CUSTOM-DESIGNED
WASTEWATER TREATMENT PLANTS
Dutchland, Inc. specializes in designing, manufacturing, and installing package wastewater treatment plants and custom-designed wastewater treatment plants. With over 30 years of experience, Dutchland offers clients a unique combination of engineering and process design, operations expertise and control systems implementation to allow for efficient execution of wastewater projects.
Typical Services Include:

• Turnkey Wastewater Engineering Services
• Complete Process Design, Permitting, Manufacturing, and Installation
• Complete Structural Design, Manufacturing, and Construction
• Complete Start-up/Equipment Operation
• Mechanical Equipment Installation

Our multi-disciplinary design team partners with each customer to develop tailored solutions for their unique wastewater needs. Plants are designed to meet various limits, including:

• Pretreatment
• Secondary Treatment
• Tertiary Treatment
• Biological Nutrient Removal
Effluent requirements from wastewater treatment plants continue to become more stringent. Biological Nutrient Removal (BNR), i.e. total nitrogen and phosphorous removal, has become a concern in many watersheds. Dutchland addresses BNR requirements by utilizing the BIO-D Extended Aeration Process.

**Process:**
The BIO-D Process utilizes Modified Ludzaek-Ettinger (MLE) principals and incorporates dual environments of both oxic (aerated) and anoxic (non-aerated, mixed) conditions in separate stages of the plant. Nitrification is accomplished first, followed by denitrification. Nitrification occurs in the aeration tanks of the BIO-D process. A recirculation system is implemented to pump the nitrate-rich wastewater from aeration to the anoxic zone at the head of the plant. The anoxic zone receives all of the energy rich BOD from the influent wastewater as well as the recycled nitrate rich contents from the aeration tanks. The biological culture within the anoxic zone utilizes a portion of the BOD as a carbon food source, and the nitrates as a source of oxygen, as no oxygen is added in this zone. The nitrates are converted to harmless nitrogen in the process. Mixers in the anoxic zone provide the necessary suspension and mixing of the wastewater, and facilitate the release of the nitrogen gas bound within the wastewater to the atmosphere.
The BIO-D Process Delivers Superior Process Performance

• Recycle rate designed for 400% of average daily flow
• Maximum dissolved oxygen levels of 0.5 mg/l are maintained in the anoxic tanks
• Minimum dissolved oxygen levels of 2.0 mg/l are maintained in the aeration tanks
• Total nitrogen level reduced to average monthly ranges of 6.0 mg/l to 8.0 mg/l
• Facilitates biological phosphorous reduction to provide greater level of phosphorous reduction while requiring less chemicals
• Phosphorous reduced to 0.5 mg/l or less
TREATMENT PROCESS FLOW CHART
The BIO-D Extended Aeration Solution

1. EQUALIZATION- FLOWS AND LOADS ARE EQUALIZED.

2. ANOXIC ZONE- DENITRIFICATION TAKES PLACE IN THIS ZONE. NITRATES ARE REDUCED TO HARMLESS NITROGEN GAS. INCOMING BOD IS USED AS A CARBON SOURCE TO CARRY OUT DENITRIFICATION.

3. AERATION- BOD REDUCTION AND NITRIFICATION TAKE PLACE. AERATION IS SUPPLIED BOD AND AMMONIA, AS

FORWARD FLOW

RECYCLE

SLUDGE RETURN/ SLUDGE WASTE

EQUALIZATION

ANOXIC

AERATION

EQUALIZATION

ANOXIC

AERATION
ADVANTAGES OF THE BIO-D PROCESS:

Simplicity:

• The technology is easy to understand, resulting in consistent and simple plant operation.
• The raw wastewater provides the natural energy (carbon) source required for denitrification. No chemicals, such as methanol, are required, in most instances.

Economical:

• Extended aeration typically costs less than competing technologies and replacement parts (e.g. diffusers, pumps, mixers) are readily available.
• Lower utility costs.

Flexibility:

• The technology can be easily retrofitted into existing facilities to handle increasing sewage loads and increasingly stringent permit requirements.

Fast Installation:

• Package plants are constructed quickly on-site. The equipment and plumbing is pre-assembled and the structural portions are pre-fabricated.
APPLICATIONS

The BIO-D Process Can Easily Be Designed For New Facilities

- For applications ranging from 5,000 – 65,000 GPD, the BIO-D process is incorporated in a modular package plant.
- For larger applications, 65,000 – 2,000,000 GPD the BIO-D process is incorporated in a post-tensioned custom-designed structure.

Retrofitting Existing Facilities For The BIO-D Process Can Be Done With Minimal Modifications

- New anoxic tanks are installed or existing tanks are converted.
- Requires only minor process and mechanical revisions, including the addition of a recycle system, which enables the retrofit to be completed quickly and cost-effectively.
DUTCHLAND STRUCTURAL DESIGN

Dutchland is a PCI-certified precaster that specializes in the design, manufacturing and construction of environmental structures. Dutchland’s custom solutions for on-site treatment are contained in precast post-tensioned tanks which provide superior material benefits while requiring the lowest maintenance.

Durability:

• Dutchland precast concrete tanks are designed for 5,000 – 6,000 psi at 28 days.
• The Dutchland precast post-tensioned tank design provides active reinforcing, in addition to passive reinforcing, which results in significantly less cracking and greater longevity.
• A low water-to-cement ratio, in addition to curing in a controlled factory, ensures a dense, highly durable, watertight structure.

Quality:

• Dutchland tanks are dynamically reinforced with post-tensioning tendons to maintain a high residual compression in the walls, even when the tank is full.

Maintenance Free:

• Precast concrete requires no maintenance.

Versatility:

• Dutchland tanks can be designed as simple or complex structures, as well as either circular, rectangular, or elliptical in configuration to accommodate projects needs or site constraints. Dutchland precast post-tensioned structures can be expanded in the future, modified at any time, and added to existing structures.
Cost Savings:

• Reduced life cycle costs due to superior design, manufacturing, and construction.

Speed:

• Precast concrete structures are manufactured in a controlled plant environment. Precast production is not impacted by weather conditions.

Experience:

• Dutchland is a full service, design/build manufacturing and construction firm specializing in the water/wastewater industry that has designed and built over 1,000 structures.

Warranty:

• A 10-year complete structural warranty is provided to the owner to warrant the base, walls, walkway and roof systems of all post-tensioned structures constructed by Dutchland.
ROSE HILL CASE STUDY

Description of the Original Plant:

The Rosehill WWTP was constructed in 1990 as an extended aeration process designed to treat standard domestic residential waste. The original installation was designed to produce a tertiary effluent with low BOD and TSS, with no consideration for the reduction of nitrogen and phosphorus. The facility utilized Dutchland’s precast concrete modular structures for all the process tanks.

Challenge:

The original design worked very well and met the permit limits originally established for the facility. However, in 2005, the Rose Hill WWTP was required to meet stricter effluent requirements. Changes needed to be made to the process at Rose Hill to accommodate for biological nutrient removal, in particular total nitrogen.

Chosen Solution:

Rose Hill WWTP converted their existing extended aeration process to the Dutchland BIO-D process. Dutchland converted one of the existing aeration tanks to an anoxic zone with the installation of mixer and provisions for internal recycle. Dutchland also fine-tuned the aeration process for finer dissolved oxygen control by updating the aeration blowers to be controlled by DO probes.
Performance:
Since converting their plant to Dutchland’s BIO-D process, the Rose Hill WWTP has achieved:
• 92% removal of total nitrogen
• Greater than 95% removal of BOD and TSS
• Average effluent total nitrogen levels consistently less than 5 mg/l
TESTIMONIALS

Dutchland was able to work directly with the engineers and me to turn around a 15 year old plant and make it run brand new.
- Lew Christy, DELCORA

I would highly recommend Dutchland for any service or repair work.
- Pat Cosgrove, Pequea Valley School District

Clean Water has been using Dutchland, Inc. for repairs and service work on wastewater plans we operate for twenty years. They always provide professional service at budget friendly rates.
- Brian Norris, Clean Water, Inc.

Dutchland, Inc. has provided quality craftsmanship and outstanding personnel at all levels. I would highly recommend Dutchland, Inc. products and services for any project.
- Bruce Ammon, Leacock Township
“Dutchland was able to retrofit our plant for the BIO-D process with minimal facility modifications and minor mechanical revisions. The installed process is economical, very easy to operate, and far exceeds our effluent quality expectations.”

– Lester Houck, Manager
Salisbury WWTP