

APPENDIX 6A:

**Construction and Demolition
Materials Management Plan**

Agreement No. CE62/2000
EIA Study for the Upgrading and Expansion of
San Wai STW and the Expansion of Ha Tsuen PS

Construction and Demolition Material Management Plan (C&DMMP)

Summary of Revisions

| Revision No. | Description | Author * | Approval * |
|---------------------|----------------------------------|-------------------|-------------------|
| First Draft | Prepared on behalf of DSD by MWH | HL (18/9/2002) | |
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* Please include date of amendment/approval.

A6. CONSTRUCTION & DEMOLITION MATERIAL MANAGEMENT PLAN

A6.1 Purpose

A6.1.1.1 The purposes of this Construction & Demolition Material Management Plan (C&DMMP) are:-

- to ensure that all construction site personnel will avoid and/or minimise the on site generation of Construction and Demolition (C&D) material;
- to estimate the quantities of C&D material generated and their time of generation; and
- to propose proper methods of reuse, recycling, handling, storage, transportation and disposal of C&D material generated from the Project.

A6.2 Background

A6.2.1.1 The *Yuen Long and Kam Tin Sewerage Master Plan* (YLKTSMP) was completed in early 1992. Subsequently, the *Review of Yuen Long and Kam Tin Sewerage and Sewage Treatment Requirements* (YLKTSMP Review) completed in early 1999 indicated that the original YLKTSMP needed to be revised to cater for the redistribution and increase of the future population in accordance with the latest *Territorial Development Strategy Review*. The YLKTSMP Review recommended the *Yuen Long and Kam Tin Sewerage and Sewage Disposal* (YLKTSSD) scheme (Stage 1 and Stage 2) and the upgrading of the sewage treatment facilities at San Wai Sewage Treatment Works (STW) from preliminary treatment to chemically enhanced primary treatment (CEPT) with disinfection.

A6.3 Scope of Project

A6.3.1.1 This Project is to expand the sewage facilities at San Wai STW and Ha Tsuen Pumping Station to cater for the projected increase of population arising from Hung Shui Kiu New Development Area (HSKNDA) and other planned developments at Yuen Long and Kam Tin areas and upgrade the sewage treatment facilities at San Wai STW from preliminary treatment to chemically enhanced primary treatment (CEPT) with disinfection for the attainment of water quality objectives on the aquatic environment in North West New Territories (NWNT).

A6.3.1.2 The proposed key items of works of this Project are shown in **Figure A6.1**.

A6.3.1.3 The upgrading and expansion of San Wai STW includes the following key items of works:

- Expand the preliminary treatment works at San Wai STW from 164,000 m³/d to 246,000 m³/d;
- Upgrade the preliminary treatment level at San Wai STW to CEPT;
- Add centralised disinfection at San Wai STW for the effluent after CEPT from San Wai STW and effluent after secondary treatment from Yuen Long STW;
- Construct and operate an emergency bypass culvert, from San Wai STW to nearby drainage channel, in order to provide an alternative discharge route for San Wai STW in an emergency event when the NWNT effluent tunnel is out of operation; and
- Rearrange the existing preliminary treatment facilities of San Wai STW to conform to the upgraded treatment works layout.

A6.3.1.4 The layout plan of the existing and the upgraded and expanded San Wai STW are shown in **Figure A6.2**.

- A6.3.1.5 The expansion of Ha Tsuen Pumping Station involves mainly expanding pumping capacity from 164,000 m³/d to 246,000 m³/d. The layout plan of the existing and the expanded Ha Tsuen Pumping Station are shown in **Figure A6.3**.

A6.4 Implementation Programme

- A6.4.1.1 The current schedule for the Project is to commence the construction in mid 2004 for commissioning in late 2007.

A6.5 Development Constraints

- A6.5.1.1 The key items of this Project are identified as Designated Projects under Part I F.1 and Part I F.3(b) of Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). An EIA study has been carried out in order to identify and assess the potential environmental impacts arising from this Project and to propose suitable mitigation measures to minimise the impacts associated.
- A6.5.1.2 In the Waste Management Implications section of the EIA report (Section 6), the issue of C&D materials, together with other types of wastes potentially being generated during the construction phase of this Project, has been examined accordingly.
- A6.5.1.3 If appropriate mitigation measures are implemented during the handling, collection, and disposal of construction waste material, the residual environmental impacts would be reduced to acceptable levels. These mitigation measures can be enforced by incorporating them into a waste management plan as part of the contract document. Environmental monitoring and audit will be necessary to ensure the implementation of correct disposal requirements for the various wastes generated from construction works.
- A6.5.1.4 Other than environmental implications, land resumption issues would likely be one of the development constraints prior to the construction phase of the Project. This issue, however, will be handled by the Project Proponent together with other related Government departments.

A6.6 Development Options

- A6.6.1.1 The construction activities including the site formation and foundation works at the proposed expanded and upgraded San Wai STW and the expanded Ha Tsuen Pumping Station will generate C&D material. At present, a portion of the expanded site of San Wai STW is fishponds, while the remainder is being used as container storage yards.
- A6.6.1.2 From the site investigation data, the expanded site of San Wai STW is covered by a layer of soft clayey materials. In order to provide a firm foundation for the ducts, cables and large diameter pipes within the STW, it is necessary to replace these soft clayey materials with suitable filling materials. The soft materials will be used in the landscaping works of the sewage treatment works, where possible.
- A6.6.1.3 The surplus excavated material from the the construction of the Ha Tsuen Pumping Station expansion will be reused for the earthfilling works at San Wai STW as far as possible. However, the possibility of reusing the surplus materials will depend on the construction programme of San Wai STW.

A6.7 Management of C&D Material

- A6.7.1.1 The construction activities including the site formation and foundation works at the proposed expanded and upgraded San Wai STW and the expanded Ha Tsuen Pumping Station will generate C&D material. The construction of the proposed emergency bypass culvert will be

carried out by traditional open trench method and will also results in a certain amount of C&D material. An initial estimate of the total volume of excavated material likely to be generated from the construction works is given in **Table A6.1**.

Table A6.1 Types and Quantities of Construction Waste

| Works Item | Expected Main Excavation Period | Excavated Spoil (m ³) | Excavated Spoil to be Reused Onsite (m ³) | Surplus Excavated Spoil (m ³) | Import Fill Material (m ³) |
|--------------------------|---------------------------------|-----------------------------------|---|---|--|
| San Wai STW | Jun 04 – Jan 05 | 22,500 | 0 | 22,500 | 120,600 |
| Ha Tsuen Pumping Station | Jun 04 – Jan 05 | 16,520 | 920 | 15,600 | 560 |
| Emergency Bypass Culvert | Jun 04 – Apr 07 | 18,000 | 4,500 | 13,500 | 2,250 |
| TOTAL | | 57,020 | 5,420 | 51,600 | 123,410 |

Surplus C&D Material

- A6.7.1.2 From the breakdown given in **Table A6.1** above, 22,500m³ out of the 51,600 m³ of surplus excavated spoil will come from the San Wai STW upgrading and expansion site. At present, a portion of the said site is fishponds, while the remainder is being used as container storage yards. From the site investigation data, the site is covered by a layer of soft clayey materials. In order to provide a firm foundation for the ducts, cables and large diameter pipes within the sewage treatment works, it is necessary to replace these soft clayey materials with suitable filling materials. The soft materials will be used in the landscaping works of the sewage treatment works, where possible.
- A6.7.1.3 Regarding the surplus materials from the Ha Tsuen Pumping Station (15,600m³), they will be reused for the earthfilling works at San Wai STW as far as practicable. However, the possibility of reusing the surplus materials will depend on the construction programme of San Wai STW. As the project proponent have to resume the land for the expansion and upgrading of San Wai STW, the construction programme may be delayed due to public objection and other unforeseen reasons.
- A6.7.1.4 In constructing the emergency bypass culvert, the excavated material will be reused for backfilling the culvert. However, there will be some surplus materials that required disposal off site. Depending on the construction programme of San Wai STW, the project proponent will try her best to make use of these C&D materials for forming the San Wai STW site.
- A6.7.1.5 In summary, the reuse of the surplus materials from Ha Tsuen Pumping Station and the emergency bypass culvert for the earthfilling works at San Wai STW is highly dependent on the construction programme of San Wai STW, which may be affected by the land resumption procedures, public objections or other unforeseen factors.

Reuse / Recycle of C&D Material

- A6.7.1.6 The project proponent will try every endeavours in minimising the generation and maximise the recycle/reuse of the C&D materials. The measures that will be taken are as follows:
- Use the excavated materials for earthfilling as far as possible;
 - Use the excavated soft materials for landscaping works;
 - Reuse the C&D materials for as pipe bedding; and

- Use precast units to minimise the amount of C&D materials generated on site.

A6.7.1.7 If the above cannot be accomplished due to various reasons beyond the project proponent's control, the surplus C&D materials will be disposed of to landfill as the last resort. No potential hazard is associated with handling and disposal of excavated spoil. The excavated spoil will be tipped to spoil banks within the construction site temporarily before removal to disposal sites.

C&D Waste Disposal Off Site

A6.7.1.8 On completion of the construction works, site buildings and facilities will be demolished and removed from site. Demobilisation of infrastructure and site clearance will generate C&D material and scrap material residues which will require disposal. Certain elements may need to be disposed to landfill or public filling facilities. However, recyclable materials should be salvaged for reuse (such as wood and metal) and inert waste utilised as public fill.

A6.7.1.9 The total new development construction area estimated for this project is about 45,000m², assuming 0.05m³ of C&D waste is generated from 1m² of area to be developed, a total of 2,250m³ of C&D waste is estimated to be generated and would require disposal at landfill sites.

A6.7.1.10 The Contractor should be responsible for ensuring that the C&D waste is collected by approved licensed waste collectors and that appropriate measures are taken to minimise adverse impacts, such as dust generation. The Contractor must also ensure that all necessary waste disposal permits are obtained. To control the proper disposal of C&D material, the implementation of the trip-ticket system stipulated in WBTCs No. 5/99A should be required.

Import Fill Material

A6.7.1.11 A breakdown of the import fill material given in **Table A6.1** is shown in **Table A6.2** below.

Table A6.2 Breakdown of Import Fill Material

| Works Item | Type of Import Fill | Quantity (m ³) | Remarks |
|--------------------------|------------------------|----------------------------|---|
| San Wai STW | Public fill | 120,500 | Public fill for forming the upgrading and expansion site |
| | Granular fill material | 100 | Compacted granular fill material for providing a foundation for the pipes within the sewage treatment works |
| Ha Tsuen Pumping Station | Grade 200 rock fill | 560 | Compacted rock fill for providing a stiff formation for the raft foundation |
| Emergency Bypass Culvert | Grade 200 rock fill | 2,250 | Compacted rock fill for providing a stiff formation for the raft foundation |

Good Site Practices

- A6.7.1.12 Recommendation for good site practices during the construction phase include:
- Nomination of approved personnel, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site;
 - Training of site personnel in proper waste management and handling procedures;

- Proper storage and site practices to minimise the potential of damage or contamination of construction materials;
- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste;
- Appropriate measures should be employed to minimise windblown litter and dust during transportation of C&D material by either covering trucks or by transporting C&D material in enclosed containers;
- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Prior to disposal of C&D waste, it is recommended that wood, steel and other metals be separated for re-use and/or recycling and inert waste utilised as fill material to minimise the quantity of waste to be disposed of to landfill;
- In order to monitor the disposal of C&D material at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system as described in WBTC No. 5/99 and 5/99A should be included as one of the contractual requirements and implemented by the contractor; and
- A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed. Quantities could be determined by weighing each load or other suitable methods.

A6.8 Conclusions

- A6.8.1.1 If appropriate management measures mentioned in Section A6.7 are implemented properly during the handling, collection, and disposal of C&D material, the residual environmental impacts would be reduced to acceptable levels.
- A6.8.1.2 The management measures to be adopted for C&D materials can be enforced by incorporating them into a waste management plan as part of the contract document. Environmental monitoring and audit will be necessary to ensure the proper implementation of proposed measures during the construction phase of the Project.

A6.9 Recommendations

- A6.9.1.1 As per the requirement stipulated in the *Environment, Transport and Works Bureau Technical Circular (Works) No. 33/2002 – Management of Construction and Demolition Material Including Rock*, the project office of this Project should monitor the implementation of this C&DMMP and prepare a half-yearly status report and submitted to Public Fill Committee (PFC). The requirements of the status report are detailed in the Technical Circular.
- A6.9.1.2 It is recommended that this C&DMMP should be reviewed regularly by both the project office and the contractor(s) of the Project, and any necessary amendment and updates should be recorded properly.