Washington State Department of Health

Large On-site Sewage Systems (LOSS)
Plans & Specifications Checklist

Intended for internal use for submittal review. Posted for use as guidance.

Project Name:	New LOSS ☐ Existing LOSS ☐
Owner Name:	Telephone: ( )
Owner Email:	County:
Engineer Name:	Telephone: ( )
Engineer Email:	County:

PLANS AND SPECIFICATIONS

WAC 246-272B	Item	Yes	No	N/A	Comments
02100(3)	Stamped, signed & dated by design engineer				SEND COPY TO DAHP IF OWNER HASN'T
02100(3)	One electronic copy				Use FTP site for large file transfers

	General				
04400(1)	Plan set must use a common engineering size of 11"x17"				
04400(2)	Plans must include the following:				
04400(2)(a)	design flow, treatment level, drainfield and tank sizing, and hydraulic loading rate				
04400(2)(b)	LOSS schematic or flow diagram				
04400(2)(c)	Hydraulic profile of the LOSS				
04400(2)(d)	Plan and profile views as applicable of all LOSS components				
04400(3)	Plan set must be scaled to clearly show all necessary information including:				
04400(3)(a)	A title sheet, plan and profile sheets, and other information that outlines and details the LOSS facilities design				
04400(3)(a)(i)	Title block indicating the project title, owner's name, date, seal and signature of the design engineer				
04400(3)(a)(ii)	Index to individual sheets				
04400(3)(a)(iii)	Vicinity map with project site location				
04400(3)(a)(iv)	Master site plan showing facilities served & general system layout				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
04400(3)(a)(v)	List of abbreviations, definitions, and symbols used within the plans				
04400(4)	North arrow, description of scale in text and graphical bar, descriptive title and date				
04400(3)(b)	Statement that all work must be in conformance with the requirements of this chapter and other design and technical standards specified by the design engineer				
04400(5)	Specifications for tanks and other treatment components must:				
04400(5)(a)	Show location, dimensions, and elevations of all treatment and pumping units				
04400(5)(b)	Include detailed plan and cross-section views with dimensions				
04400(5)(c)	Include installation details including placement depth and bedding materials, and connections to the tank to minimized settling impacts				

	Tank(s)				
06450(1)	Specify tanks in accordance with WAC 246-272C				
04400(5)(f)	Identify manufacturer and model for all pre-fabricated tanks				
04400(6)	Cast in place tanks must include design and structural calculations				
06450(4)(a)	Septic tank-effluent filter(s) max mesh size of $^1/_8$ inch				
06450(4)(b)	Tank sized for minimum liquid volume of 1000 gallons per residence for tanks for individual lots or 3 times daily design flow				
06400(2)	Access risers to grade w/gas tight lids				
06450(6)	Sizing for hydraulic surge control or where batch treatment occurs must be justified and any effect on treatment addressed				
	Tanks need to be traffic rated?				
06450(7)	Pump chambers shall have sufficient volume for: routine dosing, pump submergence, scum and sludge storage, and emergency storage				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
06450(8)	Emergency storage is 24 hours of reserve capacity design flow ≤14,500 gpd; 12 hours if design flow >14,500 gpd				
04400(5)(d)	Detailed standard plan including any related electrical components and installation requirements for tanks designed for individual lots (STEP or STEG Sewer)				
06450(10)	Grease interceptors sized for 2 times daily greywater design flow or 1000 gallons(whichever is greater), if necessary				

	Dosing/Pumping Equipment & Controls				
06600(9) & 06650(7)	All mechanical & electrical components rated for wastewater applications				
060000(1)	Check valve @ pumps				
06600(7) & 06650(11)	Quick disconnects for pump removal				
06600(8) & 06650(12)	Float switches must be mounted independently of the pump discharge & transport lines				
06600(6) & 06650(10)	Duplexing alternating pumps				
06350(1)	Programmable timers				
06600(9)(c) & 06650(13)(d) & 06400(3)(e)	Audible/visual alarms located on separate circuit from the pump				
06600(13)(a)	Dose counters and elapsed time meters for pressure distribution; or				
06650 (12)(a)	Readouts for totalizing flow meter and pressure gauge for subsurface drip				
06600(10)(b) & 06650(13(b)	Control panels enclosure is secure from tampering and resistant to weather				
06600(5)	Pressure relief valves or other device to prevent siphoning, if any portion of the pump fittings or effluent transport line is at a higher elevation than drainfield				
06600(19) & 06650(8)	Electrical components and wiring comply with WAC 276-46B-501				
06600(20) & 06650(9)	Electrical control & other electrical components must be approved by UL or an equivalent				
	Siphon data, if applicable				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Collection System				
04400(7)(a)	Pipe type, material, and size				
04400(7)(b)	Pipe elevations				
04400(7)(c)	Depth from grade and slope if applicable				
04400(7)(d)	Installation details, placement depth and bedding materials				
04400(7)(e)	Location and detail for all cleanouts and other appurtenances, including manholes				
04400(7)(f)	Horizontal setbacks from all other utility piping				
04400(7)(g) & 06500(2)	Water sewer crossing detail and instructions				
06000(2)	Collection lines / sewers, lift stations, and manholes must Meet ECY “Criteria for Sewage Works Design”				
	Drainfield General				
06100	Maintain 3-feet of vertical separation				
04400(8)(a)	Scale of 1:50 or less				
04400(8)(b)	Show plan view of drainfield area in relation to site topography showing contours on maximum of 2 feet intervals				
04400(8)(d)	Show location of numbered test pits and test wells in relation to primary and reserve drainfield areas				
04400(8)(e)	Show trench or bed profile with width, depth, piping, cover, and any features such as sand, gravel, geotextile, chambers				
06350(3)	Drainfield site property line within ½ mile or less from property line of development				
06350(5)(a)	Drainfield area slope <30%				
06350(5)(b)	Drainfield area is free from encroachment by buildings, other construction, utilities, impervious material, or vehicular traffic				
06350(6)(c) & 06350(7)	150% of required drainfield capacity constructed and sufficient area held in reserve to construct another 50% (subsurface drip needs to construct 100% capacity and reserve 100%)				
06350(8)	Drainfield pipe materials must meet ASTM D2241-05 (Class 200) or ASTM D1785-06 (Schedule 40 or 80 PVC)				
06350(9)	Minimum of 3 equal sized distribution sectors				
06350 (10)	Automatic rotating among active distribution sectors				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
06350(11)	Infiltrative surface is no deeper than 3 feet below finished grade				
06350(12) & 06350(13)	Infiltrative surface run parallel to natural ground contours and is laid level				
06350(14)	If using drain rock & distribution pipe:				
06350(14)(a)	Minimum of 6 inches drain rock below the distribution pipe				
06350(14)(b)	Minimum of 2 inches drain rock above the distribution pipe				
06350(14)(c)	Minimum of 6 inches of sidewall in original undisturbed soil				
06350(14)(d)	6 to 24 inches of cover material				
06350(15)	Drainfield separations of 4½ ft between adjacent trenches and 10 feet between beds				
01100(18)	Drain rock specified				
06650(3)	Dripline minimum installation depth of 8 inches in original undisturbed soil				

	Pressure Distribution				
04400(8)(c)	Show trench/bed length and separations, pipe size, materials, and configuration				
06600(2)	Maximum spacing between the outside lateral and the edge of trench or bed must be ½ of the selected orifice spacing				
06600(3)	Lateral must be equipped with cleanouts & monitoring ports a distal ends and accessible at finished grade				
06400(3)(b)(ii)	Monitoring ports must be 4 inches in diameter				
06400(3)(b)(iii)	Monitoring ports extend to the infiltrative surface to final grade				
06400(3)(c)(iv)	Monitoring ports shall have a cap or cover				
06400(3)(c)(v)	Monitoring ports must be anchored to remain in place				
	Minimum residual pressure				
06600(4)(a)	2-feet or 0.87 psi for orifices ≥$^{3}/_{16}$ inch diameter				
06600(4)(b) & 06600(15)	5-feet or 2.18 psi for orifices of <$^{3}/_{16}$ inch diameter (orifices may be no smaller than $^{1}/_{8}$ inch)				
06600(11)	Dose frequency of 6 doses per day				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
06600(12)	Dose volume must be at least five times the internal volume of the pipe network to be pressurized				
04400(8)(c)(iv)	Orifice spacing and size				
06600(16)(a)(i) & 06600(16)(a)(ii)	One orifice for 6 sq ft of infiltrative surface or 9 sq ft when using gravelless chambers in Soil Types 1, 2, and 3				
06600(16)(b)	One orifice every 6 feet on center along lateral in Soil Types 4 & 5				
04400(8)(iv) & 06600(17)	Orifice orientation (12 o'clock when using gravelless chambers)				
06350(6)(b) & 03400 (Table 1)	Absorption area based on design flow and hydraulic lading rates in Table 1				
	If design flow >14,500				
06600(18)(a)	Capacity for remote or off-site operation and alarm notification				
06600(18)(b)	Means to connect to an emergency power generator				

	Subsurface Drip				
06650(1)(a)	Supply line to deliver effluent				
06650(1)(b)	Return line to route filter and line flushing waste back to primary treatment unit				
06650(3) & 06650(4)	Minimum depth 8 inches original undisturbed soil and maximum depth 36 inches below finished grade				
06650(6)	Air and vacuum relief valves at high point of distribution sector on both supply and return sides and in valve box with sump and access to surface grade				
06650(13)	Control panel must:				
06650(13)(b)	Include means to track and verify dosing				
06650(13)(e)	Capacity for remote or off-site operation and alarm notification				
06650(13)(f)	Means to connect to an emergency power generator				
06650(14)	Automatic flushing of filters, manifolds and dripline				
06650(15)	Chemical injector port				
06650(16)	Filter(s) recommended by dripline manufacturer				
06650(19)	Minimum of 12 equally spaced timed doses per day per distribution zone				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
06650(20)(b)	Absorption area calculated based on Table 7				
	Sand-lined trenches & beds				
06700(2)	Minimum dosing frequency 12 equally spaced doses for coarse sand 6 equally spaced doses for ASTM C-33 sand				
06700(3)	Maximum hydraulic loading rate is 1.0 gpd/sf				
06700(4)	Specify sand either coarse sand or ASTM C-33 sand				
06700(5)	Depth of sand specified (minimum of 24 inches)				
06700(6)(b)	Installation in Type 1 soil, specify increase bed or trench width of 12 inches filled with specified sand to prevent short circuiting				
06700(6)(c)	Specify monitoring ports to the sand / native soil interface per -06400				
	Intermittent sand filters				
06750(2)	Pressure distribution to filter media				
06750(3)	Minimum dosing frequency 12 equally spaced doses for coarse sand 6 equally spaced doses for ASTM C-33 sand				
06750(4)	Maximum hydraulic loading rate to the filter is 1.0 gpd/sf				
06750(5)	Depth of sand specified (minimum of 24 inches)				
06750(6)	Influent to filter must be residential strength wastewater				
06750(8)	Maximum cover material depth of 12 inches				
06750(9)	Specify sand either coarse sand or ASTM C-33 sand				
06750(10)	Filter bed must be contained in: Flexible membrane lined pit with minimum thickness of 30 mm, lined with 3” layer of sand; or Concrete vessel that is water tight, durable and structurally sound				
06750(11)	Underdrain designed void space for a single dose to the filter				
06750(12) & 06750 (13)	Details for filtrate collection and discharge, gravity flow boot detail or pumpwell system				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
06750(14)	Two monitoring ports installed every 1,000 sq ft evenly over entire filter One to top of filter media One to bottom of underdrain				
	Recirculating gravel filter				
06800(2)	Pressure distribution to filter media				
06800(3)	Specify filter media Effective particle size 3-5mm Uniformity coefficient ≤2				
06800(4)	Filter media depth (minimum of 36 inches)				
06800(16)	Recirculating tank minimum volume: 150% of daily design flow for residential applications; or 100% of daily design flow for nonresidential applications				
06800(5)	Recirculating pump – timed dosed				
06800(6) & 06800(7)	Minimum 48 doses per day & with uniform dose volume				
06800(8) & 06800(18)	Influent must cycle through the filter at least 5 times				
06800(9) & (10)	Maximum hydraulic loading rate: 5 gpd for BOD <230 mg/L; or 1150/BOD_5 of influent to filter				
06800(11)	Maximum influent characteristics BOD_5 – 575 mg/L O&G – 30mg/L				
06800(13)	Filter bed must be contained in: Flexible membrane lined pit with minimum thickness of 30 mm, lined with 3” layer of sand; or Concrete vessel that is water tight, durable and structurally sound				
06800(14)	Two monitoring ports installed every 1,000 sq ft evenly over entire filter One to top of filter media One to bottom of underdrain				
06800(17)	Underdrain designed void space for a single dose to the filter and details for filtrate collection and discharge, gravity flow boot detail or pumpwell system				

PLANS AND SPECIFICATIONS					
WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
	Other Technologies				
06550(3)	Public domain treatment technologies without DOH RS&Gs				
06550(3)(a)	Demonstrate technology meets required treatment level				
06550(3)(b)	Influent and effluent quality sampling results from a minimum of 3 systems with similar design loading and flow data				
06550(3)(c)	Design calculations citing industry recognized source				
06550(4)	Proprietary treatment technology is registered with DOH and flow less than 3500 gpd to component; or				
06550(5)	Proprietary treatment not registered must submit				
06550(5)(a)	Dated written confirmation from proprietary product design engineer stating technology is suitable for proposal and will meet required treatment level				
06550(5)(b)	Design calculations or references to manufacturer sizing guidelines				
06550(5)(c)	Influent and effluent quality sampling results from a minimum of 3 systems with similar design loading and flow data				
	Specifications				
01100(18)	Drain rock specified				
06700 Table 8 & 9 & 04400(12)(a)	Washed coarse sand or ASTM C-33 specified				
	Geotextile specified				
	Testing specification				
05200(1)	Tanks leak tested				
04400(12)(d)(vi)	Pressure testing sewer lines				
05300(1)	Provisions for DOH final inspection				
04400(14)	Construction specifications				
04400(14)(a)	Quality of materials				
04400(14)(b)	Workmanship and fabrication of project				
04400(14)(c)	Type, size, strength, operating characteristics, and rating of equipment				
04400(14)(d)	Allowable leakage for testing gravity sewer pipe				

Washington State Department of Health

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WAC 246-272B	**Item**	**Yes**	**No**	**N/A**	**Comments**
04400(14)(e)	Electrical apparatus and wiring components				
04400(14)(f)	Meters				
04400(14)(g)	Operating tools				
04400(14)(h)	Construction materials				
04400(14)(i)	Special filter or drainfield media other that native soils				
04400(14)(j)	Other appurtenances				
04400(14)(k)	Instructions for testing materials and equipment as needed to meet the design standard				
04400(14)(l)	LOSS component and process testing to confirm functionality prior to DOH final inspection				
04400(12)	Include notes on quality assurance, inspection, and testing				

	Send copies to LHJ				
	Archaeological/historic preservation permit				
	Underground Utility Locate (611) requirement for contractor				
	LHJ permits needed				
	Other				
	Waivers				
	Easements – signed & recorded				

Reviewed By:	Date:

Comments: