Bill of quantities: Retaining wall "A+B"; L=340 m (110+230); H=3.6 m

<table>
<thead>
<tr>
<th>Activity</th>
<th>Labour</th>
<th>Equipment*</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topsoil excavation</td>
<td>1360.0</td>
<td>Dozer 1, 22.67</td>
<td>22.67 2</td>
</tr>
<tr>
<td>Sheetwall piling</td>
<td>1456.0</td>
<td>Excavator 1, 15.11</td>
<td>15.11 1</td>
</tr>
<tr>
<td>Excavation at the sheetwall</td>
<td>6914.0</td>
<td>Excavator 1, 81.34</td>
<td>81.34 8</td>
</tr>
<tr>
<td>Excavating foundation trench</td>
<td>119.0</td>
<td>Excavator 1, 31.97</td>
<td>31.97 3</td>
</tr>
<tr>
<td>Grading</td>
<td>118.3</td>
<td>Labourer 4, 31.80</td>
<td>31.80 13</td>
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<tr>
<td>Blinding</td>
<td>119.0</td>
<td>Labourer 6, 527.17</td>
<td>527.17 2</td>
</tr>
<tr>
<td>Reinforcing foundation slab</td>
<td>37.4</td>
<td>Steel fitter 4, 531.08</td>
<td>531.08 4</td>
</tr>
<tr>
<td>Shuttering foundation slab</td>
<td>312.8</td>
<td>Labourer 1, 118.86</td>
<td>118.86 2</td>
</tr>
<tr>
<td>Concreting foundation slab</td>
<td>482.8</td>
<td>Labourer 6, 608.33</td>
<td>608.33 2</td>
</tr>
<tr>
<td>Dismantle shuttering of foundation slab</td>
<td>312.8</td>
<td>Carpenter 1, 31.28</td>
<td>31.28 4</td>
</tr>
<tr>
<td>Refill along the foundation slab</td>
<td>272.0</td>
<td>Labourer 4, 231.20</td>
<td>231.20 2</td>
</tr>
<tr>
<td>Shuttering wall, internal</td>
<td>1108.4</td>
<td>Carpenter 1, 421.19</td>
<td>421.19 2</td>
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<tr>
<td>Reinforcing wall + placing spout holes</td>
<td>40.8</td>
<td>Steel fitter 4, 579.36</td>
<td>579.36 4</td>
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<tr>
<td>Shuttering wall, external + scaffold</td>
<td>1108.4</td>
<td>Labourer 1, 310.08</td>
<td>310.08 2</td>
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<tr>
<td>Concreting wall</td>
<td>510.0</td>
<td>Labourer 6, 642.60</td>
<td>642.60 2</td>
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<tr>
<td>Dismantle wall shuttering + scaffold</td>
<td>2216.8</td>
<td>Carpenter 10, 1152.74</td>
<td>1152.74 10</td>
</tr>
<tr>
<td>Cascading old embankment</td>
<td>187.0</td>
<td>Labourer 10, 319.77</td>
<td>319.77 10</td>
</tr>
<tr>
<td>Embankment building</td>
<td>11274.0</td>
<td>Dozer 1, 102.49</td>
<td>102.49 10</td>
</tr>
<tr>
<td>Porous backfill behind the wall</td>
<td>6734.0</td>
<td>Labourer 4, 122.44</td>
<td>122.44 4</td>
</tr>
<tr>
<td>Pulling out sheetwall planks</td>
<td>1456.0</td>
<td>Blacksmith 2, 145.60</td>
<td>145.60 2</td>
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<tr>
<td>Gutter (drain) construction</td>
<td>340.0</td>
<td>Labourer 4, 479.40</td>
<td>479.40 4</td>
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<tr>
<td>Slope (hollow) excavation</td>
<td>4981.8</td>
<td>Excavator 1, 58.61</td>
<td>58.61 10</td>
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<tr>
<td>Rendering the slope</td>
<td>612.0</td>
<td>Labourer 1, 624.24</td>
<td>624.24 10</td>
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<tr>
<td>Levelling the ground</td>
<td>2304.0</td>
<td>Labourer 2, 7.68</td>
<td>7.68 1</td>
</tr>
<tr>
<td>Grassing</td>
<td>2141.0</td>
<td>Labourer 8, 856.40</td>
<td>856.40 8</td>
</tr>
</tbody>
</table>

* Trucks/Lorries and/or power tools (e.g. poker vibrator, saw, bender, etc.) not indicated
* For further technical parameters and/or estimates see Technical Report

Remarks:
- Earth/gravel pit is on 7 km distance
- Excavated topsoil should be loaded on trucks and sold
- Excavated earth can be used for embankment building
- For porous backfill, gravel should be added in proportion 1:3
- Any earth fill should be compacted 3 times in not more than 25 cm thick layers
- Poor viscosity concrete for blinding transported by dumper-truck
- Reinforcement bars cut and bended at manufacturing steel-yard 11 km away
- Concrete mixed at a central batching plant some 4 km away
**Earth balance calculations: Retaining wall "A+B"; L=340 m (110+230); H=3.6 m**

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Topsoil excavation</td>
<td>m³</td>
<td>440.0</td>
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<tr>
<td>3</td>
<td>Excavation at the sheetwall</td>
<td>m³</td>
<td>0.0</td>
</tr>
<tr>
<td>4</td>
<td>Excavating foundation trench</td>
<td>m³</td>
<td>362.0</td>
</tr>
<tr>
<td>11</td>
<td>Refill along the foundation slab</td>
<td>m³</td>
<td>-88.0</td>
</tr>
<tr>
<td>17</td>
<td>Cascading old embankment</td>
<td>m³</td>
<td>187.0</td>
</tr>
<tr>
<td>18</td>
<td>Embankment building</td>
<td>m³</td>
<td>-11274.0</td>
</tr>
<tr>
<td>19</td>
<td>Porous backfill behind the wall</td>
<td>m³</td>
<td>-4221.0</td>
</tr>
<tr>
<td>22</td>
<td>Slope (hollow) excavation</td>
<td>m³</td>
<td>0.0</td>
</tr>
</tbody>
</table>

**Σ** = -10813.0

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Topsoil excavation</td>
<td>m³</td>
<td>920.0</td>
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<tr>
<td>3</td>
<td>Excavation at the sheetwall</td>
<td>m³</td>
<td>6914.0</td>
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<tr>
<td>4</td>
<td>Excavating foundation trench</td>
<td>m³</td>
<td>757.0</td>
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<tr>
<td>11</td>
<td>Refill along the foundation slab</td>
<td>m³</td>
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<tr>
<td>17</td>
<td>Cascading old embankment</td>
<td>m³</td>
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</tr>
<tr>
<td>18</td>
<td>Embankment building</td>
<td>m³</td>
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<tr>
<td>19</td>
<td>Porous backfill behind the wall</td>
<td>m³</td>
<td>-2513.0</td>
</tr>
<tr>
<td>22</td>
<td>Slope (hollow) excavation</td>
<td>m³</td>
<td>4981.8</td>
</tr>
</tbody>
</table>

**Σ** = 12468.8

**Remarks:**

Excavated topsoil (of 440+920=1360 m³) should be loaded on trucks and sold

Assuming density (compaction) of earth fills should equal to that of original (excavated/natural) earth on site:
- Gravel (of 2247 m³) as 1/3 part of porous backfill (of 4221+2513=6734 m³) is to be brought from the pit 7 km away
- For completing porous backfill (6734-2247)-(12468.8-10813)=2833.8 m³ is to be brought from the pit 7 km away

For transportation estimated bulking coefficient of earth/gravel is 1.28