TECHNICAL INFORMATION
for Retaining Walls

DESIGN SCOPE / PHILOSOPHY
The reinforced concrete precast retaining wall unit has been designed in accordance with the latest set of Eurocodes in particular BS EN 1997-1:2004 - Eurocode 7 - Geotechnical Design with the UK National Annex and BS EN 1992-1-2:2004 - Eurocode 2 - Design of concrete structures with the UK National Annex have been used.

STORAGE CAPACITY
The unit will be designed to be loaded from either side with the following conditions; retained material level with the top of the wall and with an applied surcharge of 10kN/m² or a sloping backfill with a maximum angle of 35° without an imposed surcharge. The retained material will be assumed to be granular and drained with a specific maximum moist density of 18kN/m³, for more information on specific material densities see table 1. When installed with a suitable joint sealant the wall becomes waterproof.

OVERALL STABILITY
The primary job of the unit is to retain the material behind and to do this the stem and the base have been designed to withstand the applied forces. However, to resist overturning and sliding with a factor of safety of 2 for overturning and 1.5 for sliding respectively the units require anchoring into a mass or reinforced in situ concrete base which will be designed by others to give enough resistance to the overturning and sliding forces.

- The grouted anchor bolts will be post fixed into the suitable base below and secured with a washer plate on top of the unit to increase the bearing capacity onto the base slab and prevent punching shear of the bolt head through the unit. The resistance of the anchors into the base must be checked by others.
- In addition to the overturning and sliding resistance of the supporting in situ base, the overall ground bearing pressure must be checked by others and considered when designing the in situ support base.

STEEL GRADES
All steel to be grade S275 UNO

- All Anchor Bolts to be grade 8.8 UNO
- See detailed bolt calculations

CONCRETE SPECIFICATION
The concrete shall be produced in accordance with BS8500-2.

- Compressive strength class C40/50
- Maximum aggregate size 20 mm
- Aggregates Freeze thaw resisting
- Chloride content class Cl 0,40
- Consistence class S3

REINFORCEMENT NOTES
All reinforcement to be high yield with a yield strength of 500N/mm².

- All reinforcement to be Type 2 deformed bars including any specified mesh.
- Minimum lap length to be 40 x smallest lapped bar diameter.

Table 1- Storage material densities

<table>
<thead>
<tr>
<th>Material</th>
<th>Density (kN/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium dense sand</td>
<td>18</td>
</tr>
<tr>
<td>Loose sand / gravel</td>
<td>16</td>
</tr>
<tr>
<td>Grain</td>
<td>8</td>
</tr>
<tr>
<td>Woodchip</td>
<td>8</td>
</tr>
<tr>
<td>Sewage waste</td>
<td>11</td>
</tr>
<tr>
<td>Rolled Silage</td>
<td>4+72z (see note 1)</td>
</tr>
<tr>
<td>Paper waste</td>
<td>6</td>
</tr>
<tr>
<td>Composted green waste</td>
<td>5</td>
</tr>
<tr>
<td>PFA</td>
<td>10</td>
</tr>
</tbody>
</table>

Note 1 – z = depth below rolled surface of grass silage or the compacted surface of bedding (in m).

Note 2 – For other material bulk densities please refer to Table 7 within BS 5502-22: 2003

LOADING OPTION 1
- BACKFILL POSITIONED OVER BASE OF UNIT
- LEVEL BACKFILL
- 10KN/M² SURCHARGE
- DRAINAGE ASSUMED TO REAR OF WALL STEM

LOADING OPTION 2
- BACKFILL POSITIONED OVER BASE OF UNIT
- SLOPING BACKFILL - 35°
- NO SURCHARGE
- DRAINAGE ASSUMED TO REAR OF WALL STEM

EXPOSURE CONDITIONS
Due to a nominal cover of 45mm (including Δc of 5mm) and the strength of concrete used in the manufacture of the retaining wall units, they are suitable for a range of exposure conditions as defined in BS8500.

The limiting crack width will be taken as 0.3mm and the design lifespan will be at least 50 years.

LOADING DETAILS

- Project: Precast Retaining Wall Units
- Consulting Civil & Structural Engineers: Rogers Clarke Lander Ltd.
- Date: 30/08/2012
- Sheet No: 12073 Hanson Precast Units - 3000mm High Straight Section - R0.docx
- Client: Hanson Building Products
- By: [Signatures]

CONCRETE SPECIFICATION

- Compressive strength class C40/50
- Maximum aggregate size 20 mm
- Aggregates Freeze thaw resisting
- Chloride content class Cl 0,40
- Consistence class S3

STORAGE CAPACITY

- Compressed in accordance with BS8500-2
- Retained material level with the top of the wall
- Applied surcharge of 10kN/m² or a sloping backfill with a maximum angle of 35°
- Minimum lap length to be 40 x smallest lapped bar diameter

OVERALL STABILITY

- The primary job of the unit is to retain the material behind and to do this the stem and the base have been designed to withstand the applied forces.
- Factor of safety of 2 for overturning and 1.5 for sliding respectively.
- Anchors into the base must be checked by others and considered when designing the in situ support base.

STEEL GRADES

- All steel to be grade S275 UNO
- All Anchor Bolts to be grade 8.8 UNO

REINFORCEMENT NOTES

- High yield with a yield strength of 500N/mm²
- Minimum lap length to be 40 x smallest lapped bar diameter

LOADING OPTIONS

- Option 1: Backfill positioned over base of unit
- Option 2: Sloping backfill - 35°

EXPOSURE CONDITIONS

- Nominal cover of 45mm (including Δc of 5mm)
- Strength of concrete used in the manufacture of the units
- Limiting crack width: 0.3mm
- Design lifespan: at least 50 years