U.S. Army Corps of Engineers

Kansas City District
St. Louis District

DESIGN BASIS MEMORANDUM PHASES 4, 5, AND 6 FUSRAP ST. LOUIS AIRPORT SITE ST. LOUIS, MISSOURI

REVISION 0

Total Environmental Restoration
Contract No. DACA 45-96-D-0007

November 15, 2001

Stone & Webster, Inc.
110 James S. McDonnell Boulevard
Hazelwood, Missouri 80111

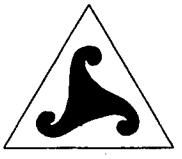
DESIGN BASIS MEMORANDUM
PHASES 4, 5, and 6
FUSRAP ST. LOUIS AIRPORT SITE
ST. LOUIS, MISSOURI

TOTAL ENVIRONMENTAL RESTORATION
CONTRACT NO. DACA 45-96-D-0007
TASK ORDER NO. KC 01

Submitted to:

Department of the Army
U.S. Army Engineer District, St. Louis
Corps of Engineers
FUSRAP Project Office
8945 Latty Avenue
Berkeley, Missouri

Submitted by:



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November 15, 2001

Revision 0

Reviewed/
Approved by: _____ **Date:** 11/13/01
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Reviewed/
Approved by: _____ **Date:** 11/15/01
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Engineering Manager

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LIST OF DRAWINGS

ATTACHMENTS

LIST OF ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate regulation
AREMA	American Railway Engineering and Maintenance-of-Way Association
bgs	below ground surface
CEMVS	US Army Corps of Engineers, St. Louis District
CFR	Code of Federal Regulations
COR	Contracting Officer's Representative
DBM	Design Basis Memorandum
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DQO	Data Quality Objectives
EM	Engineering Manual
EPA	U.S. Environmental Protection Agency
EE/CA	Engineering Evaluation/Cost Analysis
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FS/PP	Feasibility Study/Proposed Plan
FUSRAP	Formerly Utilized Sites Remedial Action Program
GDP	Grading and Drainage Plan
GFY	Government Fiscal Ycar
HEC	Hydraulic Engineering Calculation
LCY	Loose Cubic Yard
LSA	Low Specific Activity
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
mg/kg	milligram per kilogram
mrem	one thousandth of a rem
MSD	Metropolitan Sewer District
pCi/g	picoCuries per gram
PDI	Pre-Design Investigation
PP	Proposed Plan
Ra	Radium
RA	Removal Action
RAWP	Site Wide Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
rem	Roentgen Man Equivalent
ROD	Record of Decision
SLAPS	St. Louis Airport Site
SOR	Sum-of-Ratio
SSHP	Site Safety and Health Plan
SU	Survey Unit
USACE	U.S. Army Corps of Engineers
WMP	Water Management Plan

The following criteria and information are to be applied in the development of the design for Phases 4, 5, and 6:

1.0 CRITERIA

- The most restrictive of Alternative 2C of the Final *Engineering Evaluation/Cost Analysis (EE/CA) and Responsiveness Summary for the St. Louis Airport Site* (EE/CA) (CEMVS, 1998), the internal Draft *Feasibility Study for the St. Louis North County Site* (FS) (CEMVS, 2001a), the internal Draft *Feasibility Study for the St. Louis North County Site, Volume II: Appendices* (CEMVS, 2001b), and the internal Draft *Proposed Plan for the St. Louis North County Site* (PP) (CEMVS, 2001c) will be used for the evaluation of material to be excavated and removed from the St. Louis Airport Site (SLAPS). Soils from SLAPS that exceed the selected subsurface criteria i.e., below the top 6-inch layer of 15/15/50 pCi/g (respectively for Ra-226/Th-230/U-238) above background by Sum-of-Ratios (SOR) are to be excavated and disposed of at an appropriately permitted facility. Soils within the top 6-inch layer that exceed the 5/5/50 pCi/g above background (by SOR) are to be excavated and stockpiled for future use or disposed of similarly.

- The anticipated Record of Decision for the St. Louis North County Site (ROD) criteria will be taken into consideration for this design. The following information is summarized from Tables 4 and 5 on pages 38-39 of the internal Draft PP (CEMVS, 2001c) and are likely to be recommended.

Unrestricted Land Use Remediation Goals from the internal Draft PP (CEMVS, 2001c) are as follows:

Surface Criteria [0 to 15-cm below ground surface (bgs)] above background (by SOR) including Coldwater Creek Sediment.	5 pCi/g of Ra-226 14 pCi/g of Th-230 50 pCi/g of U-238 15 mg/kg of Antimony 36 mg/kg of Arsenic 2800 mg/kg of Barium 12 mg/kg of Cadmium 350 mg/kg of Chromium 1000 mg/kg of Molybdenum 1500 mg/kg of Nickel 300 mg/kg of Selenium 25 mg/kg of Thallium 150 mg/kg of Uranium 112 mg/kg of Vanadium
Subsurface Radionuclide Criteria above background (by SOR) for soils greater than 15-cm bgs including Coldwater Creek Sediment from 15-cm bgs to the mean water gradient.	15 pCi/g of Ra-226 15 pCi/g of Th-230 50 pCi/g of U-238
Subsurface Radionuclide Criteria for Coldwater Creek Sediment above background (by SOR) below the mean water gradient.	15 pCi/g of Ra-226 43 pCi/g of Th-230 150 pCi/g of U-238

Subsurface non-radionuclide criteria for soils greater than 15-cm bgs above background.	25 mg/kg of Antimony 40 mg/kg of Arsenic 30 mg/kg of Thallium 150 mg/kg of Uranium

- Supplement actions, which may lead to temporary tasks, are provided. These tasks are unlikely to apply to Phases 4, 5, and 6.

Remediation goals for use with institutional control at SLAPS:

Subsurface soil above background (by SOR)	25 pCi/g of Ra-226 70 pCi/g of Th-230 250 pCi/g of U-238 or combinations of radionuclides that could exceed the 100 mrem/year dose to a member of the critical group

Remediation goals for buildings, roads, bridges, and railroads including the use of institutional controls:

Subsurface soil above background (by SOR)	100 pCi/g of Ra-226 285 pCi/g of Th-230 1,775 pCi/g of U-238 or combinations of radionuclides that could exceed the 100 mrem/year dose to the construction or utility worker group.

- The selected action is disposal at an approved offsite facility.

- The quantity and location of soils below removal criteria will be evaluated. The technical and/or cost basis for the decision as to whether to segregate such soils will be incorporated into the design package.

- Chemical cleanup criteria will also be implemented as indicated in the internal Draft FS/PP to assure compliance with the upcoming ROD for the St. Louis North County Site.

- Design along James S. McDonnell Boulevard will be in accordance with the *Design Criteria for the Preparation of Improvement Plans*, Saint Louis County, Department of Highways and Traffic, March 1, 2000 and *St. Louis County Standard Specifications for Highway Construction*, Saint Louis County, Department of Highways and Traffic, January 1, 1997.

- Design along Norfolk Southern Railroad will be in accordance with Norfolk Southern's *Guidelines for Design and Construction of Privately Owned Industry Tracks* (NS, 2000), and the *2001 Manual for Railway Engineering,* American Railway Engineering and Maintenance-of-Way Association (AREMA, 2001).

2.0 ASSESSMENT OF EXISTING SITE INFORMATION

- Historical and Pre-Design Investigation (PDI) data are the basis for: delineation of the nature and extent of contamination; cut/fill sections; segregation of lobes of clean soil that may exist between contaminated soil; handling of potentially Resource Conservation and Recovery Act (RCRA) hazardous soils; estimating volumes of material to be transported to appropriate disposal facilities for potential cost savings; blending of higher contaminated soil with lower contaminated soil required to comply with transportation requirements; and safety and risk assessments and associated safety procedures. Contaminant distribution based on historical sampling in soils and ground water is also the basis for decisions regarding water that may enter excavations in each survey unit (SU). The control and segregation of excavation water may also influence the design cuts of any given SU.

- The *Pre-Design Investigation Summary Report, Phases 4, 5, and 6 Work Areas* (Stone & Webster, 2001a) that summarizes recent and historical data has been provided for work areas 4, 5, and 6. This summary will include an assessment of the accuracy of historical data and the impact of known or potential errors to include inconsistent data and borings that do not reach a depth at which SOR values were less than 1. Deficiencies with respect to data will also be addressed in the *Pre-Design Investigation Summary Report, Phases 4, 5, and 6 Work Areas* (Stone & Webster, 2001a).

3.0 REMEDIAL DESIGN

- The most recent revision of the SLAPS applicable or relevant and appropriate regulations (ARARs) are listed in the latest *Site Wide Removal Action Work Plan* (RAWP) (Stone & Webster, 2000a). These will be used until revised to include the requirements of the ROD.

- Remedial Design documents which will be submitted for U.S. Army Corps of Engineers (USACE) review and approval will include: the PDI Summary Report; the Design Basis Memorandum (DBM); the 60 percent design; the Revision 0, and Revision 0 Work Descriptions; and drawings which are unique to the Phases 4, 5, & 6 work areas. Design information, which is already provided in the latest RAWP, will not be repeated in the Work Descriptions for Phases 4, 5, & 6 except as necessary to address area specific conditions.

- Survey units will be delineated in the general sequence of work. Work methods will be consistent with those previously defined in the latest RAWP. Any new or special work methods will be defined.

- Cut lines and the resulting volumes are to be based on the contaminant extent defined from the *Pre-Design Investigation Summary Report, Phases 4, 5, and 6 Work Areas* (Stone & Webster, 2001a). As data gathered during investigations does not provide a 100 % accurate account of the contamination that may be encountered during Removal Actions (RAs), the design will address and describe uncertainties.

- Appropriate permits along with Federal Aviation Administration (FAA) airspace determinations for anticipated site work (Airspace Determination 00-ACE-193-NRA, & 195-197-NRA), Utility clearances (Missouri One Call needs to be contacted prior to work for a new confirmation number) and St. Louis County Highway Department permits will be identified in the design document.

- Data Quality Objectives (DQOs) for sampling are to be established during the design process of a given Work Area, with the statements leading to a Work Description for sampling.

4.0 SAFETY

- The latest *Site Safety and Health Plan* (SSHP) (Stone & Webster, 2001c) will be followed for each work area. Existing activity hazard analyses (AHAs) will be reviewed and referenced as applicable. Only new activities will require development of new AHAs.

- 29 Code of Federal Regulations (CFR) 1910 and 1926 and USACE guidelines [Engineering Manual (EM) 385-1-1 (USACE, 1996)] for soil sloping/shoring, with the factors of safety established from Stone & Webster Calculation No. 08602-KC01-064, will be used in the design of excavation plans. All data will be considered to determine sloping/shoring of excavations. The design will take into consideration previous excavation features, water management issues, and bottom of excavation as-builts.

- Air monitoring will assure compliance with the occupational dose limits specified in 10 CFR Part 20 Subpart C; compliance with the radiation dose limits for individual members of the public specified in 10 CFR Part 20 Subpart D; fugitive dust emissions and associated action levels in the latest SSHP. Off-hours dust control will use the same methodologies called out in the latest RAWP.

- As low as reasonably achievable (ALARA) will be applied for implementation of health and safety methods for worker protection and mitigation of environmental impacts during the RA. Remediation goals will also fully consider ALARA.

- Only new activities require additional AHAs. Existing AHAs will be referenced as applicable.

5.0 WATER MANAGEMENT

- Water management will comply with ARARs and the requirements of the most recent revision of the *Site Wide Water Management Plan* (WMP) (Appendix J of the latest RAWP) as well as field direction provided by USACE Contracting Officer's Representative (COR).

- All appropriate and required documentation for management and rerouting of Coldwater Creek will be identified in the design document and completed prior to the removal action. The need to prepare permit applications will be evaluated. Examples are: Metropolitan Sewer District (MSD) permit for relocating storm or sanitary sewer systems, Federal Emergency Management Agency (FEMA) permit for performing work in a flood plain, any additional requirements or ordinances from applicable cities/property owners.

- An appropriate design storm will be selected upon which to base the design of structures planned for Coldwater Creek. This selection will be made jointly with the USACE.

6.0 REMOVAL ACTION

- Initial gross excavation lines will be determined based upon historical and PDI data. They will be presented in the Phases 4, 5, & 6 Work Description and will be reviewed for appropriatc modification and be approved by USACE COR.

- Final status surveys will be based on the *Multi-Agency Radiation Survey and Site Investigation Manual* (MARSSIM), Revision 1, (DOD et al, 2000), and the *Radiological Final Status Survey Plan for the St. Louis Airport Site* (CEMVS, 1999). Potential pathways for contaminant migration (i.e. preferential pathways) will be evaluated and sampled as necessary to assure compliance with remediation goals.

- All offsite transport of contaminated soil is anticipated to be via rail. Gondolas will be used unless other packages (i.e. intermodal's) are required to comply with specific transportation or disposal requirements. The approximate loaded weight of soil per gondola for the current equipment is 218,000 lbs. (80 LCY/car). Once the SLAPS loadout is removed and no longer functional, the Eva Road loadout will be utilized to load railcars.

7.0 TRANSPORTATION AND DISPOSAL

- Packaging and shipping of SLAPS wastes will be in full compliance with Department of Transportation (DOT) requirements stated in 49 CFR with particular emphasis on those requirements contained within 49 CFR 171 through 178.

- USACE and Stone & Webster will jointly develop the approach of allocation of waste to a particular disposal facility based on the assessment of information in the *Pre-Design Investigation Summary Report, Phases 4, 5, and 6 Work Areas* (Stone & Webster, 2001a). Stone & Webster will specify in the design document, the process to be implemented for segregation of waste to be transferred to a specific disposal facility. Soil sampling occurs during excavation and stockpiling for actual characterization of shipments.

- The process used to blend higher contaminated soil with lower contaminated soil to meet transportation requirements, as appropriate, will be incorporated into design plans. Reference will be made to a detailed process included in the latest RAWP.

8.0 SITE RESTORATION

- Restoration of the area will be according to the latest RAWP, Section 7.9, and the *Grading and Drainage Plan, Revision 0* (GDP) (Appendix K of the latest RAWP). The design will address vegetation and other erosion control measures to minimize sedimentation transport off site.

- Backfill material will be material (silty/clay soils) from Fort Belle Quarry or other USACE approved borrow source. Requirements and specifications under the Excavation and Backfilling Section of Drawing RAWP-11 for compaction and additional requirements of the latest RAWP will be incorporated into the design.

- Design for Coldwater Creek Slopes will be in accordance with the specification, details, and HEC-2 analysis received from CEMVS on July 12, 2001 and confirmed September 13, 2001 (Project Record No. 12787).

9.0 REFERENCES

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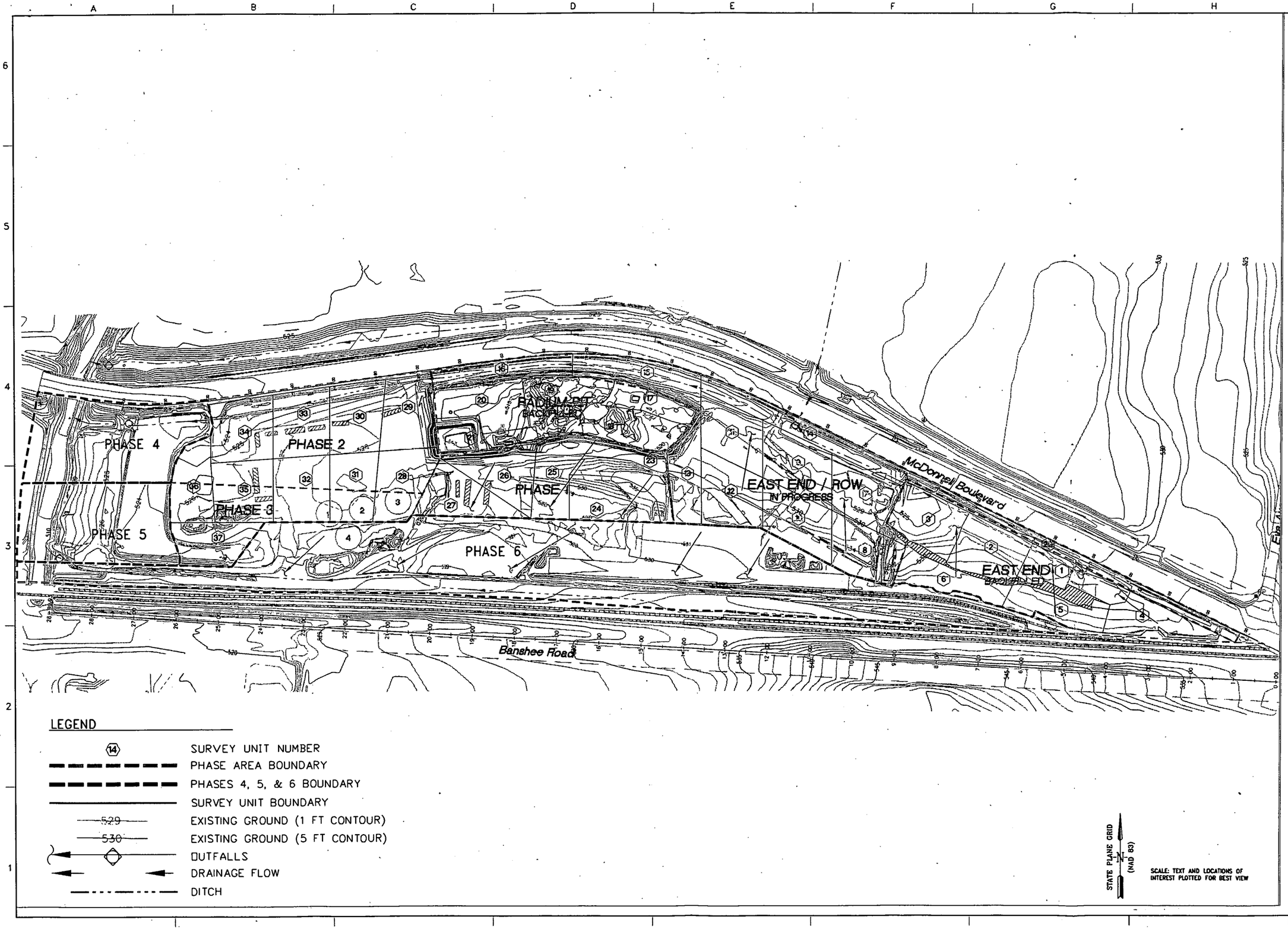
DRAWING

Phases 4, 5, and 6 Boundary



U.S. Army Corps of Engineers
ST. LOUIS DISTRICT

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A	ORIGINAL ISSUE	09/26/01	
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Revisions

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U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

FUSRAP

ST. LOUIS AIRPORT SITE
ST. LOUIS, MISSOURI

PHASES 4, 5, & 6 BOUNDARY

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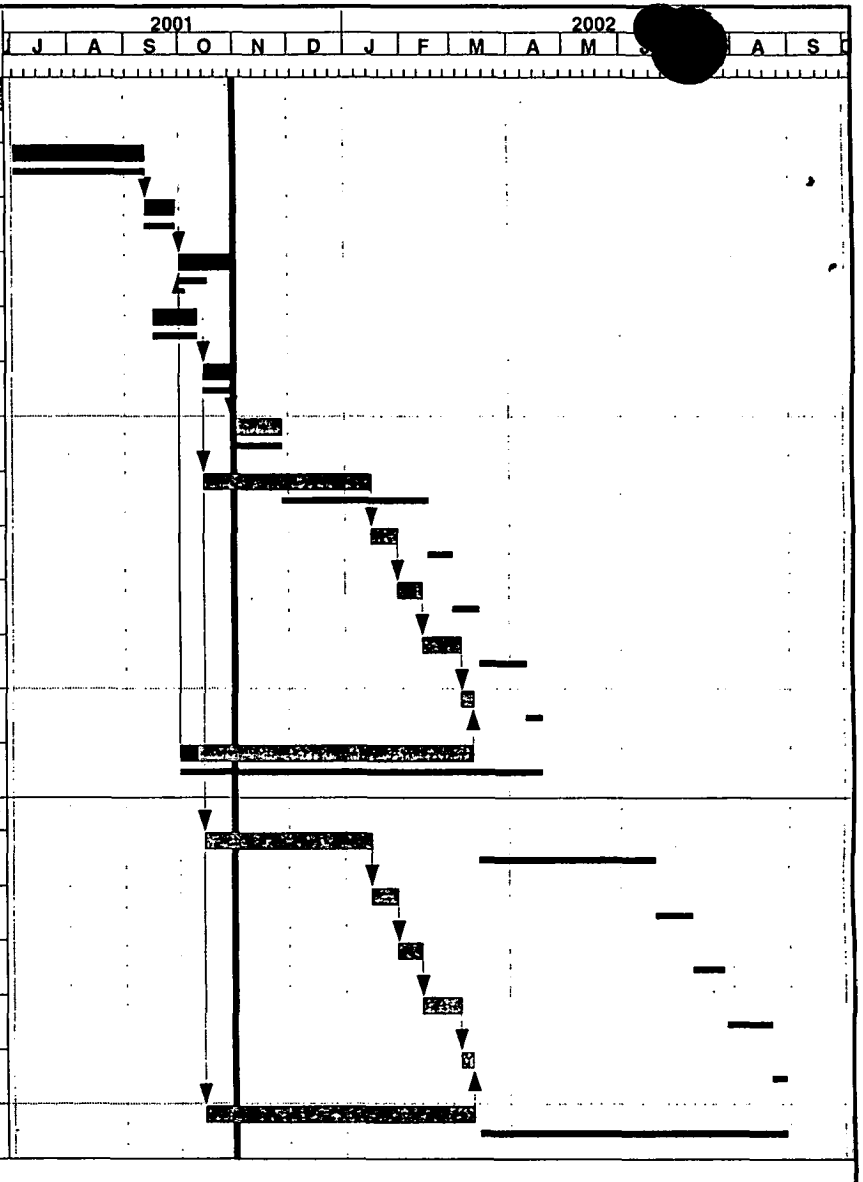
Project Number: 08603.300
Drawing Number: P4&5&6-QBM-1

ATTACHMENT

Phases 4, 5, and 6 Design Schedule

Activity Description	Activity ID	RESP	Orig Dur	Rem Dur	% Comp	Early Start	Early Finish
WADDS/SLAPS REMEDIAL DESIGN							
GFY02 Phase 4/5 (IA-1N/1S) Engineering 0510							
PDI Summary Report Rev. A PHS 4,5 & 6	SW03051001	SWE	46	0	100	02JUL01A	12SEP01A
PDI Summary Rpt Rev. A Review-COE PHS 4,5 & 6	SW03051002	COE	4	0	100	13SEP01A	28SEP01A
PDI Summary Rpt. Incorp Comments & Issue Rev. 0	SW03051003	SWE	10	0	100	01OCT01A	30OCT01A
Design Basis Memo, Rev. A PHS 4,5 & 6	SW03051004	SWE	16	0	100	17SEP01A	11OCT01A
Design Basis Memo Review-COE PHS 4,5 & 6	SW03051005	COE	9	0	100	15OCT01A	29OCT01A
DBM Incorp. Cmts & Issue Rev. 0 PHS 4,5 & 6	SW03051006	SWE	14	13	10	30OCT01A	26NOV01
RD-Phase 4 & 5 - 60% Intermediate Design	SW03051007	SWE	55	45	0	15OCT01A	14JAN02
RD-Phase 4 & 5 - 60% Design Review-COE	SW03051008	COE	10	10	0	15JAN02	28JAN02
RD-Phase 4 & 5 - 90% Design, Rev. A Work Plan	SW03051009	SWE	10	10	0	29JAN02	11FEB02
RD-Phase 4 & 5 - 90% Design Review-COE	SW03051010	COE	15	15	0	12FEB02	04MAR02
RD-Phase 4 & 5 - Incorp. Comments & Issue Rev0	SW03051011	SWE	5	5	0	05MAR02	11MAR02
GFY02 PHASE 4/5 ENGINEERING	SW030510X	SWE	126	85	6	01OCT01A	11MAR02
GFY02 Phase 6 (IA-5/6/9) Engineering 0520							
RD-Phase 6 - 60% Intermediate Design	SW03052001	SW	55	45	1	15OCT01A	14JAN02
RD-Phase 6 - 60% Design Review-COE	SW03052002	COE	10	10	0	15JAN02	28JAN02
RD-Phase 6 - 90% Design, Rev. A Work Plan	SW03052003	SWE	10	10	0	29JAN02	11FEB02
RD-Phase 6 - 90% Design Review-COE	SW03052004	COE	15	15	0	12FEB02	04MAR02
RD-Phase 6 - Incorp. Comments & Issue Rev0	SW03052005	SWE	5	5	0	05MAR02	11MAR02
GFY02 PHASE 6 ENGINEERING	SW030520X	SWE	95	85	1	15OCT01A	11MAR02



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Finish Date 30SEP02
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Run Date 15NOV01 08:04

Early Bar
Early Bar
Progress Bar
Critical Activity

1031 Sheet 1 of 1

Stone & Webster - USACE FUSRAP/SLAPS

GFY 2002

Stone & Webster, Inc.
A SHAW GROUP COMPANY

US Army Corps of Engineers

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Further Info? ☐

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- ☐ Downtown
- ☐ Iowa

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