Mission Support Alliance Hanford Site Sanitary Sewer System Design Description

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Mission Support Alliance

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Richland, Washington 99352

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<thead>
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<td>SW Callison 7/17/18</td>
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Mission Support Alliance Hanford Site Sanitary Sewer System Design Description

(INFRA-SNS)

Prepared by: S.W. Callison, P.E.
Mission Support Alliance Sanitary Sewer Design Authority
Richland, Washington

July 2018
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1.0 Introduction

This System Design Description (SDD) provides an overview of the Department of Energy (DOE) Hanford Site sanitary sewer system operated by Mission Support Alliance (MSA). This SDD was prepared to the DOE standard, DOE-STD-3024-2011, *Content of System Design Descriptions*. This SDD contains only the components of the Hanford Site sanitary sewer system managed by MSA.

1.1 System Identification

The sanitary sewer system is identified by the Hanford Site document control and management system (DCMS) code of INFRA-SNS. The sanitary sewer systems operated by MSA include multiple septic tank and drain field systems, sewage storage tank systems, a sewage treatment lagoon, a sludge or bio-solids treatment facility, networks of sewage collection piping and pumping/lift stations, and sewage pumping trucks.

1.2 Limitations

The sanitary sewer system is a non-nuclear, non-safety class, general service system. This SDD applies to the system as it exists and is configured at the current date. The SDD is a living document and is anticipated to become more detailed and thorough with each proceeding revision. Sections that are not complete as applicable may be completed with later document revisions. Sections that are not applicable to the sanitary sewer system are indicated as not applicable.

1.3 Ownership

The sanitary sewer system is owned by the DOE and is operated by MSA. This SDD does not include other DOE contractor operated sanitary sewer systems. The owner of this SDD is the MSA Design Authority (DA) for the sanitary sewer system. As information is made available the DA will add to, change, or enhance the document.

1.4 Definitions/Glossary

**Approval**: Written approval.

**Design flow**: The maximum volume of sewage a residence, structure, or other facility is estimated to generate in a twenty-four-hour period. It incorporates both an operating capacity and a surge capacity for the system during periodic heavy use events. The sizing and design of the on-site sewage system components are based on the design flow.

**Drain field**: See subsurface soil absorption system (SSAS) and soil dispersal component.

**Effluent**: The liquid discharged from a septic tank or other on-site sewage system component.

**Greywater**: Domestic type waste water flows from bathtubs, showers, bathroom sinks, washing machines, dishwashers, and kitchen or utility sinks. Greywater does not include flow from a toilet or urinal.
**Holding tank**: A sewage tank that is a component of an on-site sewage system designed to receive and temporarily store sewage from one or more facilities or dwellings for removal, dispersal, and ultimate disposal of the sewage at another location.

**Influent**: Domestic sewage entering a sewage treatment/disposal system.

**Maintenance**: The actions necessary to keep the sewage system components functioning as designed.

**Monitoring**: Periodic or continuous checking of a sewage system, which is performed by observations and measurements, to determine if the system is functioning as intended and if system maintenance is needed. Monitoring also includes maintaining accurate records that document monitoring activities.

**On-site sewage system (OSS)**: An integrated system of components, located on or nearby the property it serves, that conveys, stores, treats, and/or provides subsurface soil treatment and dispersal of sewage. It consists of a collection system, a treatment component or treatment sequence, and a soil dispersal component. An on-site sewage system also refers to a holding tank sewage system or other system that does not have a soil dispersal component.

**Operator**: A person who is responsible for operating a sewage system and ensuring that it consistently and reliably treats sewage according to the terms and conditions of the operating permit, and who meets the requirements in the applicable Washington Administrative Code (WAC).

**Pumper**: A person that removes and transports sewage or septage from on-site sewage systems.

**Record drawing**: An accurate graphic and written record of the location and features of the sewer system that are needed to properly monitor, operate, and maintain that system.

**Sanitary or domestic sewage**: Urine, feces, and the water carrying human wastes, including kitchen, bath, and laundry wastes from residences, nonresidential buildings such as offices, commercial establishments, or other buildings, excluding industrial wastewater and storm water.

**Septage**: The mixture of solid wastes, scum, sludge, and liquids pumped from within septic tanks, pump chambers, holding tanks, and other sewer components.

**Septic tank**: A watertight treatment receptacle receiving the discharge of sewage from a building sewer or sewers, designed and constructed to permit separation of settleable and floating solids from the liquid, detention and anaerobic digestion of the organic matter, prior to discharge of the liquid.

**Septic system**: See on-site sewage system or OSS.

**Sewage**: Urine, feces, and the water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments or other places.

### 1.5 Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOD</td>
<td>Biochemical oxygen demand, typically expressed in mg/L.</td>
</tr>
<tr>
<td>CBOD</td>
<td>Carbonaceous biochemical oxygen demand, typically expressed in mg/L.</td>
</tr>
</tbody>
</table>
2.0 General Overview

2.1 System Functions/Safety Functions
The sanitary sewer system does not perform a safety function. The system functions as a sanitary sewage transport, treatment, and disposal system. The system is made up of multiple separate independent sub-systems.

2.2 System Classification
The sanitary sewer system is a non-nuclear, non-safety class, general use site system.

2.3 Basic Operational Overview
The MSA managed sanitary sewer system consists of the following

- Multiple septic tank and drain field systems throughout the Hanford Site.
- The 200 West Sewage Treatment Facility (200W Lagoon).
- The 6608 sludge or bio-solids handling facility.
- Multiple sewage holding tanks.
- Pressurized and gravity fed sewer piping including manholes.
- Sewage lift stations.
- Sewage pumper trucks.
The majority of the sanitary sewer system is shown on Figures 1 and 2. Figure 1 shows the 200 East systems. Figure 2 shows the 200 West systems including the sewage treatment lagoon (200W Lagoon). The yellow highlighted MO designations on Figures 1 and 2 indicate mobile office locations with above ground integrated sewage holding tanks that are not required to be permitted with the Washington State Department of Health (DOH). The 200W Lagoon currently receives sewage entirely by pumper truck from sewage holding tanks and from other sewer systems that are undergoing repair or upgrade activities.

Not shown are the other relatively few smaller sewage systems (holding tanks and septic tanks and drain fields) located in the 100, 400, and 600 Areas of the Hanford Site.
Figure 1 – 200 East Sanitary Sewer System
Figure 2 – 200 West Sanitary Sewer
3.0 Requirements and Bases

This section documents the requirements and constraints of the sanitary sewer system.

3.1 Requirements


Washington Administrative Code (WAC) 173-216, State Waste Discharge Permit Program

WAC 173-230, Certification of operators of wastewater treatment plants

WAC 173-240, Submission of plans and reports for construction of wastewater facilities

WAC 246-272A, B, and C, On-site sewage systems, Large on-site sewage systems, and On-site sewage system tanks, respectively.

3.2 Bases

The basis of the regulatory requirements listed in Section 3.1 is to provide for adequate transfer, treatment, and disposal of sanitary sewage to protect human health and the environment.

3.3 References

In addition to the requirement references listed in Section 3.1 there are individual sewer system permits issued by the Washington State Department of Ecology and the Washington State Department of Health. These permits flow the requirements into the system operating procedures and regulatory agency approved operating and maintenance (O&M) manuals.

System operating and maintenance manuals and permit references are included in Table 1.

Additionally, a 200 East sewer network is under construction (L-853 and L-854 projects) that will decommission numerous septic systems and transport 200 East sewage directly to the 200W Lagoon for treatment and disposal. This sewer network will be regulated by Ecology under the existing 200W Lagoon operating permits and is in accordance with the Ecology approved 200 East General Sewer Plan (HNF-55909).
### 3.4 General Requirements

#### 3.4.1 System Functional Requirements

The sanitary sewer system transports, treats, and disposes sanitary sewage in accordance with applicable regulatory requirements and in accordance with contractual requirements. Applicable requirements are flowed down into individual project design, construction and operating permits and system operating documents. Sewer system contract requirements are included in Mission Support Contract DE-AC06-09RL14728, Section C, Modification 474, and Section C.2.2.10. Contract requirements include operating and maintaining the system in accordance with the applicable regulations (e.g. DOH and Ecology). System requirements are in Section 3.1.

#### 3.4.2 Subsystems and Major Components

There are no unique subsystem or major component requirements beyond those already discussed for the sanitary sewer system.

#### 3.4.3 Boundaries and Interfaces

The sanitary sewer system interfaces with the electrical power system and with facilities or buildings. The electrical system interfaces are associated with sewage pumping, monitoring, and control.

The boundary between the electrical system and the sewer system is at the sewer system component electrical control panel. Typically, there is an electrical disconnect switch located at the sewer component control panel. The boundary between the system is at the electrical disconnect switch. In the few cases where there is no disconnect switch, the boundary is at the controlling component building circuit breaker.

The boundary between the sanitary sewer system and the facility or building is at the location where the building sewer connects to the sanitary sewer system and is typically immediately outside the building footprint.

#### 3.4.4 Codes, Standards, and Regulations

See Section 3.1.

#### 3.4.5 Operability

The sanitary sewer system is non-nuclear system and does not have technical safety requirements (TSRs).

### 3.5 Specific Requirements

#### 3.5.1 Radiation and Other Hazards

The sanitary sewer system is a non-radiological system. Hazards associated with the sanitary sewer system are typical industrial workplace hazards covered by the Occupational Safety and Health Administration (OSHA).
3.5.2 As Low As Reasonably Achievable

The sanitary sewer system is a non-radiological system. This section is generally not applicable, however the system is designed to keep worker exposure to potential physical hazards and biological hazards as low as reasonably achievable. Design features toward this goal include fall protection grating and pump access features that do not require personnel to enter confined sewage contaminated spaces to access a pump (e.g. pump access rails and lifting cables). See section 3.5.4.

3.5.3 Nuclear Criticality Safety

The sanitary sewer system is a non-nuclear system. This section is not applicable.

3.5.4 Industrial Hazards

Designs for new sewer system components (e.g. sewage lift stations and tanks) with potential confined spaces should be designed to the extent practical so that personnel do not need to enter the confined space to repair, replace, or maintenance system equipment. Examples include pump guide rails that allow for the removal and installation of pumps from the outside of the confined space. Another example is electrical penetrations into the lift station within arm’s reach of the confined space entrance (< 24 inches).

Designs of components with potential fall hazards (e.g. lift stations and tanks) with potential fall hazards should be designed to protect personnel from falls. Examples include lift station and tank access hatches with built in grate covers that allow access but protect against fall hazards.

Designs of components with electrical hazards should be designed to separate low (less than 50 volts) and high voltage components into separate control panels. Electrical disconnect switches should be placed adjacent to sewer system electrical control panels.

Other general worker safety standards are included in MSC Worker Safety and Health Program, MSC-MP-32219.

3.5.5 Operating Environment and Natural Phenomena

The sanitary sewer system is predominantly an outdoor system with components located both above and below the ground surface in both sewage and non-sewage environments. Outdoor system components shall be designed to be weather resistant and operate in year round Hanford Site outdoor temperatures and conditions. System components in contact with sewage shall be designed to resist sewage corrosion.

3.5.6 Human Interface Requirements

Above and below grade sewer system components should be designed such that they are protected from vehicle traffic. Protection for above grade components may include vehicle bollards, vehicle barricades, ecology blocks, or other suitable means of protection.

New sewer components with electrical panels and sewage level controls should be equipped with an internet capable (wireless or wired) communication system that allows remote internet based
system monitoring including internet, email and cellular phone alarm notifications. Alarm notifications include high sewage level alarms, power failure, and pump failure alarms.

3.5.7 Specific Commitments

The sanitary sewer system does not have any unique or special commitments.

3.6 Engineering Disciplinary Requirements

3.6.1 Civil and Structural

The sanitary sewer system typically involves the civil engineering discipline following regulatory agency guidance and design criteria (previously referenced) to design sewage pipeline networks, sewage loading, drain field capacities, lift stations, treatment capacities, system upgrade designs, and troubleshooting activities. Additionally the civil/environmental discipline is needed for the 200W Lagoon waste water treatment facility. This discipline is needed to troubleshoot treatment problems (if any) and to modify the treatment capacity of the facility.

The sanitary sewer system generally has few building structures. Design of building facilities requires the structural engineering discipline for any new planned buildings using typical occupied building criteria (e.g. International Building Code).

3.6.2 Mechanical and Materials

Limited mechanical engineering is necessary for the sanitary sewer system for assessing sewage pump replacement and new sewage pump applications. Provided with the correct information this activity generally can be performed by engineers with sewage pump manufacturers and distributors.

The mechanical engineering discipline would be required to troubleshoot or modify the existing 6608 sewage solids handling facility. The design of new sewage system related buildings with heating, ventilation, and air conditioning (HVAC) systems would require the mechanical engineering discipline.

3.6.3 Chemical and Process

The chemical and process engineering disciplines are not anticipated to be necessary for the sanitary sewage system.

3.6.4 Electrical Power

The sanitary sewer systems requires electrical power primarily for system pumps and controls. There are no specific electrical requirements unique to the sanitary sewer system. The electrical engineering discipline is necessary for the system when designing new or upgrading existing sewage pump/lift stations. Examples of electrical engineering activities include electrical drops and electrical control panels. Additionally new or modifications to sanitary sewer system related buildings require the electrical engineering discipline.
3.6.5 Instrumentation and Control

The sanitary sewer system requires the instrumentation and control engineering discipline. New and upgraded sewage lift stations and dosing chambers are currently being installed with off-the-shelf internet based communication, monitoring and control equipment. The sanitary sewer system is a non-nuclear system, so there are no TSRs associated with the system.

Construction activities for the 200 East sewer system consolidation is ongoing. The consolidation will combine the sewage flow from multiple stand-alone drain field systems into a sewer network with sewage rerouted from the drain field systems to the existing 200W Lagoon treatment facility.

3.6.6 Computer Hardware and Software

The sanitary sewer system instrumentation and control will use commercial off-the-shelf hardware and software for system monitoring, recording, reporting, alarming, and communications. The hardware and software engineering discipline is not anticipated necessary for the sanitary sewer system.

3.6.7 Fire Protection

The sanitary sewer system does require fire protection engineering. In addition to fire protection requirements associated with building code requirements, there is an NFPA standard 820 specifically for wastewater treatment and collection facilities. MSA fire protection engineering is in the process of evaluating the standard to determine applicability to the sanitary sewer system.

3.7 Testing and Maintenance Requirements

3.7.1 Testability

The sanitary sewer system is an active system regulated by regulatory agency (Ecology or DOH) requirements and operating permits. Inspection and maintenance (testing) requirements are specified by permit and flowed down into O&M manuals and maintenance procedures.

3.7.2 TSR-Required Surveillances

The sanitary sewer system is a non-nuclear system. There are no TSR required surveillances. This section is not applicable.

3.7.3 Non-TSR Inspections and Testing

As mentioned in Section 3.7.1, the sanitary sewer system is an Ecology and a DOH regulated system enforced by agency issued operating permits with inspection and testing (operating and maintenance) requirements. These permit requirements are flowed down into regulatory agency approved O&M manuals are further flowed down in maintenance procedures.
3.7.4 Maintenance

The sanitary sewer system is an active system regulated by regulatory agency (Ecology or DOH) requirements and operating permits. Minimum inspection and maintenance requirements are specified by permit and flowed down into O&M manuals and maintenance procedures. Maintenance requirements are included in the O&M manuals for each system and are flowed into maintenance procedures. A list of existing system maintenance procedures is in Appendix C, Table C-1.

The 6608 sludge or bio-solids handling facility is being readied to treat the first batch of sludge from the 200W Lagoon system. As a result, a list of operating and maintenance procedures is being developed for the facility. The list of procedures under development for the facility is included in Appendix C, Table C-2.

Additionally, new maintenance procedures are being developed for the systems associated with the ongoing sewer consolidation projects. Those procedures will be included in future revisions to the this SDD.

3.8 Other Requirements

3.8.1 Security and Special Nuclear Material Protection

This section is not applicable to the sanitary sewer system.

3.8.2 Special Installation Requirements

There are no special installation requirements for the sanitary sewer system beyond the requirements already listed.

3.8.3 Reliability, Availability, and Preferred Failure Modes

All new sanitary sewer pumping locations should be equipped with a minimum of two duplicate pumps and with a communication system to indicate system alarms to operating personnel.

3.8.4 Quality Assurance

The sanitary sewer system is generally a quality level zero system. Exceptions include sewage pumps and electrical control panels. These components are considered quality level 3 components of the system. The sewer consolidation projects are being constructed under quality level 3.

Quality classes for items used within the system are determined using a graded approach as outlined in MSC-PRO-QA-259, Graded Approach.

The requirements of MSC-OTHER-QA-26661, MSA Quality Assurance Program Plan and MSC-PLN-QA-599, Quality Assurance Program Description shall apply to all new construction within the system. New construction activities are typically quality level 3 activities.

3.8.5 Miscellaneous Requirements

This section will be updated as appropriate requirements are determined.
4.0 System Description

The MSA managed sanitary sewer system at Hanford is comprised of a combination of the following: a centrally located sewage treatment and evaporative lagoon in 200W (200W Lagoon) including a sludge or bio-solids handling facility, several localized (large) on-site septic systems with drain fields, several in-ground or above-ground holding tanks, and a collection system including lift stations and manholes. Each of these play an integral role in the collection and treatment of sanitary sewage at Hanford. Historically, sewage treatment has been a decentralized approach, utilizing the localized drain fields to support site wide operations.

There are 21 active permitted subsurface soil absorption systems (drain fields) managed by MSA. In addition, there are 5 permitted holding tanks managed by MSA. There are 4 unpermitted septic tank and drain field systems that are grandfathered and therefore do not require DOH permits that are managed by MSA.

4.1 Configuration Information

4.1.1 Description of System, Subsystems, and Major Components

Each of the sewer systems is described in detail in an operations and maintenance (O&M) manual for each of the systems. Table 1 below contains a listing of the MSA managed sewer systems with O&M manual and permit references.
Table 1. MSA Managed Sewage Systems

<table>
<thead>
<tr>
<th>Permit</th>
<th>O&amp;M Manual</th>
<th>System Name</th>
<th>Permit Flow (gpd)</th>
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<tbody>
<tr>
<td>ST0045514</td>
<td>HNF-52451</td>
<td>200-W Evaporative Sewer Lagoon</td>
<td>55,000 averaged annually</td>
</tr>
<tr>
<td>HAN003</td>
<td>HNF-4813</td>
<td>Area 200-E, (Project W-519) 2 Doublewide Trailers, HTSS</td>
<td>230</td>
</tr>
<tr>
<td>HAN011</td>
<td>HNF-19063</td>
<td>Area 200-W, (2607-W16) Project L-338, OSS. Also includes the converted 2607-WL Holding Tank.</td>
<td>14500</td>
</tr>
<tr>
<td>HAN012</td>
<td>HNF-13057</td>
<td>Area 600, Yakima Barricade (6607-07) (Bldg 604A) HTSS</td>
<td>103</td>
</tr>
<tr>
<td>HAN013</td>
<td>HNF-58402</td>
<td>Area 200-W, MO-906 Sewage Holding Tank</td>
<td>3000</td>
</tr>
<tr>
<td>HAN035</td>
<td>HNF-33882</td>
<td>Area 600, (6607-19) HAMMER EVOC Facility, OSS</td>
<td>378</td>
</tr>
<tr>
<td>HAN041</td>
<td>HNF-57808</td>
<td>Area 200-E, HWVP Holding Tank, MO-730, HTSS</td>
<td>3000</td>
</tr>
<tr>
<td>HAN043</td>
<td>HNF-11325</td>
<td>Area 200-E, (6607-11) Project B-595 HWVP, OSS</td>
<td>11820</td>
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<tr>
<td>HAN044</td>
<td>HNF-57806</td>
<td>Area 200-E, (6607-16) Project C-018H (Bldg 242-A), OSS</td>
<td>5000</td>
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<tr>
<td>HAN045</td>
<td>HNF-48879</td>
<td>Area 200-E, (6607-13) Project 200-E Unsecured Area, OSS</td>
<td>2850</td>
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<tr>
<td>HAN046</td>
<td>HNF-57807</td>
<td>Area 200-E,(6607-17)(Bldg 6291)Conoco Fueling Station, OSS</td>
<td>50</td>
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<td>HAN047</td>
<td>HNF-4766</td>
<td>Area 200-W, (2607-W1) Project L-169, 1-OSS</td>
<td>14500</td>
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<tr>
<td>HAN049</td>
<td>HNF-2334</td>
<td>Area 200-E, (2607-EF: EL,EM,EN,EQ,EP), OSS</td>
<td>14500</td>
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<tr>
<td>HAN050</td>
<td>WHC-SW0172-OMM-001</td>
<td>Area 200-E, (2607-E12) (Bldgs 272-AW,242-A,Trailers), LOSS</td>
<td>6700</td>
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<tr>
<td>HAN051</td>
<td>WHC-SW0219-OMM-001</td>
<td>Area 200-W, (2607-W10) Project W-219, OSS</td>
<td>1900</td>
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<td>HAN052</td>
<td>WHC-SW0219-OMM-001</td>
<td>Area 200-W, (2607-W11) Project W-219, OSS</td>
<td>1300</td>
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<td>HAN054</td>
<td>WHC-SW0299-OMM-001</td>
<td>Area 200-E, (2607-E10) Grout Processing Facility, OSS</td>
<td>1100</td>
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<td>HAN055</td>
<td>WHC-SW0192-OMM-001</td>
<td>Area 200-E, (2607-EQ) Project L-092, OSS</td>
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<td>HAN062</td>
<td>WHC-SW0190-OMM-001</td>
<td>Area 200-W, (2607-WA) Project L-190, 2-OSS</td>
<td>1300</td>
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<td>HAN063</td>
<td>WHC-SW0218-OMM-001</td>
<td>Area 200-E,(2607-E8-A),(Bldg 2750-E, Adjacent Facility),OSS</td>
<td>14500</td>
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<td>HAN064</td>
<td>HNF-57804</td>
<td>Area 200-W, (2607-W14) (Project W-026) WRAP, OSS</td>
<td>2530</td>
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<td>HAN065</td>
<td>HNF-57805</td>
<td>Area 200-W, (2607-W15), Solid Waste Operations Complex, OSS</td>
<td>2700</td>
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<tr>
<td>HAN068</td>
<td>HNF-8845</td>
<td>Area 200-W, (2607-W6) ERDF DF Replacement 222-S, LOSS</td>
<td>13285</td>
</tr>
<tr>
<td>HAN071</td>
<td>HNF-57802</td>
<td>Area 200-E, (2607-E1A) Central Core SS Replacement, LOSS</td>
<td>14500</td>
</tr>
<tr>
<td>HAN074</td>
<td>RPP-53465</td>
<td>Area 200-E, (MO-143), HTS</td>
<td>2250</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>Area 100-B, 1607-B6 OSS, tank volume ~1,300 gallons</td>
<td>NA</td>
</tr>
<tr>
<td>Permit</td>
<td>O&amp;M Manual</td>
<td>System Name</td>
<td>Permit Flow (gpd)</td>
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<tr>
<td>--------</td>
<td>------------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>Area 600, 6607-5 OSS (616 Building), tank vol. ~1,000 gallons</td>
<td>NA</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>600 Area, 6607-6 OSS (Wye barricade), tank vol. ~1,250 gal.</td>
<td>NA</td>
</tr>
<tr>
<td>NA</td>
<td>NA</td>
<td>600 Area, 6607-8 OSS (251-S substation), tank vol. ~1,000 gal.</td>
<td>NA</td>
</tr>
</tbody>
</table>

4.1.2 **Boundaries and Interfaces**

The primary interface for the sanitary sewer system is with the electrical system. If present, the boundary between the two systems are the electrical disconnect switches between the electrical power source and the sewer system control panels. If not present, the boundary is the circuit breaker controlling the control panel.

Another system interface is facilities or buildings. The boundary between the sewer system and buildings is at the location where the building sewer flows into the sewer system and is generally immediately outside the building footprint.

4.1.3 **Physical Layout and Location**

The physical layout and location of the sanitary sewer system is shown in the referenced O&M manuals and on Figures 1 and 2.

4.1.4 **Principles of Operation**

The detailed principles of operation of each sanitary sewer system are included in the referenced O&M manuals.

4.1.5 **System Reliability Features**

Sanitary sewer system reliability features for newer sewage lift stations include backup mechanical floats and dual pumps. The backup floats provide for pump activation (both on and off) in the event that acoustic level transducer malfunctions. The dual pump design allows for continued sewage pumping in the event that one of the pumps becomes inoperable.

Additional reliability features include an active fleet of sewage pump trucks. These trucks can be mobilized in the event that a portion of the sewage collection becomes inoperable.

Additionally the 200W Lagoon treatment facility has two treatment trains that can be operated separately or simultaneously.

4.1.6 **System Control Features**

4.1.6.1 **System Monitoring**

The sanitary sewer system has remote and local monitoring capabilities. Newer sewer lift stations are equipped with an internet based wireless communication system that reports system
alarms (e.g. sewage levels and pump failures). The system is also a data recorder. It records sewage volumes, pump times and other system information. The information is available over the internet and is also available at the applicable lift station control panel.

4.1.6.2 Control Capability and Locations

Control of the 200W Sewage Lagoon facility is manually operated by the operator located at the facility.

Control of sewage lift stations is through adjacent control panels.

4.1.6.3 Automatic and Manual Actions

The 200W Sewage Lagoon facility is operated manually by the operator opening valves, operating pumps and aerators.

Sewage lift stations are operated automatically by adjacent control panels. The specific control panel settings for lift station are included in the applicable O&M manual and/or maintenance procedures.

4.1.6.4 Set points and Ranges

Sanitary sewer system set points and ranges are provided in applicable system O&M manuals and/or in applicable maintenance procedures.

4.1.6.5 Interlocks, Bypasses, and Permissives

No interlocks, bypasses, or permissives have been identified for the sanitary sewer system.

4.2 Operations

System operations details are included in the applicable O&M manuals and procedures. Operating and maintenance procedures are listed in Appendix C, including procedures currently under development.

4.2.1 Initial Configuration (Pre-startup)

The sanitary sewer system is not governed by a safety basis. Initial configuration requirements, if any, are included in the applicable O&M manuals and maintenance procedures.

4.2.2 System Startup

See applicable O&M manual and procedures.

4.2.3 Normal Operations

See applicable O&M manual and procedures.

4.2.4 Off-Normal Operations

See applicable O&M manual and procedures.
4.2.5 System Shutdown

See applicable O&M manual and procedures.

4.2.6 Safety Management Programs and Administrative Controls

The presence of an electrician is required for accessing high voltage equipment associated with the sanitary sewer system. Applicable Hanford site lock and tag implementing procedures are used when working on systems with stored energy potential.

Other general worker safety standards are included in *MSC Worker Safety and Health Program, MSC-MP-32219*.

4.3 Testing and Maintenance

Testing and maintenance activities are included in the applicable O&M manuals and in maintenance procedures. As discussed in previous sections a listing of maintenance procedures is included in Appendix C, Tables C-1 and C-2. Table C-1 contains existing procedures. Table C-2 is a listing of procedures being developed for the 6608 sludge or bio-solids handling facility.

4.3.1 Temporary Configurations

There are generally no temporary configurations associated with the sanitary sewer system. Occasionally during repair or equipment upgrade activities a temporary configuration may include the isolation of sewage lines and/or sewage lift stations with the use of temporary self-contained sewage facilities and/or the use of sewage pump trucks.

4.3.2 TSR-Required Surveillances

There are no TSR required surveillances for the sanitary sewer system.

4.3.3 Non-TSR Inspections and Testing

Non-TSR inspections and testing are performed to meet regulatory requirements. These inspections and testing activities are included in the applicable O&M manual and in periodic maintenance procedures. Additionally, an annual assessment is performed on an aspect of the system.

4.3.4 Maintenance

System maintenance activities are included in the applicable O&M manuals and in maintenance procedures. As discussed in previous sections a list of maintenance procedures is included in Appendix C.

4.3.4.1 Post-Maintenance Testing

Post-maintenance testing is included as necessary in the applicable maintenance procedure.
4.3.4.2 Post-Modification Testing

Post-modification testing as determined necessary is performed within the modification work package for the modified system component.

4.4 Supplemental Information

There is no supplemental information for the sanitary sewer system.
Appendix A

Source Documents


NOC Order DE12NWP-001, *Non-Radioactive Air Emissions Notice of Construction Approval Order Conditions and Restrictions, Rev. 2*


WAC 246-272A – *Washington Administrative Code, On-Site Sewage Systems*

WAC 246-272B – *Washington Administrative Code, Large On-Site Sewage System Regulations*

WAC 246-272C – *Washington Administrative Code, On-site Sewage System Tanks*


Appendix B

System Drawings

<table>
<thead>
<tr>
<th>System Number</th>
<th>Electrical Sub Component</th>
<th>System Type</th>
<th>Area</th>
<th>Drawing Numbers – Essential Drawings are indicated with an * (others are reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1607-B6</td>
<td>None</td>
<td>Drain Field</td>
<td>100B</td>
<td>H-1-13050 W-71192</td>
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<tr>
<td>6607-17</td>
<td>None</td>
<td>Drain Field</td>
<td>200E</td>
<td>H-2-815024 H-2-815025</td>
</tr>
<tr>
<td>2607-E10</td>
<td>2607-E10 LS Pumped DC</td>
<td>Drain Field</td>
<td>200E</td>
<td>H-2-140591 H-2-77720 SK-2-56597</td>
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<tr>
<td>System Number</td>
<td>Electrical Sub Component</td>
<td>System Type</td>
<td>Area</td>
<td>Drawing Numbers – Essential Drawings are indicated with an * (others are reference)</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------</td>
<td>-------------</td>
<td>------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2607-E15 W-519 (Vit)</td>
<td>High Alarm Panel</td>
<td>Holding Tank</td>
<td>200E</td>
<td>ES-W 519-1</td>
</tr>
<tr>
<td>HWVP</td>
<td>High Alarm Panel</td>
<td>Holding Tank</td>
<td>200E</td>
<td>H-2-83944</td>
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<tr>
<td>MO-143 HT</td>
<td>High Alarm Panel</td>
<td>Holding Tank</td>
<td>200E</td>
<td>H-2-836455  H-2-836456</td>
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<tr>
<td>MO-906 HT</td>
<td>High Alarm Panel</td>
<td>Holding Tank</td>
<td>200W</td>
<td>No drawings identified.</td>
</tr>
<tr>
<td>System Number</td>
<td>Electrical Sub Component</td>
<td>System Type</td>
<td>Area</td>
<td>Drawing Numbers – Essential Drawings are indicated with an * (others are reference)</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------</td>
<td>-------------</td>
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</table>
| 2607-W1       | 26207-W3 LS Pumped DC    | Drain Field | 200W   | ECN-161702
H-2-2481
H-2-16018
H-2-44511-99
H-2-44511-107 |
| 2607-W10      | 278WA LS                 | Drain Field | 200W   | ECN-W282-001
ECN-W282-002 |
| 2607-W11      | None                     | Drain Field | 200W   | H-2-83652
H-2-83653 |
| 2607-W12      | None                     | Drain Field | 200W   | H-2-83654
H-2-85189
H-2-815170 |
| 2607-W14      | None                     | Drain Field | 200W   | H-2-131741
H-2-131746 |
| 2607-W15      | Solar valve panel        | Drain Field | 200W   | H-2-823057
H-2-823058
H-2-823060 |
| 2607-W16      | 2607-Z LS Pumped DC      | Drain Field | 200W   | H-2-44511-94
H-2-93690
H-2-829505
H-2-829506
H-2-829507
H-2-829508
H-2-829509 |
| 2607-W6       | MO-291 LS 2713 LS Pumped DC | Drain Field | 200W   | H-2-5140
H-2-5153
H-2-5154
H-2-38691
H-2-38750
H-2-44511-20
H-2-46555 |
| 2607-WA       | None                     | Drain Field | 200W   | H-2-777848
H-2-777849
H-2-77850 |
| 6607-9        | 6607-2 LS Pumped DC      | Drain Field | 200W   | H-6-1676
H-6-1702
H-2-827640 |
| 6607-8        | None                     | Drain Field | 600 - 200W Substation | H-6-1550
H-2-834501 |
<p>| 6607-19       | None                     | Drain Field | 600 - Hammer | H-6-15834 |</p>
<table>
<thead>
<tr>
<th>System Number</th>
<th>Electrical Sub Component</th>
<th>System Type</th>
<th>Area</th>
<th>Drawing Numbers – Essential Drawings are indicated with an * (others are reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6607-5</td>
<td>None</td>
<td>Drain Field</td>
<td>600- 616 Building</td>
<td>H-6-1552</td>
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<tr>
<td>6607-6</td>
<td>None</td>
<td>Drain Field</td>
<td>600 - Wye</td>
<td>H-6-5350</td>
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<tr>
<td>6607-7</td>
<td>Solar Alarm Panel</td>
<td>Holding Tank</td>
<td>600 -</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yakima</td>
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<tr>
<td>200 West</td>
<td>Numerous (see individual systems)</td>
<td>SNS configuration drawings</td>
<td>200W</td>
<td>*H-2-837384 (10 drawings)</td>
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<tr>
<td>200 East</td>
<td>Numerous (see individual systems)</td>
<td>SNS configuration drawings</td>
<td>200E</td>
<td>*H-2-837329 (11 drawings)</td>
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</table>

LS – Lift Station

DC – Dosing Chamber

* - Indicates Essential Drawing. The SNS system currently does not have Support Drawings.
## Table C-1 System Procedures

<table>
<thead>
<tr>
<th>Procedure Number</th>
<th>Title</th>
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<tbody>
<tr>
<td>WM-PRO-MN-61423</td>
<td>Water and Sewer Utilities Inspections of Septic Systems Control Panels</td>
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<tr>
<td>WM-PRO-MN-61536</td>
<td>6608 Influent Flow Meter Calibration</td>
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<tr>
<td>WM-PRO-MN-61538</td>
<td>6608 Leak Detection Flow Meter Calibration</td>
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<tr>
<td>WM-PRO-MN-61539</td>
<td>Replace Pump Control Programmer Key Pad Batteries Various Septic Systems</td>
</tr>
<tr>
<td>WM-PRO-MN-61547</td>
<td>Ultrasonic Level Controllers Verification of Parameters and Timer Settings</td>
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<td>WM-PRO-MN-61549</td>
<td>Sewer System Float Switches Functional Testing</td>
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<tr>
<td>WM-PRO-MN-61554</td>
<td>6607-16 Sewer System Level Controls Functional Testing</td>
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<tr>
<td>WM-PRO-MN-61560</td>
<td>1607-W16 Sewer System Pressure Transducer Verification</td>
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<tr>
<td>WM-PRO-MN-61641</td>
<td>6608 Settling and Aeration Lagoons Weir Maintenance</td>
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<tr>
<td>WSU-GD-CP-60427</td>
<td>Prohibited Discharges to Sewage Systems</td>
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<td>WSU-GD-CP-60428</td>
<td>Writing Sewer System O&amp;M Manuals</td>
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<td>WSU-GD-CP-60521</td>
<td>200 West Evaporative Lagoons Capacity Limit Response</td>
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<td>WSU-GD-CP-60529</td>
<td>200 West Lagoon Sampling</td>
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<td>WSU-GD-CP-60542</td>
<td>200W Lagoon Permit Reporting Requirements</td>
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<td>WSU-PRO-MN-60309</td>
<td>WASTE WATER SEPTIC SYSTEM</td>
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<td>WSU-PRO-OP-60246</td>
<td>SEPTIC TANK PUMPING</td>
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<td>WSU-PRO-OP-60263</td>
<td>Waste Water Monthly Surveillance Report East Area - Data Sheets</td>
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<td>WSU-PRO-OP-60283</td>
<td>Waste Water Annual Surveillance Report - Holding Tanks</td>
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<tr>
<td>WSU-PRO-OP-60284</td>
<td>Waste Water Annual Surveillance Report - Holding Tanks Data Sheets</td>
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<td>Procedure Number</td>
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<td>WSU-PRO-OP-60301</td>
<td>Waste Water Septic System Annual Maintenance</td>
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<td>WSU-PRO-OP-60410</td>
<td>Operator Rounds and Round Sheets</td>
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<tr>
<td>WSU-PRO-OP-60470</td>
<td>Cleaning Aerators at 200 West Evaporative Lagoons</td>
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<td>WSU-PRO-OP-60471</td>
<td>Removing Aerators at 200 West Evaporative Lagoons</td>
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<td>WSU-PRO-OP-60511</td>
<td>200 West Sewer Lagoon Daily Surveillance Round Sheet</td>
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<td>WSU-PRO-OP-60512</td>
<td>200 West Sewer Lagoon Monthly Surveillance Round Sheet</td>
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<td>WSU-PRO-OP-60513</td>
<td>200 West Sewer Lagoon Quarterly Surveillance Round Sheet</td>
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<td>WSU-PRO-OP-60514</td>
<td>200 West Sewer Lagoon Semi-Annual Surveillance Round Sheet</td>
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<td>WSU-PRO-OP-60516</td>
<td>200 West Sewer Lagoon Leak Rates Chart</td>
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<td>WSU-PRO-OP-60836</td>
<td>200 West Sewer Lagoon Turnover Sheet</td>
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<td>WSU-PRO-OP-60914</td>
<td>Sanitary Sewer Line Flush</td>
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<td>WSU-PRO-OP-60554</td>
<td>Sewage Spills/Cleanup</td>
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<td>WSU-PRO-OP-61007</td>
<td>200 West Sewer Lagoon Measurements</td>
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<td>EL220092</td>
<td>6608 Aerator Maintenance</td>
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<tr>
<td>2SS-1206</td>
<td>6608 Lagoon Influent Meter Data Collections</td>
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Table C-2 System Procedures Under Development for the 6608 Bio-Solids Handling Facility.

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<th>Procedure Number</th>
<th>Preliminary/Working Title</th>
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<td>TBD</td>
<td>6608 Building Air Compressor Maintenance</td>
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<td>TBD</td>
<td>6608 Building Seepex Progressive Cavity Pump Maintenance</td>
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<td>TBD</td>
<td>6608 Building Lime Feed Pump Maintenance</td>
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<tr>
<td>TBD</td>
<td>Polymer Skid Maintenance</td>
</tr>
<tr>
<td>TBD</td>
<td>6608 Building pH probe calibration</td>
</tr>
<tr>
<td>TBD</td>
<td>6608 Bio-Solids Facility Operation Procedure</td>
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