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7. Abstract This PPMP is provided in lieu of the FDC and the CDR required by DOE Order 4700.1 and was prepared under the reinventing government initiative to reduce paperwork and associated project costs. The PPMP addresses requirements for the engineering report specified in WAC 173-240-60. Project L-234, "400 Area Sanitary Sewer Replacement," will construct a sanitary treatment and disposal system for most of the 400 Area facilities. The wastewater from these facilities will be routed to three 0.99 hectare (2.45 acre), lined lagoons through a new sewer line that will be connected to the existing 400 Area septic tank and sanitary sewer system. The existing seepage (infiltration) lagoon will be abandoned in accordance with applicable Federal, State and local codes and regulations. The design flow of the treatment and disposal system is 98,400 lpd (26,000 gpd). Project design life is 30 years.		
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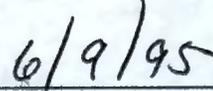
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PROJECT PROGRAM MANAGEMENT PLAN
400 AREA SANITARY SEWER
SYSTEM REPLACEMENT
PROJECT L-234

May 1995

For the U.S. Department of Energy
Contract DE-AC06-93RL12359

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

L234PPMP

L234PPMP

PROJECT PROGRAM MANAGEMENT PLAN

FOR

400 AREA SANITARY SEWER
SYSTEM REPLACEMENT

PROJECT L-234

Prepared by

ICF Kaiser Hanford Company
Richland, Washington

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Quality Engineering	Date	Project Manager	Date

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Vicky Birkland 6/9/95

ABBREVIATIONS

A-E	architect-engineer
CDR	conceptual design report
DOE	U.S. Department of Energy
EA	environmental assessment
ECN	engineering change notice
Ecology	Washington State Department of Ecology
FDC	functional design criteria
FFTF	Fast Flux Test Facility
ICF KH	ICF Kaiser Hanford Company
MRP	Management Requirements and Procedures
NEPA	National Environmental Policy Act
POTW	public owned treatment works
PPMP	project program management plan
QAP	Quality Assurance Plan
RCA	Radiation Controlled Area
RL	U.S. Department of Energy, Richland Operations Office
SSAS	subsurface soil absorption system
SWDP	state waste discharge permit
TEC	total estimated cost
WAC	Washington Administrative Code
WBS	work breakdown structure
WHC	Westinghouse Hanford Company
WPPSS	Washington Public Power Supply System

PROJECT PROGRAM MANAGEMENT PLAN

**400 AREA SANITARY SEWER
SYSTEM REPLACEMENT**

PROJECT L-234

1.0 INTRODUCTION

This PPMP is provided in lieu of the FDC and the CDR required by DOE Order 4700.1 and was prepared under the reinventing government initiative to reduce paperwork and associated project costs. The PPMP addresses requirements for the engineering report specified in WAC 173-240-60.

The 400 Area has been serviced by a septic tank and an SSAS since it opened in June 1978. The SSAS failed shortly thereafter. The septic tank effluent was piped into an unlined lagoon (pond) west of the SSAS.

The Tri-Party Agreement and subsequent Consent Order DE91NM-177 required that a WAC 173-216 permit application be submitted to Ecology by June 1994. The DOE plans to replace the existing sanitary system with a compliant system.

The sanitary waste tie-line between the 400 Area and the WPPSS POTW could be utilized. However, the tie-line has never been used and will never be activated due to regulatory and political constraints between RL and WPPSS (ref 1).

The 400 Area sanitary wastewater management options were investigated based on the tie-line never being used. The capital cost, operating cost, future expansion, and regulatory considerations of seven alternatives were considered. The alternative to install a 98,400 lpd (26,000 gpd) evaporative lagoon was rated the highest.

2.0 SUMMARY

Project L-234, "400 Area Sanitary Sewer Replacement," will construct a sanitary treatment and disposal system for most of the 400 Area facilities. The wastewater from these facilities will be routed to three 0.99 hectare (2.45 acre), lined lagoons through a new sewer line that will be connected to the existing 400 Area septic tank and sanitary sewer system. The existing seepage (infiltration) lagoon will be abandoned according to applicable Federal, State, and local codes and regulations. The design flow of the treatment and disposal system is 98,400 lpd (26,000 gpd). The project design life is 30 years.

The TEC of project L-234 is \$1,360,000, and the total estimated annual cost of the project is \$80,000. The project cost estimate is in Appendix B and the project schedule is in Appendix C.

3.0 JUSTIFICATION

The Tri-Party Agreement and Consent Order DE91NM-177 milestone for the current 400 Area sanitary wastewater system was met when the WAC 173-216 permit application was submitted in June 1994 (ref 2). The existing unlined lagoon does not meet WAC requirements; therefore, DOE intends to bring the system into compliance with current regulations by constructing project L-234.

The purpose of this project is to design and construct a 400 Area sanitary wastewater system that meets all Federal and State requirements. The sanitary system will be able to treat and dispose of the present flow (i.e., 87,055 lpd or 23,000 gpd) with only a minimal additional capacity allowance.

4.0 DESCRIPTION OF PROJECT SCOPE

Project L-234 replaces the existing 400 Area unlined lagoon with a lined evaporative lagoon system. The sanitary wastewater system has been sized for projected future flows and the addition of trucked-in wastewater from other Hanford septic systems of up to 11,355 lpd (3,000 gpd) but not exceeding the

system design capacity. Sanitary wastewater from the 400 Area will continue to use the existing septic tank and will discharge to lined evaporative lagoons. Any trucked-in sanitary wastewater will be introduced into the primary compartment of the existing septic tank. Wastewater from the septic tank system will be screened before it is discharged to the evaporative lagoon system. The schematic drawing of the proposed system is shown in Figure 2 (all figures are located in Appendix A).

The treatment and disposal facility will meet all Federal and State regulations and standards for sanitary wastewater treatment and disposal. The design life of the project is 30 years. The existing seepage (infiltration) lagoon will be abandoned in place to decay naturally.

4.1 IMPROVEMENTS TO LAND (460)

The site will be cleared before grading operations start. Areas disturbed by construction will be stabilized with gravel and crushed rock or replanted with vegetation.

An approximate 850 m (2,800 ft) long and 2.44 m (8 ft) high chain link fence will surround the perimeter of the lagoons (see Figure 2). There will be approximately 1,020 m (3,345 ft) of gravel service roads around the lagoons. The service roads will be 2.44 m (8 ft) wide.

The total estimated construction cost for improvements to land is \$150,000.

4.2 OTHER STRUCTURES (550)

The proposed lagoon system consists of three cells. The bottom area of each cell will be 0.85 hectare (2.08 acre). Cell bottom dimensions are 130.0 m (426 ft) by 65 m (213 ft) with a 1.22 m (4 ft) depth and a

0.61 m (2 ft) freeboard. The total lagoon highwater surface area is 2.97 hectares (7.35 acres). Each lagoon will have a synthetic liner (see Figure 3).

The 400 Area sanitary sewer will continue to discharge to the existing septic tank for pretreatment. The existing unlined seepage lagoon will be abandoned in place. Wastewater from the septic tank will pass through a screen before discharging to the evaporative lagoon system. Trucked wastewater will be discharged into the primary compartment of the existing septic tank (see Figure 1). Lagoon levels will be controlled by interconnected pipes with sluice gates. A bypass of the first lagoon will be provided to allow one lagoon to be taken out of service for maintenance. Figure 5 shows the lagoon control structure.

The construction cost for the evaporative lagoon system is \$540,000.

4.3 UTILITIES (600)

The existing sewer system and septic tank will be connected to the lagoon system by a 20.32 cm (8 in.) gravity sewer line via a manhole downstream from the septic tank (see Figure 2). The total estimated construction cost of the piping system is \$30,000.

The wastewater flow into the lagoons will be monitored automatically. The precipitation, water level, and lagoon evaporation will be monitored and recorded manually (an automated system will be considered during definitive design). Mass balance computations will be done using a custom program furnished by the project.

No external electrical power is required for this project. The flow monitoring device and supporting instrumentation will be battery powered.

The design contractor will provide system operations training.

4.4 DESIGN COMPLIANCE

The design and construction of project L-234 will comply with the codes and regulations listed in Section 5.0 of this report.

5.0 CRITERIA

The definitive design of project L-234 will meet the requirements of the following design criteria:

- Ecology, "Criteria for Sewage Works Design."
- WAC 173-200, "Water Quality Standards for Groundwaters of the State of Washington."
- WAC 173-216, "State Waste Discharge Permit Program."
- WAC 173-240, "Submission of Plans and Reports for Construction of Wastewater Facilities."
- WAC 173-304, "Minimum Functional Standards for Solid Waste Handling."
- WAC 246-272, "Onsite Sewage Systems."
- 6430.1A, "General Design Criteria."
 - Division 1, Section 0106, "Regulatory Requirements."
 - Division 1, Section 0109, "Reference Standards and Guides."
 - Division 1, Section 0110, "Architectural and Special Design Requirements," except Section 0110-99, "Special Facilities."
 - Division 1, Section 0170, "Construction Contract Closeout."
 - Division 2, Section 0200, "Site Development."
 - Division 2, Section 0201, "Subsurface Investigation."
 - Division 2, Section 0202, "Survey."
 - Division 2, Section 0203, "Utilities Within Easements or Corridors."

- Division 2, Section 0210, "Site Preparation."
- Division 2, Section 0215, "Shoring and Underpinning."
- Division 2, Section 0220, "Earthwork."
- Division 2, Section 0260, "Piped Utility Materials."
- Division 2, Section 0273, "Water Pollution Controls," except Section 0273-99, "Special Facilities."
- Division 2, Section 0280, "Site Improvements."
- Division 2, Section 0283, "Physical Protection."
- Division 3, Section 0330, "Cast-In-Place Concrete."
- Division 3, Section 0240, "Precast Concrete."

6.0 REQUIREMENTS

6.1 ENERGY CONSERVATION

Project L-234 will not require an Energy Conservation Report.

6.2 SITE LOCATION

Site selection was completed in accordance with RL 4320.2C, "Site Selection." The lagoon system has been located to allow sufficient reserve and buffer area for expansion and separation from the existing and planned waste sites. The selected site will allow for a total gravity flow system which will minimize construction, maintenance, and operational costs. The proposed site reserves approximately 10.9 hectares (27 acres) for the new system.

6.3 ENVIRONMENTAL COMPLIANCE

Project L-234 will not create any unusual environmental hazards. The project will be designed in accordance Federal, State, and local requirements and Ecology's Criteria for Sewage Works Design (ref 3).

A cultural resource review and an ecological survey have been completed. A categorical exclusion has been prepared to comply with NEPA and is

being forwarded to RL for concurrence. A State Environmental Policy Act checklist has been drafted and will be forwarded to RL, the State, and Indian Nations for concurrence. The A-E will consider all NEPA requirements during definitive design.

The design and construction of project L-234 will comply with the regulations listed in Section 5.0.

6.4 HEALTH AND SAFETY

Safety reviews performed during the normal planning, design, and execution of the project will mitigate identified hazards associated with construction and operations. All construction will be in accordance with the appropriate safety codes, regulations, and standards. Routine hazards will exist during construction. Operations will be conducted in conformance with recognized safety codes and regulations to ensure that a safe working environment exists.

Failure of equipment and systems provided by this project would not adversely affect the environment or safety and health of the public or employees of contractors within the Hanford Site. Project L-234 is within the analyzed bounds of the FFTF Safety Analysis Report (HEDL-TI-750001) but it does not change the report (see Section 9.6.2.6 and Chapter 18). Therefore, this project is considered to be non-safety class.

Construction contractors will be required to take reasonable precautions for protection of the health and safety of employees of the contractor, subcontractors, operating contractor, and DOE. The precautions include providing continuous access to construction areas by emergency vehicles and personnel, and ensuring that emergency evacuation routes are unobstructed.

6.5 OPERATION AND MAINTENANCE

The system design must provide adequate access for routine testing, maintenance, repair, and replacement. The design must be safe for maintenance and operations personnel. The system and equipment should be designed or selected to be functional with minimum maintenance. Components will be selected to maximize interchangeability. Special tools for servicing and maintaining equipment will be provided by the project. Operations and maintenance manuals, drawings, and data including recommended spare parts lists will be provided. Design and construction must ensure that operating interruptions are minimized, scheduled, and coordinated during the construction and testing phases of the project. The project will provide maintenance and operations training as identified during definitive design.

6.6 METRICATION

All engineering drawings will be in metric and English units.

6.7 PERMITS

According to WAC 173-216, a SWDP is required to discharge wastewater from industrial or commercial operations into the ground. At least 60 days before discharge of the effluent, an application for an SWDP must be submitted.

An engineering report, plans and specifications, and a construction quality assurance plan will be approved by Ecology before construction commences. Before construction is completed, a draft operation and maintenance manual will be submitted to Ecology for review and approval. Prior to system operation, a declaration of construction completion and complete operation and maintenance manual will be submitted to Ecology. Facilities and Utilities Projects will coordinate permitting actions through WHC Air and Water Permitting.

6.8 PHYSICAL INTERFACES

Interfacing may be required with other planned or in-progress projects. The interfaces will be identified at the start of definitive design.

6.9 PLANT FORCES WORK REVIEW

A plant forces work review is not required because this is a capital construction project.

6.10 QUALITY ASSURANCE

Project L-234 is a non-safety class project. The specific technical and quality programmatic requirements, material certifications, qualification and certification of personnel, inspections, examinations and testing, and applicable quality assurance records will be established during definitive design and included in the design documents. Independent design verification will not be required. Specifications will require controls to exclude misrepresentation of products.

6.11 SAFEGUARDS AND SECURITY

Existing safeguards and security measures will not be impacted by this project. Badging and escort requirements must be administered in compliance with DOE Order 5632.9A, "Issuance and Control of Security Badges, Credentials, and Shields." No new measures beyond the current practices will be required.

6.12 ENGINEERING REPORT

The engineering report required by WAC 173-240-60, included as Appendix A, will be submitted to Ecology for approval.

6.13 POLLUTION PREVENTION/WASTE MINIMIZATION

Pollution prevention features should be incorporated using the design guide developed by DOE (ref 4). The guideline demonstrates compliance with DOE and Federal regulations that mandate consideration of waste

minimization during design. The guideline suggests pollution prevention design opportunities for consideration in the design of the facility.

7.0 METHODS OF PERFORMANCE

Design-Construct Work (WBS 1.1, 1.2.1, 1.2.2, and 3.2)

An offsite design contractor will provide the definitive design, engineering during construction, and acceptance inspection. The design contractor will also prepare the construction quality assurance plan, the draft and final Operations and Maintenance manuals required for Ecology approval.

Construction work will be performed under fixed-price contracts managed and administered by ICF KH.

Work by Engineer/Constructor Contractor (WBS 1.2.3 and 4.0)

The engineer/constructor contractor will provide project closeout and turnover and overall project management during design and construction which includes coordination of documents required by Ecology during project design and construction.

The methods of performance comply with the WBS outlined below. The WBS gives the major phases of work to be accomplished: engineering, construction, project management, and other project activities.

1.0 ENGINEERING

1.1 Definitive Design (Design Contractor)

1.2 Engineering and Inspection

1.2.1 Engineering During Construction (Design Contractor)

1.2.2 Inspection During Construction (Design Contractor)

1.2.3 Closeout/Project Turnover (Engineer/Constructor Contractor)

3.0 CONSTRUCTION

3.2 Fixed-Price Construction (offsite Construction Contractor)

4.0 PROJECT INTEGRATION (Engineer/Constructor Contractor)

8.0 UNCERTAINTIES

The PPMP is based on use of the septic tank without major modification or upgrade for pretreatment and gravity flow into the proposed evaporative lagoons. At the end of the septic tank useful life, decommissioning will consist of filling with native soils and abandoning in place according to WAC 246-272.

The project does not include any cost to mitigate habitat lost by the installation of the lagoon system.

Evaporation data for the Hanford Site has been determined from data provided by the Washington State University Irrigated Agriculture Research and Extension Center, the Soil Conservation Service, and a 1993 climatological data summary for the Hanford Site.

Lagoon system sizing is based on the 400 Area sanitary flow not exceeding 98,400 lpd (26,000 gpd).

The PPMP design and site selection incorporates information to avoid potentially contaminated sites. No contamination is expected and no allowance has been made for construction in a contaminated area.

Synthetic liner bedding will be obtained from screened native soils. Excess soils will be spoiled within the project site.

It has been assumed that Ecology will grant a WAC 173-216 permit of no discharge. Ecology will approve the concept presented in the preliminary engineering report within 60 days of receipt (see Appendix A).

Minimal sludge buildup is assumed for the life of the project. Sludge handling or liner replacement will be in accordance with WAC 173-304. Sludge from the septic tank and lagoons will be addressed in a sludge handling plan developed during definitive design by the design contractor.

9.0 REFERENCES

1. Engineering Study, "400 Area Sanitary Waste Engineering Study," prepared by Bovay Northwest Inc., Project No. 1842-308, September 30, 1993.
2. Draft Report, "State Waste Discharge Permit Application 400 Area Septic System," prepared by the U.S. Department of Energy, Richland Operations Office, Document No. DOE/RL-94-28, April 5, 1994.
3. State of Washington Department of Ecology, "Criteria for Sewage Works Design," DOE 78-5, October 1985 (revised).
4. Report, "Orientation to Pollution Prevention for Facility Design," prepared by the U.S. Department of Energy, Richland Operations Office, January 1994.

APPENDIX A

Engineering Report and Figures

(Prepared by SCM Consultants, Inc.)

Figure 1	Schematic Diagram
Figure 2	Site Plan
Figure 3	Evaporative Lagoons
Figure 4	Sewer Profiles
Figure 5	Lagoon Control Structure
Figure A	400 Area Map (prepared by ICF Kaiser Hanford Company)

ENGINEERING REPORT

1. Name, Address, and Telephone Number of the Owner and the Authorized Representative:

U.S. Department of Energy, Richland Operations Office
P. O. Box 550, Richland, WA 99352
Phone: (509) 376-2247

Authorized Representative:

J.E. Rasmussen, DOE
Staff Chief, Regulatory Permits
Phone: (509) 376-2247

2. Project Description:

The 400 Area has been serviced by a septic tank and a subsurface soil absorption system (SSAS) since late 1970. The SSAS failed shortly after June 1978. The effluent was routed to an unlined lagoon (ref 1). The septic tank and the unlined lagoon are in use today.

The proposed project will replace the unlined lagoon with totally evaporative lined lagoons. The project will handle the present service area. The design flow for the proposed treatment system is 98,400 lpd (26,000 gpd). Figure No. A shows the service area of the project (400 Area). Figure 1 provides the system schematic diagram.

The proposed project layout is for three 0.99 hectare (2.45 acre) lagoons of 1.22 m (4 ft) deep and 0.61 m (2 ft) freeboard. Each lagoon will have a synthetic impervious liner. The 400 Area wastewater will flow to the existing septic tank and lagoons by gravity. The system design is capable of accepting an additional 11,355 lpd (3,000 gpd) from Hanford holding tanks and failed septic systems. Wastewater discharged from the existing septic tank will pass through a manually-cleaned screen prior to entering the evaporative lagoons. A bypass of the first lagoon will be installed to facilitate maintenance and operations. The three lagoons will be enclosed by a 2.44 m (8 ft) high chain-link fence around the perimeter of the lagoons. Gravel service roads will surround the lagoon cells. The service road will be 2.44 m (8 ft) wide (see Figure 3). The basic design data and sizing calculations are given in Section 7.

The wastewater flow into the lagoon will be monitored and recorded automatically. Precipitation, lagoon water level, and outflow (evaporation) will be monitored and recorded manually (an automated system will be considered during definitive design). Mass balance computations will be done using a custom program. No external electrical power is required for this project. The flow monitoring device and supporting instrumentation will be battery operated.

3. Present and Expected Future Quantity and Quality of Wastewater:

The present summer average flow is 87,055 lpd (23,000 gpd). The mean measured concentration of BOD₅, TSS and TKN (as N) in the influent wastewater is 165 mg/l, 133.5 mg/l and 88.4 mg/l respectively (Table 1). The quality of influent is expected to remain approximately the same. The main source of wastewater is from the 400 Area sanitary sewers. However, some sanitary wastewater may be hauled in by trucks from other Hanford holding and septic tanks. Trucked-in wastewater up to 11,355 lpd (3,000 gpd) may be added, but will not exceed the system design capacity of 98,410 lpd (26,000 gpd). No known industrial wastewater enters this sewer system, and none is expected in the future.

TABLE 1

MEASURED SANITARY WASTEWATER INFLUENT DATA (ref 2, page C-2)						
Constituent	N	Mean Conc.	SD	Unit	EPA Method	DL
Conductivity	2	1110	14	umho/cm	120.1	6
Ph	2	8.6	0.1	Ph	9040	0.1
TDS	2	405	21	mg/l	160.1	5
TSS	2	133.5	52	mg/l	160.2	5
BOD	2	165	7	mg/l	5210	2
TKN (as N)	2	88.4	2.3	mg/l	351.2	1.0
Total Phosphorous	2	6.4	0.1	mg/l	365.2	0.05
Total Oil and Grease	2	21	2.8	mg/l	9070	< 5
<p>N = Number of sample results averaged.</p> <p>Mean Concentration = Influent sewage sample was obtained from manhole just upstream from the existing septic tank.</p> <p>SD = One standard deviation about the mean.</p> <p>DL = Detection level as reported by the laboratory or procedure.</p>						

4. Required Degree of Treatment

The lined evaporative lagoons will treat wastewater from the existing septic tank. All wastewater to the lagoons will be disposed of through evaporation.

5. Description of Receiving Water

Sanitary effluent will not be discharged into any receiving water. It will be disposed by evaporation from the lined lagoons.

6. Type of Treatment Proposed and Alternatives Evaluated

Wastewater from the existing septic tank will be discharged into three lined evaporative lagoons in series for treatment and disposal.

The following alternatives were considered and evaluated (ref 1, pages 2-2 and 4-2):

- (i) Alternative 1: No action alternative.
- (ii) Alternative 2: It would involve a tie line between the invert to the septic tank and the Supply System Sewage Treatment Facility approximately 3 miles to the northeast of the 400 Area.
- (iii) Alternative 3: A fully compliant SSAS based upon the current flow of 87,055 lpd (23,000 gpd) and population of 700 persons. The wastewater would be pumped out of a new dosing tank to three large pressurized SSASs. The dosing tank would be of sufficient size to dose the SSAS two to four times daily. Each SSAS would be large enough to accommodate 50% of the flow and would include a system of electronically operated valves and distribution boxes.
- (iv) Alternative 4: A fully-compliant SSAS and assumes that estimated flow would be 52,990 lpd (14,000 gpd) for the present population.
- (v) Alternative 5: A compliant SSAS and assumes a future population of 1,300 and a flow of 98,410 lpd (26,000 gpd).
- (vi) Alternative 6: A compliant SSAS. It splits the 400 Area into two cores (A and B) (ref 1) based upon the sewer trunk line and associated flows. Core A flows would be diverted to the west to a new 79,485 liter (21,000 gal) septic tank. A new pressurized SSAS would also be installed. Core B flows would continue to flow to the existing septic tank. A new pressurized SSAS would be installed. This alternative would accommodate the present and future sanitary wastewater flows.
- (vii) Alternative 7: Uses the existing septic tank for the current flow of 87,055 lpd (23,000 gpd) and present population. It would discharge to lined evaporative lagoon(s).
- (viii) Alternative 8: Identical to Alternative 7 with a system capacity of 98,410 lpd (26,000 gpd).
- (ix) Alternative 9: It would not use the existing septic tank but discharge 123,013 lpd (32,500 gpd) directly into the lined evaporative lagoons.

Alternative 1 is not a viable or an acceptable alternative.

Alternative 2 cannot be implemented due to the contractual constraints between the Supply System and the DOE.

Alternatives 3 to 7 and 9: These are technically viable solutions that meet the project requirements.

Alternative 8: This is a technically viable solution that meets client and regulatory requirements. It is the most cost-effective solution for the design flow of 98,410 lpd (26,000 gpd).

7. Basic Design Data and Sizing Calculations

Design Influent to the Evaporative Lagoon = 98,410 lpd (26,000 gpd)
Net Annual Evaporation = 48 inches per year

Reference 2:

Design Influent BOD₅ Concentration = 165 mg/l
Design Influent TSS Concentration = 134 mg/l
Design Influent TKN (as N) Concentration = 88 mg/l

Three Evaporative Lagoons:

@ 0.85 hectare (2.08 acre) at the bottom each, 2.55 hectare (6.25 acre) total
@ 0.99 hectare (2.45 acre) at HWL each, 2.97 hectare (7.35) acre total

Bottom Dimensions of Lagoons:

Length = 130 m (426 ft), Width = 65 m (213 ft), Depth = 1.22 m (4 ft)
Freeboard = 0.61 m (2 ft), Waterside slope = 3:1
Landside Slope = 2:1, Top Width of Dike = 2.44 m (8 ft)
Liner: 60 mil HDPE, 36 mil Hypalon or 45 mil reinforced polypropylene

8. Discussion of Various Sites

The site selected is adjacent to the present treatment system. There is no residence in the 400 Area. The proposed lagoon site is above the 100-yr flood level.

9. General layout of Various Units

The general layout of the system is shown in Figure 2, Site Plan.

10. Infiltration, Inflow Problems, Overflows, and Bypasses

There should not be any infiltration or inflow problem in the system. No overflows or bypasses are proposed in this project.

11. Treatment of Industrial Wastes

No industrial wastewater will discharge into the proposed treatment system.

12. Outfall Analysis or Disposal Method Selected

The effluent will be disposed by evaporation from lined evaporative lagoons.

13. Method of Sludge Disposal

Sludge from the septic tank and lagoons will be disposed within the Hanford Site or an approved offsite location. A sludge handling plan will be developed during definitive design and the necessary permit application will be prepared and submitted to Ecology as necessary.

14. Provision for Future Needs

Necessary provisions have been provided for the planned future population in the 400 Area.

15. Staffing and Testing Requirements

A qualified technical person will be responsible to provide the day-to-day operation of the treatment and disposal facility. There will be one or more persons trained to assist with operations of the facility as required. All inflows (wastewater flow and precipitation) into and outflow (evaporation) from the system will be monitored.

16. Estimated Costs and Expenses

The capital cost of the project is \$1,360,000. The total annual cost is \$80,000 in fiscal year 1995 dollars.

17. Compliance with Water Quality Management Plan

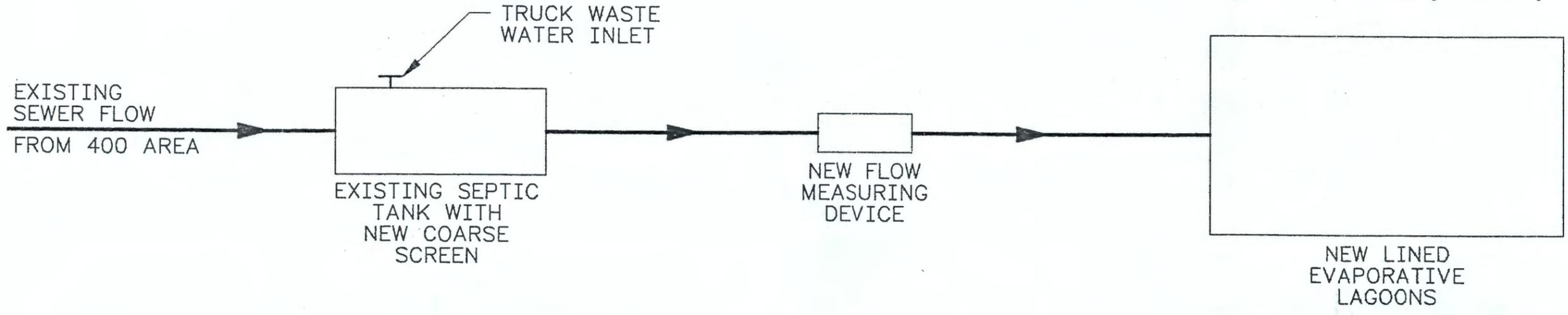
There is no State or local water quality management plan for the 400 Area.

18. Compliance with SEPA and NEPA

The project will comply with SEPA and the NEPA. A SEPA checklist will be prepared and approved by the State prior to start of construction.

REFERENCES

1. Bovay Northwest Inc., "400 Area Sanitary Waste Engineering Study," Bovay Project No. 1842-308, September 30, 1993.
2. United States Department of Energy, "State Waste Discharge Permit Application 400 Area Septic System," DOE/RL-94-28 Draft.
3. Haxo, Henry E. Jr. et al, "Liner Materials for Hazardous and Toxic Wastes and Municipal Solid Waste Leachate," Noyes Publications, Park Ridge, New Jersey, November 1985.



1 OF 5
FIGURE No.

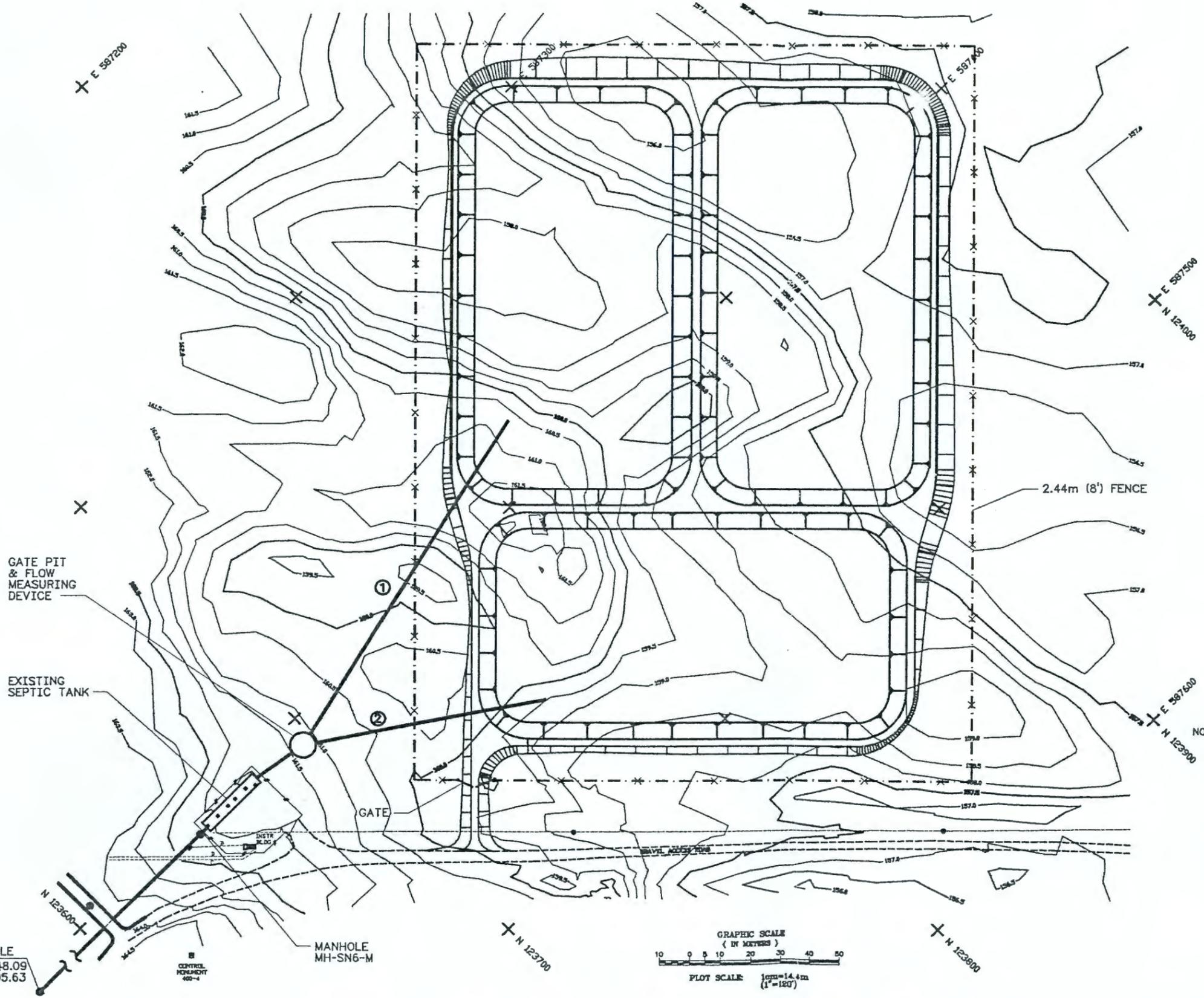
ICF KAISER HANFORD COMPANY	
400 AREA SANITARY SEWER SYSTEM REPLACEMENT SCHEMATIC DIAGRAM	
PROJ. No. 3664.020	DATE: 1-9-95
BY: TLJ	CHKD. LJL
REV. 0	APVD. CAPRIO

SCM Consultants, Inc.
Architects & Engineers, Kennewick, WA

ICF KAISER HANFORD COMPANY
400 AREA SANITARY SEWER SYSTEM REPLACEMENT
SITE PLAN
PROJ. No. 3664.020 DATE: 1-9-95 REV. 0
BY: TLJ CHKD. LjL APVD. CAPRIO

SCM Consultants, Inc.
Architects & Engineers, Kennewick, WA

CADD FILE NAME: 3664C02A.DWG
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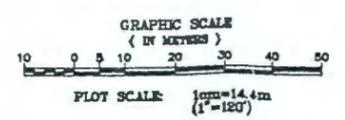


CONTOUR INTERVAL: 0.5 METER
HORIZONTAL DATUM: WGS83S/1991 (METERS)
VERTICAL DATUM: NAVD88 (METERS)

GPR SCAN DATA		
UGLINE	APPROX DEPTH	NOTES
A	1.2m	
B	0.9m	
C	0.9m	ENERGIZED
D	0.9m	ENERGIZED

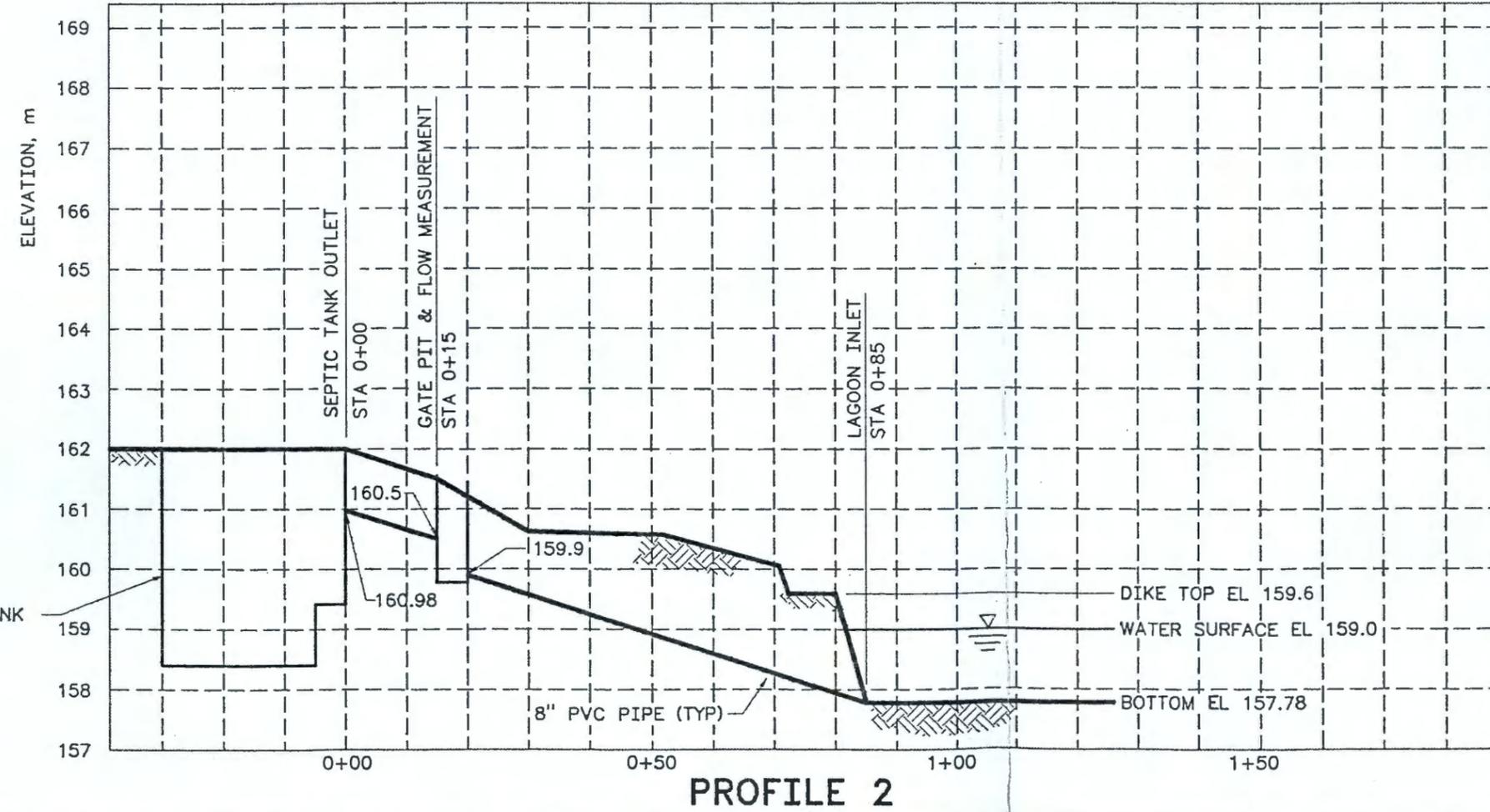
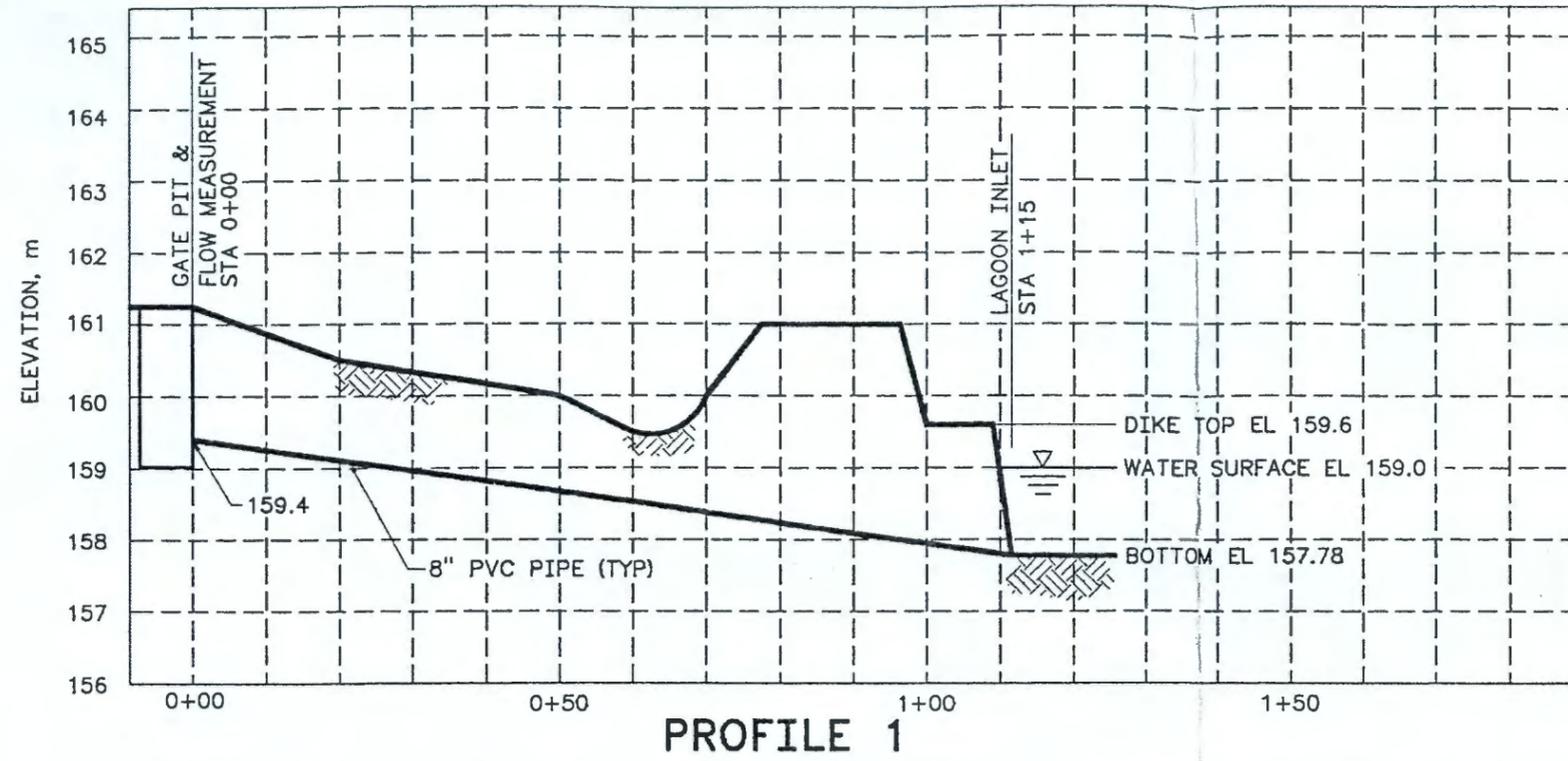
NOTE: GROUND PENETRATING RADAR (GPR) WAS USED TO ATTEMPT TO LOCATE UNDERGROUND LINES AROUND THE EXISTING SEPTIC TANK FENCED AREA AND INSTRUMENT BLDG. NO OTHER AREAS WERE SCANNED AT THIS TIME.

HORIZONTAL AND VERTICAL POSITION OF DETECTED UNDERGROUND LINES ARE +/- 0.3 METERS.



MANHOLE
N123548.09
E587405.63

MANHOLE
MH-SN6-M

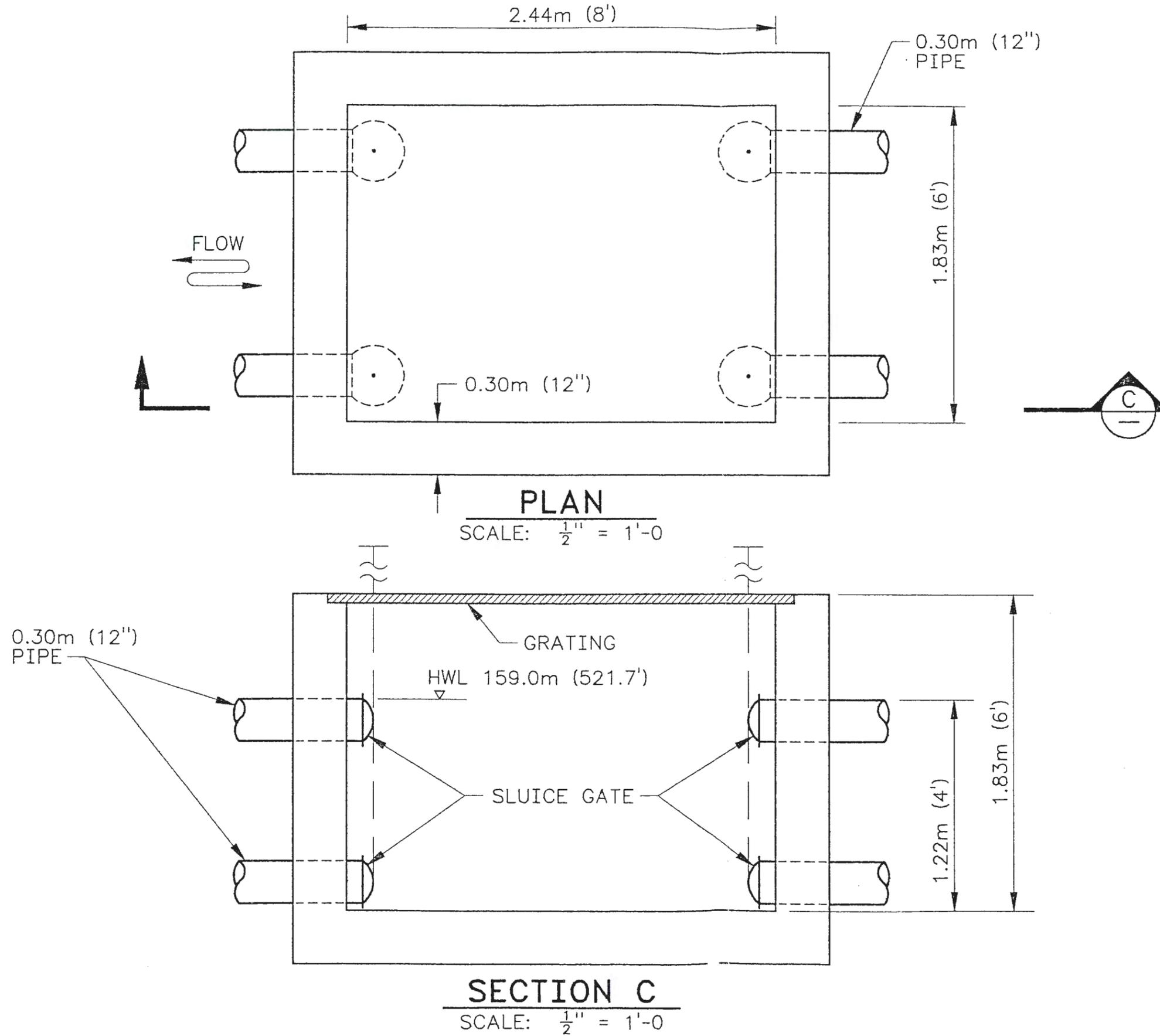


NOTE
 ELEVATIONS TO BE
 CONFIRMED DURING
 DEFINITIVE DESIGN.

4 OF 5
 FIGURE No.

ICF KAISER HANFORD COMPANY	
400 AREA SANITARY SEWER SYSTEM REPLACEMENT SEWER PROFILES	
PROJ. No. 3664.020	DATE: 1-9-95
BY: TLJ	CHKD. LJL
REV. 0	APVD. CAPRIO

SCM Consultants, Inc.
 Architects & Engineers, Kennewick, WA



5 OF 5
FIGURE No.

ICF KAISER HANFORD COMPANY	
400 AREA SANITARY SEWER SYSTEM REPLACEMENT LAGOON CONTROL STRUCTURE	
PROJ. No. 3664.020	DATE: 1-9-95
BY: TLJ	CHKD. LJJ
REV. 0	APVD. CAPRIO

SCM Consultants, Inc.
Architects & Engineers, Kennewick, WA

BUILDING NUMBER ZONE

- 401 C4
- 403 B4
- 405 B3
- 408A B4
- 408B C3
- 408C B3
- 427 B2
- 432A A4
- 436 B4
- 437 A3
- 440 A3
- 4621E B4
- 4701A B4
- 4701B D2
- 4701C C2
- 4702 B4
- 4703 B4
- 4703 B4
- 4704N D4
- 4704S D4
- 4706 C2
- 4707 C3
- 4710 B4
- 4713A B4
- 4713B C3
- 4713C A3
- 4713D B3
- 4716 B3
- 4717 B3
- 4719 C3
- 4721 B3
- 4722B C3
- 4722C C3
- 4726 C3
- 4732A D3
- 4732B D3
- 4732C D3
- 4734B C3
- 4734C C3
- 4734D B4
- 4760 C3
- 4790 C3
- 4791TC C1
- 4802 B2
- 481 B3
- 4814 C1
- 481A B3
- 483 B3
- 4831 A2
- 484 B3
- 4842A B2
- 4843 A1
- 4862 C2
- 491E B4
- 491S C3
- 491W B3
- M0353 D1
- M0378 C1
- M0379 C1
- M0908 C1
- TOWER C3
- DEWAR PAD B3
- LAYDOWN AREA A1
- 451A SUB STATION B3
- 451B SUB STATION B2

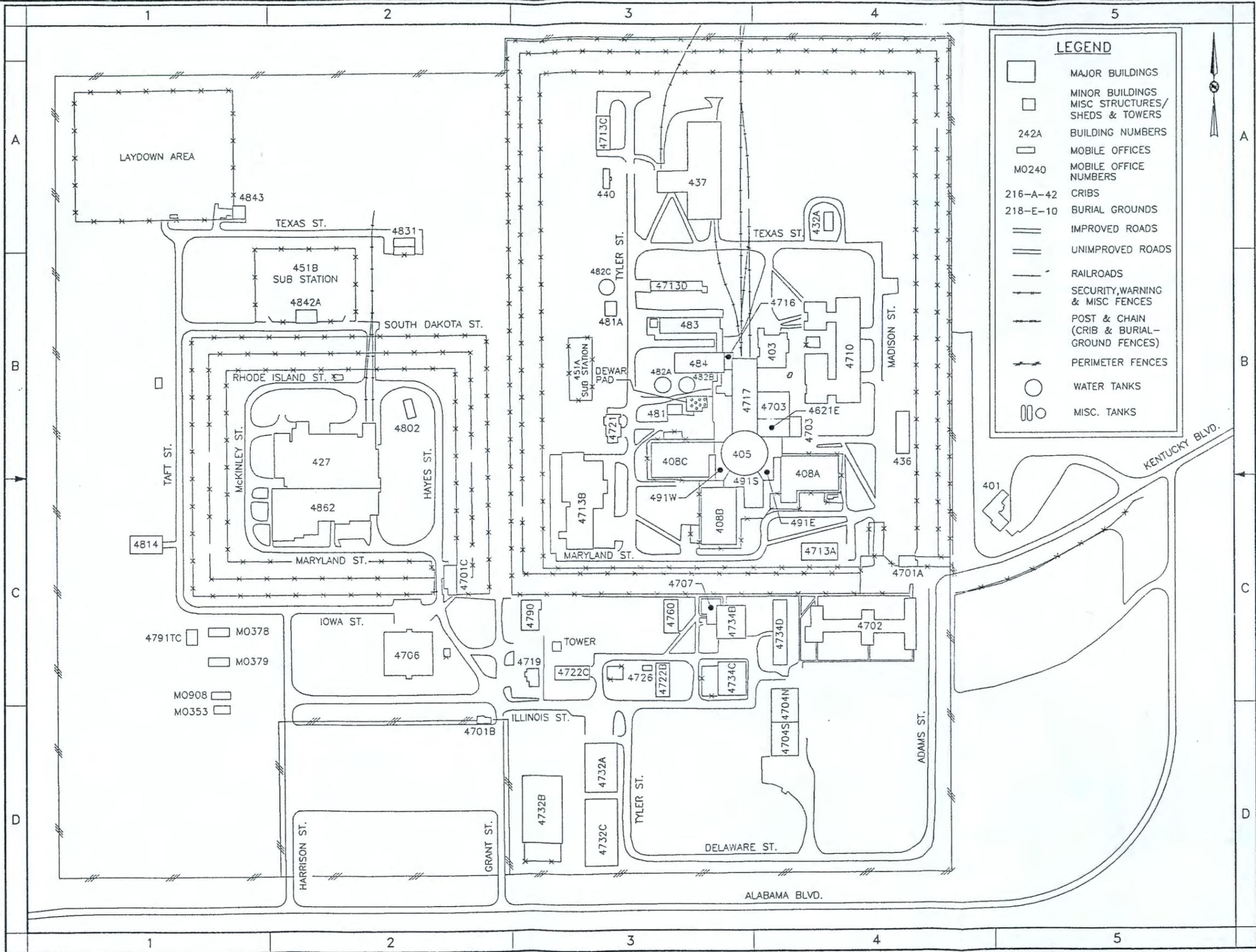


FIG: A

NOTE: THIS MAP IS FOR REFERENCE ONLY. DO NOT USE FOR CONSTRUCTION OR ENGINEERING PURPOSES.

ICF KAISER HANFORD COMPANY
MAPPING SERVICES GROUP (376-4433)

CADFILE: ZRBTO203
DATE: 9-27-94

DRAWN BY: RAFAEL TORRES

TITLE: 400 AREA

APPENDIX B

Cost Estimate Summary

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L234BAB3

** IEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R01 - PROJECT COST SUMMARY

PAGE 1 OF 11
 DATE 01/24/95 13:03:44
 BY KDE/JJM/KLR

COST CODE	DESCRIPTION	ESCALATED TOTAL COST	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
020	DEFINITIVE DESIGN	107,000	20	21,000	128,000
030	ENGINEERING/INSPECTION	36,000	25	9,000	45,000
050	CONSTRUCTION MANAGEMENT	162,000	25	40,000	202,000
060	PROJECT MANAGEMENT	69,000	25	17,000	86,000
	(ADJUSTED TO MEET DOE 5100.4)	-4,000		3,000	-1,000
000	DESIGN MANAGEMENT	370,000	23	90,000	460,000
460	IMPROVEMENTS TO LAND	148,000	25	37,000	185,000
550	OTHER STRUCTURES	540,000	25	135,000	675,000
600	UTILITIES	28,000	25	7,000	35,000
	(ADJUSTED TO MEET DOE 5100.4)	4,000		1,000	5,000
460-600	CONSTRUCTION	720,000	25	180,000	900,000
	TOTAL ESTIMATED COST (TEC)	1,090,000	25	270,000	1,360,000

REMARKS: THIS ESTIMATE IS REVISION #1 TO ESTIMATE L234BAB2
 REV. 0 DATED 1/9/95.

TYPE OF ESTIMATE REVISION #1
 CONCEPTUAL ESTIMATE JANUARY 24, 1995
 ARCHITECT/ENGINEER *Benjamin A. Baat* 1/26/95
 OPERATING CONTRACTOR *D.A. Daniels* 1/26/95

(ROUNDED/ADJUSTED TO THE NEAREST " 1,000 / 10,000 " - PERCENTAGES NOT RECALCULATED TO REFLECT ROUNDING)

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L2348AB3

** TEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R02 - WORK BREAKDOWN STRUCTURE SUMMARY

PAGE 2 OF 11
 DATE 01/24/95 13:03:52
 BY KDE/JJM/KLR

WBS DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
110000 DEFINITIVE DESIGN	105534	0	105534	1.59	1678	20	21442	128655
120000 ENGINEERING/INSPECTION	34230	0	34230	5.01	1715	25	8986	44931
SUBTOTAL 1 ENGINEERING	139764	0	139764	2.43	3393	21	30428	173586
320000 CONSTRUCTION-FIXED PRICE	684152	0	684152	4.72	32292	25	179111	895554
327710 CONSTRUCTION MANAGEMENT	154620	0	154620	4.72	7298	25	40480	202398
SUBTOTAL 3 CONSTRUCTION	838772	0	838772	4.72	39590	25	219591	1097952
410000 PROJECT MANAGEMENT - DESIGN	22584	0	22584	2.12	478	25	5766	28828
420000 PROJECT MANAGEMENT - E/I	23562	0	23562	5.30	1249	25	6203	31013
430000 PROJECT MANAGEMENT - CONSTRUCTION	20520	0	20520	5.30	1088	25	5402	27009
SUBTOTAL 4 PROJECT INTEGRATION	66666	0	66666	4.22	2815	25	17371	86850
PROJECT TOTAL	1,045,202	0	1,045,202	4.38	45,798	25	267,390	1,358,388

PAGE 3 OF 11
DATE 01/24/95 08:42:29
BY KDE/JJM/KLR

** TEST - INTERACTIVE ESTIMATING **
400 AREA SANITARY SEWER SYSTEM REPLACEMENT
CONCEPTUAL ESTIMATE REVISION #1
DOE_R03 - ESTIMATE BASIS SHEET

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. L-234/F1431
FILE NO. L234BAB3

1. DOCUMENTS AND DRAWINGS
DOCUMENTS: PRELIMINARY PMP FOR PROJECT L-234 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
DRAWINGS: DRAFT ENGINEERING REPORT FOR PROJECT L-234 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
DRAWINGS: FOUR SKETCHES/DRAWINGS

2. MATERIAL PRICES
UNIT COSTS REPRESENT CURRENT PRICES FOR SPECIFIED MATERIAL.

3. LABOR RATES
CURRENT ICF-KH BASE CRAFT RATES, AS ISSUED BY KH FINANCE (EFFECTIVE 12-01-94), INCLUDE FRINGE BENEFITS, LABOR INSURANCE, TAXES AND TRAVEL WHERE APPLICABLE, PER HANFORD SITE STABILIZATION AGREEMENT, APPENDIX A (EFFECTIVE 09-06-94). NON CRAFT HOURLY RATES ARE BASED ON THE 1995 FISCAL YEAR BUDGET LIQUIDATION RATES AS ISSUED BY KH FINANCE (EFFECTIVE 12-01-94).

4. GENERAL REQUIREMENTS/TECHNICAL SERVICES/OVERHEADS
A.) ONSITE CONTRACT ADMINISTRATION AND CONSTRUCTION MANAGEMENT COSTS, ASSOCIATED WITH THE OVERALL MANAGEMENT-OF THE FIXED PRICE CONTRACTS, ARE INCLUDED AS A COMPOSITE PERCENTAGE AND LUMP SUM ALLOWANCE (FOR BID PACKAGE PREP) BASED ON THE ESTIMATING FACTOR/BILLING SCHEDULE. THE TOTAL COMPOSITE PERCENTAGE AND LUMP SUM ALLOWANCE ARE APPLIED AGAINST THE TOTAL FIXED PRICE CONTRACT AMOUNT WHICH IS REFLECTED IN THE BODY OF THE ESTIMATE DETAIL.
B.) FIXED PRICE CONTRACTOR OVERHEAD, PROFIT, BOND AND INSURANCE COSTS HAVE BEEN APPLIED TO THE INDIVIDUAL LINE ITEMS.

5. ESCALATION
ESCALATION PERCENTAGES WERE CALCULATED FROM THE AUGUST 1994 UPDATE OF THE ECONOMIC ESCALATION PRICE CHANGE INDICES FOR DOE CONSTRUCTION PROJECTS AS PUBLISHED BY THE OFFICE OF INFRASTRUCTURE ACQUISITION FM-50.

6. ROUNDING
U.S. DEPARTMENT OF ENERGY - DOE ORDER 5100.4 PAGE 1-32 SUBPARAGRAPH (M), REQUIRES ROUNDING OF ALL GENERAL PLANT PROJECTS (GPP'S) AND LINE ITEM (LI) COST ESTIMATES. REFERENCE: DOE 5100.4, FIGURE 1-11, DATED 10-31-84.

7. REMARKS
A.) ICF KH MANLOAD PROVIDED BY PH.
B.) ESTIMATE CONTAINS ALLOWANCES FOR STABILIZATION AS DETAIL WAS LACKING.
C.) ROADS WERE ASSUMED TO BE 10 CM CRUSHED ROCK.
D.) ESTIMATE ASSUMES TWO ACCESS GATES FOR FENCED ENCLOSURE.
E.) ESTIMATE ASSUMES NO OUTSIDE FILL REQUIRED, BALANCE CUT AND FILL ACTIVITIES WILL BRING THE SITE TO THE PROPER ELEVATIONS.
F.) ESTIMATE ASSUMES EXCESS QUANTITIES OF SOIL WILL BE DISPOSED OF AT THE SITE.
G.) ESTIMATE ASSUMES A SAND BASE LAYER IN LAGOONS TO SUPPORT THE INSTALLATION OF THE LINER. MATERIAL FOR THE SOIL LINER WILL BE SCREENED FROM SOIL AT THE SITE, PER ICF-KH PH.
H.) ESTIMATE ASSUMES THAT NO CONTAMINATION WILL BE ENCOUNTERED DURING CONSTRUCTION.
I.) ESTIMATE DOES NOT CONTAIN ANY COST FOR HPT COVERAGE. HPT COVERAGE WILL BE NEEDED ON AN INTERMITTENT BASIS BECAUSE ALL THE CONSTRUCTION WORK IS IN A NON-RADIOLOGICAL AREA. THE HPT COVERAGE WILL BE PROVIDED BY THE OPERATING CONTRACTOR (WNC) AND WILL BE FUNDED BY THE OPERATING BUDGET (EXPENSE).
J.) PROJECT DOES NOT HAVE ANY ELECTRICAL WORK ASSOCIATED WITH CONSTRUCTION ACTIVITIES, PER ICF-KH PH.
K.) THIS ESTIMATE IS BASED ON A DRAFT ENGINEERING REPORT AND DRAWINGS THAT ARE NOT APPROVED.
L.) INSTRUMENTATION DETAIL AND COSTS WERE PROVIDED BY ICF-KH PH.
M.) THIS ESTIMATE WAS REVISED TO REFLECT A RE-EVALUATION OF CONTINGENCY PERCENTAGES APPLIED.

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L234B83

** TEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R04 - COST CODE ACCOUNT SUMMARY

PAGE 4 OF 11
 DATE 01/24/95 13:03:58
 BY KDE/JJM/KLR

COST CODE/VBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	ESCALATION TOTAL	SUB TOTAL	CONTINGENCY %	CONTINGENCY TOTAL	TOTAL DOLLARS
020	DEFINITIVE DESIGN									
110000	DEFINITIVE DESIGN	105534	0	105534	1.59	1678	107212	20	21442	128655
	TOTAL 020	105534	0	105534	1.59	1678	107212	20	21442	128655
030	ENGINEERING/INSPECTION									
120000	ENGINEERING/INSPECTION	34230	0	34230	5.01	1715	35945	25	8986	44931
	TOTAL 030	34230	0	34230	5.01	1715	35945	25	8986	44931
050	CONSTRUCTION MANAGEMENT									
327710	CONSTRUCTION MANAGEMENT	154620	0	154620	4.72	7298	161918	25	40480	202398
	TOTAL 050	154620	0	154620	4.72	7298	161918	25	40480	202398
060	PROJECT MANAGEMENT									
410000	PROJECT MANAGEMENT - DESIGN	22584	0	22584	2.12	478	23062	25	5766	28828
420000	PROJECT MANAGEMENT - E/I	23562	0	23562	5.30	1249	24811	25	6203	31013
430000	PROJECT MANAGEMENT - CONSTRUCTION	20520	0	20520	5.30	1088	21608	25	5402	27009
	TOTAL 060	66666	0	66666	4.22	2815	69481	25	17371	86850
460	IMPROVEMENTS TO LAND									
320000	CONSTRUCTION-FIXED PRICE	141486	0	141486	4.72	6678	148164	25	37041	185205
	TOTAL 460	141486	0	141486	4.72	6678	148164	25	37041	185205
550	OTHER STRUCTURES									
320000	CONSTRUCTION-FIXED PRICE	515917	0	515917	4.72	24351	540268	25	135067	675335

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L234B8B3

** IEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R04 - COST CODE ACCOUNT SUMMARY

PAGE 5 OF 11
 DATE 01/24/95 13:03:58
 BY KDE/JJM/KLR

COST CODE/VBS	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	SUB TOTAL	CONTINGENCY %	TOTAL DOLLARS
TOTAL 550	OTHER STRUCTURES	515917	0	515917	4.72	24351	25	675335
600	UTILITIES							
320000	CONSTRUCTION-FIXED PRICE	26749	0	26749	4.72	1263	25	35014
TOTAL 600	UTILITIES	26749	0	26749	4.72	1263	25	35014
PROJECT TOTAL		1,045,202	0	1,045,202	4.38	45,798	25	1,358,388

KAISER ENGINEERS - HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L234BAB3

** TEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R05 - ESTIMATE SUMMARY BY CSI DIVISION

PAGE 6 OF 11
 DATE 01/24/95 13:04:05
 BY KDE/JJM/KLR

CSI	DESCRIPTION	ESTIMATE SUBTOTAL	ONSITE INDIRECTS	SUB TOTAL	ESCALATION %	SUB TOTAL	CONTINGENCY %	TOTAL DOLLARS
00	TECHNICAL SERVICES	34230	0	34230	5.01	1715	25	44931
02	SITENWORK	667152	0	667152	4.72	31490	25	873301
16	ELECTRICAL	17000	0	17000	4.72	802	25	22253
22	ENVIRON ENGRG	80910	0	80910	1.59	1286	20	98636
29	INSTRUMENT	11560	0	11560	1.59	184	20	14093
40	PROJECT MANAGER	33486	0	33486	4.36	1459	25	43681
45	PROJECT PLANNING	5096	0	5096	2.12	108	25	6505
46	ESTIMATES	7564	0	7564	2.12	160	25	9655
48	PUBLICITN/EDIT/ASSEMB	6400	0	6400	1.59	102	20	7802
61	CM ADMINISTRATION	175140	0	175140	4.79	8386	25	229407
62	SURVEY	5000	0	5000	1.60	80	20	6095
65	RECORDS MGMT/TURNOVER	1664	0	1664	1.56	26	20	2029
	TOTAL CONSTRUCTION	1,045,202	0	1,045,202	4.38	45,798	25	1,358,388
	PROJECT TOTAL	1,045,202	0	1,045,202	4.38	45,798	25	1,358,388

KAISER ENGINEERS HANFORD
WESTINGHOUSE HANFORD COMPANY
JOB NO. L-234/F1431
FILE NO. L2348AB3

** TEST - INTERACTIVE ESTIMATING **
400 AREA SANITARY SEWER SYSTEM REPLACEMENT
CONCEPTUAL ESTIMATE REVISION #1
DOE_R06 - CONTINGENCY ANALYSIS BASIS SHEET

PAGE 7 OF 11
DATE 01/24/95 08:42:29
BY KDE/JJM/KLR

REFERENCE: ESTIMATE BASIS SHEET
COST CODE ACCOUNT SUMMARY

PAGE 3 OF 11
PAGE 4,5 OF 11

THE U.S. DEPARTMENT OF ENERGY - RICHLAND ORDER 5700.3 "COST ESTIMATING, ANALYSIS AND STANDARDIZATION"
DATED 3-27-85, PROVIDES GUIDELINES FOR ESTIMATE CONTINGENCIES. THE GUIDELINE FOR A CONCEPTUAL ESTIMATE
SHOULD HAVE AN OVERALL RANGE OF 15 TO 25% UP TO 40%

CONTINGENCY IS EVALUATED AT THE THIRD COST CODE LEVEL AND SUMMARIZED AT THE PRIMARY AND SECONDARY COST CODE
LEVEL OF THE DETAILED COST ESTIMATE.

ENGINEERING

COST CODE 020
WBS 110000
COST CODE 030
WBS 120000

DEFINITIVE DESIGN HAS A 20% CONTINGENCY APPLIED BASED ON UNCERTAINTIES WITH CONSTRUCTION SCOPE
AND UNCERTAINTIES WITH MAN POWER REQUIREMENTS TO COMPLETE DESIGN.

ENGINEERING INSPECTION HAS A 25% CONTINGENCY APPLIED BECAUSE THESE COST ARE BASED AS A
PERCENTAGE OF CONSTRUCTION AND CONSTRUCTION ALSO HAS A 30% CONTINGENCY APPLIED.

AVERAGE ENGINEERING CONTINGENCY 21%

CONSTRUCTION

COST CODE 460, 550, 600
WBS 320000

CONSTRUCTION ACTIVITIES HAVE A CONTINGENCY OF 25% APPLIED DUE TO LACK OF DETAIL AND DESIGN
AND POSSIBLE CHANGES IN CONSTRUCTION METHODS.

COST CODE 050
WBS 327710

A 25% CONTINGENCY WAS APPLIED TO CONSTRUCTION MANAGEMENT ACTIVITIES AS IT IS BASED AS A PERCENTAGE
OF CONSTRUCTION COSTS AND CONSTRUCTION ACTIVITIES HAVE A 25% CONTINGENCY APPLIED.

COST CODE 060
WBS 410000,
420000,
430000

PROJECT INTEGRATION HAS A 25% CONTINGENCY AS THESE COSTS ARE BASED AS A PERCENTAGE OF CONSTRUCTION
AND CONSTRUCTION ALSO HAS A 25% CONTINGENCY APPLIED.

AVERAGE CONSTRUCTION CONTINGENCY 25%

AVERAGE PROJECT CONTINGENCY 25%

KAISER ENGINEERS HANFORD
 WESTINGHOUSE HANFORD COMPANY
 JOB NO. L-234/F1431
 FILE NO. L2348AB3

** TEST - INTERACTIVE ESTIMATING **
 400 AREA SANITARY SEWER SYSTEM REPLACEMENT
 CONCEPTUAL ESTIMATE REVISION #1
 DOE_R07 - ONSITE INDIRECT COSTS BY WBS

PAGE 8 OF 11
 DATE 01/24/95 13:04:10
 BY KDE/JJM/KLR

WBS	DESCRIPTION	ESTIMATE SUBTOTAL	CONTRACT ADMINISTRATION %	TOTAL	BID PACK PREP.	OTHER INDIRECTS	TOTAL INDIRECTS
110000	DEFINITIVE DESIGN	105534	0.00	0	0	0	0
120000	ENGINEERING/INSPECTION	34230	0.00	0	0	0	0
320000	CONSTRUCTION - FIXED PRICE	684152	0.00	0	0	0	0
327710	CONSTRUCTION MANAGEMENT	154620	0.00	0	0	0	0
410000	PROJECT MANAGEMENT - DESIGN	22584	0.00	0	0	0	0
420000	PROJECT MANAGEMENT - E/I	23562	0.00	0	0	0	0
430000	PROJECT MANAGEMENT - CONSTRUCTION	20520	0.00	0	0	0	0

PROJECT TOTAL
 =====
 1,045,202
 =====
 0

PROJECT STATEMENT OF WORK
DEFINITIVE DESIGN AND CONSTRUCTION
PROJECT L 234

TITLE: 400 AREA EVAPORATIVE LAGOON

CLIENT: LANDLORD DIVISION, ICF KH

PREPARED BY: L. A. BAST

DATE: JANUARY 3, 1995

1.0 PROJECT SCOPE

Project L-234 will design and modify the sanitary treatment and disposal system for facilities in the 400 Area. Sanitary waste water from the 400 Area facilities will be routed through the existing septic system to three lined evaporative lagoons.

The existing seepage (infiltration) lagoon will be abandoned in accordance with applicable Washington State and local requirements.

2.0 DEFINITIVE DESIGN

Definitive design will be performed by an off-site A-E. The off-site A-E will provide all services related to the definitive design which includes the following:

- | | | |
|-------|--|-----------|
| 2.1 | Subsurface scanning for utilities and services interferences. | |
| 2.2 | Definitive Design documents. | |
| 2.3 | Construction Specification. | |
| 2.4 | Drawings: Estimated Numbers. | |
| 2.4.1 | Plans and profiles | 1 sheet. |
| 2.4.2 | Lagoon plan and sections | 2 sheets. |
| 2.4.3 | Lagoon details | 3 sheets. |
| 2.4.4 | Instrumentation details | 1 sheet. |
| 2.4.6 | Lagoon fencing details. | 1 sheet. |
| 2.4.7 | Cover, drawing key and symbol | 1 sheet. |
| Total | | 9 sheets. |
| 2.5 | Prepare a final detailed cost estimate and a fixed price construction contract fair cost estimate. | |

- 2.6 Evaluate construction bids.

3.0 CONSTRUCTION

Construction of the sanitary system will be performed by a fixed price contractor. The contract will be awarded, and managed by the design/build contractor. Engineering during construction and acceptance inspection will be performed by the design/build contractor.

- 3.1 The fixed-price contractor will provide all construction services to complete the work. A detailed but not all inclusive list is given below:
- 3.1.1 Install approximately 384 m (1,260 ft) of 20.32 cm (8 in.) PVC gravity sewer.
 - 3.1.2 Install one manhole with flow monitoring and control valving.
 - 3.1.3 Install three 0.99 hectare (2.45 acre) synthetic lined evaporative lagoons complete with lagoon control valving, and service roads.
 - 3.1.4 Provide and install instruments to measure and record inflows (precipitation and waste water), water level in the lagoons and outflow (evaporation), and hardware and software to conduct mass balance computations.
 - 3.1.5 Install approximately 850 m (2,800 ft) of 2.44 m (8 ft) high fence.
 - 3.1.6 Install one septic tank discharge screen.

General

- 3.1.7 Provide operator training for operation and maintenance of lagoons and appurtenance, pretreatment equipment, monitoring equipment, and mass balance computation.
- 3.1.8 Engineering during construction (i.e., preparation of ECN's, review vendor submittals, negotiate changes, provide technical direction, etc.)
- 3.1.9 As-builting of all construction drawings and specifications.
- 3.1.10 Prepare a System Operation and Maintenance manual.
- 3.1.11 Bid package preparation and award of fixed price work.
- 3.1.12 Contract management of the fixed price construction contractor.
- 3.1.13 Cost, budget, and schedule tracking and reporting.

3.1.14 Submittal documentation and handling.

3.1.15 Acceptance Inspection.

3.2 ICF KH will perform the following:

3.2.1 Final project turnover and closeout.

3.2.2 Overall project management.

4.0 REFERENCE

Project Program Management Plan, 400 Area Sanitary Sewer System Replacement, Project L-234.

5.0 ASSUMPTIONS/RISKS

5.1 All work will be performed in areas free of contamination (radiological, hazardous material etc.).

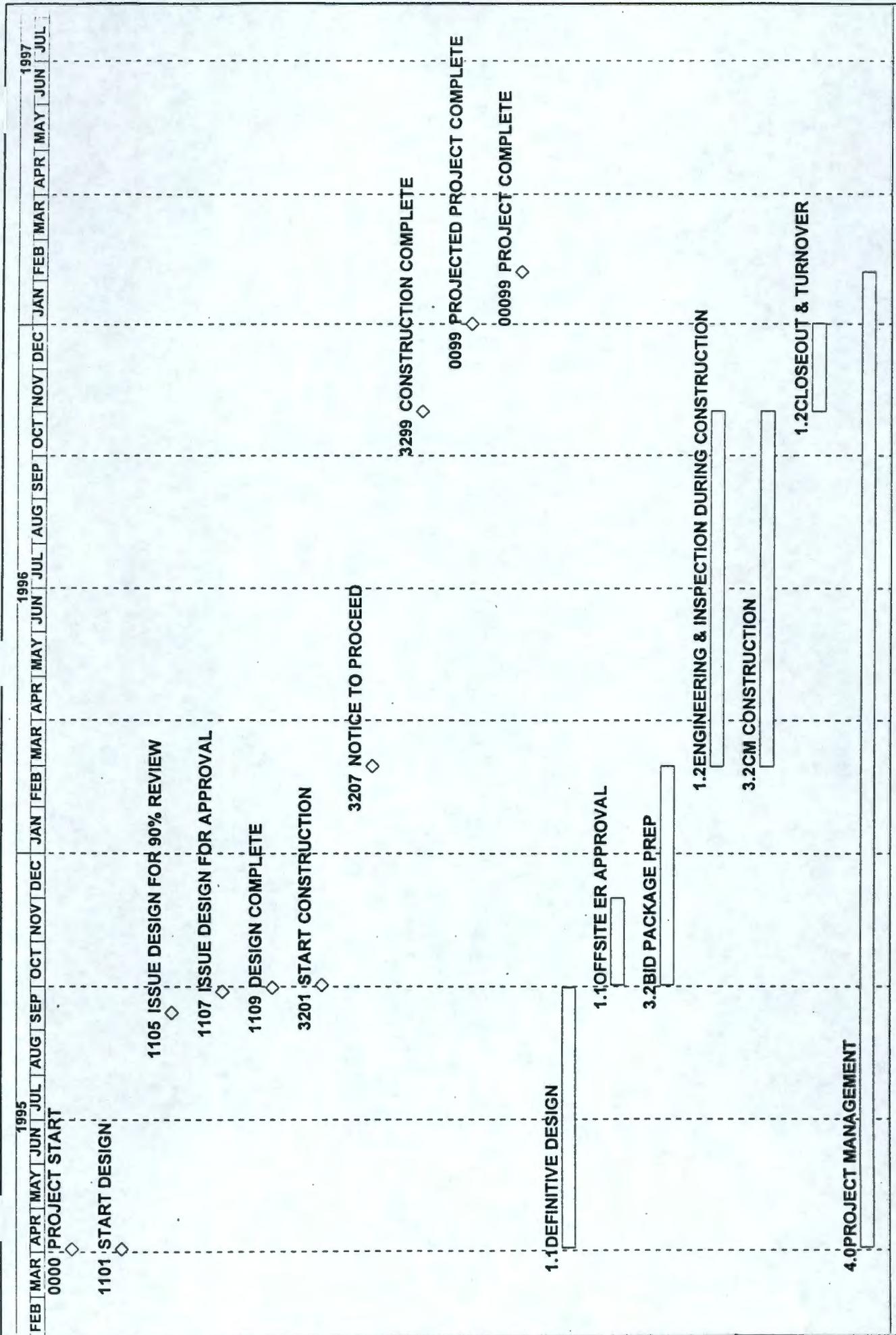
5.2 The existing sanitary septic tank is assumed to be free of any radiological and hazardous material contamination and in acceptable condition for project use.

6.0 SCHEDULE MILESTONES

6.1	Definitive Design Start	April 1995
6.2	Definitive Design (assume design only funding in FY 1995)	September 1995
6.3	Start Construction (bid package preparation)	October 1995
6.4	Offsite ER Approval	November 1995
6.5	Complete Construction	October 1996
6.6	Complete Project	December 1996

APPENDIX C

Baseline Project Schedule



Project Start	01JAN95	Early Bar	L234 400 AREA SANITARY SEWER REPLACEMENT L-234 BASELINE PROJ SCHEDULE, REV. 0	ICF KAISER HANFORD COMPANY Date: 1/31/95 Revision: [Signature] Checked/ Approved: [Signature]
Project Finish	05FEB97	Progress Bar		
Data Date	01JAN95			
Plot Date	06JAN95			

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APPENDIX D

Outline Specification

OUTLINE SPECIFICATION

DIVISION 2 - SITEWORK

Section 02200 Earthwork

1. Clearing and grubbing for lagoon sites.
2. Material for structural and common fill.
3. Compaction.
4. Excavation of utility trenches.
5. Structural excavation for lagoon sites.
6. Rip-rap: Machine placed for slope protection of treatment lagoon berms.

Section 02730 Sanitary Sewerage

1. Bedding for flexible pipe: Sand, ASTM D 653.
2. Gate pit structure.
3. PVC gravity sewer pipe with gaskets: ASTM D 3034.
4. Lagoon distribution boxes.

Section 02774 Sewage Lagoons

1. Synthetic liner - One of the following:
 - a. Chlorosulfonated polyethylene liner, 36 mil.
 - b. High density polyethylene Liner, 60 mil.
 - c. Reinforced polypropylene liner, 45 mil.
2. Lagoon level monitors: Manually read staff gauge.
3. Lagoon influent flow measurement, ISCO flow meter.
4. Measurement and control system: Campbell Scientific.

Section 02831 Chain Link Fences and Gates

1. Fence fabric: Galvanized, 11 gage.
2. Posts and accessories.
3. Fence height: 2.44 m (8 feet).

Section 02900 Landscaping

1. Ground cover: Hydroseeding with native species.

DIVISION 3 - CONCRETE

Section 03300 Cast-in-place Concrete

1. Concrete strength: 3000 psi at 28 days.
2. Concrete formwork.
3. Reinforcing steel: Deformed bars, ASTM A 615.

DIVISION 5 - METALS

Section 05500 Metal Fabrications

1. Rolled steel shapes, plates, and bars: ASTM A 36.
2. Bolts: ASTM A 307 with compatible nuts and washers.
3. Expansion anchors: Hilti Kwik Bolt II.

Section 05530 Gratings

1. Metal floor grating for distribution boxes.

DIVISION 11 - EQUIPMENT

Section 11330 Screening and Grinding Equipment

1. Septic tank effluent screen.

APPENDIX E

Energy Conservation Report and Analysis

No electrical power is required for Project L-234. All instrumentation is self-contained and battery operated.

APPENDIX F

Preliminary Safety Evaluation

The construction and operation of the proposed project involves safety hazards that are routinely encountered. Formal safety analysis and evaluation is not required. Safety reviews performed during the normal planning, design and execution of the project will mitigate identified hazards associated with construction and operations.

APPENDIX G

Physically Handicapped Assessment

A physically handicapped assessment is not required for this project.

APPENDIX H

Plant Forces Work Review

A plant forces work review is not required for this project. All construction work is covered by the Davis-Bacon Act.