GUIDELINE FOR THE DESIGN AND APPROVAL OF ON SITE (SUB SURFACE) DISPOSAL OF DOMESTIC SEWAGE
1. INTRODUCTION

This Guideline has been prepared for Developers and/or Professionals seeking approval from Durban Metropolitan Unicity Council (DMUC) for the on-site disposal of domestic sewage via septic tanks and sub surface soakaways. Permission for this disposal option on privately owned property will only be considered in areas:-

- that are not presently served by municipal waterborne sewerage and where such provision is not anticipated in the short to medium term or at all according to the Metro Unicity Council’s programme for the sewering of the Unicity Area,

- where full or semi pressure water supply already exists and

- where conditions are appropriate for the installation and operation of such disposal systems.

The property owner/developer/professional contemplating a new development or subdivision requiring the provision of on-site disposal of sewage shall make application to the Metro Wastewater Management Department through the Systems Area Engineer at the Area office of the area concerned (see address and contact details in appendix D)

Permission, if granted, will be in terms of the Unicity Sewage Disposal Bylaws and the development together with all future extensions/alterations/sub-divisions will be subject to the limitations imposed by the approval and the relevant bylaws.

This Guideline has been established to assist in the approval procedure in residential areas where extraordinary terrain or geological conditions are not prevalent e.g steep slopes or impermeable soils. Relevant specialist advice should be sought if developments are being contemplated which embrace complex engineering requirements.

This Guideline shall be read in conjunction with the Code of Practice for the Application of National Building Regulations (NBR), SABS 0400-1990 and Building Standards Act No.103 of 1977 or latest revisions thereof.

A separate Guideline is available, where a privately owned “Package Type” sewage treatment plant or other on-site system for the treatment of domestic sewage, is being considered by the Developer, where the treated effluent is to be discharged directly to a natural watercourse or through surface irrigation,
2. TECHNICAL OVERVIEW OF AN ON-SITE (SUB-SURFACE) SEWAGE DISPOSAL SYSTEM

2.1 General description of the disposal system

The system shall consist of the necessary pipework from the residence to a septic tank. The septic tank shall be constructed so as to allow the liquid fraction of the sewage to gravitate to a soak away. The soak away will allow the liquid to seep into an area where final dispersion will be by way of evapotranspiration.

2.2 Effluent Loading (E)

The effluent loading shall be determined in accordance with PP 10.4 Table 1 of SABS 0400-1990 as follows:-

<table>
<thead>
<tr>
<th>Number of bedrooms</th>
<th>Sewage flow in litres per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>700</td>
</tr>
<tr>
<td>3</td>
<td>900</td>
</tr>
<tr>
<td>4</td>
<td>1100</td>
</tr>
<tr>
<td>5</td>
<td>1400</td>
</tr>
</tbody>
</table>

2.3 Septic tank requirement

The sizing of the septic tank shall have a minimum capacity of 1.7m³ and shall be designed and constructed in accordance with the information contained within SABS 0400-1990, PP10.4.

2.4 Soakaway requirements

2.4.1 Geotechnical investigations required

*Soil profiles and geological formation* - Sampling holes should be excavated to a depth of at least one metre below the bottom of the proposed soakaway. The soil properties should be assessed and the general geological formations noted. Particular attention should be given as to whether layers of poor permeability or bed rock are present under the site. Indications in the soil profile of fluctuating groundwater tables should be noted.

*Percolation Tests* - On site soil permeability tests shall be carried out in accordance with SABS 0400-1990, Section PP28.
2.4.2 Size of the soakaway

The soakaway shall be sized and so arranged to provide sufficient vertical side infiltration area such that the maximum rate of application of effluent to the soil infiltration areas shall comply with the rates of percolation and effluent applications as indicated in Table 3, PP10.7, SABS 0400 - 1990 and as shown in the graph below.

In determining the size of the soakaway the following considerations shall be taken into account:

- The soakaway shall have a level base throughout its length,
- The area of the base shall not be considered to contribute to the soil infiltration area,
- The area of the wetted sides of the soakaway shall be greater than the effluent loading (E) divided by the maximum rate of application of effluent loading (R) as obtained from the above graph.
- The soakaway shall have a clear voided capacity greater than the effluent loading (E). The clear voided capacity may be assumed to be 30% of the overall volume of the soakaway if rubble or single size aggregate is used as backfill.
The minimum dimensions of a typical soakaway shall be as shown in the table below.

<table>
<thead>
<tr>
<th>Effluent loading (l/day)</th>
<th>Minimum width W (m)</th>
<th>Minimum depth D below ground level (m)</th>
<th>Minimum length L (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>0.6</td>
<td>0.7</td>
<td>6.5</td>
</tr>
<tr>
<td>900</td>
<td>0.6</td>
<td>0.7</td>
<td>8.3</td>
</tr>
<tr>
<td>1100</td>
<td>0.6</td>
<td>0.7</td>
<td>10.2</td>
</tr>
<tr>
<td>1400</td>
<td>0.6</td>
<td>0.7</td>
<td>13</td>
</tr>
</tbody>
</table>

2.4.3 **Position of the soakaway**

The soakaway shall be positioned such that the effluent is distributed uniformly across the proposed evapotranspiration area. A soakaway shall not be located less than four metres away from any stream.

**2.5 Requirements for a designated evapotranspiration area**

2.5.1 **General Specification**

Provision shall be made for an area of land around the soakaway to permit evapotranspiration of effluent infiltrated into the soils from the soakaway. The area to be used for evapotranspiration shall conform as a minimum to the following requirements:

(i) The depth of soil cover to bedrock shall not be less than 700 mm.

(ii) The area shall be covered by vegetation and shall NOT be covered by paving, structures, impervious surfaces, etc (i.e. hard surfaced area).

(iii) The area shall be located totally within the said subdivision boundaries.

(iv) In exceptional circumstances pumping to the soakaway may be permitted. The arrangement of the pumping system (which may include separate pump sumps and outlet balancing chambers) shall be such as not to detrimentally effect the operation of the septic tank and soakaway system.

(v) Surface stormwater, subsoil seepage and local groundwater conditions shall be taken into account when positioning, designing and constructing the soakaway and evapotranspiration area.

(vi) The soakaway must necessarily serve the purpose of distributing the effluent across the evapotranspiration area and should thus be located horizontally across the upper margin of a sloping evapotranspiration area and centrally across a level one.

(vii) Where seasonal or persistent seepages are prevalent e.g. springs, subsoil drainage
measures shall be designed and implemented to divert the seepage away from the evapotranspiration area

(viii) No stormwater from roof down pipes or pool backwash systems may be connected to the septic tank/soakaway. Soakaways specifically for stormwater shall not be located within or up slope of the evapotranspiration area.

2.5.2 Topographical features

Features relevant to the functioning of the sanitation and disposal system shall be taken into consideration, noted and marked on the site plans to be submitted as part of the submission documentation.

In general features such as depressions, gullies, rock outcrops and other such features should be noted and an assessment made of how they will affect the functioning of the disposal system.

In particular the gradient of the slopes should be evaluated as well as surface and sub surface drainage patterns. The position of rivers and wetlands relative to the proposed development should be noted

2.5.3 Minimum required evapotranspiration area

The minimum required evapotranspiration area shall be calculated as follows:-

\[
A_R = \frac{[F_C \times F_D \times E_T]}{e} \quad (m^2) \quad \text{..........................}(1)
\]

where

\[
A_R = \text{Minimum required evapotranspiration area (m}^2\text{)}
\]

\[
e = \text{Evapotranspiration rate (Table A1)}
\]

\[
F_C = \text{Terrain concentration factor (Table A2)}
\]

\[
F_D = \text{Deep infiltration factor (Table A3)}
\]

\[
E_T = \text{Effluent loading in accordance with SABS 0400 PP10.4 Table 1}
\]

2.5.4 Available area for evapotranspiration

The available area for evapotranspiration, \(A_A\) shall be measured from the plan of the proposed development and shall only take into account the undeveloped and unpaved area as follows:-
Table 2.5.4

| Evapotranspiration area is proposed on a planar slope | The available evapotranspiration area shall be calculated as the net undeveloped and unpaved area from the position of the proposed soakaway to the downslope property boundary (see schematic drawing in appendix C) |
| Evapotranspiration area is proposed on level land | The available evapotranspiration area shall be calculated as the net undeveloped and unpaved area surrounding the soak pit. (see schematic drawing in appendix C) |

3 APPROVAL

3.1 Feasibility of on-site disposal of sewage

On-site effluent disposal shall be considered feasible where the available area for evapotranspiration $A_A$ as defined in Table 2.5.4 is equal to or greater than the required area for evapotranspiration $A_R$ as calculated using formula 1.

The area allocated for evapotranspiration shall be recorded on the submission plans, and no further development or paving shall occur within the demarcated area.

3.2 Applications - general

An application shall be accompanied by a suitable motivation produced by a registered professional engineer with appropriate experience.

In order for approval to be assessed a site plan shall be drawn to scale and submitted indicating the following details of the relevant development under consideration:

1. Boundaries and boundary dimensions.
2. Peripheral outline of existing and proposed structures and impervious surfaces, where applicable.
3. Relevant positions of existing and/or proposed above-ground structure/s, septic tank, soakaway trench, interconnecting pipework and the extent of the evapotranspiration area/s.
4. Topographical features such as streams, etc.
5. Slope direction, angle of the slope of the area and MSL - based contours where available or levels based on an assumed datum indicated at four boundary peg corners.
6. Positions of percolation test holes and their relationship to the final invert of the soakaway
7. North point.

8. All appropriate dimensions, area values and existing and proposed features regarding the proposed on-site effluent disposal system shall be clearly indicated on the drawings submitted for approval.

In addition the information sheet shown in appendix B shall be completed.

3.3 Applications – subdivisions

The following procedure shall be applied in the evaluation of a proposed residential subdivision.

A site plan shall be drawn to scale and submitted indicating the following details of the relevant proposed sub division under consideration:-

1. Boundaries and boundary dimensions of existing and proposed new subdivisional area/s.

2. Peripheral outline of existing, proposed or hypothetical 2 to 4 bed roomed house. The extent of the land required to accommodate the arrangement will depend on several factors including the severity of the terrain, practical vehicular access and the general attitude of the site.

3. Based on the existing proposed and hypothetical structures, positions of existing and/or proposed septic tank/s, soakaway trench/s, interconnecting pipework and the extent of the evapotranspiration area/s shall be shown and marked.

4. Topographical features such as streams, etc must be shown.

5. Slope direction, angle of the slope of the area and MSL - based contours where available or levels based on an assumed datum indicated at four boundary peg corners.

6. Positions of percolation test holes and their relationship to the final invert of the soakaway

7. North point.

9. All appropriate dimensions, area values and existing and proposed features regarding the proposed on-site effluent disposal system shall be clearly indicated on the drawings submitted for approval.

In addition the information sheet shown in appendix B shall be completed.

The proposed allocation of areas to septic tanks, soakaways and evapotranspiration areas shall be recorded and future development shall be limited so as to accommodate and maintain these areas.
## APPENDIX A

### TABLES A1 TO A3

### TABLE A1 - Potential Effluent Evapotranspiration Rates “e”(1/m²/d)

<table>
<thead>
<tr>
<th>System Area</th>
<th>Geology</th>
<th>Evapotranspiration rate “e”</th>
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<tbody>
<tr>
<td>Amanzintoti</td>
<td>Berea</td>
<td>2.33</td>
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<tr>
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<td>2.53</td>
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<td>Location</td>
<td>Formation</td>
<td>Density</td>
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<td>Blackburn</td>
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<td>Bothas Hill</td>
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<td>Buffelsdraai</td>
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<td>1.97</td>
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<tr>
<td>Canelands</td>
<td>Alluvium</td>
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</tr>
<tr>
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<td>Craiglea</td>
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<td>Location</td>
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</table>

**TABLE A2**
### Terrain Concentration Factor “Fc”

<table>
<thead>
<tr>
<th>Slope Conformation</th>
<th>Slope Angle &lt; 14 deg.</th>
<th>Slope Angle &gt; 14</th>
</tr>
</thead>
<tbody>
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<td>Concave</td>
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<td>1.3</td>
</tr>
<tr>
<td>Planar</td>
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<td>1.1</td>
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<tr>
<td>Convex</td>
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<td>1.0</td>
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### TABLE A3

#### Deep Infiltration Factor “Fd”

<table>
<thead>
<tr>
<th>Geological Formation</th>
<th>Soil Depth</th>
<th>Slope Angle (less than 14deg)</th>
<th>Slope Angle &gt; 14deg</th>
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</thead>
<tbody>
<tr>
<td>Berea</td>
<td>&gt;1m</td>
<td>0.74</td>
<td>0.84</td>
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<td>Bluff</td>
<td>&gt;1m</td>
<td>0.61</td>
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<td>&gt;1m</td>
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<td>Tillite</td>
<td>&gt;1m</td>
<td>0.87</td>
<td>0.90</td>
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## APPENDIX B

### INFORMATION TO BE SUBMITTED WITH THE APPLICATION

Submitted by: Qualifications and registration number:

<table>
<thead>
<tr>
<th>Development Information</th>
<th></th>
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<tbody>
<tr>
<td>Locality</td>
<td></td>
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<tr>
<td>Development type</td>
<td></td>
</tr>
<tr>
<td><strong>Area of plot</strong></td>
<td><strong>Area of Residence</strong></td>
</tr>
<tr>
<td>Water supply - cross out the relevant block</td>
<td>Full pressure</td>
</tr>
<tr>
<td><strong>Effluent loading</strong></td>
<td><strong>Number of bedrooms</strong></td>
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### Geotechnical information

<table>
<thead>
<tr>
<th>Results of percolation test (mm/hr)</th>
<th>Permissible application rate (ex SABS 0400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geological description of the area</td>
<td></td>
</tr>
<tr>
<td>Rate of evapotranspiration (l/m²/day)</td>
<td></td>
</tr>
<tr>
<td>Slope of the ground</td>
<td>Shape of the ground (refer table A2)</td>
</tr>
<tr>
<td>Terrain concentration factor (table A2)</td>
<td>Deep infiltration factor (table A3)</td>
</tr>
<tr>
<td>Calculated area required for evapotranspiration (m²)</td>
<td></td>
</tr>
<tr>
<td>Actual available area for evapotranspiration (m²)</td>
<td></td>
</tr>
</tbody>
</table>

## APPENDIX C

### SCHEMATIC DRAWINGS
Top of soakaway shall be a minimum of 100mm below natural ground level

Bottom of soakaway shall be a minimum of 700mm below ground level

Distribution pipe
Filter fabric lining
Voided aggregate

Minimum width shall not be less than 600mm

Typical section through soakaway

Soakaway

A 15 degree dispersion may be allowed in the area calculations

Evapotranspiration area to be located down slope from the soakaway

Location of evapotranspiration area on planar slope

Evapotranspiration area to be located around a soakaway

Soakaway

Soakaway to be centrally located and a minimum of 4 meters to be allowed for on all sides of the soakaway

Location of evapotranspiration area on level land
**DURBAN METROPOLITAN UNICITY COUNCIL**

**DEPARTMENT OF WASTEWATER MANAGEMENT**

**SYSTEMS AREA ENGINEER OFFICES**

(Postal Address: P.O. Box 1038, DURBAN, 4000)

<table>
<thead>
<tr>
<th>AREA</th>
<th>PHYSICAL ADDRESS</th>
<th>TELEPHONE</th>
<th>FAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL</td>
<td>17 Electron Road, Springfield</td>
<td>(031) 302 4911</td>
<td>(031) 263 1131</td>
</tr>
<tr>
<td>NORTHERN</td>
<td>501 Umhlanga Rocks Drive, Umhlanga Rocks</td>
<td>(031) 566 0203</td>
<td>(031) 566 1430</td>
</tr>
<tr>
<td>SOUTHERN</td>
<td>423 Kingsway, Amanzimtoti</td>
<td>(031) 903 8376</td>
<td>(031) 903 6961</td>
</tr>
<tr>
<td>WESTERN</td>
<td>14 Scott Road, Pinetown</td>
<td>(031) 302 4911</td>
<td>(031) 302 4066</td>
</tr>
</tbody>
</table>
GUIDELINES FOR

DEVELOPERS IN RESPECT OF

PROVISION OF SEWER CONNECTIONS TO

SUBDIVISIONS IN THE

DURBAN METROPOLITAN AREA
GUIDELINES FOR PROVISION OF WATERBORNE

SEWER CONNECTIONS TO SUBDIVISIONS
(April 1997 - Revision 1)

Introduction

These guidelines have been drawn up to assist developers in an understanding of the Metropolitan Council policy associated with the provision of sewer connections to sub-divisions within the entire Durban Metropolitan Area.

(The formal policy resolution is attached as Annexure 1 to this document.)

Developers are persons, companies, organisations including all levels of the State (i.e. National, Provincial and Local Governments) who require to receive a service from the Metropolitan Council for accepting for treatment and disposal of sewage which includes domestic and trade effluent but excludes stormwater.

All aspects of such provision are controlled by the National Building Regulations, Metropolitan Sewage Disposal Bylaws and other laws and regulations together with policy statements made by the Metropolitan Council.

In order to provide a service to the Metropole, the Department has established 4 operational areas - North - north of Umgeni River, South - south of Umlaas River, West - west of a line Allervalley, Paradise Valley to Welbedacht and Central - east at that line (Plan Annexure 2 attached). In each area an office is to be established viz. at Umhlanga, Amanzimtoti and Pinetown. The head office is to remain at Prior Road, Durban.

Annexure 3 to this document gives details of contact persons, telephone numbers etc. from whom additional information can be obtained.

Sewer Connections

The Metropolitan Council in general has accepted the responsibility of providing a sewer connection to all sub-divisions existing in the Metropolitan Area as at 26 June 1996 in accordance with an approved programme.

The proof of a sub-division is that it was formally registered at the Deeds Office as at 26 June 1996. This therefore excludes all sub-divisional schemes being processed at that date.

This date is that at which the Metropolitan Council, by proclamation 80 of 1996, formally become responsible for the sewerage function and is therefore considered to be an appropriate cut-off date.

The approved programme is the programme for sewering all sub-divisions in the Metropole as approved by the Council. The programme will be reviewed and approved annually by the Council taking into consideration priorities, availability of finance and such other aspects as may be appropriate.

Flow Chart for Applications
Annexure 4 is a flow chart for assistance in understanding the processes necessary to obtain approval for an application for a sewer connection to a sub-division.

This can apply to an application for a single house on a sub-division to a major housing or development scheme.

Obviously the time scale for the Department to respond to the former is considerably less than that for major housing or development schemes. However the Department is fully aware of the cost of time delays to developers and will attempt to make rapid responses to applications. However it must be appreciated that the earlier preliminary requirements are made known to the Department the better the chances of a timeous response.

The flow chart operates on the basis of a series of questions to which a “Yes” or “No” answer is to be given until the application in either approved or rejected.

An explanation of some of the boxes is as follows:

A. The box relates to ability of the Executive Director to decline a connection on the basis of economy or feasibility e.g. topographic, geological, remoteness etc. and where the connection is not on the approved programme.

B. Identifies the situation where there is a previous contract, formal or informal, with the previous service provider in place prior to the 26th April 1996.

C. The alternative sewage disposal methods proposed must be in terms of other guidelines issued form time to time by the Department.

D. This relates to the fact that the Metropolitan Council wishes to encourage development and may be prepared to pay some of the additional operating costs incurred by a Developer who wishes to develop an area ahead of the programmed date by the provision for instance of a package plant.

GENERAL

The Department is always willing to discuss matters of concern in regard to the provision of waterborne sewerage connections and general matter associated with provision of sanitation. From time to time revisions will be made to the guidelines published by the Department and will be circulated as appropriate.
FORMAL COUNCIL RESOLUTION

The Metropolitan Council on the 7 October 1996 resolved

“3.3 That the Durban Metropolitan Council be responsible in due course, in accordance with an approved programme, at its cost to provide a sewer connection to each subdivision registered as at 1996-06-26 unless there is an existing obligation on a Developer to do so or such provision is deemed by the Executive Director (Water and Waste) to be impractical or uneconomic. Where any applicant is grieved by such a decision of the Executive Director, then an appeal may be made by the applicant to the Infrastructure and Services Committee. If no sewer connection is to be provided by the Durban Metropolitan Council the Developer may provide and operate at his own cost, an approved system.

3.4 That the policy with regard to the provision of sewerage to all township development schemes, whether private or public in the Durban Metropolitan area be as follows:-

3.4.1 The Developer of the subdivision(s) will be required to construct and hand over to the Durban Metropolitan Council the internal sewerage reticulation including pumping stations and the like, free of all costs to the Council.

3.4.2 The Durban Metropolitan Council will be responsible for providing a sewer connection to the boundary of the subdivision either immediately, where a sewer exists, or at a date in accordance with an approved programme for the provision of sewerage in the Metropolitan area.

3.4.3 Should the Developer require a sewer connection immediately, where one currently is not available, then the Developer be permitted to pay for the cost of the necessary sewerage extension prior to the date given under 3.4.2 above with the Council refunding the Developer the net expenditure incurred by the Developer from the Council’s capital provision on the programmed date.

3.4.4 Should it not be possible for the sewer extension to be provided by the Developer that complies fully with the final approved programme then the Developer may at his cost provide an alternative approved system subject to the requirement that if the operating costs are greater than 200% of the average Council overall operating costs, the extra operating costs shall be financed by an additional grant from the Developer.

3.4.5 That the erstwhile City of Durban Subdivisional Bylaws in respect of sewerage matters be made applicable as guidelines to all private township developments in the Metropolitan area outside the old City of Durban boundaries.”
DURBAN METRO WASTEWATER MANAGEMENT DEPARTMENT

USEFUL CONTACT INFORMATION

Head and Central Area Office
Postal Address  P O Box 1038
              Durban, 4000
Physical Address  3 Prior Road (off Ordnance Road)
                  Durban
Telephone  Exchange:  302 4911
            General Enquiries:  302 4678
            Business Manager:  302 4783
            Strategic Planning:  302 4662
Fax  Business Laboratory & Pollution Control:  302 4747
     Strategic Planning & Design:  302 4549
E-mail  Strategic Planning:  Billpf@dmws.durban.gov.za

Western Area Office
Physical Address  14 Scott Road
                 Pinetown
Telephone  Or Area Engineer:  302 4065
           Cellphone:  083 259 1643

Northern Area Office
Physical Address  501 Umhlanga Rocks Drive
                 Umhlanga
Telephone  Or Area Engineer  56611353
           Cellphone:  083 269 4276

Southern Area Office
Physical Address  423 Kingsway
                 Amanzimtoti
Telephone  Area Engineer:  903 8376
           Cellphone:  082 422 207

Systems Branch Main Depot
Physical Address  17 Electron Road
                 Springfield
                 Durban
Telephone  Blockage complaints - Toll Free:  0800 323235
           General  302 4911
           Systems Manager:  302 4871
Fax  2631131
WASTEWATER MANAGEMENT

DEPARTMENT

GUIDELINE FOR THE DESIGN AND CONSTRUCTION OF

TOILETS WHERE THE BASIC LEVEL OF SERVICE IS

APPROPRIATE

November 2001
Guideline / Policy
Document No. 14
GUIDELINE No. 14 - THE DESIGN AND CONSTRUCTION OF TOILETS WHERE THE BASIC LEVEL OF SERVICE IS APPROPRIATE

1 INTRODUCTION

The Water Services Act gives substance to the clause in the Constitution providing the right of access to basic water and sanitation service for every citizen. The minimum standard for basic sanitation is:

- The provision of appropriate health and hygiene education; and
- A toilet which is safe, reliable, environmentally sound, easy to keep clean, provides privacy and protection against the weather, well ventilated, keep smells to a minimum and prevents the exit of flies and other disease – carrying pests.

The eThekwini Municipality has developed principles for the provision of sanitation services that are underpinned by a report accepted by Council as follows:

“The only sustainable on-site household sanitation option is one which the householder can sustain himself”.

In support of this, the sanitation options accepted by the Municipality are:

- a dual pit system with a moveable top structure or
- a ventilated improved double pit (VDIP) with urine diversion

This guideline sets out the standards for the design and construction of such toilets. The document should be read in conjunction with the following two documents entitled;

- “Principles for Basic Levels Of Service for Water and Sanitation”; and
- “Implementation Protocol for the Delivery of On site Sanitation in the eThekwini Municipality”

2 PURPOSE AND OBJECTIVES OF THIS GUIDELINE

The purpose of this guideline is to set out the minimum standards for the design and construction of toilets installed within the eThekwini Municipality.

The objective of this guideline is to ensure the installation of toilets, where the basic level of service is appropriate within the eThekwini Municipality, are correctly carried out and that intervention by the Wastewater Management Department to ensure long-term sustainability is minimized.
3 APPLICATION OF THIS GUIDELINE

The basic level of sanitation will only be implemented in areas:

- that are not presently served by municipal waterborne sewerage and where such provision is not anticipated in the short to medium term or at all according to the eThekweni Municipality Council’s programme for the sewering of the Unicity Area,
- where the basic level of water service is planned and
- where conditions are appropriate for the installation and operation of VIDP type systems.

In general the guideline has been developed for implementation in areas where difficult geological conditions are not present. Specifically the guideline is not applicable for:

- informal settlement areas where the sites or plots have not been allocated or defined.
- areas where the average slope of the ground is greater than 1:3
- areas where the risk of pollution of the groundwater cannot be mitigated
- areas where the soils have a permeability of less than 5 mm/hr
- sites/plots which have a potable water supply in excess of the basic level of 200 litres per day
- sites or plots of less than 250m²

For those areas that are found to be unsuitable, alternative solutions shall be discussed with the Department and approval sought.

4 DESIGN, LOCATION AND CONSTRUCTION STANDARDS

4.1 General requirements

A toilet system shall consist of a pit, cover slab, superstructure, vent pipe, pedestal and urine diversion pipe work and soak away if appropriate.

The minimum general requirements for dual pits and VIDP with urine diversion constructed within the Municipality shall be as shown on drawings 1 and 2 in appendix A.
4.2 On-site location

The toilet shall be located such that:

- It is no further than 3 metres away from the site or plot boundary and if possible, close to an access road so as to allow easy access by maintenance crews if required.

- It falls outside the 1:50 year flood line or at least 20 metres from a watercourse.

4.3 Minimum standards for the superstructure

- The superstructure shall provide the user with privacy, comfort and shelter against weather.

- The door shall be sturdy, securely hinged to the superstructure and be able to be latched from both the inside and outside.

- Two basic shapes are acceptable - a simple rectangular box or a round superstructure.

- Recommended minimum internal dimensions for the various shapes are given on the attached drawings. The internal height should be a minimum of 2 metres.

- The vent pipe(s) shall be located on the outside of the superstructure.

4.4 Minimum standards for a VIDP with urine diversion

As the cost of providing a VIDP with urine diversion is greater than dual pits with a moveable superstructure, it may only be considered as an alternative when:

- Depth to rock is less than 1.5 metre

- Depth to the water table is less than 2 metres

- The permability of the soil at a depth of 1.5 metres is less than 5mm / hr.

A VIDP with urine diversion shall be constructed as per the conventional VIDP except for the following:

- The pit, of minimum depth 700mm, shall be constructed above ground and shall be adequately sealed
- A special pedestal and urinal shall be provided which will facilitate the diversion of urine and the urine shall be disposed of by way of a sub surface soak away.

4.5  **General - Disposal of grey (sullage) water**

Sites or plots of less than 350 sqm (but greater than 250 sqm) shall be provided with a rubble filled soakpit; 500mm x 500mm x 500mm deep for the disposal of grey (sullage) water. The soakpit shall be positioned in close proximity to the 200 litre water tank.
Appendix A

Construction drawings for a dual pit VIDP and VIDP with urine diversion
Door to be 813 x 2000. 50mm gap to be left at the bottom and top of the door. Door to be hinged securely and fitted with latches such that the door can be secured both from the inside and from the outside.

0.8 mm Galvanised sheeting (IBR profile) to roof. Roof to be fixed to battens using 5mm coach screws. Battens to be fixed to superstructure using 12 gauge wire.

Notes:
1. Dimensions shown are generally minimum dimensions.
2. Pits are to be lined but vertical joints in the blockwork are to be left open and 23mm diameter holes are to be drilled at 400mm centres as all to allow liquid to seep from the pit into the surrounding soils.
3. Mortar used for the pit lining to be 1:5 cement/sand.
4. Cover slabs to be precast using 25 MPa concrete.
5. Cover slabs to be laid on mortar bedding.
6. Vent pipe to be grouted into place using mortar.
7. Superstructure to be securely fixed to the cover slab.
8. Two cover slabs are to be supplied.
9. Set of concrete covers are to be supplied for both the pedestal hole and the vent pipe - the covers are to be mortared in to position on the unused pit.
10. Door to open outwards.
11. Arrangement of holes through cover slab is dependant on the selected pedestal.

Plan on pits
- 1390 mm max ext.
- 1180 mm min ext.
- Vent pipe position
- Outline of pit below
- Outline of max. size of superstructure
- 300 mm dimension between pits
- 813 mm dia.

Plan on superstructure
- 150 mm diameter hole for 110mm vent pipe
- Diameter and arrangement of holes through slab is dependant on the type of pedestal selected
- TIA is to be agreed since arrangement dependant on pedestal selected
- 840 mm dia.

Plan on cover slab
- 300 mm dia.
- 300 mm dia.

Elevation on toilet
- 2000 mm to top of roof
- 1200 mm
- 100 mm thick ELV

Typical section through toilet
- Fly screen (1mm2 aluminium or stainless steel) attached to 110mm diameter vent pipe
- Vent pipe to be fixed to superstructure with hangerbars at 500 c.f. maximum

ETHEKWINI MUNICIPALITY
WASTEWATER DEPARTMENT

Construction details
Standard dual pit VIP

Scale 1:50
Drg. 1
Plan on blockwork to pits

Plan on VIDP showing position of superstructure

Plan on cover slabs

Typical section - cover slab

Typical section A-A through toilet

0.8 mm Galvanised sheeting (IBR profile) to roof. Roof to be fixed to battens using 6mm coach screws. Battens to be fixed to superstructure using 12 gauge wire.

Notes:
1. Dimensions shown are for M150 blocks
2. Mortar joints to be 10 mm
3. Mortar to be 1:3 cement:sand
4. Mix for foundations to be 1 cement:4 sand:4 stone
5. Cover slabs to be precast using 25 MPa concrete
6. Cover slabs to be laid on mortar bedding
7. End cover slabs to be laid with 10 mm fall
8. Vent pipe to be grooved into place using mortar
9. Internal faces of the blockwork to the pit to be bagged using 1 cement to 3 sand
10. Door to open outwards
11. Superstructure to be securely fixed to the cover slab
12. The dimensions of the cover slab may vary depending on the type of pedestal used.

METAL SHEETING TO BE NOTCHED AROUND VENT PIPE

0.8 mm thick galvanised metal sheeting
IBR profile

Door frame ex-75 x 50 SAP (4)
fixed to structure at 400 c/c with
Hilti HPS 960
Impact Anchor
or similar approved

40 mm urine diversion pipework
fixed to U/S concrete and blockwork
@ maximum 400 mm c/c using purpose made holdcarts

75 x 50 battens
38 x 38 battens

Floor to vault to be screeded with
50 mm of 1:3 cement and mix
100 mm min. soil cover
over soakpit.

Urine diversion pipework to extend at least 2 meters
from the walls of the VIDP
and then to discharge into
rubble filled soakpit
500mm x 500mm x 500mm deep

ETHEKWINI MUNICIPALITY
WASTEWATER DEPARTMENT

Construction details
VIDP with urine diversion

Scale 1:50

Drg. 2
GUIDELINES FOR THE MANAGEMENT OF
METAL FINISHING INDUSTRY EFFLUENT
DEVELOPED BY THE DURBAN CHAMBER OF COMMERCE
BYLAWS WORKING GROUP

July 2001
Guideline / Policy
Document No. 13
The purpose of this document is to provide a guideline for the management of metal finishing industry effluent. This is a guideline document only and it is acknowledged that other, equally acceptable, methods and processes are available which will also maintain an acceptable discharge and result in compliance with effluent standards under all conditions of discharge.

The guideline document does, however, represent a guide to practical treatment processes, process control methodology and engineering design. It also sets out how the Department will exercise controls to ensure compliance with effluent quality limits. Adoption of the recommendations given in this guideline document will provide for both industry’s compliance with effluent standards and the Department’s statutory control function, without this latter entailing excessive costs. The adoption of this guideline document and the implementation of the statutory control function by the Metro Wastewater Management Department will come into effect on the 1st October 1999.

The guidelines consider the following aspects:-

A. Correct treatment process chemistry
B. Correct process control
C. Correct engineering design
D. Metro requirements for effluent compliance and monitoring
E. Methods of sludge handling storage and disposal

A. Proposed Treatment Process and Chemistry Guidelines for Six Classes of Metal Finishing Effluents

The recommended treatment process for six classes of metal finishing effluents is set out below.

Class 1: Treatment of Effluents from Powder Coating and Anodising Operations

This effluent generally contains zinc, (from the zinc phosphate dip), Chrome (from the chrome passivation) and iron or aluminium which are the base metal coated.

Note: The phosphate dip can either be of zinc or iron phosphate. The passivation dip can be either high or low in chromium. Most factories use the zinc and high chrome options because these give better corrosion protection. Some, for cost reasons and indoor applications, use the iron phosphate and low chrome passivation.

Treatment Process Recommended
The effluent is either acid or caustic from the metal cleaning operation. The treatment steps recommended for batch operations are:-

(a) pH adjust to 9 to 9,5
(b) Batch settling
(c) Discharge of supernatant to sewer
(d) Discharge of sludge to waste disposal site

Note:  1. The optimum pH for zinc precipitation is 9,0 to 9,5. High or low pH values will lead to zinc in the effluent.
   2. The treatment process is complicated if aluminium is also present in the effluent since the optimum pH for aluminium is 6,5 to 7,5. Due to the greater toxicity of zinc, the process should rather be optimised for zinc removal.

Class 2: Treatment of Effluent Using Cyanide but not Containing Chrome

Cyanide is used in the plating of zinc, cadmium, gold, silver brass and copper.

Treatment Process Recommended

The cyanide must be destroyed at high pH in order to prevent the formation of HCN. The process recommended is:-

(a) pH adjust to about 9.
(b) Oxidise cyanide to destruction using chlorine, HTH or sodium hypochlorite. This step can be done on individual or combined streams.
(c) The heavy metals are also precipitated at this high pH.
(d) Batch settling.
(e) Discharge supernatant to sewer
(f) Discharge sludge to waste disposal site

Class 3: The Treatment of Effluent Containing Cyanide and Chrome
Treatment Process Recommended

The accepted process is to separate, in-house, the cyanide and chrome streams and to treat them separately. Separate treatment is undertaken in order to prevent the formation of HCN gas which could be generated from a mixed effluent if the pH of the mixed effluent tank becomes acidic. The recommended treatment process is therefore:-

(a) Separate in-house the cyanide and chrome effluent.
(b) Oxidise cyanide stream at high pH.
(c) Reduce chrome stream at either high or low pH depending on the reducing agent used.
(d) Combine the streams and then adjust pH about 9 to 9.5 to precipitate out metals.
(e) Batch Settle.
(f) Discharge supernatant to sewer
(g) Discharge sludge to waste disposal site

Class 4: Treatment of Effluents Not Containing Cyanide But Including Chrome

Treatment Process Recommended

The process requires reduction of chrome followed by pH adjustment for precipitation of metals. The process steps are:-

(a) Adjust pH
(b) Add reducing agent (e.g. Sodium Hydro Sulphite)
(c) Adjust pH to 9 to 9.5
(d) Batch Settle
(e) Discharge supernatant to sewer
(f) Discharge sludge to waste disposal site

Class 5: The Treatment of Effluent Not Containing Cyanide, Chrome, Lead or Tin

Metals include aluminium, nickel, copper, and zinc.

1. The effluent can also include a small quantity of chrome from the passivation of aluminium. If this is the case the Chrome (6+) must first be reduced to Chrome (3+). The chrome, will not appear in the effluent provided that the final pH is about 9.
2. Zinc and copper are normally plated from cyanide solutions but are, however, found in effluent from radiator refurbishing factories resulting from the cleaning and welding of radiators.

**Treatment Process Recommended:**

(a) For aluminium: pH to 6.5 to 7.5

(b) For copper, zinc and nickel: pH to 9 to 9.5

(c) Batch Settle

(d) Discharge supernatent to sewer

(e) Discharge sludge to waste disposal site

**Class 6: Effluent Containing Lead and Tin**

Tin and lead dissolve at both high and low pH levels. Tin and lead can be precipitated using sulphides and with lime provided the pH is correct.

**Treatment Process Recommended**

(a) The optimum pH must first be determined in the laboratory.

(b) Adjust pH to optimum pH

(c) Add sulphides and lime

(d) Batch settle

(e) Discharge supernatent to sewer

(f) Discharge sludge to waste disposal system

**B. CORRECT EFFLUENT TREATMENT PROCESS CONTROL**

B.1 pH

pH Paper is suitable for small concerns provided that the correct range is selected for the particular application. A pH meter is more suited to a larger company which is capable of pH meter calibration and maintenance.
B.2 Redox

Correct Oxidation and reduction potentials are required for cyanide oxidation and chrome reduction.

The Redox potential can be measured using a good quality pH meter. Alternatively test kits are available for measuring cyanide and Chrome (6').

C. ENGINEERING DESIGN FOR CONTROLLED EFFLUENT DISCHARGE

C.1 Type of Reactor

C.1.1 Batch Reactors

Because of the ease of the operation and lower cost, a batch rather than a flow through reactor is recommended for most applications. Batch tanks are suitable for all installations less than 20 kR/day.

Batch tank systems should be provided with 3 tanks each with a minimum of 1 day capacity as follows:-

<table>
<thead>
<tr>
<th>Tank 1</th>
<th>=</th>
<th>Filling</th>
<th>:</th>
<th>Day 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank 2</td>
<td>=</td>
<td>React and settle</td>
<td>:</td>
<td>Day 2</td>
</tr>
<tr>
<td>Tank 3</td>
<td>=</td>
<td>Drain to sewer</td>
<td>:</td>
<td>Day 3</td>
</tr>
</tbody>
</table>

The batch tank draining to sewer must be discharged during working day hours with supervision to ensure compliance and allow audit checks by Council.

C.1.2 Flow Through Reactor

For more than 20 kR/day the tank size could be unwieldy for good batch control. Flow through should therefore be considered for effluent volumes greater than 20 kR/day.

The tank must be accessible for chemical addition and process control monitoring.

The following is recommended :-

(a) Automatic pH control

(b) The tank must be well mixed.

(c) For a continuous settler provide approximately 0.5 m/hr upflow rate.

(d) Pulsed sludge withdrawal.
C.2 Mixing

Adequate mixing is vital for good process operations. Two options are suitable:

C.2.1 Air Mixing

Air mixing is adequate provided that the tank is fitted with diffusers or multiple orifices and not a single sparger pipe.

C.2.2 Mechanical Mixing

The best mixing is achieved with a propeller type mixer.

C.3 Sludge Separation

C.3.1 Settling Time

For a batch reactor provide approximately 8 hours settling time.
For a continuous settler provide approximately 0.5 m/h upflow rate.

C.3.2 Clear effluent Draw-off Point From Batch Settling Tank.

Clear liquid draw-off from a batch settler should be through an ‘L’ shaped pipe where the top of the draw-off is about 500 mm from the tank bottom. The tank must be desludged when the level of the sludge reaches about 300 mm from the tank bottom. A sample valve must be set at 300 mm to provide a check on sludge level.

C.3.3 Clear Effluent Draw-off Rate

Effluent to sewer draw off should be through an orifice or pulse valve in order to provide drainage during working hours and over 8 hours to provide for supervision and audit checks by Council.

D. METRO REQUIREMENTS FOR EFFLUENT COMPLIANCE AND MONITORING

The responsibility to control the treatment process such that it complies with the permitted quality limits and the responsibility to monitor the effluent such that the effluent quality is known must reside with the factory. The Metro’s role is to undertake spot checks to determine compliance. All analysis to be undertaken on digested samples

This Guideline document prescribes the minimum standard to be applied to all metal finishing industries in the Metro, such that ad-hoc sampling by Metro on a random basis of a slow, even, discharge of effluent e.g over an eight hour period can be made. There will be a period allowed for the implementation of this requirement.
D.1 Metro to Sample as follows:-

D.1.1 All factories once per week, where industries are seen to be complying this monitoring is to be relaxed to say twice per month.

The tariff rate for regulatory monitoring will apply.

D.1.2 For those industries that do not comply adequately, it will be necessary for Metro to carry out more frequent monitoring which will be charged for on a cost recovery basis. The full cost of which will come into effect on the 1st October 2000.

D.2 Cost Recovery

Additional monitoring at a cost of R105-00 per sample will be phased in as follows:

1/10/99 to 31/3/2000 No additional cost
1/4/2000 to 30/9/2000 50% of cost
1/10/2000 onwards Full cost

The above costs will be subject to annual tariff changes.

D.3 Limits for Effluent Discharge

Until such time that definite direction is provided by Department of Water Affairs and Forestry in terms of any addendum or any revision to the 1997 Sludge Disposal Guidelines, the current agreement (as put in place at the formation of the Working Group) will be continued viz:-

D.3.1 the metal limits as per the attached Schedule A continue to be relaxed (through the mechanism of clause 4/6 of the Sewage Disposal Bylaws) to those pertaining via the previous Bylaws of each of the erstwhile Local Authorities to existing permitted dischargers, as per Table 1.

D.3.2 in any area of the Metro where either there were no Bylaws or the Bylaws had no stated limits for metals, then the limits as Schedule A will continue to apply.

D.3.3 permits for metal plating industries wishing to set up a new business in the Metro will be subject to the metal limits as Schedule A.

E. SLUDGE HANDLING STORAGE AND ACCEPTABLE DISPOSAL
The sludge can either be dewatered on site using a filter press or disposed of as liquid sludge to tanker for off-site treatment.

E.1 Prevention of sludge discharge to sewer.

E.1.1 Clear effluent draw-off design is to be as per sketch attached.

E.1.2 Clear effluent is to be discharged through a filter to Council sewer.

E.2 Sludge Storage

Waste sludges must be stored in a roofed and bunded area with no external drainage. Toxic sludges must be stored in a lockable area and in lock proof containers.

The bund should be of such dimensions that it contains the volume of the largest tank it serves leaving a freeboard of at least 150 mm. In calculating the bund volume do not forget to subtract the volume displaced by the base of the tanks. The bund should be 0.6 x the height of the highest tank away from the closest tank to the bund.

The bund area should be constructed of a material resistant to/not affected by the chemicals stored in the bund. Alternatively it must be lined with a corrosive resistant material.

Should there be stormwater ingress due to the heights of the roof consideration should be given to enclosing the sides of the roofed area.

E.3 Sludge Treatment and Disposal

E.3.1 Sludge treatment/neutralisation to be carried out with lime and cement resulting in a solid product.

E.3.2 Classification of the treated sludge is carried out according to the minimum requirements for the handling, classification and disposal of hazardous waste (DWA & F Second Edition 1998). This process entails using the T.C.L.P. Leaching test.

E.3.3 After classification the choice of landfill site is assessed (either Hh or HH) and in all probability will be assessed Hh.

E.3.4 Factory responsible for acceptable disposal to landfill.

E.4 Best Practical Environmental Option for disposal of metal sludges.

The EnviroServ proposal to develop and implement cost effective sludge treatment
and disposal of metal sludges is considered to represent the Best Practical Environmental Option. However, it will be necessary to consult with all generators of metal sludges and to obtain signed commitment from them. The proposal is attached.

3. SUMMARY

In general the recommendations of these guidelines are thus:-

1. Batch tank treatment, i.e. for flows less than 20 m³/day and controlled flow through tank system for flows greater than 20 m³/day. Three batch tanks to be installed, each with one day storage capacity.

2. Provide correct process chemistry for a particular effluent type, provide pH measurement and adequate mixing facilities.

3. Orifice or pulsed valve discharge over 8 hours.


5. Off-site disposal of all metal sludges to regulated solid waste disposal site in accordance with EnviroServ’s proposal.

6. Waste minimisation management to be encouraged.

7. Monitoring by Metro over and above normal regulatory monitoring will be on a cost recovery basis following a phasing in period.
ETHEKWINI

WASTEWATER MANAGEMENT

DEPARTMENT

GUIDELINE FOR PRIVATELY-OWNED

“PACKAGE” SEWAGE TREATMENT PLANTS

OR OTHER “ON-SITE” SYSTEMS FOR THE

TREATMENT OF DOMESTIC SEWAGE

IN THE ETHEKWINI MUNICIPAL AREA

WHERE THE TREATED WASTEWATER IS TO BE DISCHARGED

TO A NATURAL SURFACE WATER COURSE OR

THROUGH SURFACE IRRIGATION

October 2002/Rev.C
Guideline/Policy
Document No.12
INTRODUCTION

This Guideline has been prepared for Developers, Professionals, Individual Property Owners and Treatment Plant Suppliers seeking approval from the eThekwini Municipal Council for the “on-site” treatment of domestic sewage where the disposal of the treated wastewater is to a natural surface watercourse or through surface irrigation.

The Guideline will be used by all staff of the Council in order to provide for a common understanding of “on-site” treatment systems/disposal protocols and to ensure that there is a uniform approach to the approval and control of such systems.

This Guideline has been established to assist the approval procedure in areas where extraordinary terrain or geological conditions are not prevalent. Relevant specialist advice should be sought if developments are being contemplated which embrace complex engineering requirements.

A separate Guideline is available where the on-site disposal of domestic sewage via septic tanks and sub-surface soak-aways is being considered by the Developer.
APPROVAL PROCEDURE

1. (i) The property owner/developer contemplating a development involving/requiring the provision of a sewage treatment and disposal system on the development site shall, in the process of seeking building plan approval, in terms of the National Building Regulations, from the Council, make application to the eThekwini Wastewater Management Department (EWM), through the Systems Area Engineer at the Area Office of the area concerned (see address and contact details in Annexure 1 attached), for approval to install and operate a “package-type” or other on-site sewage treatment plant/system (hereafter referred to as the “Plant”).

(ii) At an early stage following receipt of the initial application, the Systems Area Engineer will arrange a mandatory site meeting of all relevant parties, viz. Council officials (representing Wastewater Systems, Pollution Control, Building Inspectorate, Health), Plant Supplier and Engineering / Geotechnical Consultant, to communicate requirements.

The EIA Scoping Report and Geotechnical Report, in those cases where these are required (see (v)(c) below and schedule III) must be available prior to the site meeting.

(iii) Thereafter, approval may be granted by EWM in terms of the Sewage Disposal Bylaws of the eThekwini Municipality, if EWM is satisfied that the applicant has complied with all the necessary requirements in terms of this Guide, in respect of the Plant. If so, EWM will register the Plant. The development, together with all future extensions/alterations/sub-divisions will be subject to the limitations imposed by the approval issued and the relevant bylaws.

(iv) For plants which are limited to treating domestic sewage from a single house unit where the treated effluent is to be discharged to garden for irrigation the approval will be subject to the conditions and minimum requirements listed in Schedule I, item (a) only plus any other requirements that may be imposed in instances where special circumstances exist.

NOTE: For the purpose of this Policy Guideline a single house unit is deemed to be one that does not generate more than 1,4kR/day of sewage for treatment and disposal (as given in the National Building Regulations, PP10.4, Table 1, for a 5 bed-roomed dwelling house). Plants with loadings greater than 1,4kR/day or a single house unit with more than 5 bedrooms must be dealt with as per item (v) below.

(v) For all plants other than those contemplated in (iv) above:

a) The approval will be subject to the conditions and minimum requirements listed in Schedule I of this Guide plus any other requirements that may be imposed in instances where special circumstances exist.

b) EWM will undertake periodic inspections and sampling of effluent for the purpose of auditing performance and effluent quality compliance.

A charge will be levied for this service.
c) An Environmental Impact Assessment (EIA) “Scoping” Report must be prepared by the applicant for submission to EWM with the application. The report should include, but not be limited to:-

- an assessment of the impact of the proposed discharge on the receiving watercourse, both from a chemical/biological and hydraulic aspect.

- measures to be taken to provide for mechanical, electrical, operational or process failure and malfunctions of the discharge system.

- measures to be taken to avoid or mitigate nuisance or complaint arising from the operation of the sewage treatment plant/system and to ensure protection of public health and safety. The factors to be considered shall include, but not be limited to, those factors included in Schedule II.

**NOTE:** In the case of single house applications where the discharge will be to a surface water course, an EIA Scoping Report of reduced scope following an abbreviated assessment of impact, will be acceptable but with the proviso that EWM may call for a full EIA Scoping Report in the case of any particular application should it deem this to be necessary.

All other sewage treatment plant installations require a full EIA Scoping Report to be submitted.

(vi) Local Authority Health Department approval may also be required in terms of the Scheduled Trades and Occupations Bylaws.

(vii) Discharge of treated effluent from a package plant via a Council stormwater drain will only be considered under exceptional circumstances if

C no alternative of direct discharge to a watercourse is reasonably available.
C irrigation within the property is not possible.
C irrigation within an adjacent property (in terms of an agreement written into the Title Deeds) is not possible.

Treated effluent discharging into a constructed open channel stormwater drain will be visually unacceptable and unlikely to meet approval.

EWM will need to consider any likelihood of multiple discharges of effluent in relation to the capacity of the stormwater system.

For discharge to stormwater EWM would require additional sampling / monitoring (possibly both by the Plant owner and the EWM Pollution inspectorate). Any privately owned pipe crossing an adjacent property to discharge to a stormwater system (or to a watercourse) would require an agreement written into the Title Deeds.
2. Besides obtaining approval and registration by EWM, the property-owner/developer must also make application to the Department of Water Affairs and Forestry’s (DWAF) Regional Office in order to comply with the relevant National Legislation.

(1) In the case of the proposed discharge of treated effluent into a water course:

In general DWAF requires that this “water use” be registered with that Department when

- the discharge is less than 2 M\(\text{m}^3\)/day and
- the discharge quality complies with the General Limit Values.

The General Limit Values are set out in Annexure 2 of this Guide Document for ease of reference.

The applicable legislation is given in the “General Authorisation 3”, published by DWAF in terms of the National Water Act 1998 (Act No. 36 of 1998), in Government Notice No. 1191 dated 8 October 1999. This “General Authorisation” stipulates other requirements which may be applicable to a particular application and reference to this document should be made before making application to DWAF.

DWAF requires that a licence be applied for to that Department in terms of the National Water Act 1998 (Act No. 36 of 1998) when

- the discharge is greater than 2 M\(\text{m}^3\)/day and/or
- the discharge quality does not comply with the General Limit Values.

Plants of this size fall outside the scope of this Guideline.

(2) In the case of the proposed “irrigation” of treated effluent:

In general DWAF requires that this “water use” be registered with that Department only when

- the volume used for irrigation exceeds 10\(\text{m}^3\)/day.

The applicable legislation in respect of irrigation volumes in excess of 10\(\text{m}^3\)/d and up to 500\(\text{m}^3\)/day is given in “General Authorisation 2” published in Government Notice No. 1191 dated 8 October 1999. Reference should be made to this document where the volume to be used for irrigation exceeds 10\(\text{m}^3\)/day.

3. Should a developer be contemplating one treatment plant to cater for the wastewater from several adjacent developments early discussion needs to take place with eThekwini Water Services and DWAF regarding the feasibility and acceptability of such an arrangement.
SCHEDULE I

Minimum Requirements and Conditions for approval to be granted in terms of the eThekwini Sewage Disposal Bylaws

(a) When the proposed discharge of treated effluent is into a watercourse, either directly or via a constructed stormwater drain, the Department will require quality compliance with the “General Limit Values” (see Annexure 2).

When irrigation of treated effluent is proposed the Department will require that the irrigation effluent:

• is in compliance with the General Limit Values (see Annexure 2).

• has adequate disinfection to ensure a zero faecal coliform count.

and that the area to be irrigated complies with Schedule III.

(b) The property owner/developer shall engage a professional engineering consultant experienced in the design of sewage treatment plants for small (urban) communities to undertake the design/selection and supervise the installation and construction of the plant.

(c) The owner of the property, which may be a Body Corporate, shall:

 appoint/employ a person or firm having appropriate qualification/experience/training to supervise the day to day operations of the sewage treatment plant. (While the owner remains ultimately responsible for compliance with the quality requirements for the effluent discharged from his/her plant, the plant supplier / professional team are expected to take responsibility for the adequate training of on-site operators of their plant and the issue of adequate operating instructions to ensure the timeous identification and remedy of any plant or process failure or malfunction with a view to the avoidance or minimisation of incidents of sub-standard effluent, pollution or nuisance condition.)

 enter into a maintenance contract for the plant with the supplier, or other competent body, and ensure that such a contract shall continue in force for the life of the plant.

 enter into a contract with an accredited sewage treatment process consultant and laboratory analyst in respect of the operational control of the plant and for the regular monitoring and reporting, to EWM, of the treatment performance and the effluent quality and quantity for compliance with the conditions and requirements set out by EWM in the approval for the installation. (Such performance reports shall be submitted for the attention of the Technical Officer (Pollution Control), eThekwini Wastewater Management and, in the event of monitoring results reflecting non-compliance with effluent quality requirements, or specific incidents of plant or process failure or malfunction having occurred, resulting in non-compliance, the report shall include details of the steps taken to rectify the position.)
In the event of a transfer of ownership of a single house unit the continuity of the above contracts shall become the responsibility of the new owner.

(d) The supply, installation, commissioning, maintenance and monitoring services referred to in (b) and (c) above may (but need not necessarily) be provided by the same company, but any contract between the property owner and the supplier of services should clearly set out the scope of services to be covered by the contract and identify which party is responsible for carrying out the various operating, maintenance and monitoring duties on behalf of the owner. An example of a typical “Scope of Services” schedule is given in Annexure 4.

(e) It shall be the responsibility of the Developer, in the case of a “spec” development, to apprise all prospective owners of these requirements and their financial implications prior to the latter purchasing or taking transfer of the property. In the case of “cluster” developments and “share-block” or “sectional title” schemes in which development and occupation may take place over a period of time, the Developer himself may need initially to enter into contracts to satisfy the requirements referred to in (c) above.
Factors that must be considered in the planning and design of on-site sewage treatment plants in urban areas and the preparation of EIA reports

There are a number of particular factors which should be taken into account relating to the “environmental impact” of small sewage treatment plants in residential neighbourhoods and their potential to cause “nuisance” to premises in the close proximity and/or cause pollution of local streams, as well as public health and safety considerations. Some of these factors are listed in this Schedule (for guidance purposes only), but the specific design, location and operational parameters for such plants must be the responsibility of the competent person(s) engaged by the property owner/developer for that function and must be such as to accord with “best practice” and avoid or mitigate problems of nuisance or malfunction.

1. **Load Variation**

   The design must allow for the large variations in flow and organic loading, both on a diurnal and seasonal (holiday periods etc) basis, that are typically experienced by small treatment plants serving small groups of people such as in the case of cluster housing schemes, schools, institutions and commercial shopping centre developments.

   The source and nature of the wastewater treated and the type of development served must be accurately known and the plant designed and sized appropriately.

   If the plant is not adequately designed to cater for the peak hydraulic and organic loads, consequences could be suspended solids carry over, off-spec. effluent, soakaway clogging stream pollution and inadequate sterilisation of the effluent.

   Some form of flow balancing may well be necessary. This is often accomplished by incorporating an enlarged septic tank ahead of the biological treatment stage but care must be taken to avoid increased risk of odour nuisance with such an arrangement or with sewage holding/balancing tanks.

   In the case of Biological Trickling Filter plants the adequate design, operation and maintenance of the flow distribution system is important for adequate treatment of the sewage particularly during periods of low flow.

2. **Odour**

   - Package sewage plants, by their very nature, will generate odours at times and under certain conditions but sewage odours are normally confined to the immediate vicinity of the plant and do not usually carry great distances.

   - Odour nuisance may arise as a result of mechanical failure, organic overload or under-capacity aeration equipment.

   - In valley situations on calm winter nights temperature inversions occur, which condition is conducive to entrapment and build-up of any odour release.
• The plant should be located as far as possible from the closest residential unit on the property but should also not be positioned any closer to the boundary of the neighbouring property than it is to the closest residential unit on its own property.

• Prevention of odour nuisance may be dealt with by enclosure of the plant and extraction of off-gasses for recycling through the aerobic biological treatment unit or through a separate biofilter unit (The latter unit will require media replacement approximately every 3 to 5 years).

3. Noise

• High speed blowers, compressors and motors should either be housed in a sound proof room or their use avoided.

• As in the case of odour, to avoid noise nuisance the plant should be located as far from residential units as possible, whilst also taking neighbouring properties into account.

4. Psychoda Flies

• These inhabit Biological Trickling Filters as an important component of the biological life on the filter necessary for good performance of the filter. They are normally confined to the immediate vicinity of the filter but may at times and under certain wind conditions be blown to nearby residence where they may constitute a temporary nuisance.

5. Visual Intrusion

• The plant should be screened from residences and neighbours (with trees or shrubs) and/or sunk into the ground. Note however that leaves shed from trees can cause clogging problems in treatment units.

• If the plant is totally enclosed in an aesthetically pleasing building it will be essential to provide adequate ventilation before persons enter (see below).

6. Public Health and Safety

• Access to children must be prevented at all times.

• Adequate ventilation must be provided before any person, including the plant supervisor and maintenance and operating personnel, enters enclosed areas or confined spaces on the plant due to the possible presence of toxic or explosive gases (such as hydrogen sulphide and methane) or to oxygen deficiency.

• For effluent sterilisation, if chlorine is to be used it should preferably be in the form of solid or liquid hypochlorite rather than chlorine gas from cylinders of liquid chlorine which constitute a potential hazard and has implications for public safety if not properly supervised, handled, maintained and secured.
Continuous flow-proportional dosage system and adequate contact time essential.

- The plant must be secured to prevent unauthorised access.

7. Waste Disposal

- The removal of waste sludge from the plant should be arranged through a registered waste disposal contractor and disposed of at an approved Metro disposal point (not into a sewer manhole) or in such a manner as approved by the Department of Water Affairs in consultation with the Metro Health authority.

- Adequate access to allow for the removal of waste sludge must be provided.
Minimum Requirements where disposal of the effluent is by irrigation

On site disposal of effluent by irrigation shall be considered feasible where the available area for irrigation is greater than the required area for irrigation.

The area allocated for irrigation shall be recorded on the submission plans and no further development or paving shall occur within the demarcated area.

Available area for irrigation

The area to be used for irrigation shall conform as a minimum to the following requirements (A geotechnical report, prepared by a suitably qualified person, covering points (i) - (v) below, should be submitted in support of the application):

(i) The depth of soil cover to bedrock on completion of the final earthworks shall not be less than 400 mm. (Written confirmation from the treatment plant supplier that this is the case, will be acceptable).

(ii) The area shall be wholly covered by vegetation and shall NOT be covered by paving, structured, impervious surfaces, etc (ie. hard surfaced area).

(iii) The area shall generally be located totally within the boundaries of the subdivision. Should the owner be considering entering into negotiation to irrigate one or more adjacent developments, early discussion needs to take place with EWM and DWAF regarding the feasibility and acceptability of such an arrangement. Any such arrangement would also need to be included in the Title Deeds of each property in order for it to be a binding legal commitment on future owners of the affected properties.

(iv) Surface stormwater, subsoil seepage, the gradient of slopes and local groundwater conditions shall be taken into account when positioning and designing the irrigation area. Features relevant to the functioning of the sanitation and disposal system shall be noted and marked on the site plans to be submitted as part of the submission documentation. In general features such as depressions, gullies, rock outcrops and other features should be noted and an assessment made of how they will affect the functioning of the disposal system.

(v) No stormwater from roof downpipes or pool backwash systems may be connected to discharge into the waste water system. Soakpits specifically for stormwater shall not be located within or up slope of the irrigation area.

Required Area for irrigation

The minimum area required for irrigation shall be determined by the maximum design capacity of the installed plant and an irrigation rate of 2 litres per sq.m per day. Site specific variations to the above irrigation rate will only be considered if supported by a detailed analysis of the site by a professional engineering consultant experienced in such matters.
# DURBAN METROPOLITAN UNICITY COUNCIL
## DEPARTMENT OF WASTEWATER MANAGEMENT
### SYSTEMS AREA ENGINEER OFFICES
(Postal Address: P.O. Box 1038, DURBAN, 4000)

<table>
<thead>
<tr>
<th>AREA</th>
<th>PHYSICAL ADDRESS</th>
<th>TELEPHONE</th>
<th>FAX</th>
</tr>
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<tbody>
<tr>
<td>CENTRAL</td>
<td>17 Electron Road, Springfield</td>
<td>(031) 302 4911</td>
<td>(031) 263 1131</td>
</tr>
<tr>
<td>NORTHERN</td>
<td>501 Umhlanga Rocks Drive, Umhlanga Rocks</td>
<td>(031) 566 0203</td>
<td>(031) 566 1430</td>
</tr>
<tr>
<td>SOUTHERN</td>
<td>423 Kingsway, Amanzimtoti</td>
<td>(031) 903 8376</td>
<td>(031) 903 6961</td>
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<tr>
<td>WESTERN</td>
<td>14 Scott Road, Pinetown</td>
<td>(031) 302 4911</td>
<td>(031) 302 4066</td>
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## Wastewater limit values applicable to discharge of wastewater into a water resource #

<table>
<thead>
<tr>
<th>SUBSTANCE/PARAMETER</th>
<th>GENERAL LIMIT</th>
<th>SPECIAL LIMIT</th>
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<tbody>
<tr>
<td>Faecal Coliforms (per 100 ml)</td>
<td>1 000</td>
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<tr>
<td>Chemical Oxygen Demand (mg/l)</td>
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<td>30*</td>
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<td>pH</td>
<td>5,5-9,5</td>
<td>5,5-7,5</td>
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<td>Nitrate/Nitrite as Nitrogen (mg/l)</td>
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<td>Chlorine as Free Chlorine (mg/l)</td>
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<td>0</td>
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<td>Suspended Solids (mg/l)</td>
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<td>Electrical Conductivity (mS/m)</td>
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<td>50 mS/m above background receiving water, to a maximum of 100 mS/m</td>
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<td>Ortho-Phosphate as phosphorous (mg/l)</td>
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<td>1 (median) and 2,5 (maximum)</td>
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<td>Fluoride (mg/l)</td>
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<td>Mercury and its compounds (mg/l)</td>
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<td>Dissolved Zinc (mg/l)</td>
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<tr>
<td>Boron (mg/l)</td>
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* After removal of algae

# From Government Notice No. 1191 dated 8 October 1999.
Has the proposed plant been approved in terms of EWM Guideline No. 8?

Yes

Is the application for a single house unit where treated effluent is to be irrigated on the property?

Yes

Documents to be submitted

Details of proposed development (see note below chart) and any “special circumstances” relative to the application.

Details of proposed sewage treatment plant / process and registered professional engineer responsible

EIA REPORT

Local Authority Health Department approval

DWAF Registration / Licence

Confirmation of contracts (for operation / maintenance / monitoring / reporting services)

Drawing and calculation of irrigation area and confirmation of compliance with the requirements of Schedule III

Approval (See approval draft letter)

Systems Engineer to notify Pollution Control and Accounts Division to add Plant to database.

No

Reject Application

Is the application for a single house unit where treated effluent is to be irrigated on the property?

No

Is the treated effluent to be discharged to a watercourse?

Yes

Documents to be submitted

No

Is treated effluent to be used for irrigation on the property?

No

Yes

Documents to be submitted
NOTE: Information to be submitted with the application must include:-

1. Physical Address of property / subdivision.

2. Property description and size (area).

3. Number of dwelling units proposed on the site.

4. Description of dwelling unit type(s).

5. Anticipated daily quantity of sewage that will be generated on the development site.

6. Plan to be submitted showing:-
   - position of all buildings
   - position of sewage treatment plant
   - position of irrigation area (if applicable)
   - position of other features relevant to the irrigation disposal option (if applicable)

7. Brief description of sewage treatment plant / process to be installed including capacity details.

8. Name and address of the registered professional engineer responsible for the treatment plant design / selection / installation.

9. Name and address of treatment plant manufacturer / supplier.

10. Name and address of process performance monitoring consultant / contractor.
ANNEXURE 4

“SCOPE OF SERVICES” SCHEDULE

(in connection with “Package” Sewage Treatment Plant installation and operation and service contracts / agreements between Owner and Supplier.)

1. Compliance with Conditions of Acceptance / Approval by Municipality:

1.1 Submission to the Department of Water Affairs and Forestry of a Registration Form for the registration, or an application for the licencing, of the water use, that is the discharge of (treated) wastewater into a surface watercourse* or the on-site irrigation of treated effluent* (*delete whichever does not apply).

| by Plant Supplier on behalf of Owner | by Owner | not applicable |

1.2 Obtaining of Municipal Health Department approval.

| by Plant Supplier on behalf of Owner | by Owner | not applicable |

2. Design and Installation

2.1 Design / selection and supervision of the installation and construction.

| by Plant Supplier | by Engineering Consultant Name: |

3. Operation, Maintenance and Monitoring:

3.1 Day to day operation of the plant

| by Supplier | by Owner or his / her employee # |

# N.B.: If by Owner, the supplier must undertake to train / instruct the “on-site” operator in the day-to-day operational requirements of the plant, both initially and on an ongoing basis as necessary.

3.2 Plant Maintenance

| by Supplier | by other - name |

3.3 Regular performance monitoring (effluent quality analysis) and reporting as required in the Letter of Approval for the installation issued by eThekwini Wastewater Management in terms of Guideline No. 12.

| by Supplier | by other - name |

3.4 Consumables Supply

| by Plant Supplier | by owner |
GUIDELINES REGARDING APPLICATION FOR
ROAD TANKER DISCHARGE TO
SEA OUTFALL AT
SOUTHERN WASTE WATER TREATMENT WORKS
CONTENTS

1. Procedure to be followed

2. Blank Indemnity Form

3. Extract from Bylaws

4. Tariff of Charges

5. Regulations for Operations within Works
PROCEDURE TO BE FOLLOWED BY COMPANIES THAT REQUIRE
PERMISSION TO DISCHARGE TANKERED EFFLUENT TO SOUTHERN WASTE
WATER TREATMENT WORKS

1. A letterhead application containing the following information should be fixed to the
Pollution Division, Durban Waste Water Management on (031) 3024747 or posted to
P O Box 1038, Durban, 4000.
   – Description of effluent i.e. process of origin (quality parameters)
   – Volume of tanker
   – Number of loads per month (max. expected)
   – Street address/company name of effluent source
   – Expected date of initial discharge

2. Five litres of typical sample must be provided for analysis by DWWM Laboratory
(trade effluent not conservancy). The effluent must comply at all times with Chapter
5 of the Sewage Disposal Bylaws for the City of Durban. This sample will be checked
for compliance with the Quality limits for Sea Outfall discharge. An account for this
analysis must be paid by the applicant.

3. At the discretion of the permitting officer the company requesting permission to
discharge tankered effluent may be instructed to provide samples of the effluent and
employ Dr Connell of Ematek : CSIR to conduct a standard toxicity test on the effluent.
The final approval would be subject to the effluent passing this test.

4. The company must sign and complete the indemnity form to protect Southern Works
fixture from damage by road tankers using the facilities. The company must also abide
strictly to the regulations for road vehicles within the Southern Works property.

5. A permit will be issued (renewable annually) summarising any special conditions. An
account number must be provided for the raising of the monthly charges.

6. The company must design a tanker delivery note book which indicates the volume of
a particular load and one page must be submitted per load delivered.
DURBAN METROPOLITAN COUNCIL

INDEMNITY

Given by ................................................................. (hereinafter called .................................................................)
in favour of DURBAN METRO COUNCIL (hereinafter called the Council).

WHEREAS the Council has agreed to permit ...........................................................
..................................................................................................................
to enter upon the premises of the Southern Waste Water Treatment Works for the purpose of
discharging road tankers of authorised effluent at the Works on conditions that
..................................................................................................................
indemnifies the Council against any injury, loss or damage that may result.

NOW THEREFORE, I .................................................................
a Director of .................................................................
authorised thereto by resolution of the Board of Directors dated ..............................................
..................................................................................................................
do hereby on behalf of .................................................................
indemnify the Council against any injury, loss or damage to persons or property (including
claims arising therefrom) which may in any way arising as a result of the entry upon the said
premises of any vehicle belonging to or being operated on behalf of
..................................................................................................................
..................................................................................................................

SIGNED AT DURBAN THIS ............... DAY OF ................. 199 ..

WITNESSES:

1. .................................................................
2. .................................................................
Acceptance of Sewage Delivered by Private Road Tanker

(1) The authorised officer may, at his discretion, and subject to such conditions as he may specify, accept sewage for disposal delivered to Council facilities by private road tanker.

(2) No person shall discharge into Council facilities by private road tanker except with and in terms of the written permission of the authorised officer.

The charges for any sewage delivered for disposal to any Council facilities shall be assessed by the authorised officer in accordance with the prescribed tariff of charges.

(3) When delivery is by tanker -

(i) the time of delivery shall be arranged with the authorised officer and

(ii) the quality and character of the sewage shall be established to the satisfaction of the authorised officer prior to the discharge thereof and no person shall deliver sewage which does not comply with the standards laid down in terms of these Bylaws.

(4) Any permission granted in terms of this section may be withdrawn should the conditions for acceptance of sewage delivered by private road tanker be specified in accordance with subsection (1) not be met.

TARIFF OF CHARGES

ACCEPTANCE OF SEWAGE DELIVERED BY PRIVATE ROAD TANKER (3/8)

The charges for any sewage delivered for disposal to any Council facilities shall be assessed by the authorised officer in accordance with the prescribed tariff of charges:

(i) Disposal of sewage from within the City of Durban delivered by private road tanker to Council facilities

(a) per tanker load R27,81 + R3,89 VAT : R31,70

(ii) Disposal of sewage from without the City of Durban delivered by private road tanker to Council facilities

(a) per tanker load R34,82 + R4,88 VAT : R39,70
REGULATIONS FOR THE SAFE OPERATION OF TANKERS WITHIN THE SOUTHERN WASTE WATER TREATMENT WORKS WHICH MUST BE ADHERED TO AT ALL TIMES

1. The maximum permitted speed for all tankers within the Southern Waste Water Works is 20 km per hour.

2. Speed must be reduced further when approaching and negotiating bends in the road.

3. In the event of two tankers approaching a bend from opposite directions, the unladen tanker must pull to one side and stop to allow the laden tanker to negotiate the bend without hindrance.

4. Tanker drivers must remain alert at all times and be aware that roads within the Works may be used by pedestrians, tractors, mowers and other vehicles engaged in operation and maintenance of the works.

5. In the event of a tanker suspected of exceeding the speed limit, the Company concerned will be required to provide the relevant tachograph, for scrutiny by the Southern Waste Water Treatment Works Superintendent.

6. The firm involved will be required to advise the Superintendent of the action taken to prevent a re-occurrence of the incident.

7. Drivers should be constantly reminded of the need to remain vigilant and be made aware of the serious consequences arising from accident damage by a tanker laden with effluent. Extreme care should be taken to avoid the possibility of damage to any of the Launders carrying sewage.

8. Please update driver training to ensure that they comprehend the above regulations.

You are reminded that the permit holder will be held responsible for any damages or spillages caused by tankers and will be liable for any costs incurred as a result of driver negligence.
1. **Introduction**
The information contained herewith is intended to provide parameters of usage and policy regarding the use of structured wall uPVC sewer piping in the Durban Metropolitan Area (DMA).

This document shall be read in conjunction with SABS 1601 : 1994 and Appendix C hereto attached.

It is a requirement that the tests contained herewith shall be undertaken by an independent testing body which has at its disposal a reputable and adequately equipped laboratory specialising in this field of operation and that the body shall employ a registered professional engineer of the appropriate discipline for the responsibility of certification of the tests unless provisions set out in Section 7 are complied with.

2. **Acknowledgements**

The jetting aspects of this document have been based on the information supplied to the Durban Metropolitan Council (DMC) by the Structured Wall Pipe Association of Southern Africa (SWPASA) in the form of a Draft Document for Thermoplastics Structured Wall Pipe Systems prepared by the Steering Group for Structured Wall Gravity Sewer and Drainage, United Kingdom.

3. **SABS Compliance**

The piping shall comply in all aspects with the standards stipulated by the South African Bureau of Standards (SABS 1601 : 1994) with the exception that the required minimum wall thickness in contact with the effluent, \( e_4 \) shall be as indicated below:

<table>
<thead>
<tr>
<th><em>Type and Description</em></th>
<th>Figure No *</th>
<th>Nominal Diameter (mm)</th>
<th>*Required Minimum Wall Thickness, ( e_4 ) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandwich Wall</td>
<td>1</td>
<td>160</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>1.25</td>
</tr>
<tr>
<td>Hollow core with axial</td>
<td>1</td>
<td>160</td>
<td>1.25</td>
</tr>
<tr>
<td>hollow sections</td>
<td></td>
<td>200</td>
<td>1.25</td>
</tr>
<tr>
<td>Ribbed</td>
<td>2</td>
<td>160</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>1.25</td>
</tr>
<tr>
<td>Corrugated</td>
<td>2</td>
<td>160</td>
<td>1.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>1.25</td>
</tr>
</tbody>
</table>

* (Reference : SABS 1601 : 1994, Figures 1 & 2)

The above piping shall bear the SABS mark as the normal requirement.

4. **Pipe Application**
Structured wall uPVC piping shall be used in domestic sewer reticulation systems only. The use of the piping shall NOT be permitted for bulk mains or other sewer reticulation systems downstream of the following:

1. Industrial areas
2. Business areas
3. Garage/filling station complexes
4. Areas which have the potential of being developed into the above areas and complexes.

5. **Water Jetting Tests**

Water jetting tests shall be carried out in accordance with the specifications and information set out in the attached Appendix C.

The resistance of structured wall uPVC sewer piping to water jetting shall be determined according to requirements contained herewith and shall be performed, monitored, correlated and certified by the independent testing body.

When tested in accordance with Appendix C, the manufacturer shall declare the pressure limit identified by C.4 and confirmed by C.4.3 at which there are no signs of damage to the pipe wall.

*Note*: Damage is defined as penetration through the wall in contact with the effluent for a twin walled pipe where the layers are of solid construction as well as penetration through the first inside layer of a multi layered pipe.

6. **Acceptance Criteria**

Where the pressure limit as identified by C.4 as being greater than or equal to 180 bar, the pipe shall be deemed to be suitable for use within the area of jurisdiction of the DMC.

7. **Quality Verification**

Wall thicknesses, e₅, shall be determined in accordance with current SABS testing, measuring and quality verification methods.

The frequency, sampling and criteria of compliance of the wall thickness and water jetting tests shall be undertaken in accordance with SABS 1601 : 1994, Annex B (or the latest edition thereof), with the exception that the water jetting tests shall be undertaken at six monthly intervals.

Any pipe manufacturer who is SABS 1S0 9002 accredited and who provides this Council with suitable evidence that his quality management system addresses the water jetting test requirements of the Council, may undertake such tests internally and will not require the certification of an independent testing body.

8. **Independent Testing Body**

The independent testing body (encompassing all those acting on its behalf, such as employees, consultants, etc) shall produce evidence of qualification pertaining to its field of expertise whenever required to do so.
APPENDIX C : RESISTANCE TO WATER JETTING.

C.1 **Apparatus**

C.1.1 **Pump Unit**

The pump shall be capable of delivering water up to and in excess of 350 bar (5000 psi).

C.1.2 **Jetting nozzle**

The jetting nozzle shall have an orifice diameter of 1.5 mm and a coefficient of discharge of between 0.6 and 0.7 when measured in accordance with Section C.3.3. A typical nozzle design is shown in Diagram 1.

C.1.3 **Pressure gauge**

The pressure gauge shall be capable of measuring up to and in excess of 350 bar (5000 psi) to an accuracy of ± 10 bar. The pressure gauge shall be connected to the water supply immediately before the jetting nozzle.

C.1.4 **Test rig**

The test rig shall be designed to withstand pressures in excess of 350 bar (5000 psi).

It shall be capable of:

- holding the nozzle at a constant vertical stand-off distance of (5 mm ± 0.5 mm) from the internal pipe surface;
- holding the nozzle at two different angles (30° ± 1° and 45° ± 1°);
- maintaining a stationary jet of water throughout the period of the test;
- holding the test piece stationary throughout the period of the test.

A schematic of the rig design is shown in Diagram 2.

C.1.5 **Measuring Equipment**

Suitable means of checking the vertical stand-off distance between the internal pipe surface and the jet orifice.

Suitable means of measuring the orifice diameter in the jet nozzle to an accuracy of ± 0.1mm

C.2 **Test piece**

The test piece shall be a 300 mm long section of pipe of the diameter to be tested. The test piece shall be marked off longitudinally along the pipe into eight equi-distant sections and numbered. The marking shall be waterproof.
C.3 **Procedure to confirm the co-efficient of discharge of the nozzle**

C.3.1 The test piece shall be mounted in the rig and suitably restrained to prevent movement during testing. The pipe shall not be held in such a way that distortion of the pipe can occur.

C.3.2 The jetting nozzle shall be fixed in place and the vertical distance of 5 mm as defined in C.1.4 shall be checked. The nozzle shall be positioned over the area where the wall is the thinnest or is a single wall thickness.

C.3.3 Check the co-efficient of discharge by the following method:

The volume of flow from the jet shall be collected and measured for 30 secs at pressures of 200, 300 and 400 bar.

The co-efficient of discharge, \( C_d = \frac{0.474 \times Q}{d^2 \times p^{0.5}} \)

where
- \( p \) = pressure in Mpa
- \( Q \) = flow rate in 1/min = volume of flow (1) / collection period (min)
- \( d \) = orifice diameter in mm

[Note: 1 Mpa = 10 bar = 145 psi]

C.4 **Procedure to identify the pressure limit**

C.4.1 The Jetting Pressure Requirement (JPR) for structured wall uPVC sewer pipes is 180 bar.

A stationary jet of water at a pressure of 30 bar less than the JPR above, shall be applied to the pipe surface for 120 secs. Record the segment number and pressure.

The pipe surface shall be inspected for signs of damage (as defined in Section 5, Note).

C.4.2 The procedure shall be repeated after turning the pipe to an untested segment, and increasing the pressure by an increment of 10 bar up to 180 bar. After each test, the pipe surface shall be inspected for signs of damage as defined previously.

The pressure limit is identified as the pressure increment below that which causes damage (as defined in Section 5, Note).

C.4.3 To confirm the results, the test shall be repeated five times on an untested segment at the identified pressure limit. The pipe shall show no signs of damage on any of the five segments.
C.5 **Test report**

The report shall include:

5.1 identification of the sample;
5.2 test pressure, angle of jet and level of surface damage;
5.3 observations including photographs of damaged area.
Diagram 1: Schematic of Jet Design
NOTE: Only the key dimensions are shown

Diagram: Schematic of Test Rig
METRO

WASTEWATER MANAGEMENT

POLICY GUIDELINES FOR

THE SUBMISSION OF ALTERNATIVE

ON-SITE WATERBORNE SANITATION SYSTEMS

Approved December 1997
Guideline / Policy
Document No. 8
DURBAN METRO WASTEWATER MANAGEMENT

GUIDELINES FOR THE SUBMISSION OF ALTERNATIVE, ON-SITE WATERBORNE SANITATION SYSTEMS FOR APPROVAL

INTRODUCTION

These guidelines give a broad outline of the procedures followed by Durban Metro Wastewater Management (DMWM) in order to assess the functioning of alternative on-site sanitation systems. These guidelines cover general policy of the Department regarding testing of products and its approach to acceptance of products as well as details of specific data requirements and criteria for assessment of products for use in the Durban Metropolitan Area.

These guidelines will generally only apply to those systems which do not comply with the National Building Regulations and S.A.B.S. 0400.

General Policy with Respect to Testing Products and Acceptance

DMWM will not undertake product testing on behalf of a private organisation seeking acceptance of his product. All information and proof of performance required by DMWM in order to gauge acceptability of the product must be supplied by the applicant at his cost. DMWM may however wish to conduct further “in-house” testing on the product to either clarify or confirm certain data or information supplied by the applicant. Although the applicant may be informed of the broad outcome of such tests the detailed results will not be released.

In instances where a product shows wide potential but the applicant is unable at that stage to supply all relevant information or test results for DMWM to adequately assess the product then approval for use within the Metropolitan area will not be given. However DMWM will endeavour to facilitate such further development testing, or research that it considers necessary, by the applicant.

Once evaluated, should the product satisfy the requirements, DMWM will notify the Substructure Authorities that the product is acceptable for use in the Durban Metropolitan Area (DMA). This is in no way to be construed as an endorsement of the product for widespread use outside of the DMA.

Procedure and Criteria Applied by DMWM

In assessing products DMWM will use the National Building Regulations (NBR) and SABS 0400 as a datum. However DMWM does not wish to limit efforts to resolve sanitation problems to existing technology only and by its very nature, future technology will not necessarily be covered by the NBR.
The following flow chart indicates the broad procedure and criteria under which applications will be scrutinised.

**APPLICATION**

1. DESCRIPTION OF PRODUCT

2. VISUAL INSPECTION OF PRODUCT

3. **DOES PRODUCT COMPLY WITH SABS 1000?**
   - **NO**
   - **YES**

4. **SCIENTIFIC AND/OR STATISTICAL DETAIL AND DESCRIPTION OF OPERATION**
   - **DEEMED TO SATISFY**
   - **NO**

5. **SERVICING REQUIREMENTS**
   - **DEEMED TO SATISFY**
   - **NO**

6. **PRACTICALITY OF USE**
   - **DEEMED TO SATISFY**
   - **NO**

7. **ROBUSTNESS & MATERIALS**
   - **DEEMED TO SATISFY**
   - **NO**

8. **CONSTRUCTION, INSTALLATION, SPECIFICATION & REQUIREMENTS**
   - **DEEMED TO SATISFY**
   - **NO**

**ACCEPTANCE**

**NON ACCEPTANCE**
Information That Needs to Be Supplied to the Assessors

As a minimum, the supplier and/or promoter of a product and/or system must supply the following information to DMWM. This information requirement is in no way intended to be exhaustive and should further information be required to adequately assess a specific application then DMWM will call for it as and when required.

1. **Description of Product and System**
   
   i) A clear description and/or illustration of the product/system, as well as descriptions/illustrations of the unit parts.
   
   ii) A clear and full specification of the product/systems intended use and how it is intended to function from the point of acceptance of waste, through its treatment, to ultimate disposal of all treated waste products.
   
   iii) The applicant shall state clearly the level of hygiene and public health impact achievable with specific reference to effective barriers against faecal related diseases, fly and vector infestation and odours.
   
   iv) A clear and detailed specification of the products intended purpose, its range of use, limiting factors, and operational criteria, which should include: geographic or geological conditions under which it may function; full application/design specifications in terms of hydraulic loading, biological loading, sizing of the units for applied loads and installation conditions.
   
   v) Whether the applicant considers the system to comply with the NBR or not.

2. **Visual Inspection**

   i) The vendor must make the system/product easily available for visual inspection by the assessor.
   
   ii) Details of actual installations, period of operation, failures which have occurred, feedback of users, etc.

3. **Scientific and/or Statistical Details and Description of Operation**

   i) A full scientific explanation of how the product should work and statistical evidence that the system works and under what limiting parameters it works.
   
   ii) Mass balance and loading diagrams, which indicate the functioning of the unit parts as well as the whole, for the following parameters

   a) Materials entering and leaving
   b) BOD / COD / OA / PV entering and leaving
   c) Water entering and leaving
   
   iii) If the parameters, in the influent to any unit part, exceed the ranges implied by NBR, then a description and scientific proof of how the subsequent units/system copes with the additional loads.
   
   iv) Scientific/statistical evidence confirming the operation and claims of the special features where appropriate.
   
   v) Applicants should make comment and indicate whether the system will cater for all waste water generated on the site. Water balance diagram should be provided for total water consumption on site where product/system is being used to dispose of only portions of the water.

   **NOTE:** Where testing or sampling has been undertaken by reputable, independent 3rd parties on behalf of the applicant this data would obviously carry more weight.

   Where scientific or statistical evidence is used a detailed description of the intention of the tests, the method, result, interpretation of the results and conclusion are required.
4. **Servicing Requirements and User Operation**

i) Description of intended method of use by user.

ii) Description of maintenance services required by the user including the frequency of services.

iii) Description of services to be undertaken by the agent and the frequency of these services and costs where appropriate.

iv) Description of services to be undertaken by the local authority including frequency and cost.

v) List and or description of other services or additives (e.g. access, water, etc) required to maintain the product / system.

vi) Diagram indicating access points and critical dimensions.

vii) Description, number required, and cost of special tools and / or materials required for servicing.

viii) For products / systems intended for the low income areas the following are required:

   a) Description of how and where hard paper is handled (all systems intended for the low income areas must be able to handle newspaper as a minimum)

   b) Description of how and where grit is handled.

   c) Description of closures to access points with particular reference to the provision of ingress of extraneous materials.

ix) Description, cost and availability of all specials.

x) Ease of repair / replacement of components and costs.

5. **Practicality of Use**

i) Description and diagrams with critical dimensions illustrating the minimum space requirements and positions of components.

ii) Description of light requirements and sources.

iii) Description of ventilation requirements and sources.

iv) Description of odour control methods.

v) Description of user operation

vi) Cleaning methods

vii) Description of all prohibitions on the system / product

viii) Cost of running the system - Operating costs

ix) Description of suitability of system to “do it yourself” repairs.

6. **Robustness and Materials**

i) Copies of all JASWIC, Agrément Board or SABS certificates indicating fitness for use should be supplied where appropriate.

ii) List and description of all parts and components which do not have JASWIC, Agrément Board or SABS certificates.
iii) List of components and materials with a description of the appropriateness of the material for the application.

7. **Construction / Installation Specification and Requirements**
   
i) Instructions, description and diagrams for installation / construction
   
ii) Specifications and description of special parameters and or requirements for construction / installation
   
iii) Description of expertise required by personnel doing installation
   
iv) Description of any special techniques required for installation
   
v) Description of site conditions which make installation inappropriate.
METRO

WASTEWATER MANAGEMENT

DEPARTMENT

GUIDELINES FOR

PROCESSING OF SUBDIVISION APPROVAL

FOR WASTEWATER DISPOSAL

September 1997
Guideline / Policy
Document No. 7

DURBAN METRO WATER SERVICES
WASTEWATER MANAGEMENT DEPARTMENT

PROCESSING OF SUBDIVISION APPROVAL FOR WASTEWATER DISPOSAL

Because of the urgency to have the bare essential processes in place to allow continued processing of subdivisional applications, the following guide has been developed as a provisional document. Where policy documents, procedures, guidelines or by-law references, etc, are identified but still being developed or sourced, these are recorded and will be included as and when they are complete.

Refer to letters to Local Councils requesting directors as to their preferred options regarding the processing of subdivision applications.

General

1. The North, Inner West and South Local Councils have the option to utilise extended staff resources or they can choose to utilise the offices of the Department of Local government and Housing for processing of township service applications (leading to registration) - task previously undertaken by Private Townships Board, however presently being absorbed by the Department of Local Government and Housing.

The Outer West Council does not have the right to the option.

The North Central and South Central Councils have opted to utilise their own resources, viz. P.E.S.U.

2. Flow charts for processing

The flow charts are attached.

Chart A - Outer West Council and other who do not have resources.
Chart B - North & South Central Councils and others who do have resources.

3. Chart A

Upon receipt of a subdivision application from the developer the Local Council (LC) forwards the details to the Area Engineer (AE), Systems Branch, of the appropriate area, for his technical assessment and preliminary approval in terms of the method of effluent disposal appropriate to the particular subdivision. Response to these applications will take the form of comments (eg “subject to”) on the LC circulation sheets.

The method and procedure for receiving the applications and recording responses are to be established between the AE and the LC.
In assessing the submission the AE should consider the following:

C Guideline Document No. 1 - This document sets out Council’s policy with respect to providing a sewer connection to individual subdivisions.

C Guideline Document No. 2 - This document sets out the draft guidelines of the levels of service Metro Water Services associated with the level of sanitation available.

NOTE: Where the sanitation system will not permit standard full pressure water supply, a formal written memorandum must be forwarded to the Water Department, attention Mr F. Stevens, and discussions held.

C The method of assessment will be carried out by the AE in accordance with the Guidelines presently in place in the local entity. Example: Table E for Kloof and an extract and adaptation of Water Services Advisory Boards subdivision approval for septic tank effluent disposal have been included. Further local guidelines will be sourced where they exist.

Further guidelines are being developed for application uniformly throughout the Metropolitan area. Specifically two guidelines presently being developed are Guidelines for Application for Package Plants, for Private Pumping Stations and a Guideline for Effluent Disposal from On-Site Systems. Until such time that revised guidelines have been completed those existing local guidelines in place should continue to be used and also be used as appropriate in other areas where previous guidelines do not exist.

All subdivision applications relating to township development which will consist of more than three new subdivisions must be discussed with the relevant Area Design Engineer (who should then appropriately refer to the Strategic Planning Branch). The results of any such discussions must be minuted at the monthly liaison meeting which should record the item as outstanding until the Certificate B is issued and as-built drawings and schedule of properties served forwarded to Engineering Support Division, Prior Road.

Procedures to be followed for sectional title or re-zoning applications submitted by the LC to the Area Engineer for comments will be explained in a separate guideline.

The Area Engineer is to keep a register of all applications received and when they were returned to the Local Council (and a system of tracking progress, when applications are sent to head office, etc.)

3.1 Thereafter the application is returned to the Local Council who will forward it to the Department of Local Government and Housing (LG & H), Mayville, for preliminary approval confirmation accompanied by the other approved services like roads, stormwater, electricity, etc.

3.2 The LG & H will return the draft conditions of subdivision registration to the LC. The Area Engineer should set up a system with the Local Council to receive such draft conditions as may pertain to sewerage issues for record purposes.
3.3 In due course the developer will request the Area Engineer to issue Certificates A and B. (Pro-forma sample copies attached). Certificates A and B, addressed to the Department of Local Government and Housing, are to be authorised by Manager : Systems prior to returning them to the Local Council.

C Certificate A is important with respect to those levels of service other than full waterborne.

In order to allow Certificate B to be authorised for subdivision applications involving sewer reticulation, the following shall be complied with:

C It will be necessary for the Area Engineer to examine and approve engineering drawings pertaining to wastewater disposal for a development (where applicable), prior to issue of the Certificate B.

C The existing Durban City Council Design Standards and Specifications for sewers will apply with immediate effect to all areas as was accepted by Council resolution dated 7 October 1997 (See annexure 1, Policy Doc. No.1). Standard documentation, design criteria, specifications, etc. will be collated and shortly issued.

C Where the sewer reticulation is to be taken over by the Department, an inspection shall be carried out before the issuing of Certificate B.

C Certificate B will NOT be issued for developments utilising waterborne reticulation until such reticulation has been built to the satisfaction of the Area Engineer and as-built drawings have been lodged.

C Together with completion of Certificate B the Area Engineer is to ensure completion of the Completion Certificate for internal circulation and capture.

3.4 Once all the certificates have been received by the Local Council they will be forwarded to LG & H for further processing. Thereafter final approval certificate 28 (1) will be forwarded to the Developer’s attorney for him to process for registration.

4. Chart B

The alternative procedure for the processing of subdivision application available to the Local Council to follow in terms of Ordinance Nos. 27 of 1949, Sections 39 (1) and 47 bis A(1) (a) is illustrated on the attached Flow Chart B and is as follows:

4.1 Procedure Clause 3 to be duplicated for this process of service application except that the LC will produce the Conditions of Subdivision and, in addition, that Certificates A and B will be addressed to the Local Council.

4.2 Thereafter the application is returned to the Local Council who processes the application and certificates issued by the AE and issues the final approval Certificate 28 (1) to the Developer who forwards it on to his attorney to process for registration.

4.3 It must be noted that the current service offered by the Physical Environment Service Unit within the North Central and South Central Local Councils will continue and Certificates A and B will not be issued by Metro Wastewater Management.

13 September 2004
SUBDIVISIONAL COMPLETION CERTIFICATE

REFERENCE: 16/5/6/2
DM/mmn

ENQUIRIES:

MANAGER: BUSINESS

ATTENTION: MR D. MEREDITH

Dear Sir

DEVELOPMENT
______________________________________________________________

ADDRESS


We wish to confirm that we are satisfied that the sewer reticulation as constructed for the above development has been completed in accordance with our Metro Wastewater Design Standards and Specifications.

As Built drawings have been lodged with us by the Consulting Engineer / Developer and are attached. As of ____________ 19__ maintenance of these sewers will be carried out by the Metro Wastewater Management Department.

Yours faithfully

MANAGER: SYSTEMS

REFERENCE: 16/5/6/2

COPIES TO: ________________________________ LOCAL AUTHORITY

ENQUIRIES:
Dear Sir

This serves to confirm that Durban Metro Water Services:-

¢ is willing to accept waste water from:-

..............................................................................................................................
..............................................................................................................................

OR ¢ Approves of the sewage disposal system proposed for

..............................................................................................................................
..............................................................................................................................

for the disposal of sewage and wastewater for each of the subdivisions to be registered.

I trust that this information is sufficient to satisfy Clause A.............: Sewage Disposal of the Conditions of Establishment applicable to the proposed private township,

.....................................................................................................................................Reference .................

Yours faithfully

MANAGER : SYSTEMS

REFERENCE: 65/12/6/6/2 ENQUIRIES: C DAVIES
The Secretary
Local Government and Housing
Private Bag X54310
DURBAN
4000

Dear Sir

---

PTB: 28936 - LOT 760 (of 523) of LOT 31 No 1560 - Part Gateway
---

This serves to confirm that Durban Metro Water Services is satisfied that:-

$\quad$ The developer has reticulated at their cost, and to Durban Metro Council’s specification.

Lot 760 (of 523) of Lot 31 No 1560

for the disposal of sewage and wastewater.

I trust that this information is sufficient to satisfy Clause B2: Sewage Disposal, of the Conditions of Establishment applicable to the proposed private township, Part Gateway Development Reference PTB 28936.

Yours faithfully

AB DAVIS
DIRECTOR: WASTEWATER MANAGEMENT
PROCESSING OF SUBDIVISION APPROVAL FOR WASTEWATER DISPOSAL:

FLOW CHART A
(CURRENT SYSTEM)

DEVELOPER

LOCAL COUNCIL

- TOWN PLANNING SCRUTINY
- ROADS
- STORM WATER DRAINAGE
- ELECTRICITY APPROVAL
- AND POSSIBLE OTHER

ISSUE OF CERTIFICATES

FOR TECHNICAL ASSESSMENT

METRO WATER MANAGEMENT
SYSTEMS BRANCH
AREA ENGINEER:
- AVAILABILITY OF WATER BORNE SEWER
- APPROVAL OF SEPTIC TANKS, PACKAGE PLANTS AND PRIVATE PUMP STATIONS
- ISSUE OF CERTIFICATES: CATEGORIES A & B

LOCAL GOVERNMENT AND HOUSING
(PREVIOUSLY UNDERTAKEN BY PRIVATE TOWNSHIPS BOARD)

METRO WATER ISSUES A5 CERTIFICATE

PRELIMINARY APPROVAL PRIOR TO ISSUE OF CONDITIONS OF ACCEPTANCE

RETURN OF DRAFT CONDITIONS

FINAL APPROVAL OF CERTIFICATE

DEVELOPER

FINAL APPROVAL CERTIFICATE 28(1)
PROCESSING OF SUBDIVISION APPROVAL FOR WASTEWATER DISPOSAL:
FLOW CHART B

(EXTENDED POWERS TO LOCAL COUNCILS IN TERMS OF ORD. NO. 27 OF 1949, SECTIONS 39 (1) AND 47 BIS A(1)(a))

- DEVELOPER

* ESTABLISHMENT OF CONDITIONS OF SUBDIVISION APPROVAL
  * CONFIRM CONDITIONS ARE COMPLIED WITH

* TOWN PLANNING SCRUTINY

* ROADS
* STORM WATER DRAINAGE
* ELECTRICITY APPROVAL
  * AND POSSIBLE OTHER

LOCAL COUNCIL

ISSUE OF CERT.

TECH. ASSES.

METRO WASTEWATER MANAGEMENT SYSTEMS BRANCH AREA ENGINEER:

- AVAILABILITY OF WATER BORNE SEWER.
- APPROVAL OF SEPTIC TANKS, PACKAGE PLANTS AND PRIVATE PUMP STATIONS
- ISSUE OF CERTIFICATES: CATEGORIES A & B

METRO WATER ISSUES A5 CERTIFICATE

ISSUE OF FINAL APPROVAL:
CERTIFICATE 28 (1)

DEVELOPER
DURBAN METRO WATER SERVICES
Department of WASTEWATER

MANAGEMENT

Application Form

PERMISSION IN TERMS OF SECTION 3/1(1) OF THE SEWAGE DISPOSAL BYLAWS TO DISCHARGE TRADE EFFLUENT INTO THE COUNCIL’S SEWERS.

I (full name) _____________________________________________________ the undersigned duly authorised to act on behalf of ____________________________ and hereinafter referred to as the applicant, hereby apply in terms of Section 3/1(1) for permission to discharge trade effluent into the Council’s sewer on the basis of the facts stated herein, and I submit the following information as required by the Executive Director: Metro Water Services.

PART 1 - Business Details

Nature of the business or industry concerned _________________________________

___________________________________________________________________________

Name under which the business or industry is carried out ______________________

___________________________________________________________________________

Name of land owner/landlord ________________________________________________

___________________________________________________________________________

If the business or industry is carried out by a company, the company registration number and the full names of the secretary and directors must be stated

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

Address of the business or industry __________________________________________

___________________________________________________________________________(physical address)

P O Box & Code _____________________________________________________________

Lot No(s) & Township _______________________________ Telephone No. __________
Electricity Account Numbers

Date of initial effluent discharge to sewer (anticipated if not available)

Give a brief description of industrial or trade process by which the effluent will be produced. (attach a process diagram where necessary)

The applicant hereby declares and warrants that:

The information and calculations submitted by him/her in Parts 1, 2 and 3 of this application have been checked and are in all respects factually correct.

The discharge of trade effluent will comply at all times with the requirements of the Sewage Disposal Bylaws.

Signed in ______________________ by the applicant

This ______ day of ____________________ 19 ___

______________________________
SIGNATURE AND CAPACITY OF APPLICANT
PART 2

A. COMPOSITION OF THE EFFLUENT TO BE DISCHARGED

PLEASE CROSS RELEVANT ITEM/S

<table>
<thead>
<tr>
<th>Cyanide</th>
<th>Chromium</th>
<th>Nickel</th>
<th>Cadmium</th>
<th>Copper</th>
<th>Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>Ammonium</td>
<td>Sulphide</td>
<td>Sulphates</td>
<td>Nitrates</td>
<td>Acids</td>
</tr>
<tr>
<td>Starch or Sugars</td>
<td>Tar or Tar Oil</td>
<td>Grease/Oil/Fats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthetic Detergents</td>
<td>Volatile Solvents</td>
<td>Suspended Matter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alkalis</td>
<td>Pesticides/Herbicides</td>
<td>Colour</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Estimated monthly discharge (kl/month) ________________________

Maximum rate of discharge (litres/sec) ________________________

Maximum temperature of effluent (DegC) ________________________

pH range of effluent ________________________

Any other relevant information relating to Quality/Quantity of effluent to be discharged.
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
B. PRETREATMENT OF EFFLUENT

CROSS RELEVANT BLOCKS

<table>
<thead>
<tr>
<th>Trade Effluent discharged through connection to foul sewer</th>
<th>Effluent discharges to Sand/Oil/Grease Trap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutralising of pH</td>
<td>Screening</td>
</tr>
<tr>
<td>Precipitation/Flocculation</td>
<td>Dissolved Air Flotation</td>
</tr>
<tr>
<td>Mineral Oils Separation</td>
<td>Settling</td>
</tr>
<tr>
<td></td>
<td>Aeration</td>
</tr>
<tr>
<td></td>
<td>Other Treatment</td>
</tr>
</tbody>
</table>

Further details____________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________

C. STORMWATER

The standard of controls required depends on the type of process & Potential impact on water courses.  YES / NO

1. Complete separation of Stormwater & Trade Effluent drainage exists

2. Dirty Process areas are bunded and separated from clean stormwater areas

3. Stormwater containment tank exists to catch accidental spills and contaminated stormwater runoff from dirty process areas.

4. Washwater from vehicle washing, parts washing etc. drains to foul sewer

5. Boiler and Cooling Tower blowdown drains to foul sewer

6. Chemical/Oil/Used Oil Storage tanks properly bunded.

7. Fuel bowsers/Road tanker loading/drum filling areas are roofed & bunded and drained to foul sewer via sand/oil/grease trap of approved design.

8. All potable water taps drain to foul sewer & not stormwater

Further Details____________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
PART 3 - Water Balance

FACTS RELATING TO THE CONSUMPTION AND USAGE OF WATER

The following information is required in terms of Section 5(8) and 5(9) of the Sewage Disposal Bylaws for the purpose of estimating the quantity of trade effluent discharged into the Council’s sewer.

A. **Potable Water Meters** (installed & read by municipality)

<table>
<thead>
<tr>
<th>Water Account Number</th>
<th>Meter ID Number</th>
<th>Annual Average Consumption (kl/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
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<td>6</td>
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<tr>
<td>7</td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td></td>
<td></td>
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<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average municipal supply during the annual period from _____________ to _____________. ________________ kl/month
B. **Boreholes**

<table>
<thead>
<tr>
<th>Borehole Meter conversion Factor</th>
<th>Annual Average Consumption (kl/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Average supply during the annual period from _____________ to _______________.

________________kl/month

C. **Internal Meters** (private potable water meter read by company)

<table>
<thead>
<tr>
<th>Meter I.D. Number</th>
<th>Internal Meter conversion Factor</th>
<th>Annual Average Consumption (kl/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Average supply during the annual period from _____________ to _______________.

________________kl/month

D. **Water in raw materials**

________________kl/month

**TOTAL WATER IN (A + B + C + D)**

________________kl/month

E. **Water used by Staff for Domestic Purposes**
### Allowance (kl) per month

<table>
<thead>
<tr>
<th>Allowance (kl)</th>
<th>kl/month</th>
</tr>
</thead>
</table>

1. **Day Workers**
   - Number: days per month
   - Allowance: 0.09/person/day

2. **Shift Workers**
   - Number: shifts per month
   - Allowance: 0.14/person/shift

3. **Meals served per month**
   - Number
   - Allowance: 0.005/meal

4. **Watered Garden Area**
   - (m²)
   - Allowance: 0.05/m²

**Total Domestic Losses**

<table>
<thead>
<tr>
<th>Allowance ________________________________</th>
<th>kl/month</th>
</tr>
</thead>
</table>

---

### Manufacturing Process Losses

Data submitted as representative of the annual period ________ to ________.

#### F1. WATER CONTENT OF PRODUCTS MANUFACTURED

<table>
<thead>
<tr>
<th>Product</th>
<th>Volume Produced</th>
<th>% Water Content</th>
<th>Water Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Allowance______________________________ kl/month**
### F2. BOILERS

<table>
<thead>
<tr>
<th>Make of Boiler</th>
<th>Model of Boiler</th>
<th>Steam raised (kg/hour)</th>
<th>Hours steamed per month</th>
<th>Fresh water make-up (kl/month)</th>
<th>Water used for coal wetting and ash quenching: (kl/month)</th>
<th>Fuel type</th>
<th>Fuel Usage (kg or litres / month)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>BOILER 1</th>
<th>BOILER 1</th>
<th>BOILER 3</th>
<th>BOILER 4</th>
</tr>
</thead>
</table>

Allowance ______________________ kl/month

### F3. COOLING TOWERS

<table>
<thead>
<tr>
<th>1) Type of Tower</th>
<th>2) Serial No.</th>
<th>3) Model No.</th>
<th>Make-up Water fed to tower kl/month</th>
<th>Temperature drop.(Deg C)</th>
<th>Estimated loss by evaporation kl/month</th>
<th>Water re-circulated in kl/month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>TOTAL</th>
</tr>
</thead>
</table>

Please Note: Regarding Cooling Towers

It is imperative that the calculation of the re-circulation rate is done accurately since evaporation from cooling towers is a significant loss of water in the water balance. If you are uncertain what the correct re-circulation rate is, then please approach the supplier of the cooling tower for the relevant details for this particular model of tower. (Attach details). If no correct data can be obtained, then no allowance will be given.

Allowance ______________________ kl/month

### F4. OTHER PROCESSES LOSSES
1.
2.
3.

<table>
<thead>
<tr>
<th>PROCESS DESCRIPTION</th>
<th>CALCULATION</th>
<th>LOSS CLAIMED kl/Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allowance _____________________ kl/month

Total Manufacturing Process Losses _____________________ kl/month

G. **Effluents not discharged to sewer**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CALCULATION</th>
<th>LOSS CLAIMED kl/Month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note that allowances for liquid waste removal will only be given for safe disposal certificates supplied by waste disposal contractors acceptable to Council, copies of which must be attached to this application.

Allowance _____________________ kl/month
OFFICE USE ONLY

A  Total Water In  ___________________ kl/month
B  Total Domestic Losses  ___________________ kl/month
C  Total Manufacturing Process Losses  ___________________ kl/month
D  Losses not discharged to Sewer  ___________________ kl/month

E  Trade Effluent  =  A - B - C - D  
    =  ___________________ kl/month

F  Trade Effluent %  =  \frac{E}{A}  =  \frac{\text{_______________________}}{\text{_______________________}}  \%
METRO

WASTEWATER MANAGEMENT

DEPARTMENT

TREATMENT AND DISPOSAL OF SLUDGE AT

WASTEWATER TREATMENT WORKS
TREATMENT AND DISPOSAL OF SLUDGE AT

WASTEWATER TREATMENT WORKS

Introduction

The purpose of this brief document is to describe, in broad outline, the alternative methods of treating and disposing of sludge from wastewater treatment works within the Durban Metropolitan area.

Sewage Sludge

Wastewater, which comprises domestic sewage and / or industrial effluents, contains certain quantities of solid particles in addition to the biological and chemical constituents.

On arrival at a treatment works, the wastewater is screened to remove intractable / inorganic solids such as stones, plastic bags and the like and is then passed through de-gritters to remove sand and grit. The quantity of screenings and sand / grit removed is relatively small and those solids are usually buried on site or transported to and disposed of at regional solid waste (refuse) sites.

The screened wastewater enters the primary and secondary treatment sections of the works and various processes are used to separate the primarily biological organic solids from the liquid. The liquid is treated to prescribed standards and discharged to the nearby river / watercourse or through a sea outfall. The solids (which are collectively referred to as sludge) are treated and disposed of in a number of different ways.

The sludge treatment processes can include gravity settlement and thickening, anaerobic digestion (whereby sludge is stored for extended periods of time and stabilised by means of natural biological processes without oxygen), followed by conditioning and dewatering by means of drying beds, belt and plate presses and centrifuges.

The basic options for the ultimate disposal of the treated sludge are:

C Agricultural use including horticulture and forestry
C Landfill and land reclamation
C Marine disposal
C Incineration and disposal of residue by landfill

Agricultural Use

Whilst sewage sludge contains nutrients such as nitrogen and phosphates, it is not a major fertilizer resource because the nutrients form a very small portion of the total mass of sludge which has to be loaded, transported, offloaded, and spread on the land.
If sewage sludge is to be used in agriculture, there must be benefits to both the farmers and the producer and there must not be any adverse environmental impacts such as pollution of surface or ground water or risk to agricultural workers. Precautions to minimise risk from contaminants such as toxic metals and pathogens are essential. Sewage sludge usually contains significant quantities of ascaris ova (eggs of an intestinal hook worm) and it is essential that these eggs are sterilised if the sludge is to be used to grow crops that are eaten raw or if there is a possibility of farm workers coming into contact with the sludge. There is a cost implication to sterilising the ascaris ova and this mitigates against the wide spread use of sewage sludge for agriculture. The medical authorities do not allow sludge to be utilised for agricultural purposes without adequate sterilisation.

Sewage sludge can be mixed with garden refuse and / or wood chips and then composted in windrows, eventually being bagged and sold. The techniques of this process are well-tried and tested and the heat generated in the composting process sterilises the ascaris ova. However the economic viability of sludge composting depends entirely on the market i.e. on the willingness of members of public and farmers to purchase and / or use the compost. Transport costs are not insignificant and can affect the economic viability of composting sewage sludge. In addition there is a limited market for compost and the sludge generated in the Metro Area to sufficient to produce a volume of compost that far exceeds the demand.

**Landfill and Land Reclamation**

This option is usually selected on economic grounds or because the degree of contamination of the sludge renders it unsuitable for agricultural use. Sludge is often disposed of on the treatment works site or in municipal landfill sites together with municipal refuse (co-disposal).

Sludge can be used for land reclamation and for surface dressing of completed refuse sites and the like but, in the Metro area, such disposal opportunities are limited.

**Marine Disposal**

Disposal of liquid sludge into the sea by properly designed and operated marine outfall pipelines can be an acceptable and economical method particularly where suitable landfill sites and/or agricultural land and other options are not available.

**Incineration**

Incineration of sewage sludge is often the selected option when alternative methods of sludge disposal are not available, are uneconomic and/or when the sludge contains excessive quantities of heavy metals and/or other toxic substances. The process is reliable and effective but has a relatively high capital and operating cost and careful consideration must be made prior to its implementation.

Incineration produces a much reduced volume of sterile, odourless and inorganic residue which can readily be disposed of in a landfill site. The incineration process could result in a certain amount of air pollution unless full air pollution prevention measures are instituted.
CURRENT EUROPEAN PRACTICE FOR THE DISPOSAL OF SLUDGE (Ref.1)

The current practice in Europe is as follows:

<table>
<thead>
<tr>
<th>Method</th>
<th>% of Sludge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled tipping and land reclamations</td>
<td>42%</td>
</tr>
<tr>
<td>Agricultural use</td>
<td>35%</td>
</tr>
<tr>
<td>Marine disposal</td>
<td>10%</td>
</tr>
<tr>
<td>Incineration</td>
<td>11%</td>
</tr>
<tr>
<td>Unspecified</td>
<td>2%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

A recent trend towards incineration has been taking place due to use in agriculture becoming less favoured as a result of heavy metal build up.

CURRENT PRACTICE IN RSA FOR THE DISPOSAL OF SLUDGE

Statistical information is not readily available but it is estimated that the figures are similar to those in Europe but with the exception that agricultural use is probably significantly less than 35% due to the ascaris ova problem and that the landfill method probably accounts for considerably more than 42% of the total volume of sewage sludge disposed of in RSA.

OBJECTIVES OF STUDIES

A main object of the strategic planning in the metro area is to identify the most practical, cost effective and acceptable method of dealing with the sludge generated. A number of alternative solutions will be investigated and these will include, inter alia, sludge treatment on a number of treatment works sites followed by disposal on landfill sites or marine disposal of sludge or other options.

Further studies on the agricultural use of sludge will not be carried out. It is envisaged that this will only be done as and when market conditions dictate as previous studies have enabled accurate costings and viability of such methods to be obtained.

SUMMARY

The disposal of sludge must be carried out in an environmentally friendly manner and at minimum cost to the ratepayers. Research and studies into alternative disposal methods are on-going to achieve the most effective and economic means in the Metropolitan Area.

This document was produced by Messrs J. Howard (SSI), A.B. Davis and C. Olivier (MWMD).

22 July 1997
RE-USE OF TREATED EFFLUENT FROM SEWAGE TREATMENT WORKS
RE-USE OF TREATED EFFLUENT FROM
SEWAGE TREATMENT WORKS

Introduction

The Durban Metropolitan Council recognises that in a number of years there may be a shortage of potable water in the Metro area and therefore a continuous review of options must be carried out to ensure that adequate sources of suitable water to meet human, industrial and environmental needs is available.

However it must be appreciated that the economic cost to the end-user, assuming that the same environmental benefits are obtained, must be the criteria. Thus as the demand for potable water increases, the price of that potable water will also increase in real terms. Thus, as such increases occur, the economic benefit of using reclaimed effluent will increase and if the unit cost is below potable water more opportunities for re-cycling will occur.

The purpose of this brief document is to discuss, in broad outline, the factors which affect decisions to re-use treated sewage effluent instead of discharging it into river / watercourses or out to sea.

Treated Effluent

Wastewater, which comprises sewage and/or industrial effluents, contains many substances, some of which are in solid form while others are dissolved in the liquid.

On arrival at the treatment works the wastewater is subjected to a number of treatment processes. Initially the wastewater is screened to remove intractable / inorganic solids such as stones, plastic bags and the like. Thereafter sand and grit is removed from the wastewater and other solids are removed by gravity settling. At land based treatment works, the liquid is then subjected to purification process such as biological filtration or biological breakdown through prolonged contact with aerobic organisms. The liquid is then passed through secondary settling tanks (to remove solids which have been produced during the biologic process) and then disinfected (usually by the addition of chlorine) prior to being discharged to the nearby river / watercourse.

The treatment processes which are described above are designed to ensure that the effluent being discharged to the river / watercourse complies with prescribed standards - usually the so-called “General Standard” set by the Department of Water Affairs and Forestry.
Whist this effluent is relatively clean and does not have significant impacts on the receiving waters or the environment it usually contains relatively small quantities of organics, inorganics and pathogens and cannot be used for anything other than for irrigation without further treatment.

Areas in which treated sewage effluent have been used throughout the world include:

- Industrial Re-use
- Potable water (Drinking Water)
- Irrigation of agricultural lands or public open space
- Aquaculture
- Recharging of ground water

**Industrial Re-use**

If consideration is to be given to the re-use of treated sewage effluent by industries it is essential to first determine the quality of the effluent which the industries will accept. For example, if treated effluent is to be used for making white paper, the colour component of the effluent is critical. On the other hand, if the effluent is to be used in a spray cooling tower, colour would not be important but other organic compounds which could cause algae growths would be of concern.

Durban Metro has identified a possible effluent re-use scheme which economic assessments have shown to be viable and is currently inviting the private sector to submit bids to design, build and operate a re-use “second class water” scheme at their Southern Wastewater Treatment Works as an extension to the second class water supply of 8 000 kilolitres per day to an industrialist which has been operating since 1974.

**Potable Water Production**

The technology to convert treated sewage effluent to drinking water is well-tried and tested and, were it not for the high costs of these processes, this would be practised on a much larger scale than is done at present.

**Agricultural Irrigation**

A major factor influencing the viability of this type of re-use is the proximity and extent of available agricultural land and the cost implications this has on reticulating water to the lands. Re-use for irrigation currently takes place at two Metropolitan works.

**Public Open Space Irrigation**

This option is at present not viable since public open space generally consists of small pockets of land widely dispersed which makes the reticulation of re-use water to these sites uneconomical.
Aquaculture

Re-use for aquaculture has been attempted twice in Durban and on both occasions the concessions have had to be terminated because they were economically unviable.

Re-Charge of Ground Water

This option is not available because ground water levels in Durban generally do not need to be re-charged and in many instances high levels actually cause problems.

Objectives of Strategic Studies

The main objective of studies is to identify the most practical, cost effective, and acceptable method of dealing with the sewage generated within a study area. A number of alternatives will be investigated and these will include, inter alia, treatment of sewage on numerous different sites including the potential for marine disposal of all or some of the sewage.

Detailed studies on the re-use of treated sewage effluent will not be carried out as part of the studies as it is envisaged that this will be done as and when market conditions dictate. However, in selecting a plan for the Metro, consideration will be given to the impact of any alternative on the possibility of future re-cycling. Because of Durban’s location, climate and topography the most likely area of re-use will be that of industrial re-use and centralisation of treatment and proximity to industrial demand would favour this.

As stated above a re-use project has already been identified by Durban Metro and is being proceeded with.

Summary

The degree of tertiary treatment which the treated sewage effluent requires before it can be sold to end-users has a significant effect on the costs of the treatment and hence on the economic viability of re-use.

Other factors which have a major financial effect on a re-use scheme are the economy of scale of the operation and the costs of distributing / reticulating the treated effluent. Studies carried out have indicated that re-use of treated sewage effluent is only viable if there is a willing consumer(s) who will purchase a substantial quantity and who is situated within 2 to 3 kilometres of a treatment works. The costs to the consumer of the treated effluent must be less than the cost of potable water otherwise artificial penalisation of users occurs.

Prepared by Messrs J. Howard / A. Davis / C. Olivier 6 August 1997
METRO

WASTEWATER MANAGEMENT

DEPARTMENT

MONITORING AND CONTROL OF

SEWAGE DISPOSAL AND TREATMENT

July 1997
Guideline / Policy
Document No. 3
MONITORING AND CONTROL OF

SEWAGE DISPOSAL AND TREATMENT

The Importance of Monitoring

Wastewater is made up of both industrial effluent and domestic sewage.

Where there is no formal disposal system, sewage is normally treated and disposed of on-site. Care must be taken in setting the parameters under which this will be permitted in order to prevent pollution of the soil and natural water courses and surface runoff which could lead to serious health, hygiene and environmental problems.

In the case of the formal sewerage systems, it is critical that these also are well managed to avoid pollution problems with resulting public or environmental health concerns.

Regular tests have to be conducted during all stages of the sewage conveyance, treatment and ultimate disposal systems to ensure that the disposal process does not have a negative impact on rivers and sea environment.

This pamphlet provides information about the monitoring and control of sewage disposal in the Durban Metropolitan area.

Monitoring Sewage Disposal in the Metro Area

Durban Wastewater Management Department (DWM) is responsible for providing a formal sewerage system and for the treatment and safe disposal of wastewater in the Metro area. Associated with this it is also carries out, for self auditing purposes, general pollution monitoring. In turn the Department itself is monitored and controlled by the Department of Water Affairs and Forestry (DWAF).

The monitoring and testing carried out by DWM is undertaken in four main areas; at source, the reticulation system, the treatment process itself and the treated discharge to river and sea.

1. Monitoring a Source

DWM issues permits to commerce and industry which regulate the discharge of trade and industrial effluents to the sewerage system. Where industries are discharging a significant volume or a high strength effluent, these are regularly monitored to ensure compliance with quality requirements set down in the Metropolitan Sewage Disposal Bylaws. This monitoring can also be used to determine the tariff of charge to be raised where the effluent is stronger than normal domestic sewage.
In instances where contravention of the Bylaws has occurred DWM may issue notices, recover costs or refer the incident for prosecution.

2. **Self Auditing of the Reticulation System**

DWM undertakes a large river and water courses monitoring programme in the Metro area to assess the state of surface water as a self audit on the integrity of the formal sewerage system and on other polluters. The analysis of these samples is undertaken to indicate the water quality from a chemical and biological aspect. If pollution is found, steps are immediately taken to identify the cause and prevent the repetition of such pollution by direct action or by issuing of a notice in terms of the Metropolitan Sewage Disposal Bylaws.

3. **Monitoring At the Treatment Works**

Wastewater entering the treatment works is analysed regularly at all stages of the treatment process. This enables the works operator to determine the strength of incoming wastewater and to adjust his treatment process accordingly, and also provides a background check to the effectiveness of the source monitoring.

Land based treatment is largely a natural process and has to be managed carefully to maintain efficiency. Tests are conducted throughout various physical and biological stages of the treatment process.

4. **Monitoring of Discharge and Disposal of Treated Sewage**

DWM discharges treated effluent into rivers and estuaries as part of the land based treatment process and partially treated effluent into the sea via its two deep sea marine outfall pipelines.

Rivers: Monitoring of river water upstream and downstream of the discharge point is required by the Department of Water Affairs and Forestry in terms of its permits issued in terms of the Water Act to assess the impact on the receiving water quality. Samples are taken on a monthly basis and analysed for pH, oxygen absorption levels, faecal coliforms and various critical chemical constituents.

Marine Environment: Surf water is sampled at various points along the beaches twice a month and tested for the presence of E. Coli and other microbial indicators of pollution. Measurement of salinity indicates the presence of any fresh water run off from the land.

Bacteriological, biological and chemical monitoring surveys of sea water, surf water, sediments and marine biological tissue samples are carried out (annually) in the vicinity of the marine outfalls by an independent organisation as an audit function in terms of the discharge permits.

Chemical testing is carried out by DWM on the partially treated effluent before it is discharged via the marine outfall pipe to ensure the quality remains within the
requirements of the discharge permit issued by the Department of Water Affairs and Forestry. The tests are conducted weekly.

The physical condition of the sea outfall pipes is monitored by regular underwater inspections.

As a result of the above monitoring carried out on a routine basis, it is easy to obtain an overall perception of the state of the river or the sea i.e. its closeness to the water quality of the natural system.

Enforcement and Sanction

The Environmental Conservation Act (No. 73 of 1989), the Water Act (No. 54 of 1956) and local Bylaws provide a foundation for ensuring water quality. If an incident occurs corrective action or charges can be brought under various sections of legislation.

Penalties for contravention range from fines to imprisonment. The maximum penalty for a first time contravention of the Sewage Disposal Bylaws is six months imprisonment in terms of the Local Authorities Ordinance (No. 25 of 1974). If the incident is serious enough charges can be brought by the Department of Water Affairs in terms of the Water Act or by the Attorney General under the Environmental Conservation Act which has a maximum penalty of ten years imprisonment.

A guilty party can also be fined, can be liable for the cost of any clean up operation and can have property confiscated.

General

The monitoring and control of water pollution in the Metropolitan area by the Department of Wastewater Management, is seen as imperative in maintaining a healthy environment for the community and for natural resources.
METRO

WASTEWATER MANAGEMENT

POLICY GUIDELINES

ON

WATER SUPPLY AND

SANITATION PROVISION

TO COMMUNITIES

Revised September 1998
Guideline / Policy
Document No. 2
DURBAN METROPOLITAN COUNCIL

WASTEWATER MANAGEMENT DEPARTMENT

POLICY GUIDELINES

WATER SUPPLY AND SANITATION PROVISION TO COMMUNITIES

1.0 General Comments

Any water supply and sanitation provision for residential communities must be:-

1.1 An affordable solution to consumer and service provider,

1.2 A sustainable solution
   - Limit to cross subsidy proportion
   - Capable of being maintained
   - Acceptable to community
   - Parity with other customers,

1.3 An environmentally satisfactory solution
   - Pollution Prevention
   - Healthy Residential Area
   - Compliance with Water Act (DWAF approvals),

1.4 Within Economic capability to be undertaken by Council,

1.5 A joint solution for “domestic water cycle”,

2.0 Options Available

In the Durban Metropolitan area there are a number of existing water supply systems. In due course there will be only three water supply systems available viz. 1) Basic - 200R tank on the ground, 2) Intermediate - semi pressure and 3) Conventional full pressure.

For each of these an appropriate sanitation system is recommended.

2.1 Basic Water Provision (up to 200Rd)

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<td>3. Chemical toilets (expensive)</td>
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<td>1. Septic Tanks provided adequate soakaway capacity available (see guidelines for soakaways). For example with 400Rd consumption, more than 200 m² undeveloped plot size is to be available and soil conditions and topography suitable.</td>
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<tr>
<td>2. Conservancy Tanks acceptable with minimum capacity of 7000 R or 7 days retention, whichever is greater or refer to SABS 0400-1990, PP10.4, Table 1 or consult professional engineer for flow assessment. Very expensive to owner to use due to high operating costs plus potential access problems.</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>2) Construction difficulties due to Durban topography restraints</td>
</tr>
<tr>
<td></td>
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<td>2. Package Plants (expensive to operate compared to i) above and major security concerns (pumping stations currently being vandalised). (Has to be justified by applicant in terms of Guidelines for Developers in respect of Provision of Sewer Connections to Sub-divisions (Guideline / Policy Document No. 1)).</td>
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<td>B) Interceptor tank with small bore reticulation system (final operational costs unlikely to be less than conventional sewerage systems due to necessity to empty interceptor tanks. - Acceptable in principle but has to be justified economically by applicant) Sewage Conveyed to</td>
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1) Conventional treatment works or package plant (see comments above)

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2.3 Water Conventional Provision - Full pressure

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ii) Off Site Systems

a) Conventional sewerage acceptable (see comments under 2 ii) A)

b) Interceptor Tanks with small bore (see comments under 2 ii) B)
3.0 **Costs** - It is absolutely essential that the final likely charges to individual households are made known to potential customers and agreement obtained that such charges are acceptable. As an example the following broad charges are based on 1998/99 costs assuming R 1.65/kL sewage user charge and are indicative only.

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<td>Monthly Sewerage Charges on a user charge basis (For servicing and treating and based on 70% of water consumption)</td>
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**CONCLUSION**

The above guidelines have been established so as to ensure sustainable, healthy living conditions.

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ENQUIRIES:

The guidelines given in this document are intended as a general guideline, for more specific advice please contact:-

3024077  Outer West/Inner West and North Local Council Areas and Durban North of the Umgeni River.

3024685  South Local Council and Queensburgh area and Durban South of the Umgeni River.
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1. BUILDING PLANS APPROVAL AND COMPLIANCE WITH THE PROVISIONS OF THE DURBAN METRO SEWAGE DISPOSAL BYLAWS

When submitting a building plan an application for permission to discharge trade effluent into the Council sewer must be applied for. A Trade Effluent application form can be seen in Annexure 9 or a copy can be obtained by telephoning the Pollution Division Enquiries on 3024685 or 3024077.

For information the relevant Section of the Durban Metro Sewage Disposal Bylaws reads as follows:-

“Section 2/3 : Provision of Services to Trade Premises

Any person who wishes to construct or cause to be constructed, a building which shall be used as a trade premises, shall at the time of lodging a building plan in terms of Section 4 of the National Building Regulations and Building Standards Act also lodge applications for connection to the sewage disposal system and for permission to discharge trade effluent in terms of section 4/1 of these bylaws.”

Additions to Existing Factory : Review of Existing Drainage and Bunding

Where additions to an existing factory premises are to be made, a written statement from the developers Professional Engineer or Responsible Person must be obtained, certifying that the bunding and drainage on the premises conforms to National Building regulations and to the relevant SABS regulations and this must be attached to the plan submission.

Factories that require additional drainage controls

If the factory is to be used for one of the following types of industrial activity or similar then prior consultation with Pollution Division staff on drainage and pre-treatment requirements for inclusion in the drainage plan prior to formal submission is necessary:-

Textile Dyeing
Metal finishing such as metal plating and anodising
Chemical processing and storage
Food production
Industries using large volumes of water
Oil processing and handling
Petrol Service Stations
Failure to comply with the provisions of the Durban Metro Sewage Disposal Bylaw requirements at the time of lodging a building plan could result in unnecessary expense to retrofit drainage requirements for both protection of the Council Sewage Disposal System and protection for preventing pollution of water courses.

2. **FLOOR DRAINAGE REQUIREMENTS FOR FACTORIES AND WAREHOUSES WHERE WATER-BORNE SEWERAGE IS PROVIDED**

As a precautionary measure, to prevent pollution of watercourses and public water and in terms of the Durban Metro Sewage Disposal Bylaws: Section 6/4: Installation of Pretreatment Facility, the Department requires that factory and warehouse floor areas are drained to the Council foul sewer via a suitably sized pre-treatment trap in order to contain and separate pollutants prior to discharge. Spillages can be contained in this pre-treatment trap (sand, oil and grease trap) in an emergency.

The installation of such drainage can be done in various ways.

One option is the following:-

The floor is levelled and a channel constructed across the entrance within the building in addition thereto, a dished washing area within the building is constructed with a minimum size of 1 x 1 m. Both the channel across the entrance and the dished wash area is connected to an approved sand, oil and grease trap that drains to the Council foul sewer. A water tap must be provided for the dished wash area.

**Drainage for Mini Factories**

The floor drainage requirements as set out above also apply to Mini factories with the proviso that the internal wash area must be situated away from the reception area.

It is not necessary for each mini factory to have its own sand, oil and grease trap. As a general rule:

One standard sand, oil and grease trap per 10 units - Annexure (5)
One medium sand, oil and grease trap per 25 units - Annexure (2)
One large sand, oil and grease trap per 75 units - Annexure (3)

**Washbays for Mini Factories**

All mini-factories with ten or more units must have a vehicle washbay conforming with the washbay requirements as set out in Section 5.

**Stormwater Drainage**

The recommended stormwater pre-treatment trap for mini factories where the risk of stormwater pollution is high, is set out in Annexure (7).

3. **MINIMUM REQUIREMENTS FOR FLOOR DRAINAGE FOR FACTORIES AND WAREHOUSES WHERE NO WATER-BORNE SEWERAGE IS PROVIDED**

No trade effluent is permitted to be discharged into a septic tank. The requirements as set out in (1) and (2) above apply with an additional provision of an effluent conservancy tank to accept the discharge of trade effluent from the factory/warehouse wash area.

*Please note* the developer must obtain written permission to discharge the trade effluent
from the conservancy tank via a road tanker to a Council facility.

4. **TRADE EFFLUENT SAMPLING POINTS**

The sample point must be situated in an area which will give a representative sample of the industrial final effluent discharged to the foul water sewer. If more than one sample point is required written permission must be obtained by telephoning 3024685 or 3024077. The sample point must be situated after the pre-treatment system and not contain domestic sewage and be easily accessible. The design of a sampling point is set out in annexure 8.

For ease of access to the sampling point, a petrol station manhole cover is recommended for placement over the sampling point. See annexure 1. The sampling point must be clearly marked as a Metro Trade Effluent and Sampling Point.

5. **WASHBAY DESIGN AND DRAINAGE**

A drawing of a washbay is shown in annexure 6.

The washing area must be roofed over.

The washbay floor must either be surrounded by a kerb not less than 100 mm high or elevated above the immediately surrounding ground level by not less than 200 mm. Should there be rain water ingress due to the height of the roof consideration should be given to enclosing the sides or alternative acceptable means to exclude stormwater.

The washbay minimum size must be sufficient as to enclose the largest vehicle to be used in the washbay.

The floor of the washbay must be paved with an impervious material and must connected to an approved sand, oil and grease trap that drains to the Council foul sewer.

6. **STORAGE AREAS DESIGN AND DRAINAGE**

**Refuse Bin Storage**

Refuse bin storage areas are to comply with Health Bylaws and National Building Regulations Part P Drainage Section P3 (2) and Part U Refuse Disposal.

**Waste Skips**

The waste skip storage area must be bunded. Where there are a number of skips and oily residues are also disposed of in this area then the bunded area must discharge through a stormwater pre-treatment trap as set out in Annexure 5 or the skip area must be roofed and the drainage contained.

**Lubricating Oil Storage**

The storage and decanting of oil must be performed in an enclosed roofed and bunded area with no external drainage. Within this area there should be a sealed pit for collection and disposal or re-use of spilt oil products.

**Waste Sludges Storage**

Waste sludges must be stored in a roofed and bunded area with no external drainage. Toxic sludges must be stored in a lockable area.
7. **BUNDING OF STORAGE TANKS**

Tank farms are to comply with SABS standards 089 Part 1.

The bund should be of such dimensions that it contains the volume of the largest tank it serves leaving a freeboard of at least 150 mm. In calculating the bund volume it is necessary to subtract the volume displaced by the base of the tanks. The calculation should be shown on the plan.

The bund should be provided with a lockable valve for the release of clean stormwater. This outlet should be flush with the internal ground level.

Provision must be made for the removal of the content of the bund either to sewer or via tanker. This could be done via another lockable valve to the industrial effluent sewer line or a sump area for collection by tanker.

The bund area should be constructed of a material resistant to/not affected by the chemicals stored in the bund. Alternatively it must be lined with a corrosive resistant material.

8. **SERVICE STATION DRAINAGE**

*Roofed Forecourt Area: New Service Stations*

The area under the forecourt roof is a process area and must be drained to the Council foul sewer via a sand, oil and grease trap (see Annexure 5). Draining of the forecourt area to the sand, oil and grease trap must be designed to meet safety requirements.

*Area outside Roofed Forecourt Area: New Service Stations*

These areas must be shown to be graded to run away from the roofed forecourt area and drained via a stormwater pre-treatment trap (Annexure 5) before discharging into the Council stormwater sewer.

*Underground Fuel Tanks*

**Leak Prevention and Impact Minimisation at Service Stations**

2. **New installations**

   New underground tanks must comply with:
   (a) SABS 1535 which requires that the tanks be protected against corrosion by a 3 mm coating of glass-reinforced polyester (GRP).
   (b) SABS 1830 which requires the use of non-corrosive plastic materials in pipework used for conveying petroleum products.
   (c) SABS 089 Part 3 requires:
       - The installation of observation wells situated around the tanks to facilitate early warning that a leak has arisen.
• The provision of a plastic sheet below the tank which slopes towards the observation well.

• All pipes (vent, filler and delivery) should slope back to the tank so that fuel does not remain in pipes. A non-return valve must be fitted close to suction pump under dispenser to ensure that the delivery line does not retain product when the pump not in use.

• Tanks are filled from delivery trucks by gravity and not under pressure.

• Shear-off valves are positioned below the dispensers so that no spillage occurs if the dispenser is knocked over.

• Provision of an overfill protection on each tank.

• Installation of containment boxes at filler points.

• Installation of leak detectors on the pressure systems.

• The plan must indicate compliance with the relevant SABS Specification.

Recommendations for upgrading of old installations

It should noted that old installations pose a potential threat to the environment and replacement costs could run into millions of rands. Specific risk prevention measures specific to each old tank site, therefore, need to be implemented and should inter alia include the following:-

• Conduct integrity testing of all old tanks on an annual basis and identify priority risk prevention measures.

• Instal cathodic protection systems on a programmed schedule.

• Implement an effective inventory accounting system that will ensure fuel losses are timeously identified, reported and resolved.

• Other risk prevention measures identified.

• Identify roles and responsibilities of Petroleum marketing company and Service Station operator in risk management of old tanks.

9. PRECAUTONARY STORMWATER DRAINAGE POLLUTION PREVENTION CONTROLS

The National Water Act (“NWA”) places a positive obligation on both owners of land and persons who control or occupy land on which any activity or process is, or was, performed or undertaken, which causes, or has caused, or may cause, pollution to a water resource, to take all reasonable measures to prevent the pollution from occurring, continuing or re-occurring.  

1 An update on Environmental Imperatives for Directors
Therefore:-

Industrial activities that can present a pollution risk must be identified by the applicant before submission of plans and ensure that drainage controls are designed and constructed that will assist in managing the pollution risk. Consultation with the Pollution Division prior to formal lodging of building plans is recommended.

**Standard stormwater pre-treatment trap**

Annexure (7) gives an example of a trap that is suitable for a minimum stormwater pre-treatment system.
DAYLIGHT OPENING
MAIN COVER 550 DIA.
INSPECTION COVER 200 DIA.
MASS 168 Kg

FRAME
INSPECTION COVER
MAIN COVER

PLAN

SECTION

NOTES
CAST IRON
HEAVY DUTY APPLICATION
CONVENIENT INSPECTION COVER

ANNEXURE 1
1. EXTERNAL WALLS 230 BRICK CEMENT PLASTERED.
2. INTERNAL WALLS 115 BRICK CEMENT PLASTERED.
3. ALL BENDS AND JUNCTIONS TO BE 100 DIA. CAST IRON OR SANS 947 PVC.
4. LONG TAIL BENDS TO BE USED TO THE LENGTH SHOWN.
5. TRAP MUST BE ACCESSIBLE TO CULLY Sucker VEHICLE.
6. WORK NOT TO BE COMMENCED WITHOUT THE APPROVAL OF A BUILDING INSPECTOR.
7. ALL COMPARTMENTS TO BE FILLED WITH WATER BEFORE TRAP IS PLACED IN SERVICE.
8. LIGHT DUTY 450 x 450mm MANHOLE COVER TO BE USED. 500mm PETCH STATION HEAVY DUTY
MANHOLE COVER WITH 250mm 3MD INSPECTION COVER TO BE USED IF SUBJECT TO HEAVY TRAFFIC.
9. HALF CHAMFER SAMPLING POINT WITH BENCHES SIDES AND CAST IRON COVER (550 x 250 MAX).
10. FLOOR & COVER SLAB GRADED TO INLET GRATING WHEN USED AS A COVERED CAR WASH AREA.
1. EXTERNAL WALLS 230 BRICK CEMENT PLASTERED.
2. INTERNAL WALLS 110 BRICK CEMENT PLASTERED.
3. ALL BENDS AND JUNCTIONS TO BE 180° DIA. CAST IRON OR SS907 PVC.
4. LONG TAIL BENDS TO BE USED TO THE LENGTHS SHOWN.
5. TRAP MUST BE ACCESSIBLE TO GULLY BUCKET VEHICLE.
6. WORK NOT TO BE COMMENCED WITHOUT THE APPROVAL OF A BUILDING INSPECTOR.
7. ALL COMPARTMENTS TO BE FILLED WITH WATER BEFORE TRAP IS PLACED IN POSITION.
8. LIGHT DUTY 450 x 600mm MANHOLE COVERS TO BE USED.
9. 650mm PETROL STATION HEAVY DUTY MANHOLE COVERS WITH 200mm SSA INSPECTION COVER TO BE USED IF SUBJECT TO HEAVY TRAFFIC.
10. COLUMN CHANNEL SAMPLING POINT WITH BRANCHED SIDES AND CAST IRON COVER (250 x 250 MM).
ANNEXURE 4

1. EXTERNAL WALLS 230 BRICK CEMENT PLASTERED.
2. INTERNAL WALLS 115 BRICK CEMENT PLASTERED.
3. ALL HOSES AND JUNCTIONS IN TANK TO BE TONGUE AND CAST IRON.
4. LONG TAIL BENDS TO BE USED AS SHOWN.
5. LOCKABLE LIGHT DUTY HATCHING REQUIRED FOR COVER.
6. SAMPLING MANHOLE TO BE EITHER 500 dia. PETROL STATION.
   HEAVY DUTY MANHOLE COVER WITH 800 dia. INSPECTION COVER.
   ALTERNATIVELY SAMPLING MANHOLE MAY BE MAX 550 x 550
   HEAVY DUTY MANHOLE COVER.

Project Title: MODIFIED OPEN HAND, OIL AND GAS MISC. TANK

<table>
<thead>
<tr>
<th>S No.</th>
<th>Issue</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01</td>
<td>24/11/06</td>
</tr>
</tbody>
</table>

Designed: B. PELCHA

Checked: Sanjay Scag

Manager/Engineer: A. K. Agarwal
Wastewater Management

Fizah Kettani WATER DEVICES

-11-
ANNEXURE 5

1. EXTERNAL WALLS 230 BRICK AND CEMENT PLASTERED.
2. INTERNAL WALLS 115 BRICK AND CEMENT PLASTERED.
3. ALL BENDS AND JUNCTIONS TO BE 100 MM CAST IRON OR SABS 967 PVC.
4. LONG TAIL BENDS TO BE USED TO THE LENGTHS SHOWN.
5. TRAP MUST BE ACCESSIBLE TO GULLY EJECTOR VEHICLE
6. WORK NOT TO BE COMMENCED WITHOUT THE APPROVAL OF A BUILDING INSPECTOR.
7. ALL COMPARTMENTS TO BE FILLED WITH WATER BEFORE TRAP IS PLACED IN SERVICE.
8. LIGHT DUTY 450 x 450mm MANHOLE COVERS TO BE USED. 500mm PETROL STAION HEAVY DUTY MANHOLE COVERS WITH 200mm EA INSPECTION COVER TO BE USED IF SUBJECT TO HEAVY TRAFFIC.
9. HALF CHANNEL SAMPLING POINT WITH BENCHES AND CAST IRON COVER (250 x 250 MAX)
10. FLOOR & COVER SLAB GRADED TO INLET GRATING WHEN USED AS A COVERED CAR WASH AREA.
1. EXTERNAL WALLS 230 BRICK CEMENT PLASTERED
2. INTERNAL WALLS 115 BRICK CEMENT PLASTERED.
3. INLET BEND 100 Dia. CAST IRON OR SABS 967 PVC.
4. OUTLET PIPE 110 Dia. CAST IRON OR SABS 967 PVC.
5. LONG TAIL MENS TO BE USED ON THE LENGTHS SHOWN.
6. TRAP MUST BE ACCESSIBLE TO CRAWLER VEHICLE.
7. STORMWATER CHANNEL TO GRADES TO INLET OVERFLOW WEIR.
8. LAUNDER ON SIDE OF TRAP TO CONNECT TO FINAL DISCHARGE POINT.
9. WORK NOT TO BE COMMENCED WITHOUT THE APPROVAL OF A BUILDING INSPECTOR.
1. DRAINAGE TO BE AN IN-LINE INSPECTION PIPE.
2. MANHOLE TO BE CONSTRUCTED 230mm BRICK WALLS AND PLASTERED WITH WATERPROOF CEMENT.
3. THE BASE TO HAVE WATERPROOF CEMENT BENCHING TO THE INSPECTION PIPE.
4. TRAP MUST BE FITTED WITH 600x400 DOUBLE SEAL MANHOLE COVER.
5. THE SAMPLING TRAP TO BE SITUATED WITHIN 10m OF THE PRETREATMENT FACILITY.
6. ONLY PROCESS EFFLUENT IS ALLOWED TO FLOW THROUGH THE TRAP.
APPLICATION
TRADE EFFLUENT SITE DISCHARGE

PERMISSION IN TERMS OF CHAPTER 4/1 OF THE DURBAN METROPOLITAN SEWAGE DISPOSAL BYLAWS TO DISCHARGE TRADE EFFLUENT INTO THE COUNCIL'S SEWER.

I (full name) ___________________________________________ the undersigned, duly authorised to act on behalf of ___________________________________________ and hereinafter referred to as the applicant, hereby apply in terms of Chapter 3/1(1) for permission to discharge trade effluent into the Council’s sewer on the basis of the facts stated herein, and I submit the following information as required by the Executive Director: Metro Water Services.

PART 1 - Business Details

Nature of the business or industry concerned ___________________________________________

___________________________________________________________________________

Name under which the business or industry is carried out ___________________________________________

___________________________________________________________________________

Name of land owner/landlord ___________________________________________

___________________________________________________________________________

If the business or industry is carried out by a company, the company registration number and the full names of the directors and secretary must be stated ___________________________________________

___________________________________________________________________________

Address of the business or industry (physical address) ___________________________________________

___________________________________________________________________________

P O Box & Code ___________________________________________

Telephone No. ___________________________
Electricity Account Numbers

Water Account Numbers

Date of initial effluent discharge to sewer (anticipated if not available)

Give a brief description of industrial or trade process by which the effluent will be produced. (attach a process diagram where necessary)

The applicant hereby declares and warrants that:-

The information submitted by him/her in Part 1 are in all respects factually correct.

The discharge of trade effluent will comply at all times with the requirements of the Sewage Disposal Bylaws.

1. I am in possession of a copy of the Sewage Disposal Bylaws and am familiar with the contents.
2. □ Please include a copy of the Sewage Disposal Bylaws. A nominal charge will be raised.

Signed in ______________________ by the applicant

This _______ day of ______________________

SIGNATURE AND CAPACITY OF APPLICANT

Pollution Officer/Inspector: ______________________

Telephone Number: ______________________
**Provisional Advice to Accounts Section**

<table>
<thead>
<tr>
<th>Pollution Officer/Inspector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
</tr>
<tr>
<td>Name of Company</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charge to be raised as percentage of Water Consumption</th>
<th>Charges to be raised as Metered Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charge to be raised on Trade Effluent Tankers</th>
<th>Charge to be raised on Conservancy Tankers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Charge to be raised by Special Calculation</th>
<th>Water consumption &lt;100kR/month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Average monthly water consumption for previous 12 months as obtained from Accounts Section</th>
<th>kR/month</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Effluent to Sewer</th>
<th>Effluent to Outfall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sewage Works Discharged to</th>
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</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Already on Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Point Number</th>
<th>Sample Point Description</th>
</tr>
</thead>
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</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**COMMENTS & ACTION**

Attach Inspection Report: ____________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Attach Draft Provisional Permit

Signature: ____________________________  Date: ____________________________
CPO

| Business details complete | Yes | No |
| Water consumption checked by CPO |     |    |
| Electricity account number completed |     |    |
| Water account number completed |     |    |
| Are all water meters noted |     |    |
| Site specific details checked |     |    |
| Process description completed |     |    |
| Inspection report checked and signed |     |    |
| Draft provisional permit checked |     |    |

<table>
<thead>
<tr>
<th>Provisional Regulatory Monitoring Charge Group</th>
<th>&lt;100kR/mth</th>
<th>100-1000kR/month</th>
<th>1000-10,000kR/month</th>
<th>&gt;10,000kR/month</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Inspection Area</th>
<th>Provisional Officer/Inspector</th>
</tr>
</thead>
</table>

Comments to Engineer:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Signature:_________________________ Date:_________________________

Comments to CPO/Technician
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

If percentage water consumption, provisional percentage to be applied

Provisional charge rate to be used

Date from which charge to be raised

Comments to Accounts: Attach Final Signed Provisional Permit
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Signature:_________________________ Date:_________________________

-20-
## Accounts Section Use Only:

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site No.</td>
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</tr>
<tr>
<td>Customer No.</td>
<td></td>
</tr>
<tr>
<td>Monitoring Code</td>
<td></td>
</tr>
<tr>
<td>Initial charge Rate</td>
<td></td>
</tr>
<tr>
<td>Sample Point No</td>
<td></td>
</tr>
<tr>
<td>Permit No.</td>
<td></td>
</tr>
<tr>
<td>Permit Start Date</td>
<td></td>
</tr>
<tr>
<td>Permit Expiry Date</td>
<td></td>
</tr>
<tr>
<td>Permit Inspection Week</td>
<td></td>
</tr>
<tr>
<td>Reg. Mon. Inspection Weeks</td>
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</tr>
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</table>

## Date and Signature

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include all information on TES</td>
<td></td>
<td>Clerk</td>
</tr>
<tr>
<td>Checked</td>
<td></td>
<td>Supervisor</td>
</tr>
<tr>
<td>Checked</td>
<td></td>
<td>Chief Administrator</td>
</tr>
<tr>
<td>Sent for Scanning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filed at Prior Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copy to Area Engineer</td>
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<td></td>
</tr>
</tbody>
</table>

Application for Site Trade Effluent Discharge.wpd

C:/Council_Web/WServ_Deve_Plan/Guidelines\16204_1.WPD
POLLUTION DIVISION
TRADE EFFLUENT SITE DISCHARGE

Enquiries: Pollution Officer/Inspector ____________________________

Tel : ____________________

PERMISSION IN TERMS OF CHAPTER 4/1 OF THE SEWAGE DISPOSAL BYLAWS TO DISCHARGE TRADE EFFLUENT INTO THE COUNCIL’S SEWER.

PART 2

A. COMPOSITION OF THE EFFLUENT TO BE DISCHARGED

<table>
<thead>
<tr>
<th>PLEASE CROSS RELEVANT BLOCKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyanide</td>
</tr>
<tr>
<td>Iron</td>
</tr>
<tr>
<td>Starch or Sugars</td>
</tr>
<tr>
<td>Synthetic Detergents</td>
</tr>
<tr>
<td>Alkalis</td>
</tr>
</tbody>
</table>

Estimated monthly discharge (kR/month) ________________________________

Maximum rate of discharge (R/sec) ________________________________

Maximum temperature of effluent (°C) ________________________________

pH range of effluent ________________________________

Any other relevant information relating to Quality/Quantity of effluent to be discharged.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________
B. PRETREATMENT OF EFFLUENT

<table>
<thead>
<tr>
<th>PLEASE CROSS RELEVANT BLOCKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade Effluent discharged through connection to foul sewer</td>
</tr>
<tr>
<td>Neutralising of pH</td>
</tr>
<tr>
<td>Precipitation/Flocculation</td>
</tr>
<tr>
<td>Mineral Oils Separation</td>
</tr>
</tbody>
</table>

Sampling point available: Yes ☐ No ☐

Further details

A. DISPOSAL OF LIQUID WASTES/SLUDGES NOT DISCHARGED TO COUNCIL SEWER

1. Details of processes that generate liquid wastes/sludges not discharged to sewer

2. Chemical content and volume of such wastes/sludges

<table>
<thead>
<tr>
<th>Type</th>
<th>Volume/annum</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

3. Final disposal of such wastes/sludges
D. SITE DRAINAGE

The standard of controls required depends on the type of process and potential impact on water courses.

<table>
<thead>
<tr>
<th>Type</th>
<th>Disposal To</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>YES/NO</th>
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</tbody>
</table>

1. Complete separation of Stormwater and Trade Effluent drainage exists
2. Dirty Process areas are bunded and separated from clean stormwater areas
3. Stormwater containment tank exists to catch accidental spills and contaminated stormwater runoff from dirty process areas.
4. Washwater from vehicle washing, parts washing etc. drains to foul sewer
5. Boiler and Cooling Tower blowdown drains to foul sewer
6. Chemical/Oil/Used Oil Storage tanks properly bunded.
7. Fuel bowsers/Road tanker loading/drum filling areas are roofed & bunded and drained to foul sewer via sand, oil and grease trap of approved design.
8. All potable water taps drain to foul sewer and not stormwater

Further Details

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
PART 3 - Water Balance

FACTS RELATING TO THE CONSUMPTION AND USAGE OF WATER

The following information is required in terms of Section 5(8) and 5(9) of the Sewage Disposal Bylaws for the purpose of estimating the quantity of trade effluent discharged into the Council’s sewer.

A. **Potable Water Meters** (installed & read by municipality)

<table>
<thead>
<tr>
<th>Water Account Number</th>
<th>Meter ID Number</th>
<th>Annual Average Consumption (kR/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<tr>
<td>10</td>
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</tbody>
</table>

Average municipal supply during the annual period from ________________ to ________________.

____________________kR/month

B. **Boreholes**

<table>
<thead>
<tr>
<th>Borehole Meter conversion Factor</th>
<th>Annual Average Consumption (kR/month)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
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<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Average supply during the annual period from ________________ to ________________

____________________kR/month
C. INTERNAL METERS (private potable water meter read by company)

<table>
<thead>
<tr>
<th>Meter I.D. Number</th>
<th>Internal Meter Conversion Factor</th>
<th>Annual Average Consumption (kR/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<tr>
<td>6</td>
<td></td>
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</tr>
</tbody>
</table>

Average supply during the annual period from ___________ to ___________

___________________ kR/month

D. WATER IN RAW MATERIALS

___________________ kR/month

Total Water In

___________________ kR/month

E. WATER USED BY STAFF FOR DOMESTIC PURPOSES

<table>
<thead>
<tr>
<th>Allowance (kR)</th>
<th>kR/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Workers</td>
<td>number</td>
</tr>
<tr>
<td>days per month</td>
<td>0.09/person/day</td>
</tr>
<tr>
<td>Shift Workers</td>
<td>shifts per month</td>
</tr>
<tr>
<td>0.14/person/shift</td>
<td></td>
</tr>
<tr>
<td>Meals served per month</td>
<td>number</td>
</tr>
<tr>
<td>0.005/meal</td>
<td></td>
</tr>
<tr>
<td>Watered Garden Area</td>
<td>(m²)</td>
</tr>
<tr>
<td>0.05/m²</td>
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</tr>
</tbody>
</table>

Total Domestic Losses ____________________ kR/month
F. MANUFACTURING PROCESS LOSSES

Data submitted as representative of the annual period from _____________ to ___________

F1. WATER CONTENT OF PRODUCTS MANUFACTURED

<table>
<thead>
<tr>
<th>Product</th>
<th>Volume Produced</th>
<th>% Water Content</th>
<th>Water Allowance</th>
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<tbody>
<tr>
<td></td>
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</table>

Allowance ______________________ kR/month

F2. BOILERS

<table>
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<tr>
<th></th>
<th>BOILER 1</th>
<th>BOILER 1</th>
<th>BOILER 3</th>
<th>BOILER 4</th>
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<tbody>
<tr>
<td>Make of Boiler</td>
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<tr>
<td>Model of Boiler</td>
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</tr>
<tr>
<td>Steam raised (kg/hour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours steamed per month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh water make-up (kR/month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water used for coal wetting and ash quenching: (kR/month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Usage (kg or R/month)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allowance ______________________ kR/month

F3. COOLING TOWERS

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Type of Tower</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Serial No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Model No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make-up Water fed to tower kR/month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature drop.(° C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated loss by evaporation kR/month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water re-circulated in kR/month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please Note: Regarding Cooling Towers

It is imperative that the calculation of the re-circulation rate is done accurately since evaporation from cooling towers is a significant loss of water in the water balance. If you are uncertain what the correct re-circulation rate is, then please approach the supplier of the cooling tower for the relevant details for this particular model of tower. (Attach details). If no correct data can be obtained, then no allowance will be given.

Allowance ___________________ kR/month

F. OTHER PROCESSES LOSSES

<table>
<thead>
<tr>
<th>PROCESS DESCRIPTION</th>
<th>CALCULATION</th>
<th>LOSS CLAIMED kR/Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allowance ___________________ kR/month

G. EFFLUENTS NOT DISCHARGED TO SEWER

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>CALCULATION</th>
<th>LOSS CLAIMED kR/Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please note that allowances for liquid waste removal will only be given for quantities where safe disposal certificates, as supplied by waste disposal contractors acceptable to Council, are supplied. Copies of such certificates must be attached to this application.

Allowance ___________________ kR/month

The applicant hereby declares and warrants that the information and calculations submitted by the applicant are in all respects factually correct.

Signed in ___________________________________________ by the applicant this _____________day of ________________________________

SIGNATURE & CAPACITY OF APPLICANT

COMPANY : ____________________________
ADDRESS : ___________________________
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Total Water In</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Total Domestic Losses</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Total Manufacturing Process Losses</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Losses not discharged to Sewer</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Trade Effluent</td>
<td>A - B - C - D</td>
</tr>
<tr>
<td>F</td>
<td>Trade Effluent %</td>
<td>E ÷ A</td>
</tr>
</tbody>
</table>
Final Advice to Accounts Section

Pollution Officer/Inspector

Attach Copy of Completed Part 1 & Provisional Advice to Accounts Section

<table>
<thead>
<tr>
<th>Date:</th>
<th>Name of Company</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sample Point Number</th>
<th>Sample Point Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sampler showed sampling points</th>
<th>Yes/No</th>
<th>Name of Sampler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of 6 samples taken</td>
<td>Yes/No</td>
<td>Dates</td>
</tr>
<tr>
<td>Obtain charge rate and other information for 1 year from Accounts and attach</td>
<td></td>
<td>Comments</td>
</tr>
</tbody>
</table>

Attach Draft Final Permit

Comments:

________________________________________________________________________________________

Signature: ___________________________    Date: ___________________________
CPO

Draft permit checked
Composition of effluent checked
Pretreatment of effluent checked
Stormwater prevention checked
Safe disposal certificates checked
Sample analysis checked

<table>
<thead>
<tr>
<th>Final Regulatory Monitoring Charge Group</th>
<th>&lt;100kRmth</th>
<th>100-1000kR/month</th>
<th>1000-10 000kR/month</th>
<th>&gt;10000kR/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection Area</td>
<td>Officer/Inspector</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technician

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition of effluent checked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretreatment of effluent checked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample analysis checked</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments on Water Balance

If metered trade effluent, type and calibration required

Comments to Engineer:

Signature: ___________________________  Date: ___________________________
Engineer

Comments to Technician/CPO


Comments to Accounts:  **Attach Final Signed Permit**


Signature:____________________  Date:____________________
### Accounts Section Use Only:

<table>
<thead>
<tr>
<th>Site No.</th>
<th>Permit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer No.</td>
<td>Permit Start Date</td>
</tr>
<tr>
<td>Monitoring Code</td>
<td>Permit Expiry Date</td>
</tr>
<tr>
<td>Initial charge Rate</td>
<td>Permit Inspection Week</td>
</tr>
<tr>
<td>Sample Point No</td>
<td>Reg. Mon. Inspection Weeks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerk</td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td></td>
</tr>
<tr>
<td>Chief Administrator</td>
<td></td>
</tr>
<tr>
<td>Sent for Scanning</td>
<td></td>
</tr>
<tr>
<td>Filed at Prior Road</td>
<td></td>
</tr>
<tr>
<td>Copy to Area Engineer</td>
<td></td>
</tr>
</tbody>
</table>

Final Part 2 3 4 + Advice to Accounts

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