



**DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
NEVADA DIVISION OF ENVIRONMENTAL PROTECTION**

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**GUIDANCE DOCUMENT FOR DESIGN AND PERMITTING OF A
PACKAGE WASTEWATER TREATMENT PLANT**



Information from the items listed below shall be presented as a minimum in an application for a package wastewater treatment plant. The Bureau of Water Pollution Control reserves the right to require further information as needed. It is recommended that a design summary report (Preliminary Engineering Report) accompany each plan and specification submittal.

This document is solely intended as guidance, and is not regulation. It shall not replace best professional engineering judgment in the design of a wastewater treatment package plant and effluent disposal system.

KEY WORDS:

NDEP: Nevada Division of Environmental Protection
NRS: Nevada Revised Statutes

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I Introduction

As listed under NRS 445A.380, a package treatment plant means a plant that consists of units or modules designed for construction, assembly, connection, and installation at the site for treatment of wastewater. These units are privately owned and are to be operated to treat wastewater from a limited area with a minimum design flow of 5,000 gpd. If a publicly owned sewer is available to service a project, a permit for a package plant will not be issued.

These units are generally supplied by a specified manufacturer and are designed to achieve a minimum of secondary treatment. NDEP does not endorse or approve any specific package treatment plant. Each submittal must be wet stamped by a Nevada Registered Professional Engineer and shall include plan drawings and technical specifications.

Prior to selection of a particular package plant, the design engineers should contact NDEP to determine the effluent disposal options and associated effluent criteria.

II. Permit Application

An appropriate permit application must be completed and submitted with the appropriate fee to NDEP before a technical review will commence. Applications and the fee schedule are available at the NDEP website at the following address, <http://ndep.nv.gov/bwpc/forms.htm>.

a. Permit Type

The owner of the package treatment plant will be issued a state groundwater discharge permit (NEVxxx) if the effluent is discharged to RIBs', reuse, leach fields, or any other non-surface water discharge. These permits are administered solely by NDEP and there are no federal reporting requirements.

If the effluent from the package treatment plant is to be discharged to a stream, river or lake, an NPDES permit (NVxxx) will be issued. This is a federal permit that is administered by the State but does require copying of quarterly reports to the U.S. EPA.

b. Permit Terms

The reporting requirements and permit limitations will be listed in the discharge permit. These permits are effective for five years and require submittal of quarterly reports to NDEP. The engineer should consult with the permit writer to discuss the draft permit conditions so that there is no misunderstanding on the final permit. There is a minimum of 30-days provided for comments on the draft permit (by the permittee and the public).

Typical permit requirements include flow monitoring of the effluent via an acceptable measuring device (flume, weir, magnetic meter, etc.) and sampling of the effluent. Standard effluent samples include BOD, TSS, pH, and (if applicable, Nitrogen and Coliform). Additional constituent monitoring may be required at the Division's discretion.

III. Statutory Requirements for Package Plants

NRS 445A.540 lists the conditions for issuing a permit for a package treatment plant. The role of the local governing body (Town, City, or County) is paramount in these statutes. They have authority to approve/deny a package treatment plant independently of NDEP and can require the plant to be abandoned should public sewer become available in the future.

1. Local Governing Body Role

Prior to issuing a permit for a package treatment plant, NDEP must have assurance from the local government that it has accepted the package plant and that the requirements listed under NRS 445A.540 have been met. These include:

- i. Acceptance by the local government that it will assume operation and maintenance of the plant should the developer default for any reason.
- ii. Signing of a declaration of covenants, conditions, and restrictions with the owner of the lands to be served by the package plant which will provide for the assessment of fees for the operation of the plant by the county in the event that they have to operate the plant.
- iii. Receipt of a surety from the developer to the county for the continued operation of the plant for five years following start-up or until 75% of the lots served by the plant are sold.

IV. Design Criteria

a. Siting Criteria

A site map shall be provided that depicts the area topography, nearby dwelling units, and adjacent water bodies (streams, lakes, etc.). The facility should not be installed in the 100-year flood plain. If the facility is installed in an area subject to flooding, specific engineering safeguards must be in-place to assure the treatment plant will not be adversely affected by a flood event.

Additionally, the site geotechnical information shall be provided. This should include, among other items, the soil chemistry, depth to water table, and bedding specifications (gradation, etc.)

b. Effluent Limitations

The treatment plant must at minimum meet secondary treatment standards. This includes 30 mg/l BOD₅, 30 mg/l TSS, and a pH range of 6 to 9 S.U. If reuse is the option for effluent disposal, the effluent shall meet the fecal coliform limits listed under NAC 445A.275-277.

For disposal of effluent to a surface water, the applicable water quality standards for the receiving body shall apply. If the effluent is to be applied to ground waters (RIB, leach field, etc.), denitrification is required to a level of 10 mg/l total nitrogen.

c. Influent Characterization

The engineer shall provide NDEP the justification for the plant sizing based on the service area flows and organic strength of the flows. Engineering references can be used for determination of flows and strengths if there is no sampling data.

If other than domestic wastewater flows are planned to be served by the plant, a listing of the types of waste streams needs to be delineated. A pretreatment program may be required for waste streams that could cause an upset at the treatment plant or cause the pass through of pollutants.

d. Odor Control

The Divisions guidance document WTS-21 shall be followed.

e. Package Plant Data

Operation and performance data on the selected package treatment plant shall be provided for the plant. This data should be from plant locations similar in climate to the proposed project location and under similar loading conditions (flow, strength, composition).

f. Screening

A plan for influent screening must be included in the design. This can include a bar screen or any acceptable mechanical screen. A plan for the handling and disposal of the screenings material shall be provided.

g. Grit Removal

The Division recommends that a grit removal process be included in the design. This will both protect mechanical equipment from premature wear and limit the problem of grit accumulations in downstream units.

h. Aeration Basin

The design parameters for the aeration basin shall be provided for review. This shall include the calculations for the aeration of the basin (actual oxygen transfer rates, air flow, blower horsepower), the basin sizing for the aeration zone, and anoxic zone (if applicable).

The Division requires 100% back-up aeration supply (typically a redundant blower) for all treatment plants.

i. Settling

The sizing criteria for the secondary clarifier shall be provided. A plan for scum removal shall be included in the design. Redundancy for the sludge pumping is required.

j. Filtration

If part of the plant, the design criteria for the filtration unit shall be included in the submittal. This shall include the backwash cycle and filter loading rate. A redundant filter shall be included in the design.

k. Disinfection

If required, the design calculations for the chlorine contact basin shall be provided. A back-up chlorinator (pump) shall be included in the design. If another method of effluent disinfection is proposed (UV, ozone, etc.), a plan to add a chlorine residual to the disinfected effluent shall be provided.

l. Solids Management

The method of solids (sludge) handling shall be provided. If sludge is to be dewatered at the site, specific odor control measures may be required at the process unit.

m. Back-up electricity

A plan for a back-up generator shall be provided at the site. This unit shall be sufficient to operate the blowers, pumps, and other critical components of the treatment plant that are required to meet the permit limits.

n. Effluent Disposal

The design for the method of effluent disposal shall be provided. Guidance documents for reuse, ponds, leach fields, and RIB's are available at the Division for assistance. Surface water discharges are designed on a site-specific basis.

Nevada Revised Statutes applicable to package treatment plants

NRS 445A.380 "Package plant for sewage treatment" defined.

1. "Package plant for sewage treatment" means any plant which:
 - (a) Consists of units or modules designed for construction, assembly, connection and installation at the site for treatment of sewage; and
 - (b) Is privately owned and will be operated to treat wastewater and sewage for a limited area.
 2. The term does not include:
 - (a) A plant for the treatment of domestic sewage whose capacity is less than 5,000 gallons per day;
 - (b) Septic systems comprised of single or multiple septic tanks and leach fields; or
 - (c) Systems operated for the pretreatment of industrial wastewater before disposal to a publicly owned treatment plant.
- (Added to NRS by 1979, 1912; A 1993, 909)—(Substituted in revision for NRS 445.168)

NRS 445A.535 Package plant for sewage treatment: Exemption from provisions of NRS 445A.540 to 445A.560, inclusive.

Any public utility subject to the jurisdiction of the Public Utilities Commission of Nevada which is providing sewerage on June 7, 1979, is exempt from the provisions of NRS 445A.540 to 445A.560, inclusive.

(Added to NRS by 1979, 1913; A 1987, 717; 1997, 1995)

NRS 445A.540 Package plant for sewage treatment: Conditions for issuing permit.

A permit to discharge water from a package plant for sewage treatment may not be issued unless all of the following conditions are met:

1. Neither of the following is available:
 - (a) Sewerage provided by a public utility; or
 - (b) Sewerage provided by a municipality or other public entity.
2. The applicant fully complies with all of the conditions of NRS 445A.465 to 445A.515, inclusive.
3. The local governing body assumes:
 - (a) Responsibility in case of default by the builder or developer for the continued operation and maintenance of the plant in accordance with all of the terms and conditions of the permit.
 - (b) The duty of assessing the lands served as provided in subsection 5.
4. The applicant furnishes the local governing body sufficient surety in the form of a bond, certificate of deposit, investment certificate or any other form acceptable to the governing body, to ensure the continued maintenance and operation of the plant:
 - (a) For 5 years following the date the plant is placed in operation; or
 - (b) Until 75 percent of the lots or parcels served by the plant are sold, whichever is later.
5. The owners of the lands to be served by the package plant for sewage treatment record a declaration of covenants, conditions and restrictions, which is an equitable servitude running with the land and which must provide that each lot or parcel will be assessed by the local governing body for its proportionate share of the cost of continued operation and maintenance of the plant if there is a default by the applicant or operator of the plant and a sufficient surety, as provided in subsection 4, is not available.

6. The declaration of covenants, conditions and restrictions recorded by the owners further provides that if the local governing body determines that:

(a) The plant is not satisfactorily serving the needs of its users; and

(b) Sewerage provided by a public utility or a municipality or other public entity is reasonably available,

the local governing body may require all users of a package plant for sewage treatment to connect into the available sewers provided by a utility or a municipality or other public entity, and each lot or parcel will be assessed by the local governing body for its proportionate share of the cost of connecting into those sewers. These assessments are not subject to the jurisdiction of the Public Utilities Commission of Nevada.

7. Provision has been made for disposition of the plant and the land on which it is situated after the local governing body requires all users to connect into available sewers provided by a public utility or a municipality or other public entity.

(Added to NRS by 1979, 1913; A 1987, 717; 1997, 1995)

NRS 445A.545 Package plant for sewage treatment: Assessment lien.

No lien for the assessments provided by the covenants, conditions and restrictions described in NRS 445A.540 is binding upon the property until the local governing body, after a hearing, establishes the costs, apportions them to each lot or parcel and records a notice of lien in the office of the county recorder in the county in which the property is located.

(Added to NRS by 1979, 1914)—(Substituted in revision for NRS 445.2523)

NRS 445A.550 Package plant for sewage treatment: Deposit and expenditure of proceeds of assessments; refund of surplus.

1. The proceeds of any assessments upon lots or parcels must be deposited with the treasurer of the local governing body which received them, and they may be expended only for the following purposes:

(a) Continued maintenance and operation of the package plant for sewage treatment;

(b) Replacement of the plant if necessary; and

(c) Payment of the costs of connection to any sewer provided by a public utility or a municipality or other public entity that becomes reasonably available.

2. If any surplus exists in the proceeds of assessments after all purposes of the assessments have been fully met, the surplus must be refunded to the persons who paid the assessments, in the proportion that their respective assessments bear to the gross proceeds of all assessments collected by the local governing body.

(Added to NRS by 1979, 1914)—(Substituted in revision for NRS 445.2525)

NRS 445A.555 Package plant for sewage treatment: Remedy for violation of conditions of permit; assumption of control of plant by local governing body.

1. If the Department has found that any of the conditions of a permit to discharge water from a package plant for sewage treatment are being violated and has notified the holder of the permit that he must bring the plant into compliance, but the holder of the permit has failed to comply within a reasonable time after the date of the notice, the local governing body may take the following actions independently of any further action by the Department:

(a) Give written notice, by certified mail, to the owner of the plant and the owners of the property served by the plant that if the violation is not corrected within 30 days after the date of the notice, the local governing body will seek a court order authorizing it to assume control; and

(b) After the 30-day period has expired, if the plant has not been brought into compliance, apply to the district court for an order authorizing the local governing body to assume control of the plant and assess the property for the continued operation and maintenance of the plant as provided in subsection 5 of NRS 445A.540.

2. If the local governing body determines at any time that immediate action is necessary to protect the public health and welfare, it may assume physical control and operation of a package plant for sewage treatment without complying with any of the requirements set forth in subsection 1. The local governing body may not maintain control of the plant pursuant to this subsection for a period greater than 30 days unless it obtains an order from the district court authorizing an extension.

(Added to NRS by 1979, 1914)—(Substituted in revision for NRS 445.2527)

NRS 445A.560 Package plant for sewage treatment: Regulation by local governing body. No provision of this chapter prevents:

1. A local governing body or a health district from imposing its own conditions for approval of the operation of any package plant for sewage treatment located within its jurisdiction, which may be more stringent than those authorized by this chapter.

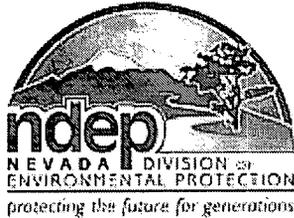
2. A local governing body from requiring the prior approval of proposed package plants for sewage treatment by a local committee created for this purpose.

3. A local governing body from converting connections to package plants for sewage treatment into connections to sewers provided by a public utility or a municipality or other public entity.

(Added to NRS by 1979, 1914)—(Substituted in revision for NRS 445.2529)

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- _____ Contact Nevada Division of Environmental Protection to discuss project
- _____ Coordinate with local government for acceptance of project under NRS 445a.540
- _____ Initiate necessary legal documents with local government in accordance with NRS 445a.540
- _____ Complete Application for groundwater or surface water discharge permit and submit to NDEP with appropriate fees
- _____ Submit Preliminary Design Report to NDEP for review – (See WTS-40)
- _____ Submit draft plans and specifications for project
- _____ Submit final plans and specifications for project, incorporating NDEP review comments.
- _____ Review the draft permit and submit comments back to NDEP within 30-day public comment period.
- _____ Receive Final Permit and initiate construction of project. (Note construction may be allowed after final plan review and prior to final permit issuance)
- _____ Submit Construction Certification Letter on project. If significant change order were encountered during construction, an As-Built Drawing for the project needs to be submitted to NDEP.
- _____ Submit draft operation and maintenance manual to DEP for review within 90-days of plant start-up or a permit specified deadline



State of Nevada

Nevada Division of Environmental Protection

Bureau of Water Pollution Control

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Note: The Publications and Fact Sheets listed below are available in Adobe PDF file format. 

Water Technical Sheets (WTS)

WTS - 1A General design criteria for reclaimed water irrigation use. The guidance document describes design information to be evaluated in acquiring a discharge permit from NDEP to use reclaimed water (30 pages 71KB).

WTS - 1B General design criteria for preparing an effluent management plan. The guidance document describes information to be evaluated in preparing a management plan for reclaimed water use (25 pages 60KB)

WTS - 2 Minimum Information Required for an Operation and Maintenance Manual for a Wastewater Treatment Plant: The fact sheet describes minimum information required in all wastewater treatment plant operation and maintenance manuals (3 pages)

WTS - 3 Guidance Document For An Application For Rapid Infiltration Basins: Rapid Infiltration Basins (RIB) allow land treatment and disposal of wastewater. Applied wastewater percolates through the soil and the treated effluent drains via hydraulic pathways to groundwater or surface water. The fact sheet contains information that must be present in an application for a RIB. The Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria (2 pages)

WTS - 4 Guidance Document For Design Of Groundwater Monitoring Wells: The fact sheet outlines information necessary for developing a monitoring well for the Division of Environmental Protection or pursuant to an Administrative Order require by NDEP.

WTS - 5 Guidance Document For Design Of Wastewater Treatment Ponds: The fact contains information required in an application for development of a wastewater treatment pond (10 pages).

WTS - 13 Change Order Or Addendum Submittal Form: Note: This Form is to be submitted with all Change Orders and addendum to the Bureau of Water Pollution Control approval.

WTS - 14 Pumping Station Design and Submittal Criterion, Document: The fact sheet discuss required plans and specifications for all pumping stations which will be used to convey untreated, partially treated or fully treated wastewater.

WTS - 20 Abandonment of Sewerage Facilities: This fact sheet discuss requirements for the abandonment of a facility which has been used to collect, treat or dispose of sewage. Such action requires the approval of the Plan of Abandonment by the County Health Agency, where appropriate, or the Nevada Division of Health.

WTS - 21 Implementation of NAC 445.181 - Locating a Treatment Works: State regulations require that when locating the site for a wastewater treatment works and facilities, the designer shall attempt to select a site that is not within 984.3 feet (300 meters) of an occupied dwelling or other building. This Fact Sheet outlines the policy for implementing NAC 445.181

WTS - 22 Design Criteria for Individual Sewage Disposal Systems (ISDS) related to Subdivisions: The fact sheet outlines minimum design criteria for individual sewage disposal systems. (Note: This fact sheet is not for large-capacity septic systems or high-density clusters of small septic tanks. Please see WTS-23 for these systems.) This criteria is not meant to supersede or circumvent any existing state policy, statute or regulation and the Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria

WTS - 23 Design Criteria for Large Capacity Septic Systems: The fact sheet outlines minimum design criteria for individual sewage disposal systems that are equal to or greater than 5,000 gallon capacity. Please note that a large capacity septic system can be made up of one large tank or a group of smaller tanks on one property that exceed the 5,000 gallons design capacity. This criteria is not meant to supersede or circumvent any existing state policy, statute or regulation and the Bureau of Water Pollution Control reserves the right to require further site characterization and additional design criteria.

WTS - 37 Guidance Document For Design Of Wastewater And Other Detention Basins: The fact sheet presented information that must be contained in an application for a wastewater holding pond. The Bureau of Water Pollution Control does reserves the right to require further information as needed, (4 pages).

WTS - 41 — Guidance Document for Design and Permitting of a Package Wastewater Treatment Plant — The documet presents information about the minimum requirements in an application for a package wastewater treatment plant. The Bureau of Water Pollution Control reserves the right to require further information as needed. 

WTS - 42 — (O&M) Manual - Septage & Biosolids Beneficial Use Application Sites: This guidance document discusses the required information to prepare an Operations and Maintenance (O&M) Manual for septage and biosolids beneficial use application sites (4 pages). 

Wellhead Protection

Wellhead Protection Program Fact Sheet Describes the State of Nevada Wellhead Protection Program, describes what a wellhead protection plan is, and identifies financial and technical assistance available in Nevada.

Wellhead Protection Program Guide In-depth guide on how to develop a community Wellhead Protection Plan (218KB) 

Wellhead Protection: Local Authority Fact Sheet 
Describes what a wellhead protection plan is and the authorities a community has to implement it.

Underground Injection Control

Requests for Tracer Use in Ground Water 

UIC Requests for Chemical Use 

Operation and Maintenance of Large-Capacity Septic Systems Fact Sheet

Closure Requirements: Septic Systems receiving Industrial Wastes
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Groundwater Protection

Domestic Septic Systems Fact Sheet How septic systems work, and how to maintain them so that they function properly to avoid ground water and well contamination.

Domestic Animal Waste Management Fact Sheet How to manage horses, goats, pigs and other domestic animals and their waste in order to prevent ground water and well contamination.

Ground Water Protection Public Education Materials Fact Sheet A compendium of educational materials for schools and home owners and where to get them.
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Abandoned and Unused Wells Fact Sheet Describes what abandoned wells are, and why it is important to properly plug unused wells to prevent ground water contamination.
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Home Heating Oil Tanks Fact Sheet Describes what home heating oil tanks are and how, over time, they can develop leaks which can contaminate ground water and wells.
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