Memo to: Mr. John Mulholland, Director of Services, Infrastructure & Environment.

From: Mr. John Carley, Senior Engineer, Water Services & Environment

Re: Part VIII Planning – Palatine Sewerage Treatment Improvement Scheme

Date: 3rd December 2004

The Part VIII Planning documentation is attached for placing on public display. The treatment plant is proposed on a site attached and beside the existing treatment plant in Palatine. The existing treatment plant is at its design capacity. The new plant will cater for a population equivalent of 1000 people.

The plant is designed to treat the sewerage to:
- Biochemical Oxygen Demand (BOD) = 10mg/l
- Suspended Solids (SS) = 10mg/l
- Total Nitrogen (N) = 5mg/l
- Phosphorous (P) = 1mg/l

The plant proposed is the Stahlermatic Biological Treatment Unit, which incorporated fixed film and activated sludge growth mechanisms. The treatment process will treat 3 times day weather flow. Additional flows will be stored in a storm-water holding tank. The accommodation works will include a new roadway to access the site.

I consider the site chosen for the treatment plant to be the most environmental acceptable and economic site for the extension of the existing treatment plants. I recommend the scheme proceed to planning.

Yours sincerely,

J. Carley
Senior Engineer
Water Services
Palatine Sewage Treatment Works Improvement Scheme

Part VIII – Planning

John Mulholland,
Director of Services,
Infrastructure, Water Services & Environment,
Carlow County Council,
County Buildings,
Athy Road,
Carlow.

November 2004
disposal. The effluent will then discharge to an inlet pump sump from where it will be pumped to a proprietary Biological Treatment unit – the Stahlermatic Biological Treatment unit.

The Stahlermatic (STM) Process is an advanced process incorporating a combination of fixed film and activated sludge growth mechanisms in a single unit. Further details of the process are given in Appendix 1 and a brochure for the system is given in Appendix 2.

The effluent from this Stahlermatic unit will discharge to a settlement tank where the sludge will settle from the effluent. Clarified effluent from the settlement tank will then flow into the outfall chamber, which will consist of a wedge wire screening. This screening will remove any remaining suspended solids from the final effluent, thus producing the required final effluent standards.

Settled sludge will be removed to a sludge holding tank where it will be stored for removal off site.

The treatment works will fully treat flows up to 3 times the Dry Weather flow of 230 m³/day. Flows in excess of this will pass through the fine screens and grit removal systems before flowing to a stormwater holding tank, which will provide storage for a further 3 times the Dry Weather flow. Any additional flow will then pass from the storm Water Holding tank to the stream. Following the storm event, the contents of the stormwater holding tank will be returned to the main treatment process stream where it will be fully treated.

The effluent from the plant will be treated to the following standards:

- **Biochemical Oxygen Demand (B.O.D.)** - 10 mg/l
- **Suspended Solids (S.S.)** - 10 mg/l
- **Total Nitrogen** - 5 mg/l
- **Phosphorus** - 1 mg/l

The works will also include necessary accommodation works for the new site including the construction of a new roadway to access the site.

**Impact of the Scheme**

The treatment works site is located on a site on the north west side of Palatine Village. An earthen berm is to be constructed around the site to screen the works from view and to lessen the visual impact of the scheme. The berm will be planted to a detailed landscaping plan to further screen the works and blend the site in with the local environment. The site will also be fenced with a welded mesh panel security fence, which will be coloured green, again to reduce the visual impact of the site.

The major impact of the scheme will be the high quality treated effluent, which will be discharged from the works to the Palatine stream. This will result in a
lower impact on the water quality on the local watercourses than the current plant.

**Archaeological Impact**

An Archaeological Desktop Study, including a site inspection, of the scheme was carried out by Tobar Archaeological Services in November 2004. This study found that there are "no recorded monuments located on or in close proximity to the proposed development site" and "no previously unrecorded monuments were detected during field walking of the proposed site". Whilst there is no evidence to suggest that the works will interfere with any known archaeological remains, the archaeologist has recommended as a mitigation strategy that either "a suitably qualified archaeologist should monitor the removal of topsoil" or "archaeological testing of the proposed site should be undertaken". — see Appendix 3 for Archaeological Report.

**Drawings & Appendices**

The drawings and Appendices which accompany this report are:

- Existing Palatine sewer network
- Palatine WWTW Site Location
- Palatine WWTW Site layout
- Palatine WWTW Site Sections
- Fencing Standard Details

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</tr>
</thead>
<tbody>
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</table>
Introduction

Palatine Village is located a distance of approx. 6 kilometres north east of Carlow Town. The village has an existing population of approx. 280 people and at present, sewage in the village is treated on a site at the north west side of the village. Effluent from the existing works discharges to the Palatine Stream.

It is proposed to upgrade the existing treatment works to provide an improved quality of effluent from the treatment works and to provide for future development in Palatine.

Existing Treatment Works

The existing treatment process consists of an aeration tank, settlement tank/clarifier and sludge drying beds. The plant is at the end of its useful life and is at its design capacity. It will not be able to accommodate future development in the area.

Description of Proposed Works

It is proposed to provide a new treatment works on the site of the existing treatment works in Palatine, with an enlarged site footprint. The new works will cater for future development in Palatine, up to a population equivalent of 1,000 people, and will provide a high quality of treated effluent, which will comply with the highest standards. The plant has been designed so that additional capacity can be added at the site with relative ease in the future if the need arises.

The treatment works will consist of the following treatment processes

- fine screening
- grit removal
- biological treatment
- Sludge Treatment

Tertiary treatment will be provided to ensure that the effluent meets the required high standard.

The existing inlet pipe to the works will discharge to a new inlet works, which will consist of fine (6mm) screening and grit removal. Screenings will be compacted and discharged into a sealed bin for disposal. The grit removal system consists of a grit chamber, in which the grit is allowed to settle out of the flow. From this chamber, the settled grit is discharged to a sealed bin for
NOTE. 2.4 M High fence shown
Appendix No. 1

Details of Proposed Treatment System
Appendix No. 1

DETAILS OF PROPOSED TREATMENT SYSTEM

The Stahlermatic (STM) process is an advanced process incorporating a combination of fixed film and activated sludge growth mechanisms in a single basin. Each of these processes has their own advantages.

Historically, fixed film systems such as Rotating Biological Contactors are single and stable with low maintenance. The activated sludge process is a more flexible process and will produce a higher quality of final effluent. The STM plant combines the advantages of both processes.

The system works like a conventional activated sludge system with activated biological sludge in the mixed liquor and with a return sludge circuit to increase the concentration of the suspended sludge. The efficiency of the typical activated sludge system is enhanced by working with higher concentrations of the suspended sludge than usual and by the additional effect of the total biofilm. The powerful effects of STM system results from this significant increase of the total biomass concentration.

The STM-system can be used in the same way and with the same process combinations as a conventional activated sludge system.

The immersed STM-contact aerators or "contactors" are attached radially around a large centre shaft. The plates and discs in the contactors are formed with a special surface profile. The process uses only a single mechanical drive system. A geared motor above water level rotates a contactor. Through it atmospheric air is dissolved in the mixer liquor to supply activated sludge sufficiently with oxygen. The biofilm on the contact aerators is supplied with oxygen when the contactors emerge above water level. During the downward rotation the air is trapped in the chambers created by the plates and discs of the contactors, and forced into the water. As it is conducted to the bottom of the biotank the air is compressed more and more. In principle the biofilm is supplied with oxygen during the total rotation of the contactor, in the atmosphere and in the mixed liquor. The trapped air is partially used to reduce the power requirements by buoyancy so that the power consumption of the system is relatively low. In effect, the contactor acts as an extremely efficient aerator.

The oxygen supply for the microorganisms is ensured by rotating the contactors slowly. As soon as a segment emerges from the chambers above water level during this rotation, the mixed liquor inside the chambers runs out. The segment will then be filled with atmospheric air. The necessary oxygen for the biological wastewater treatment dissolves on the wet surfaces on the fixed biofilm. Because this very large surface area is directly affected by the partial pressure of the air, an immediate saturation of the oxygen concentration is achieved. By diffusion oxygen penetrates into the biofilm due to the concentration gradient.
While the segments are submerging again into the mixed liquor the air cannot escape and is trapped in the segments. As the contactor rotates, the air is forced and conducted to the bottom of the biotank. In this way the air is compressed more and more. During the downward rotation some of the air can escape and is channelled in the form of middle fine and fine bubbles to the centre of the aerator caused by the shape of the segments. Finally the bubbles reach the water surface through the opposite segments.

This turbulence combined with the rotation of the wheel effects a homogeneous mixing of the biotank. The activated sludge in the mixed liquor is always sufficiently supplied with oxygen.

During the upward rotation of the contact aerator the partially filled segments provide buoyancy and tremendously reduce the propulsive power required for rotation. Only a few moments before emerging again the rest of the air is released into the water.

The fixed film on the surface areas within the segments are supplied with oxygen up to saturation while open to atmosphere at the start of the cycle. The forced conducted air is contacting all inner surface areas of the plates or discs in the segments during rotation. By this all microorganisms of the fixed film are sufficiently supplied with oxygen during rotation in the mixing liquor too.

**Characteristics of the S.T.M. Process**

- Suitable for populations Equivalent to 50 PE to 5,000. (can go to 25,000 PE)
- Complete Waste Water Treatment System that needs no chemicals.
- Utilises a very small space.
- Totally Automatic. Normally no personnel required on site.
- Combines the process of fixed film contactors and Activated Sludge treatment.
- Low cost, saves over 50% of the power requirement of a conventional plant.
- Low maintenance (components have 20 year plus life)
- Automatic Nitrification and de-Nitrification, Automatic Oxygen level control.
- Simple to Install. Simple and robust construction.
- Replaces the technology of rotating Biological Contactors.
- No odours on any kind.
- Larger Tank operational volume to conventional Rotation Biological Contactors.
- Huge area for the growth of active biofilm.
- Constant mixing without additional equipment.
- Higher than normal concentration of the suspended sludge biomass.
- High process stability.
- Optimal Oxygen transfer Efficiency.
- Silent Operation.
- Better Sludge quality giving better dewatering capability.
➢ Over 500 installations world-wide. Patented and licensed in 66 Countries.

For an equivalent volume of waste water to be treated:-

➢ Compared to a conventional Activated sludge system the Stahlematic consumes 55% less energy and occupies 48% less volume area.

➢ The system results in Higher B.O.D. and S.S. removal
More advanced de-nitrification.
More advanced biological P elimination.
Simultaneous stabilisation of the sludge.

➢ The system can handle storm flows and dry weather flows equally well, with automatic Dissolved Oxygen sensing to speed or slow down process.

To summarise, this system has significant advantages over comparable processes. It has lower investment costs, lower running costs, and a complete absence of the use of any chemicals.
Appendix No. 2

STM®-AEROTOR

The Aeration System with Specific Advantages

STM
Stählermatic®
STÄHLERMATIC®
The combined wastewater treatment process

The technique of the "combined processes" for the biological treatment of wastewater is a combination of the submerged fixed film process and the activated sludge system.

Wastewater treatment according to the STÄHLERMATIC® technique is effected on the one side by suspended activated sludge in the mixed liquor and on the other side by fixed microorganisms in a biofilm on the surface of the "contactors. This combines the advantages of activated sludge and fixed film processes in one. The system works like a conventional activated sludge system with activated biological sludge in the mixed liquor with sludge return. The efficiency of the typical activated sludge system is enhanced by working with higher concentrations in the suspended sludge as usual and by the additional effect of the biofilm.

The STÄHLERMATIC® system can be used in the same process combinations as conventional activated sludge systems, but with higher efficiency. Advanced nitrification and denitrification as well as effective biological P-elimination are carried out simultaneously and safely in one tank.

The immersed STÄHLERMATIC®-Aerotor is a wheel with a center shaft. The wheel is of a cage design. The plates and discs in the contact aerators are formed with a special surface profile in order to assure maximum oxygen transfer. Only one mechanical drive is necessary. An electric gear motor above water level rotates the contact aerators. By this atmospheric air is dissolved in the mixed liquor to supply the activated sludge sufficiently with oxygen. The biofilm on the contact aerators is adequately supplied with oxygen when the contactors emerge above water level. During the downward travel the air is trapped in the chambers, created by the plates and discs of the contactors, and forced into the water. Moving downwards to the bottom of the biotank the air is compressed more and more. During the upward travel of the contact aerator the partially airfilled segments provide buoyancy and reduce significantly the power consumption. The fixed film on the surface areas within the segments are supplied with oxygen up to saturation while passing the atmosphere. The forced air contacts all inner surface areas of the plates or discs in the segments during rotation. By this all microorganisms of the fixed film are fully supplied with oxygen during rotation in the mixed liquor.

The forced air contacts the specially profiled surfaces of the plates and discs. Due to these profiles continuously new, innumerable transition zones are formed for the oxygen transfer. This results in the typical oxygen supply for both components, fixed biofilm and suspended activated sludge.

Mode of operation

In principle the mode of operation is identical for both kinds of contact aerators, the cell-segment- and the pipe-segment-contact-aerator.

The oxygen supply for all microorganisms is ensured by rotating the STÄHLERMATIC®-Aerators slowly by an electric frequency controlled gear motor above water-level. As soon as a segment emerges above water level during rotation, the mixed liquor inside the chambers flows out. The segment will then be filled with atmospheric air. The necessary oxygen for the biofilm dissolves on the wet surfaces of the fixed bed biofilm. Because this very large surface area is directly affected by the partial pressure of the air, an immediate saturation of the oxygen concentration is achieved.

When the segments are submerge again the air cannot escape and is trapped in the segments. In the course of the rotation the trapped air is forced to the bottom of the biotank and compressed more and more. During the downward travel a part of the air can escape. The bubbles travelling with the rotation of the wheel result in a homogeneous mixing of the biotank. In addition the activated sludge in the mixed liquor is always effectively supplied with oxygen.

During upward travel of the contact aerator the partially airfilled segments provide buoyancy and reduce significantly the power consumption. The fixed film on the surface areas within the segments are supplied with oxygen up to saturation while passing the atmosphere. The forced air contacts all inner surface areas of the plates or discs in the segments during rotation. By this all microorganisms of the fixed film are fully supplied with oxygen during rotation in the mixed liquor.

The forced air contacts the specially profiled surfaces of the plates and discs. Due to these profiles continuously new, innumerable transition zones are formed for the oxygen transfer. This results in the typical oxygen supply for both components, fixed biofilm and suspended activated sludge.

Waste water treatment plant "Nieder-/Oberzurheim"

starting | 1989
degree of purification | advanced nitrification
(control value < 10 mg NH₄-N / l, temperature > 12°C)
volume load | < 0.7 kg BOD₅ / (m³ x d)
effluent quality | < 3 mg BOD₅ / l
< 33 mg COD / l
< 4 mg NH₄-N / l
< 4 mg NO₃-N / l
no chemical treatment | < 1 mg P / l

Paper Mill Thailand

waste water source: process water from paper mill
connected load: 74.000 p.e.
waste water flow: 2,000 m³/d
starting: 1986
volume load: 2.8 kg BOD₅ / (m³ x d)
influent load: BOD₅ | 4480 kg/d conc. 2500 mg/l
COD | 7000 kg/d conc. 3500 mg/l
effluent concentration: BOD₅ | ≤ 40 mg/l
Design features

The characteristic properties of the STM-system are the high degradation efficiency, high quality effluent standards and a high flexibility caused by the combination of the advantages of the biological processes in a true hybrid system. In local settled plants the facilities can be equipped for permanent use in any size. In cases of temporary use the facilities are placed in container or modular constructed units. Different sizes and design features comply with requirements specified. The used materials are proved to guarantee a long service life. The solid and simple construction renders possible low maintenance, eminent safety in service and lowest power consumption. The STÄHLMATIC® contact aerators can be constructed as a cell-segment or as a pipe-segment contact aerator. The construction of the STM-contact aerators corresponds to the principles of the DIN 19569 - 3 -1995 - 01 (equipment of waste water facilities).

The cell-segment contact aerator (ZR) consists of several segments, each with two airpockets. The segments are constructed of a series of plates, made of Polypropylene, to provide large growth surfaces for the fixed film biomass, and to create the airpockets for the oxygen supply. Sufficient oxygen transfer is guaranteed for any pollution load.

In principle the pipe-segment contact aerator is identical in function and operation with the cell-segment contact aerator. The growth surfaces for the fixed film and the volume of the airpockets are smaller. This construction comply with the requirements for special applications or for other functions. Parallel to the shaft several cylindrical hollow bodies in form of pipes are radially arranged as contact aerators. The pipes are constructed of a series of discs made of Polypropylene. Usually both kinds of contact aerators are equipped with a scraper. If required the contact aerators can be equipped with up to nine attached pipes. They increase the active surface area and the oxygen input.

Paper mill "Köhler - Kehl am Rhein"

kind of waste water: manufacturing waste waters from a papermill
population equivalents: 5,000
starting: 1994
effluent quality:
- 3 - 5 mg BOD₅/I
- 65 - 70 mg COD/I
- 0,1 mg NH₄-N/I
- 1 mg NO₃-N/I
- 1 mg P/I

Paper mill "Köhler - Oberkirch"

kind of waste water: manufacturing waste waters from a papermill
population equivalents: 12,000
starting: 1984
volume load: 0,5-0,7 kg BOD₅/(m³·d)
effluent quality:
- < 5 mg BOD₅/I
- < 70 mg COD/I
Application fields

The STM-technique is used
- for new waste water treatment facilities
- to equip existing plants to reach an advanced degree of treatment
- for reorganization, modernization and expansion of existing plants.

The contact aerator will be installed in a biotank built of concrete in great waste water treatment plants or in smaller local settled facilities. Smaller facilities or in cases of temporary use of such facilities the STM-system is built in a steel construction completely equipped: container-units, packaged units, modular constructed units.

Application fields
- Treatment of domestic waste water in every size of the needed facility.
- Treatment of domestic waste water influenced by industrial and manufactural waste water
- STM-biological treatment facilities coupled with
  - conventional activated sludge systems
  - denitrification facilities
  - N-elimination facilities
  - P-elimination facilities
  - sewage lagoons or polishing ponds
  - treatment facilities for fecal sludge
- Aerobic sludge stabilization
  - primary sludge
  - excess sludge
  - fecal sludge
- Biological treatment of leachate from sanitary landfill.
- Treatment of liquid manure partial, basic treatment
- Aquaculture systems:
  - intensive fish farming in closed warm water circuits.

Wastewater treatment plant Siriraj Hospital Mahidol Universität, Bangkok, Thailand

The wastewaters are collected from the hospital and all university building in Siriraj campus and flow to the wastewater treatment plant. The solids will be separated before treatment in following processes. The wastewaters are treated biologically with the STÄHLERMATIC®-system.

The STÄHLERMATIC®-system is equipped with 12 pipe-segments-contact-aerators RR 4.3 x 2.5.

The excess sludge will be stabilized simultaneously. The sludge is biologically and sanitarily clean and is pressed, dried, packed into bags and used as fertilizer.

The table shows figures for the efficiency of the plant. Sanitary investigations of germs in the effluent water, in the sludge and in the air near the biological stage shows that hygienically the plant works unobjectionable.
<table>
<thead>
<tr>
<th>Type</th>
<th>Pipe diameter (in.)</th>
<th>maximum water level (ft)</th>
<th>maximum effective flow rate (gpm)</th>
<th>average power consumption (kw)</th>
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<tr>
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<td>7.5</td>
<td>30.0</td>
<td>0.93</td>
</tr>
<tr>
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<td>RR 4.3</td>
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<td>RR 4.8</td>
<td>3.0</td>
<td>7.5</td>
<td>30.0</td>
<td>0.93</td>
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Notes:
- For inspection purposes only.
- Consent of copyright owner required for any other use.

EPA Export 26-07-2013:14:19:38
The effluent standards are guaranteed independent of temperature (summer / winter)

Recommended datas for dimensioning

The ATV-Guidelines are the basis for all dimensionings, documented in the papers A 122, A 126, A 131, A 135, A 257 and H 254. Other informations are given in the report of the ATV-workshop 2.6.4 "Combined waste water treatment techniques". The following recommended datas are based on practical experience by operating more than 500 STÄHLERMATIC®-facilities of long standing worldwide (actual states of the STÄHLERMATIC®-technique). These recommended datas have to be used in the dimensioning instructions according to the Guidelines mentioned above.

"Combined Waste water Treatment Techniques"

The principle of the datas specified in the guidelines mentioned above can be used for the dimensioning of the Stahlermatic-wastewater treatment facilities.

Indications for the method used of dimensioning of the STÄHLERMATIC®-system can be found in these guidelines:

The influent load is divided in different proportions for the suspended activated sludge and for the fixed film. For both components the degradation efficiency has to be proofed separately in accordance with the guidelines. As a rule this method is used for all waste water treatment plants with a design capacity of not more than 10,000 population equivalents. Other informations are given in the ATV-Guidelines A 131 and H 254.

Biological treatment of leachate from the sanitary landfill Hengelo, Netherlands

The aim of the facility is the advanced degradation of nitrogen through simultaneous nitrification, denitrification and P-elimination in a single treatment which was accomplished in 1995 in a one year pilot project. The Hengelo facility went early 1997 into full scale operation.

Elimination rate (%) COD BOD₅ NH₄-N N-Kj P total
>60 >95 >96 >90 >85
Flexibility of volume adaption and the dimensioning of the oxygen supply

The STM-system offers various possibilities in the design:

Variation of the oxygen supply by
- changing the number of revolutions of the contact aerators (adaptation to changing operation conditions) by using an infinitely variable gear motor or a frequency regulated motor
- assembling additional pipes: increase of the total oxygen transfer and of degradation efficiency
- Adaptation of the volume of the biotank

Volume of the biotank

If the tank has to be completely aerobic, e.g. for advanced nitrification, smaller sizes of the biotank are recommended. The biotank volume is then always sufficiently supplied with oxygen. A high nitrification efficiency is always guaranteed.

Choosing a larger size of the biotank equipped with the same contact aerator (expanding the biotank volume) results in a larger treatment volume. Consequently the anoxic environmental zones are increased, so that simultaneous denitrification takes place. These anoxic zones are mainly beneath the contact aerators. By expanding the biotank volume an always aerobic environment in the centre and right next to the contact aerator is guaranteed.

Schematic view of the environmental conditions

STÄHLERMATIC®-biostage with simultaneous nitrification/denitrification and with advanced biological P-uptake

High nitrification efficiency is achieved independent of the number of revolutions of the contact aerator. The size of the zones with different oxygen environment is not fixed. The extension of the zones will change dependent on the number of revolutions, the oxygen demand and depending on the required degradation rate and the hydraulic loading rate (turbulence) of the tank.

Mainly the denitrification efficiency is influenced. The conditions for a high nitrification efficiency are always kept. Oxygen control in combination with operation control will keep nearly constant oxygen conditions in the different environmental zones. Advanced nitrification and simultaneous denitrification will always work with a high efficiency.

With the possibility to equip the contact aerators with additional pipes or to choose other sizes of the biotank the STM-system can comply with all requirements of degradation: advanced biodegradation of the organic carbon components, advanced nitrification and simultaneous denitrification.

Phosphate is extensively eliminated by biological uptake as the STM-system will work with higher concentrations of the biomass compared to conventional systems. In an expanded biotank the suspended activated sludge changes continuously from one oxygen environment into another one (aerobic - anoxic). By this the P-uptake will be enhanced. Nevertheless the efficiency of the other degradation processes is kept without changing.

Comparison to other activated sludge systems

Example: 10,000 population equivalents

Advanced nitrification/denitrification, with simultaneous biological P-uptake and sludge stabilization.

Conventional activated sludge system

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<th>Energy KWh/d</th>
<th>Total volume</th>
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<tr>
<td>Stählermatic</td>
<td>100%</td>
<td>45%</td>
</tr>
<tr>
<td>SBR</td>
<td>112%</td>
<td>52%</td>
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</table>

Comparison to other activated sludge systems

Example: 10,000 population equivalents

Advanced nitrification/denitrification, with simultaneous biological P-uptake and sludge stabilization.
Advantages

**Stable Process Performance**
High process stability and flexibility, even under high loadings, by combining the activated sludge and fixed film processes. Even the strictest effluent standards can be met consistently.

**Solid and Simple Construction**
Quality System assured construction, including long life polypropylene media, simple low-maintenance drive train, and nylon lined support bearings for extended life.

**Lowest Capital Cost**
Tank volume is reduced by 40% over conventional aeration by the STM®-Aerotor's process efficiency.

**Lowest Energy Usage**
The STM®-Aerotor, which is 75% submerged, operates at slow speeds driven by a low-powered motor. This provides great savings in energy. Compared with a fine bubble aeration only 45% of the necessary energy is used.

**Advanced Biological Nutrient Removal**
The STM®-Aerotor can provide consistent simultaneous nitrification / denitrification, as well as biological phosphorus removal, in a single basin.

**No Noise or Odor Problems**
Simple slow-speed operation reduces operating noise. The STM®-Aerotor process operates with virtually no problem-causing odors.

**Improved Sludge Quality**
Better sludge settling characteristics (lower sludge volume index), better dewaterability, and smaller volumes of waste sludge.

STM®-Aerators worldwide more than 800 references
Appendix No. 3

Archaeological Report
ARCHAEOLOGICAL IMPACT ASSESSMENT
OF A PROPOSED WASTE WATER TREATMENT PLANT EXTENSION AT PALATINE, CO. CARLOW

AUTHORS: MIRIAM CARROLL AND ANNETTE QUINN

DATE: NOVEMBER 2004

CLIENT: CARLOW COUNTY COUNCIL COUNTY BUILDINGS ATHY ROAD CARLOW

TOBAR
archaeological services

CARLOW COUNTY COUNCIL
1-0 NOV 2004
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1. INTRODUCTION

This report presents the results of an archaeological impact assessment of a proposed extension to a waste water treatment plant at Palatine, County Carlow. The project involves the construction of an extension to an existing sewage works. This report amalgamates desk-based research and the results of field walking to identify areas of archaeological significance or potential likely to be impacted by the proposed development. A number of mitigating measures will also be recommended in order to minimise any such impact.

2. METHODOLOGY

A desk-based study of the proposed development was undertaken in order to assess the archaeological potential of the area and to identify the impacts of the proposed development on this landscape.

Cartographic Sources
A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Carlow. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record. The 1st (1837) and 2nd edition OS maps for the area were also consulted.

Documentary Sources
The published Archaeological Inventory of County Carlow was consulted as were all local journals such as Carloviana

Field walking
A programme of field walking in the proposed development area was undertaken. The site of the proposed extension was inspected to assess the likely impact, if any, on the recorded monuments in this area and also to determine if previously unrecorded archaeological monuments existed on or near to the location of the proposed site. A photographic and descriptive record was made of the proposed development site.
3. DEVELOPMENT PROPOSAL

The proposed development consists of the construction of an extension to an existing waste water treatment plant. The new works will occupy an area immediately west and south-west of the existing plant on a site measuring 100m NE-SW x 50m NW-SE. The project will involve ground disturbance in the form of topsoil removal on the proposed site.

4. RECEIVING ENVIRONMENT

The proposed development area is located in the townland of Killyshane immediately north-east of Palatine village (Fig. 1). The village is located over three miles north-east of Carlow town, just off the N9 between Carlow and Dublin. Palatine village is situated just inside the Carlow-Kildare border and the proposed development site is located in a greenfield site immediately west of the Union and Rural District boundary between the two counties. The proposed development site presently consists of a portion of a long, narrow green field immediately east of a public roadway and c. 120m north-west of Palatine Bridge (Plates 1-2). The existing treatment plant occupies the north-east corner of the site and a narrow gravel trackway gives access from the public roadway to the latter (Fig. 2). The field is bound to the east by a stream and to the south and west by the public road and to the north by the remainder of the green field. The site has a north-east facing slope which is quite steep at the west side of the development area where the ground falls away steeply from the public road. The topography of the Palatine area consists of undulating pastureland at an altitude of 200-300ft above Ordnance Datum.
5. DESCRIPTION OF THE CULTURAL HERITAGE WITHIN THE PROPOSED DEVELOPMENT AREA

Recorded Monuments within Proposed Development Area
No recorded monuments are located on or in close proximity to the proposed development site (Fig. 1). No previously unrecorded monuments were detected during field walking of the proposed site.

Recorded Monuments in Vicinity of Proposed Development Area
The nearest recorded monuments to the proposed development site are located c. 2.5km to the south-west in the townland of Oakpark/Painestown and are classified as enclosure sites (RMP CW002-011 and 012).

The term enclosure is often used to describe monuments which cannot be classified into a particular site type, such as a ringfort, but whose shape, size and morphology suggests that it is archaeological in nature. Enclosures may represent destroyed or partially destroyed ringforts and are generally comprised of circular or sub-circular areas enclosed by an earthen bank or a wall or drystone construction. Ringforts are the most numerous archaeological monuments in the Irish landscape. They consist of a circular or roughly circular area enclosed by an earthen bank formed of material thrown up from the digging of a concentric ditch on its outside. Ringforts are usually enclosed by a single bank (univallate); bivallate or trivallate ringforts i.e. those enclosed by double or triple rings of banks are less common. The number of banks and ditches enclosing these monuments are considered to reflect the status of the site, rather than the strengthening of its defences. Archaeological excavation has shown that the majority of ringforts functioned as enclosed farmsteads, built during the early medieval period (5th – 9th Century AD). Excavation within the interior of the monuments has traced the remains of circular and rectangular dwelling houses as well as smaller huts probably used to stall animals. The enclosing earthworks would also have protected domestic livestock from natural predators such as wolves and foxes.
General Historical Background

The place name Killyshane is derived from the Irish *Cille Seain* which may be translated as John’s Church (O’Toole 1937, 24). The origin of the place name Palatine, however, does not appear to be from the Irish language. In his *Topographical Dictionary of Ireland* Lewis (1837, 454) lists the village as Palatinetown and states that it is said to have derived its name from a colony of German refugees who settled here in the reign of Louis XIV.

Burton Hall Demense is located to the south-east of Palatine village. Burton Hall house was completed in 1730 having replaced an earlier structure which reputedly dates to the mid-sixteenth century (O’Toole 1993, 72). The house was purchased by the Irish Land Commission in 1927 and was later bought by Harmon Herring Cooper who demolished part of the Hall using the salvaged material to build a new house (ibid., 74).

6. IMPACT OF THE DEVELOPMENT ON THE CULTURAL HERITAGE LANDSCAPE

Visual Impact

No recorded archaeological monuments are located on or near to the proposed development site at Killyshane, Palatine. The nearest recorded monuments are located c. 2.5km from the proposed site therefore the construction of the extension to the existing waste water treatment plant will not have any visual impact on the latter.

Archaeological Impact

No known or newly discovered archaeological monuments are located on the proposed development site. The location of the development site adjacent to a stream may increase its potential to contain archaeological remains. It is possible that ground disturbance associated with the construction of the extension to the waste water treatment plant may uncover the remains of buried archaeological features or deposits which are no longer visible above ground.
7. MITIGATION STRATEGIES

The proposed development is not located within the constraint zone for any recorded monuments nor were any previously unrecorded monuments detected during fieldwalking. It is possible, however, that previously unrecorded or sub-surface archaeological remains may exist within the development area. In order to minimise the impact of such works on the archaeological and cultural heritage landscape the following mitigating strategies are recommended:

- Archaeological testing of the proposed development site should be undertaken by a suitably qualified archaeologist prior to the commencement of ground works in order to establish if buried archaeological remains exist within the development area.

OR

- A suitably qualified archaeologist should monitor the removal of topsoil during the construction phase of the development in order to prevent the loss of or damage to previously unrecorded or sub-surface archaeological remains.

- Should archaeological remains be uncovered during monitoring of groundworks provision should be made for the appropriate resolution of such remains through preservation in situ or preservation by record.
8. REFERENCES


O' Toole, E., 1937, *Place Names of County Carlow*.

Figure 1: Extract from Record of Monuments and Places Carlow Sheet 2, showing proposed development site in red.
Plate 1: Proposed development site at Killyshane, Palatine, looking north.

Plate 2: Existing plant on left and proposed development site looking south.