – INDUSTRIAL SERVICES GROUP

Dale E. Markley

Dale E. Markley.
Technical Project Manager

MWM/eu/STEAMLET.DOC

Attachment: Addenda for Soil Remediation Plans

cc: Nelson Wainwright II
Steve Auchterlonie, USEPA

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→ Received 1-11-99, reviewed

→ Call Dave
1) ESD?
2) Move treatment area

→ Call till next week (1-19)

→ air emission modelling?
→ " " threshold
→ # soil samples/batch
→ storage of treated soil waiting analysis results

→ size of open hole during treatment
→ amount of excavated soil waiting treatment.
→ Soil treatment tip (pre-treatment soil storage) next to neighbors' properties

→ ESD or not → MDNE decision.

ADDENDUM TO EXCAVATED SOIL TREATMENT PLANS, SPECIFICATIONS, AND SUPPORTING DOCUMENTATION
WAINWRIGHT OPERABLE UNIT
VALLEY PARK, MISSOURI

January 7, 1999

REQUIRED REVISIONS TO SUPPORT STEAM INJECTION TECHNOLOGY

The following revisions are provided to the design plans and specifications, and supporting plans and documentation originally prepared for the ex-situ vapor extraction (ESVE) system for implementation of the steam injection technology.

Performance Standard Verification Plan, 5/29/98: (and corresponding sections of Addendum 2, 9/11/98)

The following sections of the report are revised:

- Section 3.2 Soil Vapor Extraction Treatment Cells: The soil sampling procedures, and soil criteria to be monitored for the steam process will be performed as applicable to this process. The revised procedures for sampling are to collect soil samples from the first three batches (approximately 7-8 cubic yards per batch) that are treated and analyze for tetrachloroethylene (PCE) and trichloroethylene (TCE). Thereafter, one sample per 100 cubic yards of treated soil will be collected and analyzed for PCE and TCE.

- Section 6.2 Ex Situ/In Situ SVE Treatment System Emissions Monitoring: The air monitoring objectives, air sampling procedures, and criteria for carbon changeout are modified as follows:

  - Objectives: compliance of untreated emissions with emission limits will not be evaluated since vapor-phase carbon treatment will be utilized for the duration of this operation.

  - Sampling Procedures: The methods for collection and analysis of emission samples remains unchanged. Concurrent with collection of samples for laboratory analysis, field measurement of emissions using a PID will also be conducted. The frequency of sample collection will be daily for the first week of operation. Thereafter, samples will be collected on a lesser frequency based on evaluation of results, but not less often than weekly.

  - Changeout Criteria: No change.

- Section 7 Reporting Procedures: The revisions include:
  - Replacement of ESVE treatment cell results with results for soil treatment batches.
  - Replacement of ESVE emission results with steam injection process emission results.
- Appendix A Analytical Methods: The same analytical methods are planned.

Construction Quality Assurance Plan, 5/29/98: Replace reference to ESVE system with steam injection system.

Quality Assurance Project Plan – Addendum 2 to Appendix D, 9/11/98: : Replace reference to ESVE system with steam injection system.

Operation and Maintenance Plan (Ex Situ Vapor Extraction System), 5/29/98: An O &M plan for steam injection will be available onsite. The short duration of treatment by this process means less concern over long-term operational issues.

Health and Safety Plan Addendum, 9/4/98: Delete CO monitoring and safety issues regarding soil handling in the building, since all soil handling and treatment will now be conducted outside. Health and safety issues relating specifically to the steam injection process will be provided as a supplement to the existing H&S Plan.

Flooding Contingency Plan Addendum: Delete reference to ESVE design and operation components. Contingency measures relating to the excavation and exterior piles remains unchanged. Add the following contingency procedures for the steam injection operation:

- Shut down all steam injection equipment and remove from the site, including carbon units, boiler fuel supplies, and other ancillary systems.

Plans and Specifications, Ex-Situ Soil Vapor Extraction Treatment, 5/29/98: Replace reference to ESVE system with steam injection system.

- Section 3 Remediation Objectives: The remediation objectives will remain the same but the duration of on-site time to complete treatment is much shorter. The estimated duration for soil treatment is 12 to 15 days, based on a production rate of 35 to 40 cubic yards per day.

- Section 4 Ex-Situ Vapor Extraction System: This section is replaced with the attached information on steam injection system.

- Section 5 Treatment Building: This section is not needed since all soil handling and treatment activities are conducted outside. Heating and ventilation provisions, specifically for the GET system, are reduced due to elimination of soil pile in building.)

- Section 7 Site Restoration: Delete the apron/driveway provisions. Long-term driveway access to the building and other ESVE-related equipment is no longer needed. The ESVE dismantling provisions are no longer applicable. Upon completion of treatment utilizing the steam injection process, all equipment will be demobilized from the site.

- Section 8 Permits: The submittal of air permit (or waiver) information will need to include information on the boiler combustion operation. A permit for operation of a combustion device may be required.

- Section 12: Electrical Service Connections: Delete this section. The mobile steam injection process equipment will only require hookup or plug in to available electrical power.

- Section 19.1 Excavation: The following changes shall apply to this section.

  Temporary Storage of Impacted Soils : delete from first sentence … then for conditioning/preparation for subsequent placement onto the ESVE containment.

  Replace …60-mil HDPE liner underlain by Type I geotextile, and two-layer cover of 10-mil visqueen.. with … 45-mil polyethylene liner and covered using 4-mil plastic sheeting.

  Replace 1-ft high sandbag berm … with 1-ft high berm.

  Containment Pile Soil Preparation/Placement: Delete paragraphs 1, 3, 4, 5, 6, and 7. Conditioning of the soil will no longer be needed since a soil pile will not be constructed.

- Section 19.2 Containment Access for Treated Soil Removal: Delete this section. The ESVE containment system will no longer be constructed or utilized.

- Section 21 System Startup: Delete this section. Documentation pertaining to steam injection system startup will be provided at the site prior to start up.

- Section 22 System Operation: Delete this section. Documentation pertaining to steam injection operation and maintenance will be provided at the site prior to startup.

- Section 25 Work Schedule: Unchanged.

- Appendix A - Calculations: Delete. ESVE calculation are no longer applicable.

- Appendix B – Equipment Specifications: Delete. The specifications for ESVE-specific equipment are no longer applicable.

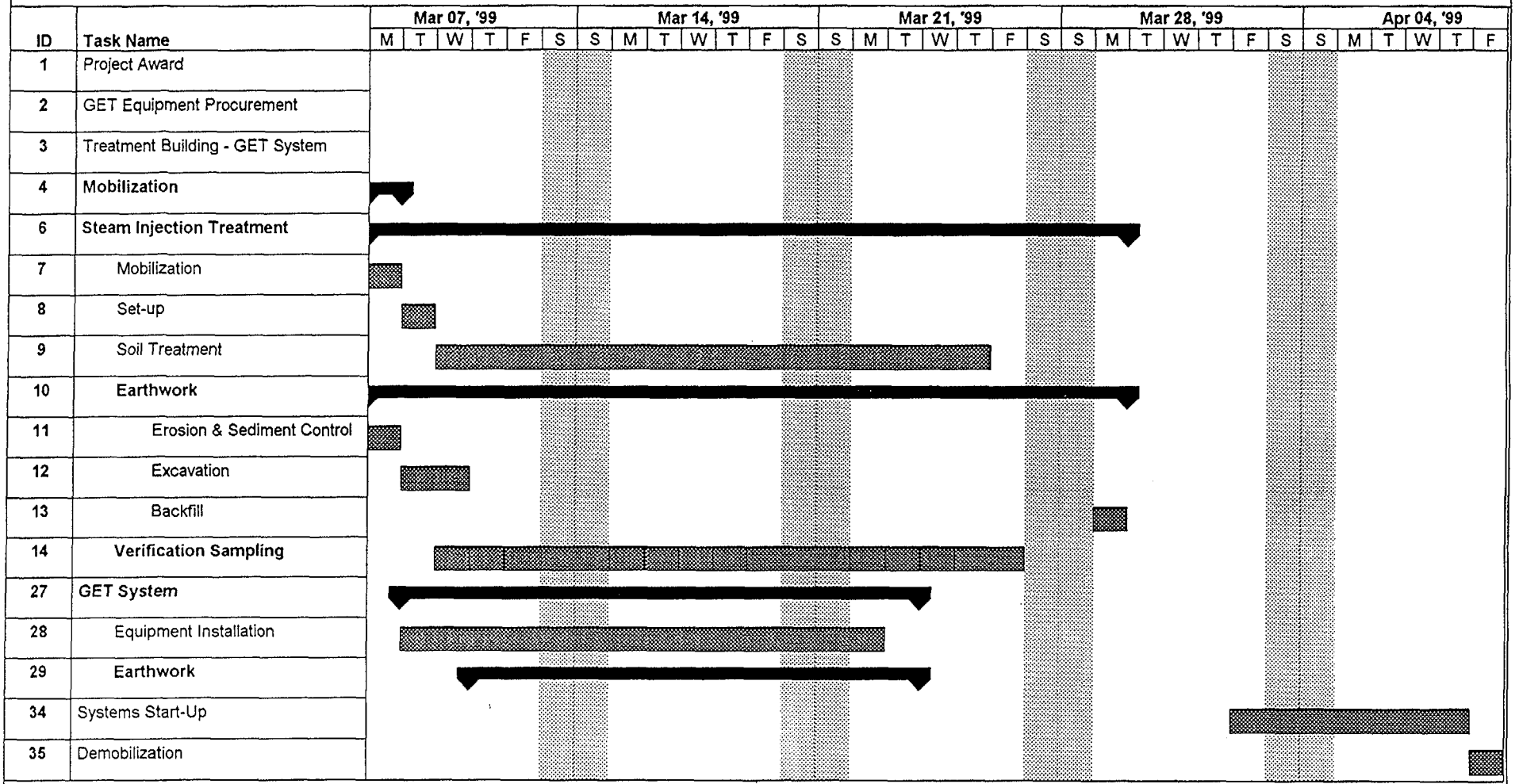
- Appendix C – General Installation/Construction Specifications: Delete Division 15 – Mechanical and Division 16 – Electrical. Construction of mechanical and electrical items will no longer be required for the steam injection process.

- Appendix D – Project Schedule: See attached Gantt Chart. This is a preliminary schedule subject to revision based on delivery of equipment and materials.

Revised Ambient Air Monitoring Plan, 9/10/98: The plan should not require revisions since the excavation activities are the same. The duration of air monitoring may be longer.

Preliminary

Steam Injection Treatment



Note: Project Award 12/09/98
Equipment Procurement
begins 1/04/99

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

STEAM INJECTION PROCESS
PROCESS DESCRIPTION
WAINWRIGHT OPERABLE UNIT
VALLEY PARK, MISSOURI

The steam injection process will be utilized to treat excavated impacted soil at the Wainwright site. The system consists of mobile trailer-mounted equipment that will be located in the north yard area of the site. (See revised drawing C-1.)

The system consists of two soil processor containers, condensers, heat exchangers, vapor-phase carbon units, condensate collection and treatment, and an oil-fired steam generator. The dual container configuration allows loading or unloading of one container while the second container is being treated.

Treatment consists of loading contaminated soil into one of the containers (approximately 7-8 cubic yard capacity), sealing the container, and injecting steam generated by the boiler through the soil. The steam heats the soil and volatilizes the contaminants. The steam, condensate, and contaminants are then removed from the container.

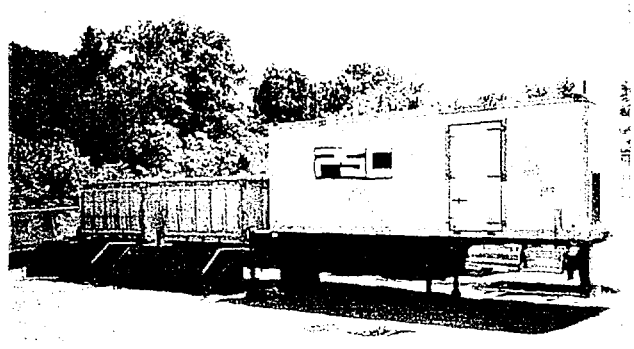
Contaminant-laden vapors exit the container, and pass through a condenser/cooler system to condense and remove steam and contaminants from the off-gas and reduce the gas temperature prior to carbon treatment. The condensed liquids are combined with condensate collected from the cooling system, and treated to allow recycling of boiler feed water back to the boiler.

The vapors that exit the cooling system then flow through vapor-phase carbon units that remove most of the remaining organic compounds. The relatively low flow exhaust stream is then emitted to the atmosphere.

Philip's Mobile Steam Injection Unit

The CleanSoil® process for soil remediation can be used in any situation where on-site treatment is the preferred alternative. By using this process, you eliminate:

- **Landfill Costs**
- **Transportation Expense and Liabilities**
- **Future Liabilities in Landfills**
- **The Need for Backfill**



The Remedial Process . . .

The CleanSoil® process is a patented process designed to clean soils at sites contaminated with hydrocarbons such as gasoline, diesel, kerosene, varsol, and solvents. The process is a highly-efficient mobile remediation method proven to be one of the most cost-effective methods for on-site cleaning. The term *Steam Injection* has been applied to this process.

The Equipment . . .

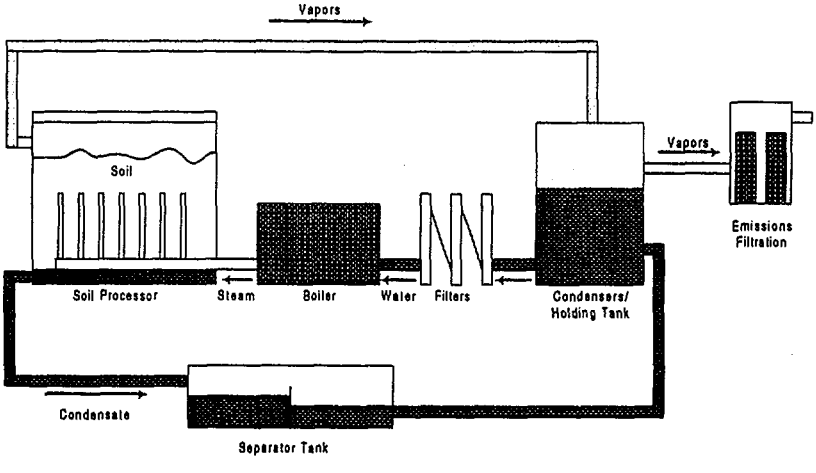
The equipment that comprises the CleanSoil® unit is mounted on a standard width, forty-five foot trailer. The trailer is mobilized to the site, the contaminated soil processed, and the remediated soil left on-site or removed. Each CleanSoil® unit consists of two eight-cubic yard processors. Each processor has an intermediate porous floor onto which the soil is loaded. Once loaded, each processor is closed and sealed, except for the vents.

The Treatment . . .

A boiler fueled with #2 fuel oil generates steam that is supplied through internal steel piping to each processor. The steam, by virtue of the proprietary design of the process, passes through the soil matrix and mobilizes the contaminants. Contaminants in the vapor phase are routed through condensers and the liquid is placed in a holding tank. Steam condensate from the bottom of the processor boxes is also directed into the holding tank. All liquids are then filtered through a multi-staged particulate and oilphillic filter system. The filtered water then travels to the water supply tank where it is recycled back to the boiler for future steam generation. This is a closed loop system. No discharge of liquid occurs. The contamination is removed while the soil, undamaged, can be beneficially reused or recycled.

Contaminants Treated . . .

- Benzene
- Chlorobenzene
- 1,2-Dichlorobenzene
- Chloroform
- 1,3-Dichlorobenzene
- Ethyl Benzene
- Methylene Chloride
- MEK
- Tetrachloroethene
- Toluene
- Trichloroethene
- Vinyl Chloride
- Xylene
- Solvents
- JP-4
- Diesel # 2
- Gasoline
- Kerosene
- Varsol



Process Diagram

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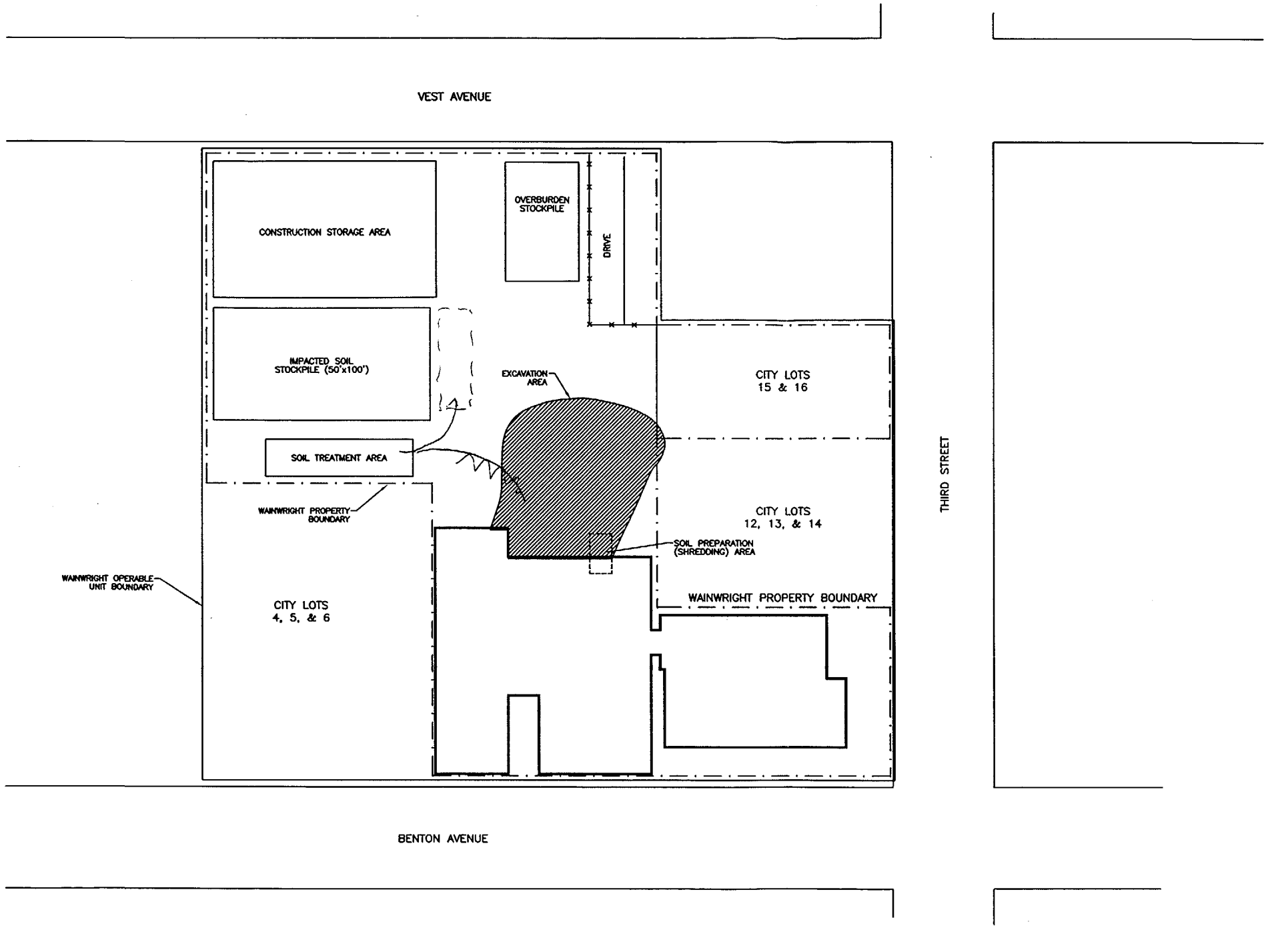
1440 SENS ROAD LAPORTE, TX 77571 800-449-1794 281-470-1388



LEGEND

— · — · — WAINWRIGHT PROPERTY BOUNDARY

——— WAINWRIGHT OPERABLE UNIT BOUNDARY

NO.	REVISION	BY	APPR.	DATE
△				

PSC PHILIP SERVICES CORP.

CLIENT

WAINWRIGHT INDUSTRIES, INC.

PROJECT TITLE

SOIL STEAM INJECTION PROCESS
WAINWRIGHT OPERABLE UNIT
VALLEY PARK, MISSOURI

SEAL

SHEET TITLE

SITE LAYOUT

DRAWN BY TMM	DATE 1/7/98	SCALE 1=25	
DESIGNED BY MWM			
CHECKED BY MWM	PROJECT NUMBER 16674	DRAWING NO. REVISED C-1	
APPROVED BY			

COL 166748-012