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B 00613

Your Ref :
Our Ref : (CV/2013/03)/M45/~~210~~/B00613

M45/600/B00613

By Hand

27 November 2013

Mr. Charles Pang
Environmental Impact Assessment Ordinance Register Office
Environmental Protection Department
27/F, Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

Dear Sirs,

Contract No. CV/2013/03
Liantang / Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works - Contract 5

Waste Management Plan (EP No. EP-404/2011/A)

With reference to Condition 3.2 of Environmental Permit (EP) No. EP- 404/2011/A for the captioned Project, and on behalf of the Permit Holder, Civil Engineering and Development Department (CEDD), I would like to submit three hard copies of revised Waste Management Plan for the Project titled "Liantang / Heung Yuen Wai Boundary Control Point and Associated Works", which had been certified by the ET Leader and verified by the IEC, for your approval.

The Waste Management Plan was revised to include all submissions to the Engineer in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site. We have no further comment for the revised Plan.

Should you have any queries, please contact the undersigned or our Mr. Perry Yam at 2674 2273.

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Ray Ng
Senior Resident Engineer

Encl.

c.c. CEDD/BCP - Attn: - Mr. Chris Wong / Mr. Michael Chan (Fax No. 2714 0103) } w/e
SMEC(IEC) - Attn: - Mr. Antony Wong (Fax No. 3995 8101) } w/o encl.
AUES(ET) - Attn: - Mr. T. W. Tam (Fax No. 2959 6079) } w/o encl.
AECOM - Attn: - Mr. Francis Leong / Mr. Pat Lam } w/e - 1 CD copy
SRJV - Attn: - Mr. Edwin Au (Fax No. 2403 1162) } w/o encl.

CTW/RN/PY/LQR/tc

SMEC ASIA Ltd.
瑞峰工程顧問有限公司

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25 November 2013

Our ref: 7076192/L14865/RY/AB/AW/WM/rw
Your ref:

AECOM
8/F, Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin
N.T.

By Email & Post

Attention: Mr Alan LEE

Dear Sirs

Agreement No. CE 42/2012 (EP)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Waste Management Plan – Contract No. CV/2013/03 (Contract 5)

Reference is made to the Waste Management Plan (WMP) dated 25 November 2013 for CV/2013/03 (Contract 5) certified by the ET Leader (ET's ref.: TCS00670/13/300/L0090 dated 22 November 2013). Please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 3.2 of the Environmental Permit No. EP-404/2011/A.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Ms Winnie MA on tel. 3995 8138 or by email to winnie.ma@smec.com.

Yours faithfully
For and on behalf of
SMEC Asia Limited

Antony WONG
Independent Environmental Checker

FAXED 25 NOV 2013

cc	CEDD/BCP	-	Mr Pui Sang LI / Mr Eric CHAN	by fax: 2714 0103
	AECOM	-	Mr Pat LAM / Mr Perry YAM	by email
	SRJV	-	Mr Edwin AU	by email
	AUES	-	Mr TW TAM	by email

Our Ref: TCS00670/13/300/L0090

Sang Hing Civil – Richwell Machinery JV
Rm 215A-B, 2/F, Central Services Building
Nan Fung Industrial City
18 Tin Hau Road, Tuen Mun
New Territories, Hong Kong.

Attn: Mr. Edwin Au

22 November 2013
By hand and fax: 2403-1162

Dear Mr. Au,

Re: Contract CV/2013/03 Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 5
Waste Management Plan (Rev.04)

I refer to the Waste Management Plan (Rev.04) submitted to us on 22 November 2013 by *e-mail*, please note that we have no adverse comment on this submission. We herewith certify the captioned submission accordance with *Condition 3.2* of Environmental Permit (EP) No. EP-404/2011/A.

Should you have any enquiries, please do not hesitate to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or Email: twtam@fordbusiness.com.

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting (AUES)

T. W. Tam
Environmental Team Leader

cc	AECOM (RE)	Attn: Mr. Kelvin Lee	Fax: 3922-9797
	SMEC (IEC)	Attn: Mr. Antony Wong	Fax: 3995-8101

生興土木 - 顯豐機械聯營
SANG HING CIVIL - RICHWELL MACHINERY JV

A 01101

Our ref. : SRJV/W47/SO/X10.5/1311/00766
Your ref. :

RECEIVED 26 NOV 2013

Date : 25 November 2013

The Engineer's Representative **BY HAND**
AECOM
8/F, Grand Central Plaza
Tower 2, 138 Shatin Rural Committee Road
Shatin, Hong Kong

Attention : Mr. Ray Ng

Dear Sir,

Contract No. CV/2013/03
Liantang / Heung Yuen Wai Boundary Control Point –
Site Formation and Infrastructure Works - Contract 5
Waste Management Plan(rev.4)

We submitted herewith the Waste Management Plan (rev.4) with certification of AUES (ET) and SMEC (IEC) for your information and retention.

Yours faithfully
For and on behalf of
SANG HING CIVIL – RICHWELL MACHINERY JV

Edwin Au
Site Agent

EA /KC/at

Encl.

c.c. SRJV Head Office
AECOM Head Office

Room 215A-B , 2/F., Central Services Building, Nan Fung Industrial City,
No. 18 Tin Hau Road, Tuen Mun, N.T., Hong Kong
Tel : (852) 2403 1118 Fax: (852) 2403 1162 E-mail: srjv.cv201303@gmail.com

生興土木 - 顯豐機械聯營
Sang Hing Civil - Richwell Machinery JV

Contract No.: CV/2013/03

Liantang/ Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works – Contract 5

Waste Management Plan

Environmental Permit (EP No.: EP-404/2011/A)

Issue Date: 25 November 2013

Prepared by:

Chan Ng jhon-keibi (Environmental Officer)

Endorsed by:

Edwin Au (Site Agent)

(rev.4)

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Appendix C	Estimated Timber Used Form
Appendix D	Site Location Plan
Appendix E	Daily Record Summary for disposal C&D Waste Material from Site
Appendix F	Weekly Environmental Walk Inspection Report
Appendix G	Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

ENVIRONMENTAL MISSION OF Sang Hing Civil – Richwell Machinery JV

To serve the community by planning and producing convenient and cost effective waste management facilities and services to adequately safeguard the environment and health and welfare of the community and to promote a sustainable approach to waste management, in which we produce less waste and reuse or recover value from waste.

(1) INTRODUCTION

Construction & Demolition (C&D) waste, usually containing a mixture of inert and non-inert substances, arises from site clearance, excavation, construction, refurbishment, renovation, demolition and roadworks. The non-inert portion of C&D waste disposed of at landfills, comprising bamboo, plastics, timber, vegetation and other organic materials, was often mixed with inert substances, e.g. concrete, asphalt, brick/sand, rock/rubble etc. If separation of inert materials at source is more effective, more void space of landfills can be saved.

The government is implementing a C&D waste management strategy which is essentially to avoid, minimize, recycle and dispose of waste (in order of desirability). The target is to reduce the generation of C&D waste and hence its intake at landfills, and to reuse and recycle as much C&D material as possible. Sing Hing ensures that waste will be disposed at licensed sites and necessary waste disposal permits or licenses will be obtained prior to commencement of works where necessary, only licensed waste hauler will be used for waste collection throughout the works.

This Waste Management Plan has been prepared in response to the requirement of Condition 3.2 of EP-404/2011, Sang Hing Civil - Richwell Machinery JV would follow the plan to execute the works accordingly.

1.1 Definitions

Construction and Demolition (C&D) material is defined by the Environmental Protection Department as:

A mixture of surplus materials arising from any excavation, civil/building construction, site clearance, demolition activities, road works and building renovation. Over 80% of C&D materials are *inert* and are further defined as *public fill*. Public fill includes debris, rubble, earth and concrete in which are suitable for land reclamation and site formation. When sorted properly, materials such as clean concrete and asphalt can be recycled for use in construction in construction. The remaining *non-inert* substances in C&D material are call *C&D waste* which includes bamboo, timber, vegetation, packing waste and other organic materials. In contract to public fill, C&D waste is not suitable for land reclamation and is disposed of at landfills.

1.2 Legislation and Guideline

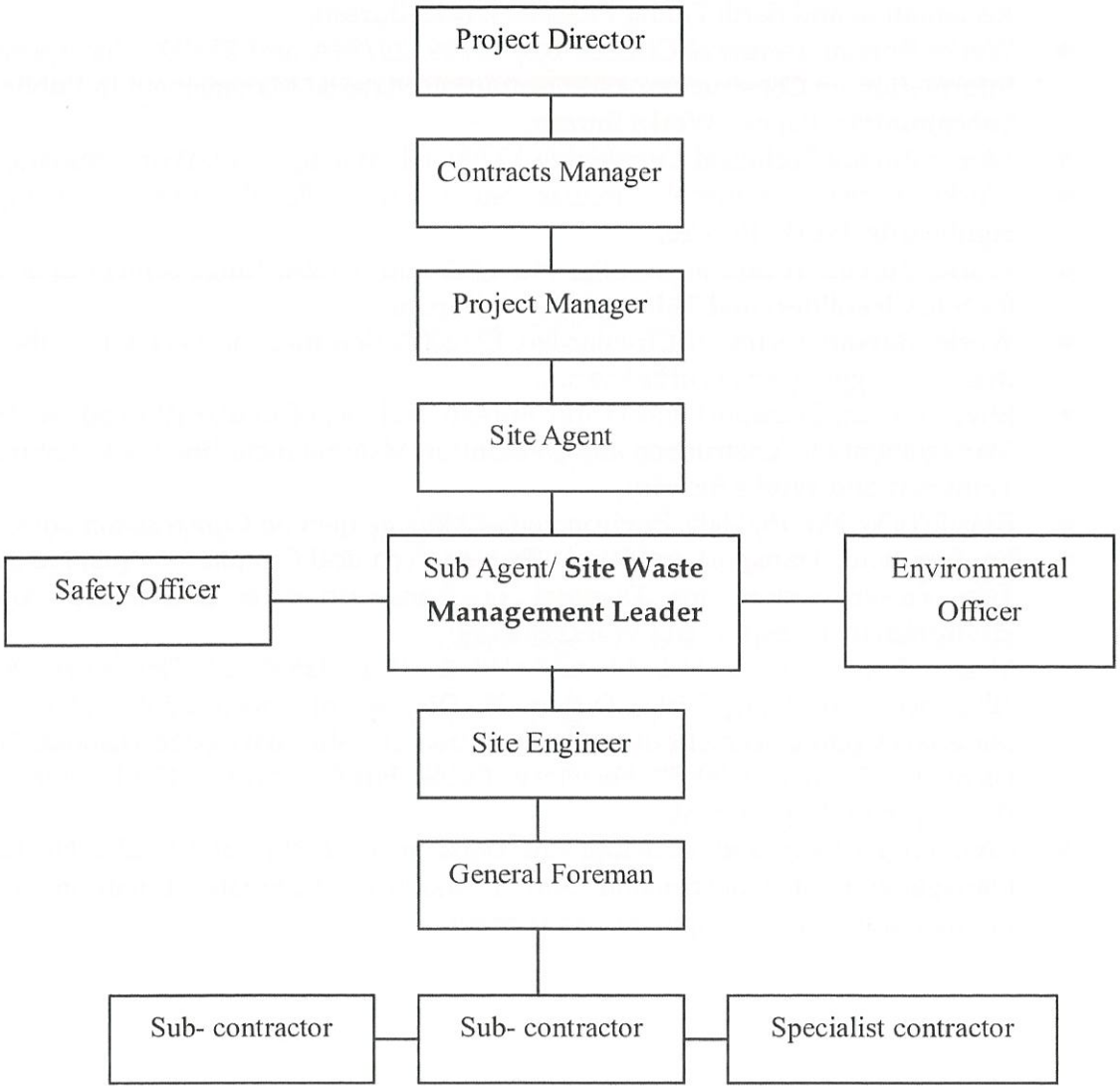
The principal statutory environmental protection and pollution control requirements to be observed relevant to the execution of the Works including, but not be limited to:-

- Air Pollution Control Ordinance (Cap 311)
- Waste Disposal Ordinance (Cap 354)
- Water Pollution Control Ordinance (Cap 358)
- Noise Control Ordinance (Cap 400)
- Dumping at Sea Ordinance (Cap 446)
- Environmental Impact Assessment Ordinance (Cap 499)
- Factories and Industrial Undertakings Ordinance (Cap 59)
- Buildings Ordinance (Cap 121)
- Buildings Ordinance (Application to New Territories) Ordinance (Cap 121)
- Public Health and Municipal Services Ordinance (Cap 132)
- Public Cleansing and Prevention of Nuisances (Regional Council) By-Laws (Cap 132)
- Public Cleansing and Prevention of Nuisances (Urban Council) By-Laws (Cap 132)
- Summary Offences Ordinance (Cap 228)
- Merchant Shipping (Oil Pollution) (Hong Kong) Order 1975
- Waste Disposal (Chemical Waste) (General) Regulation
- Air Pollution Control (Open Burning) Regulation
- Air Pollution Control (Construction Dust) Regulation
- Air Pollution Control (Furnaces Ovens and Chimneys) Installation and Alteration Regulation
- Cap 354 s 35 Codes of Practice
- Waste Reduction Framework Plan, 1998 to 2007, Planning, Environment and Lands Bureau, Government Secretariat (5 November 1998);
- 2001 Review of the Waste Reduction Framework Plan, Waste Reduction Committee;
- Site Practice for Waste Reduction in Construction Industry (2001), Environmental Protection Department;
- Chapter 9 Environment, Hong Kong Planning and Standards Guidelines;
- New Disposal Arrangements for Construction Waste (1992), Environmental Protection Department & Civil Engineering Department;
- A Guide to Chemical Waste Control Scheme and A Guide to the Registration of Chemical Waste Producer, Environmental Protection Department;
- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), Environmental Protection Department;
- A Guide to the Control on Import and Export of Waste (1999), Environmental Protection Department;
- Project Administration Handbook for Civil Engineering Works - Works Branch Technical Circular 32/92, The Use of tropical Hard Wood on Construction Sites, Works Branch;

- Works Bureau Technical Circular No, 2/93, Public Dumps, Works Bureau;
- Works Bureau Technical Circular No, 2/93B, Public Filling Facilities, Works Bureau;
- Works Bureau Technical Circular No, 16/96, Wet Soil in Public Dumps, Works Bureau;
- Works Bureau Technical Circular No, 4/98 and 4/98A, Use of Public Fill in Reclamation and Earth Filling Projects, Works Bureau;
- Works Bureau Technical Circular No, 25/99. 25/99A and 25/99C, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers, Works Bureau;
- Works Bureau Technical Circular No 12/00, Fill Management; Works Bureau;
- Works Bureau Technical Circular No 19/01 , Metallic Site -Hoardings and Signboards, Works Bureau;
- Works Bureau Technical Circular No 6/02 and 6/02A, Enhancement Specification for Site Cleanliness and Tidiness, Works Bureau;
- Works Bureau Technical Circular No 12/2002, Specification Facilitating the Use of Recycled Aggregates, Works Bureau;
- Environment, Transport and Works Bureau Technical Circular (Works) No 33/2002, Management of Construction and Demolition Material including Rock, Environment, Transport and Works Bureau;
- ETWB TCW No. 19/2005, Environmental Management on Construction Sites;
- Environment, Transport and Works Bureau Technical Circular (Works) No 31/2004, Trip Ticket System for Disposal of Construction & Demolition Materials, Environment Transport and Works Bureau;
- Memo Ref. (15) in FM PF/GEN/18.01 Pt.4 dated 22 December 2004 on "Enhancement of Trip Ticket System for Disposal of Construction and Demolition Materials Commencement of Implementation of Using Bar-coded Disposal Delivery Form (DDF) on 15.1 2005", Secretary, Public Fill Committee, Civil Engineering & Development Department;
- Civil Engineering and Development Department Technical Circular No 05/2005, Management of Construction and Demolition Materials, Environment, Civil Engineering and Development Department;

(2) ORGANISATION

WASTE MANAGEMENT ORGANISATION CHART



2.1 Individual Responsibilities

While all people involved should be encouraged to contribute their ideas and suggestions on ways to minimize waste, one person (or the Environmental, Health and Safety Manager) should act as the Site Waste Management Leader, responsible for overseeing the management of C&D Material. This person will be responsible for managing waste reduction initiatives and coordinating the activities of other employees.

The key role of a individual member is as follows:

The Project Director / Site Agent has the following duties in relation to waste management control:

- be responsible for overall project management and shall have the day-today authority and responsibility for time, cost, safety, environmental and quality management;
- be responsible for the provision of sufficient resources and facilities for the implementation of the Waste Management Plan.
- Monitor and control the works including those of subcontractors to ensure compliance of WMP;
- Ensure the remedial actions or mitigation measures are carried out as planned; and
- Supervise and arrange the maintenance of waste management facilities.

Project Manager

Project Manager is responsible to the Project Director / Site Agent for overall planning, site operations, appoint of committee members for waste management, staff supervision control coordination and external liaison. He is ultimately responsible for all aspects of waste management issues within the Project, which they achieve by implementation of the WMP.

He is also responsible for provision of necessary support to the Environmental Officer for the preparation and review of WMP and arrangement of site staff to attend environmental training with regard to waste management organized by other bodies or the Environmental Officer.

He shall ensure the recommendations from the Client, Independent. Environmental Consultant (IEC), Engineer, Environmental Team (ET), or environmental officer are implemented to improve the waste management practices and carry out immediate action to rectify the noncompliance of waste management requirements. The Project Manager has the following responsibilities in relation to waste management:

- Keep abreast of the requirements of the statutory regulations in relation to waste management;
- Ensure works are executed in accordance with the WMP;
- Arrange routine joint site inspection with Environmental Officer and review environmental inspection report submitted by the environmental engineer;
- Ensure works are undertaken in accordance with the recommendations made by the Client, IEC, Engineer, ET and Environmental Officer;
- Monitor and control the works including those of subcontractors to ensure compliance with specified requirements;
- Ensure appropriate waste management mitigation measures are properly implemented;
- Ensure follow up actions are properly undertaken in the event of non-compliance of the WMP;
- Review method statement to ensure appropriate mitigation measures are implemented prior to execution of work;
- Liaise with Client, IEC, Engineer, ET and Environmental Officer on waste management issues;
- Monitor records of all trained personnel in the site offices; and
- Monitor the following documents.
- any statutory required waste management permits/licenses including dumping license, chemical waste producer, admission ticket and etc.;
- C&D material disposal delivery record; and
- Waste reuse / recycle / disposal summary.

Site Waste Management Leader

- Ensure that all-relevant legislation and the contractor's duty of care is complied with.
- Initiate waste reduction, reuse and recycling.
- Ensure all site personnel know their responsibilities for site waste management.
- Co-ordinate waste management on site, gather data about waste on site, keep accurate records on waste movement on and off site.

- Ensure that all waste storage areas and containers are properly labeled to show site workers where to deposit specific materials.
- Be aware of the construction activities currently taking place on site and the activities planned in the short term. Conduct a survey of wastes likely to be generated on site and keep a record of them for planning ahead.
- Whenever possible, ensure the re-use or recycling of material already on site before it is carted away or new materials are imported.
- Obtain a list of potential buyers or collectors of materials to be re-used or recycled.
- Encourage all site personnel to use their initiate in coming up with ideas of how to reduce, reuse and recycle wastes. Set up and "Ideas Board" where people can have their say and record suggestions that they may have for reducing, reusing and recycling wastes.
- Inform designers so that waste can be reused and recycled on site or another site

Sub Agent/ Site Engineer/ Foreman/ Environmental Officer

They are responsible for the following duties in relation to environmental control:

- Assist the Project Manager in implementing the WMP;
- Control the works including those of subcontractors to fulfill the requirement of waste management issues;
- Report to the Project Manager any non-compliance of any waste management issues;
- Maintain the onsite waste management facilities including sorting area, temporary storage area, general refuse bins, recycling bins and etc;
- Carry out remedial actions or mitigation measures to rectify the non-compliance;
- Conduct environmental toolbox talks with respect to waste management to laborers and workers regularly; and
- Carry out routine maintenance of waste management facilities. Maintenance records shall be kept in site office.

Subcontractors and other Employees

Every employee and subcontractor has the duty to carry out agreed waste management practices as instructed by the Sub Agent/ Site Engineer/ Foreman.

Every employee and subcontractor shall report promptly to the Sub Agent /Site Engineer/ Supervisor any non-compliance of waste management issues.

2.2 Managing Subcontractors

It is very important to coordinate waste management on sites where there are a number of subcontractors. Some supervision are suggested as follows:

- Many sites are now using a system of allowable waste percentages. In the early pre-work agreements the site manager decides how much waste is acceptable, and agrees a percentage with the subcontractor.

  If they waste more than the agreed amount, they can be charged the extra costs. This is a great incentive to reduce wastes by efficient use of materials. The lower the allowable percentage, the more care people will take with materials. Setting the right level is crucial. Allowable wastage percentages can be applied to all materials or restricted to those that are expensive or commonly generate excessive wastage.

- Make subcontractors responsible for both purchasing the raw materials they need, and disposing of any waste material from their activities. This will give them a direct financial incentive to use materials efficiently with the minimum of wastage.

- Make subcontractors aware of wastage and the costs involved in dealing with wastes.

- Hold regular meetings to discuss wastage on site.

  (Mainly source from CIRIA Special publication 133, 1997)

(3) Analysis of Construction and Demolition (C&D) Material

3.1 Estimation

The first step in implementing a waste minimization programme is to estimate the quantity of construction wastes that will be generated from projects. The estimate provides information on the quantities of the different types of waste that will be generated. Based on this information, the direct cost of materials waste and the consequent cost of waste removal and treatment, for example, sorting can be calculated for the purpose of cost control.

- Concrete Waste
  The amount of concrete waste, for example, can be estimated if the material waste level of concrete is known. Recent research indicated that the average waste level is about 4%, which is considered the norm for the concreting trade. However, it could be reduced to 2% if careful material ordering and handling is applied. The amount of waste can be estimated according to:

  Quantity of Concrete Works (m^3) × Material Wastage (%)

- Waste from blockwork and brickwork
  Inert granular waste generated by blockwork and brickwork is estimated to be 10% of the quantity of this work required in the project. The estimate can be calculated according to:

  Quantity of Work Done (m^2) × Thickness (m) × Material Wastage (%)

- Waste from screeding and plastering
  A higher wastage of 15% is given as the norm since these trades are difficult to control. The estimate can be calculated according to:

  Quantity of Work Done (m^2) × Thickness (m) × Material Wastage (%)

- Waste from timber formwork
  Timber formwork is proposed to use at least 12 times before being discarded. The timber waste can be estimated according to:

  Quantity of Formwork (m^2) × Thickness (m) ÷ 12 (No. of Uses)

- Packing Waste
  Contractors have little control on the quantity of packing wastes produced, which is estimated at 5% of the volume of the materials that required packing, hence
  Volume of Packaged Construction Materials × 5%

- Waste from Dredging Activities
  There is no dredging activity in this contract therefore disposal strategy for dredged sediment is not applicable.

- Other Wastes
  There are blank rows in the standard form for the provision of estimates of other types of wastes.

Based on these data, an analysis of when, what quantities and type of construction and demolition (C&D) material are anticipated to be generated in the course of the execution of the Works can be carried out and summarized, together with the Classification of C&D Material shown in next section.

(4) CLASSIFICATION OF C&D MATERIAL

4.1 Inert Portion of C&D Material (Public Fill)

Inert01 public fill that can be reused and/or recycled to enable it to be reused in the Contract
Inert02 surplus public fill to be delivered to public filling facilities
Inert03 surplus public fill to be delivered and reused at the Contractor's own outlets as approved by the Engineer

	CIVIL CONSTRUCTION	DEMOLITION ACTIVITIES	LAND EXCAVATION	LAND FORMATION	REFURBISHMENT	RENOVATION WORKS	ROAD WORKS	SITE CLEARANCE
Aggregate	Inert01							
Asphalt	Inert03							
Brick	Inert01							
Cement Plaster	Inert01							
Concrete	Inert02							
Debris	Inert02							
Dirt	Inert01							
Earth	Inert02							
Mortar	Inert01							
Mud	Inert01							
Reinforced Concrete	Inert01							
Rock	Inert01							
Rubble	Inert02							
Sand	Inert01							
Soil	Inert01							

4.2 Non-inert Portion of C&D Material (C&D Waste), including General Refuse

Non-inert01 Chemical waste
Non-inert02 C&D waste to be recycled
Non-inert03 C&D waste to be re-used
Non-inert04 C&D waste to be returned
Non-inert05 C&D waste which cannot be reused or recycled and has to be disposed of at landfill sites

	Civil Construction	Demolition Activities	Land Excavation	Land Formation	Refurbishment	Renovation Works	Road Works	Site Clearance
Bamboo	Non-inert04							
Packing Waste	Non-inert05							
Plastics	Non-inert02							
Timber	Non-inert03							
Vegetation	Non-inert05							
Other Organic Material	Non-inert01							
Paper	Non-inert02							
Cardboard	Non-inert04							
Metal	Non-inert03							
Foam Board	Non-inert04							

(5) AVOIDANCE/MINIMIZATION OF C&D MATERIAL

- Low waste technology.
- Use of pre-casting and pre-fabrication standardizes construction design.
- Use of tailor-made building fixtures and fittings.
- Reduce the amount of material and temporary works on site.
- Use of more durable material.
- Increase flexibility in design.
- Better site management as well as improved material storage and handling on site.
- Research and implement new building materials and technology.

Avoid: Avoid producing waste is top priority in the hierarchy. Instead of using disposable products such as foam lunch boxes, cutlery and cups. By avoiding the use of over-packaged and disposable items you are already helping to reduce waste generated in Hong Kong. A change in public attitudes towards avoidance of such products will send a message to the producers to take action and minimize waste during production.

Minimise: Sometimes waste must be produced, but the quantity should be minimized. Bulk buying will not only cost you less but will also greatly reduce the amount of unnecessary waste generated for final disposal at landfills.

5.1 Site Management and Material Ordering

- Coordinate with designer and specification writer to ensure dimensional coordination of design with materials and components to minimize cutting waste.
- Coordinate with designer and specification writer to use alternative materials instead of timber.
- Provide training to workers to improve their skill in handling materials and performing construction work.
- Review waste management periodically to identify additional waste reduction alternatives.
- Consider reduction of construction waste and awareness of environmental protection as basic requirements in management.
- Improve construction technology by research or adoption.
- Employ competent subcontractors and skill labourers.
- Purchasing inventory should be carefully controlled to prevent wastage of materials.
- Adopt just-in-time ordering and to ensure materials arrive on site when they are needed, thereby avoiding damage while stored on site and additional moving of materials.
- Order appropriate material sizes to minimize cutting, and order appropriate quantities to avoid excess.

5.2 Site Practice

It is important to store materials correctly to avoid damaging them. If materials are damaged by poor storage, they may not meet the specification and therefore become waste. Good storage saves time and money and wastes fewer raw materials. Use the raw material storage table as shown below to guide the storage decision. It can help in reducing the amount of wastage - and help contractors keep to allowable waste percentages.

Materials	Store under Cover	Store in Secure Area	Store on Pallets	Store Material Bound	Special Requirements
Sand, Gravel, Rock, Crushed Concrete					Store on hard standing base to reduce wastage. Store in bays if large quantities
Plaster, Cement	✓		✓		Avoid material getting damp
Concrete, Paviors				✓	Store material in original packing until used, and protect from vehicle movements
Bricks			✓	✓	Store material in original packing until used, and protect from vehicle movements
Clay Pipes, Concrete Pipes			✓	✓	Use stoppers and spacers to prevent rolling, and store in original packing until used
Wood	✓	✓		✓	Protect all types of wood from rain
Metals	✓	✓			Store in original packing until used
Any Internal Fittings	✓	✓			Store in original packing until used
Cladding	✓	✓			Wrap in polythene to prevent scratches
Sheet Glass, Glazing Unit		✓	✓		Protect glass from breakage due to bad handing or vehicle movements
Paints		✓			Protect from theft
Bituminous Felt	✓	✓			Usually store in rolls and protect with polythene
Insulting Material	✓	✓			Store under polythene
Ceramic Tiles	✓	✓		✓	Store in original packing until used
Glass Fibre	✓			✓	
Ironmongery	✓	✓			
Oils		✓			Store in bowers, tanks or cans according to quantity - protect container from damage to reduce likelihood of spillage - use a bund
Kerbstones				✓	Protect from vehicle movements & tar spraying to reduce damage
Clay & Slate Tiles		✓	✓	✓	Keep in original packing until used
Topsoil, Subsoil					Store on hardstanding base to reduce wastage and keep segregated from potential contaminants
Precast Concrete Units					Store in original packing, away from vehicular movements

(Source: CIRIA Special publication 133, 1997)

5.3 Use of Metal Formwork

Advantages of Low Waste Technologies over Traditional Construction Methods for formwork can be compared as follows:

TRADITIONAL METHODS	LOW WASTE TECHNOLOGIES
• Conventional Timber Formwork.	• Large steel panel forms.
• Double the cost of using steel panel in long run.	• High initial cost but balanced by the long terms savings in timber formwork.
• Labour intensive for erecting and striking formwork.	• Less labour force required for erecting and striking formwork.
• Longer construction duration.	• High efficiency, twice faster than timber formwork system.
• Plastering need for leveling concrete surface.	• Better quality concrete products, concrete surfaces suitable for applying tiles and paints directly.
• Reused 8-15 times, several sets of timber forms needed for a high-rise block.	• Reused over 100 times, one set of forms sufficient to complete a block and can be reused in another sites.
• Hand lift timber board from floor to floor.	• Tower cranes needed for lifting formwork.
• Considerate timber waste produced.	• Waste steel scrapped for recycling, less waste produced.

We would try to adopt metal formwork during construction if possible, the estimated timber used form is attached in Annex C.

5.4 Use of Excavated Material for Filling

- Existing landscaping and contours should be used to avoid over excavation. Otherwise, excavated material should be used for filling.

5.5 Sorting of Demolition Debris

- All demolition debris from demolition works should be sorted to recover on site broken concrete, reinforcement bars, mechanical and electrical fittings as well as other building services fittings / materials that have established recycling outlets.

(6) SORTING FACILITIES

6.1 Background

The HKSAR government has realised the importance of source separation and has published technical circular WBTC no. 5/98 on on-site sorting of C&D material on demolition sites. It is stated that " as from 1st April 1998 all tenders for contracts which comprise solely (i.e. 100%) demolition works shall include a requirement for on-site sorting of all C&D material prior to disposal and a particular specification clause shall be included in the tender documents for mandatory on-site sorting, processing and disposal of the same."

"All construction and demolition (C&D) materials arising from or in connection with the demolition work shall be sorted on-site and be separated into different groups for disposal at landfills, public filling areas, in filling areas provided by the Contractor, or recycling as appropriate. All public fills to be disposed of at public filling areas shall be sorted and broken down according to the Dumping Licence conditions.

Unless otherwise stated in the Contract, all C&D materials arising from or in connection with the demolition work shall become the property of the Contractor. The Contractor shall promptly remove all sorted and processed materials arising from or in connection with the demolition work from the Site on a regular basis as demolition work proceeds.

It is suggested that contractors should separate at least inert from non-inert materials for reclamation and site formation use. Recent research indicated that 90% of demolition waste produced could be used for reclamation if waste sorting is performed. Higher grade use e.g. a road sub-base, of inert waste is also feasible provided that the relevant specifications are met.

6.2 Sorting and Separation

C&D materials will be sorted on-site. The sources of generation will be identified and the quantity will be estimated, on-site sorting and/or collection, temporary storage areas will be arranged commensurate with the Site situations.

The C&D materials will be sorted at source into:

- Hard rock, and/or those naturally occurring hard materials whose geological nature is to be regarded as rock, suitable for reuse on the Site which shall be further sorted and deposited to designated areas as shown on the drawings for various types of rock fill materials according to different size/weight within site for further re-use, and without further breaking down if possible;
- Broken concrete, brickwork, concrete, reinforced concrete, masonry, bituminous paving, and/or artificial hard materials which will be broken down to size smaller than 250mm and used as general fill materials, and with any materials unsuitable for filling disposed off Site, e.g. metal;
- Metals;
- Paper and plastics;
- Chemical wastes; and
- Any other materials suitable for disposal at public fill reception facilities, sorting facilities and Landfills/outlying Island transfer facilities. (disposal at the sorting facilities should first be approved by the Engineer)

Thorough sorting of C&D materials generated from demolition works will be carried out in order to recover broken concrete, brickwork, concrete, reinforced concrete, masonry, bituminous paving, and/or artificial hard materials, reinforcement bars, mechanical and electrical fittings, hardware as well as other fittings/materials that have established recycling outlets.

Equipment and material packaging will be recovered, properly stockpiled in dry and covered condition to prevent cross contamination by other C&D materials, especially in the course of collecting paper for recycling.

Sufficient space will be identified and provided for sorting and temporary storage of C&D materials to facilitate collection and/or sorting on the Site. The space provided

will commensurate with the estimated quantity for each type of C&D materials generated and the conditions of the Site.

Except for those inert C&D materials to be reused on the Site, all other C&D materials will be removed off the Site as soon as practicable in order to optimize the use of the on-site storage space.

The Site Waste Management Leader will ensure that the segregated wastes are stored properly in designated storage points to avoid possible loss or leakage and that wastes are covered properly to minimize windblown litter and dust during transportation as far as practicable. The general foreman will ensure that the waste storage areas are cleaned regularly and wastes are removed in a timely manner.

(7) HANDLING, RECYCLING, REUSE AND RETURN OF C&D MATERIAL

7.1 General Handling

- Designate central area for cutting and storage so reusable pieces can easily be located.
- Do not use tropical hardwood for temporary works. Use *metal* falsework if possible.
- Avoid buying poor quality materials. If the wear-out rate is high, another source of supply should be considered.
- Whenever possible, packing materials *(e.g. Paper/Cardboard)* should be returned to the supplier for reuse. In some cases the supplier holds a deposit until the pallets are returned.
- Avoid overloading limited storage space on site.
- Avoid unnecessary handling.
- Whenever using *timber* for a specific purpose, try to avoid treating it with chemicals and using nails, as this will make it difficult to reuse/recycle the timber afterwards.

7.2 Alternative Uses of Demolition Materials

Bulky demolition materials can be separated into ferrous metals and concrete waste. The ferrous metal can be sent to steel mill for producing recycled steel. The concrete waste can be reused for road building or sent to concrete processing station for making recycled aggregate.

The suitability of the recycled aggregate for various applications is summarised in the following table (Kibert, 1993)

RECYCLED AGGREGATE CATEGORY	GENERAL BULK FILL	FILL IN DRAINAGE PROJECT	MATERIAL FOR ROAD CONSTRUCTION	NEW CONCRETE MANUFACTURER
Crushed Demolition Debris	✓	✓	×	×
Graded Mixed Debris	✓	✓	O	O
Clean Graded Brick	✓	✓	✓	O
Clean Graded Concrete	✓	✓	✓	✓

✓-Suitable O-Suitable in some cases ×-Not Suitable

7.3 Schedule of Materials

MATERIALS	REASON FOR LIKELY WASTE	PREVENTATIVE ACTION
Aggregates	Misuse in lieu of hardcore for temporary work. Lost in mire.	Store in prepared areas on bunker boards (or concrete bases of road, etc.) Use membrane if soil underneath.
Boarding	Waste in stacks Cutting waste	Stack horizontally off ground under cover. Save "cut-off" for smaller parts of nearby work.
Bricks	Losses at all stages. Tipping and form of stacking.	Care in every movement, square and firm stacking. Avoid tipping any bricks, care in stacking all bricks.
Concrete (ready mixed)	Carless "dribbling". Unloading. Excess load waste. Loss at workplace.	Care when vehicle unloads. Loads to be ordered in accordance with operations. Reserve operations for surplus of load. Care in placing droppings to be collected before they harden.
Concrete (site-mixed)	Loss by unclean batching plant. Over-mixing losses. Movement losses. Loss at workplace.	Batching plant to be on hard standing. Mixing to be controlled to operations in progress. Careful movement, no overloading. Care in placing, droppings to be collected before they harden.
Metal	Losses from stores	Correlate issues from stores to size of operations.
Nails, screws	Losses at workplace.	Use nail boxes or pouches.
Timber (carcassing)	Loss in handling to and on site. Long off cuts. Loss by other use.	Care in unloading, stacking off ground by size. Careful scheduling to trade sizes. Provide bins for off cuts to longer pieces.
Timber (joinery grade)	Substitution	Control use of timber from site storage.
Timber Formwork	Maximum no, of uses not realized. Use for other purposes.	Careful moving from set to set. Spare bin of off cuts available for other purposes.

(Source : Skoyles, 1987)

(8) CHEMICAL WASTE

Chemical waste is defined in the Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance (Cap. 354). Chemical waste can be any substance arising from any process or trade activity which contains chemical in such form, quantity or concentration that can cause pollution to the environment or become a risk to health.

Chapter 354	Waste Disposal Ordinance (WDO)
CAP 354C	Waste Disposal (Chemical Waste) (General) Regulation
CAP 354G	Waste Disposal (Chemical Waste) (General) Regulation (Application of Parts II, VII & VIII) Notice 1992
CAP 354H	Waste Disposal (Chemical Waste) (General) Regulation (Application of Regulation 4 and Parts III, IV & VI) Notice 1992
CAP 354I	Waste Disposal (Chemical Waste) (General) Regulation (Application of Section 4 and Parts III, IV, V & VI) Notice 1993
CAP 354J	Waste Disposal (Charges for Disposal of Chemical Waste) Regulation

8.1 Identification of Chemical Waste

(1) Subject to subsection (2), any substance or thing being-
   (a) scrap material;
   (b) effluent; or
   (c) an unwanted substance or by-product arising from the application of or in the course of any process or trade activity, and which is or contains any substance or chemical specified in Schedule 1 shall be regarded as chemical waste, if such substance or chemical occurs in such form, quantity or concentration so as to cause pollution or constitute a danger to health or risk of pollution to the environment.

(2) Any-
   (a) thing which is of a class or description specified by the EPD in a notice published in the Gazette for the purposes of this section; or
   (b) other thing being a discharge or deposit which is made in accordance with a licence granted under the Water Pollution Control Ordinance (Cap 358) or in conformity with a technical memorandum issued under that Ordinance, shall not be chemical waste.

(Mainly sourced from Cap 354C s 3 Chemical waste)

(Source: Cap 354C sched 1 Substances and Chemicals)

PART A

Any substance to which the Antibiotics Ordinance (Cap 137) applies Asbestos
Dangerous drugs (as defined in the Dangerous Drugs Ordinance (Cap 134))
Dangerous goods, category 2, NES
Dangerous goods, category 6, NES
Dangerous goods, category 9, NES
Dibenzofurans
Dioxins
Pesticides (as defined in the register referred to in section 4(b) of the Pesticides Ordinance (Cap 133))
Poisons (Part I) (as defined in the Pharmacy and Poisons Ordinance (Cap 138))
Polychlorinated biphenyls

PART B

Antimony and its compounds
Arsenic compounds
Barium compounds
Beryllium and its compounds
Boron compounds
Cadmium and its compounds
Chromium and its compounds, NES
Chromium bearing solid tannery waste
Cobalt and its compounds
Copper compounds
Cyanides
Dangerous goods, category 3, NES
Dangerous goods, category 4, NES
Dangerous goods, category 5, NES
Dangerous goods, category 7, NES
Dangerous goods, category 8, NES
Dangerous goods, category 10, NES
Halogenated organic solvents and compounds
Lead and its compounds
Manganese and its compounds
Mercury and its compounds
Mineral oils employed for engine lubrication
Mineral oils, NES
Nickel and its compounds
Non-halogenated organic solvents and compounds

Organo lead compounds
Organo mercury compounds
Organo tin compounds
Paints
Pesticides (as defined in the register referred to in section 4(a) of the Pesticides Ordinance (Cap 133))
Pharmaceutical products and medicines, NES
Phosphorus compounds excluding phosphates
Selenium compounds
Silver compounds
Sulphides
Thallium and its compounds
Tin compounds
Vanadium compounds
Zinc compounds

Acids, alkalis and corrosive compounds

Acetic acid above 10% acetic acid by weight
Acids or acidic solutions, NES with acidity equivalent to above 5% nitric acid by weight
Ammonia solution above 10% ammonia by weight
Bases or alkaline solutions, NES with alkalinity equivalent to above 1% sodium hydroxide by weight
Chromic acid above 1% chromic acid by weight
Fluoboric acid above 5% fluoboric acid by weight
Formic acid above 10% formic acid by weight
Hydrochloric acid above 5% hydrochloric acid by weight
Hydrofluoric acid above 0.1% hydrofluoric acid by weight
Hydrogen peroxide solution above 8% hydrogen peroxide by weight
Nitric acid above 5% nitric acid by weight
Perchloric acid above 5% perchloric acid by weight
Phosphoric acid above 5% phosphoric acid by weight
Potassium hydroxide solution above 1% potassium hydroxide by weight
Potassium hypochlorite solution above 5% active chlorine
Sodium hydroxide solution above 1% sodium hydroxide by weight
Sodium hypochlorite solution above 5% active chlorine
Sulphuric acid above 5% sulphuric acid by weight

NES = Not elsewhere specified

8.2 Packaging

(1) Sang Hing Civil – Richwell Machinery JV shall ensure that-

(a) chemical waste is not packed or stored in a manner that may render the handling of the container in which it is packed or stored unsafe or affect the effectiveness of the container;

(b) any container in which chemical waste is packed or stored is properly and securely closed, sealed and no chemical waste adheres to the external surface of the container;

(c) chemical wastes generated from different sources or different types of chemical wastes which in the event of contact with one another are likely to produce consequences dangerous to the health or safety of any person, are not mixed, packed or stored together in a container;

(d) where a container is used for the storage of liquid chemical waste, sufficient ullage is allowed so that no leakage from or permanent distortion of the container occurs as a result of the expansion of the liquid due to changes of temperature or any other condition which is likely to occur in the storage, handling or transport of chemical waste.

(Mainly sourced from Cap 354C s 10 Proper packing of chemical waste)

8.3 Labelling

(1) Sang Hing Civil – Richwell Machinery JV shall ensure that-
   (a) there is displayed on every container of chemical waste a label in English and Chinese of such design and dimensions as specified in Parts 1 and 2 respectively of Schedule 2 containing the particulars and the appropriate symbols specified in Parts 3 and 4 respectively of that Schedule;
   (b) any information supplied pursuant to paragraph (a) is accurate and sufficient so as to enable the safe storage, handling and transport of the chemical waste;
   (c) any label referred to in paragraph (a) is securely attached to the container and kept clean and positioned so that it is clearly visible and is not obstructed.

(2) Where pursuant to subsection (1), particulars of safety precautions are required to be contained in a label, Sang Hing Civil – Richwell Machinery JV shall ensure that they are adequate and appropriate having regard to the form or nature of the chemical waste in the relevant container.

(3) Where any label displayed pursuant to subsection (1) complies with such provisions or standards relating to labelling as may be contained in a relevant Code of Practice, subsections (1) and (2) shall be regarded as having been complied with.

(Mainly sourced from Cap 354C s 12 Labelling of containers)

(Source: Cap 354C sched 2 Provisions relating to labels)

PART 1 DESIGN OF LABEL FOR CHEMICAL WASTE

PART 2 DIMENSIONS OF LABEL

Capacity of container	Dimensions of label
Not more than 50 litres	not less than 90mm x 100mm
Between 50 and 450 litres	not less than 120 mm x 150 mm
Over 450 litres	not less than 180 mm x 200 mm

PART 3 PARTICULARS TO APPEAR ON LABEL

1. The name, address and contact telephone number of the relevant waste producer.
2. The chemical name/names or common name/names of the substances from which the chemical waste is derived.
3. Classification of the chemical waste (waste type and waste code).
4. The appropriate hazard symbol or symbols of the size specified in Note 1.
5. Statement of the risk (or risks) arising on contact with/exposure to or otherwise in relation to the chemical waste.
6. Safety precautions to be taken in relation to the chemical waste.
7. The words "CHEMICAL WASTE" and characters"化學廢物" of such size as specified in Note 2.

Note 1. The size of any symbol in this Part shall not be less than 1/10th of the area of the label and shall not in any case be less than 500 mm ^{2}. Generally, the minimum dimensions should be 25mm x 25mm.

Note 2. The combined size of the words "CHEMICAL WASTE" and characters "化學廢物" shall not be less than 1/20th of the area of the label. For the small-size labels, the minimum size of the characters should be around 5mm high.

PART 4 SYMBOLS IN LABEL

Classification Symbol 危險分類 符號

8.4 Storage

8.4.1 Storage in large containers only with the approval of EPD

(1) Chemical waste shall not be packed or stored in any container with a capacity exceeding 450 litres unless-

(a) it is a container which conforms to specifications approved generally for the purpose by EPD; or

(b) in a particular case EPD, on an application made for the purpose, has given his approval in writing for the use of such container.

(Mainly sourced from Cap 354C s 11 Storage in large containers only with the approval of EPD)

8.4.2 Storage area

(1) Sang Hing Civil - Richwell Machinery JV shall ensure that any area used for the storage of containers of chemical waste complies with the requirements in subsection (2).

(2) The requirements for the purposes of subsection (1) are that such area shall-
   (a) not be used for any purpose other than the storage of chemical waste;
   (b) be enclosed on at least 3 sides by a wall, partition fence or a similar device, which shall not be less than-
      (i) 2 metres in height; or
      (ii) the height of the tallest container or where appropriate the height of the tallest stack of containers,
   whichever is less;
   (c) not have any connection to any surface water drains or foul sewers;
   (d) have adequate space for the handling of the containers;
   (e) where the storage area is not within a building, be provided with a roof or a similar covering; and
   (f) be kept clean and dry.

(3) Where any chemical waste is stored other than on the premises in which it is produced the waste producer shall, in addition to the requirements in subsection (2), ensure that any means of access to the area in which the waste is stored is secured with a lock or such other means at all times except when access is reasonably necessary for normal operations relating to the stored chemical waste.

(Mainly sourced from Cap 354C s 13 Storage area)

8.4.3 Storage of liquid chemical waste

(1) Without prejudice to any other requirement relating to the storage of chemical waste, Sang Hing Civil – Richwell Machinery JV shall ensure that any area in which containers of chemical waste in liquid form are stored-
   (a) has an impermeable floor or surface;
   (b) has a retention structure with the capacity to accommodate-
      (i) the contents of the largest container; or
      (ii) 20% by volume of the chemical waste, stored in that area, whichever is the greater; and
   (c) where such containers are stacked, is enclosed by walls or partitions constructed out of an impermeable material.

(Mainly sourced from Cap 354C s 14 Storage of liquid chemical waste)

8.4.4 Storage of containers

(1) Sang Hing Civil – Richwell Machinery JV shall ensure that-
   (a) any container with chemical waste is not stored with other wastes, whether chemical or otherwise, if it is likely that there will be dangerous consequences to the health or safety of any person in the event of its contact with such other wastes;
   (b) any stacks of containers of chemical waste are made secure so as to prevent their falling down.

(Mainly sourced from Cap 354C s 15 Storage of containers)

8.4.5 Storage in working area

The requirements relating to storage shall not apply where-

(a) the chemical waste is stored in the working or processing area;
(b) the quantity of chemical waste stored in a single working or processing area does not exceed 50 litres;
(c) the chemical waste so stored is packed or stored in containers and labelled;
(d) the containers referred to in paragraph (c) are kept in a cupboard, cabinet or receptacle which is safe and suitable having regard to the nature of the chemical waste; and
(e) in the case of different chemical wastes which are likely in the event of contact with one another to produce consequences dangerous to the health or safety of any person are stored, that they are separated inside the cupboard, cabinet or receptacle, as the case may be, by an impermeable partition.

(Mainly sourced from Cap 354C s 16 Storage in working area)

8.4.6 Storage in large fixed containers

Where chemical waste is stored in any container and which is a fixed structure-

(a) above the ground, the requirements of sections 13 and 15 of Cap 354C shall not apply; and
(b) below ground level, the requirements of sections 13, 14 and 15 of Cap 354C shall not apply.

(Mainly sourced from Cap 354C s 17 Storage in large fixed containers)

8.5 Transportation

(1) When a waste collector delivers any chemical waste at a reception point he shall hand over to the manager of the reception point the original and one copy of the trip ticket containing the particulars furnished under sections 22(1) and 23(1) of Cap 354C.

(Mainly sourced from Cap 354C s 25 Delivery of chemical waste by waste collector)

8.6 Disposal

(1) Subject to subsection (2) and any directions issued by EPD under section 17 of the Ordinance (WDO), Sang Hing Civil - Richwell Machinery JV shall cause or arrange for any chemical waste produced by him or in his possession or custody-
   (a) to be delivered to a reception point; or
   (b) where an appropriate waste disposal licence has been granted under section 21 of the Ordinance (WDO) in respect of the site or premises where the chemical waste is located or produced, to be disposed of at such site or premises.

(2) Where the nature of the chemical waste is such that a reception point, site or premises referred to in subsection (1) which is suitable for the disposal of the chemical waste is not available in Hong Kong, Sang Hing Civil - Richwell Machinery JV shall make other arrangements for the disposal of such chemical waste and such arrangements shall be subject to the approval in writing of EPD.

(3) Where a waste producer consigns chemical waste to a waste collector under section 21 he shall be deemed to have complied with subsection (1)(a).

(4) Without prejudice to any provision in Part V, EPD may require Sang Hing Civil - Richwell Machinery JV to produce such documents, records or any other information as EPD may consider necessary to establish to his satisfaction that subsection (1) or (2), as the case may be, has been complied with.

(5) A waste producer who fails to comply with-
   (a) subsection (1) or (2) commits an offence and is liable to a fine of $200000 and to imprisonment for 6 months; and
   (b) a requirement made under subsection (4) commits an offence and is liable to a fine of $100000 and to imprisonment for 6 months.

(6) Subsection (5)(a) shall not apply where the chemical waste is stored as required under section 9 of Cap 354C.

(7) Throughout the works, wastes shall be removed from site in a timely manner. General refuse is collected on a daily basis.

(Mainly sourced from Cap 354C s 8 Disposal of chemical waste)

(9) GENERAL REFUSE

Each year, millions of tonnes of waste are disposed of in Hong Kong - enough to fill a 13-storey building over Victoria Park. Separated waste can be recycled to make useful products. Recycling is not only good for the environment, it can also conserve resources and save money. Recovery rate of municipal solid waste in Hong Kong was 34% (about 1.8 million tonnes).

Major initiatives are:-

- Enhancing collection of separated waste and adding newly designed separation bins, so that wastes can be sorted and disposed of in different dumpsters.
- Introduction of a helpline on recycling.
- Enhancing labour education and community work.
- Top management setting examples on waste reduction.
- Reinforcing producer responsibility scheme.

9.1 What Types of Waste Paper can be Recycled?

TYPES OF PAPER THAT CAN BE RECYCLED	TYPES OF PAPER THAT CANNOT BE RECYCLED
• Brochures & Publicity materials	• Used paper cups or paper dishes
• Magazines & Books (remove laminated cover)	• Facial tissues, toilet paper or paper towels
• Envelopes (remove plastic window)	• Beverage cartons
• White/Coloured writing paper	• Thermal fax paper/Thermal paper
• Newspapers	• Plastic laminated paper
• Cartons	• Carbon paper/Wax paper
• Cardboards	• Cellophanes
	• Stickers

9.2 What Types of Aluminium Cans can be Recycled?

All types of aluminium cans can be recycled. The most common found in construction sites are:

- Soft drink cans

Points to note:

- Do not put iron cans into a recycling bin.
- Wash aluminium cans to prevent insects breeding.
- Remove plastic straws.

9.3 What Types of Plastic Bottles can be Recycled?

All types of plastic bottles can be recycled. The common found in construction sites are :

- Bath cream bottles
- Beverage bottles
- Detergent bottles
- Shampoo bottles

Points to note:

- Remove fluid, metal & paper from the bottle before putting into recycling bins.
- Wash plastic bottles to prevent insects breeding.

9.4 Arrangement for Collection of Recyclable Materials by Recycling Contractors

- Make arrangement with potential recycling contractors to facilitate that recyclable materials sorted from the Site.
- Record the quantities of all the recyclable materials before removal off sites by the recycling contractors and include the details in the Waste Flow Table. The monthly waste flow table is attached in Annex B.
- Regular meeting with the recycling contractors reviewing the method for the recyclable materials sorted from Site.

(10) DISPOSAL OF SURPLUS C&D MATERIAL

10.1 Disposal Outlets

Public Fill Reception Facilities
[Designated] Tuen Mun Area 38

Landfills
[Designated] North East New Territories Landfill(NENT)

A trip ticket system is adopted under the contract. The billing account for the trip ticket system is under Sang Hing Civil - Richwell Machinery JV with account number 7017351.

10.2 Transportation of the C&D Material

- The Contractor shall produce a Construction and Demolition Material Disposal Delivery Form (the Form) for each and every vehicular trip transporting construction and demolition (C&D) material, i.e. public fill or C&D waste, removed from the Site. The Contractor shall complete the Form in duplicate except for the Time of Departure. Sample of the form is at Appendix 25.8 this Particular Specification.

- Prior to the vehicle leaving the Site, the Contractor shall present to the site supervisory staff the completed Form. The site supervisory staff shall insert the Time of Departure and stamp the Form. The site supervisory staff shall retain a copy of the Form and return the original to the Contractor. The Form shall be carried on board the vehicle at all times throughout the vehicular trip. And the C&D materials will be properly covered before leaving the site.

- For each vehicular trip, the Contractor shall obtain a receipt from the operator of the public filling facility or the landfill. The Contractor shall submit the original receipt to the Engineer's Representative within 5 working days of the vehicular trip. Late return without any acceptable reason might be regarded as non-compliance by the Engineer's Representative.

- The Contractor acknowledges and shall permit the Engineer's Representative to request and obtain information from the operator of the public filling area or the landfill verifying the receipt and the accuracy of the information on that receipt.

10.3 Mechanism for Recording C&D Materials Removed Off Site

- Establish a disposal delivery form to ensure proper disposal of C&D materials.

- The disposal system shall include the followings:
  1. a form to be prepared in duplicate for each and every vehicular trip of transporting C&D materials off site.

  2. a method for estimation of the load for inert C&D materials, metals, papers / cardboard or other C&D wastes from the Site.

  3. a mechanism for collection of the returned form together with the receipt from public filling areas or landfill sites after each vehicular trip.

  4. a register for each vehicular trip to be ready for inspection by the Engineer upon request.

  5. Throughout the works, records of quantities of wastes generated, recycled and disposed are properly kept. For demolition material/waste, the number of loads for each day shall be recorded so that quantity of waste can then be estimated based on average truck load and the receipts of the charge could be used for estimating the quantity for landfill charges.

(11) SITE CLEANLINESS

11.1 5S Policy

Through the valuable experience of gaining from supporting the **"Good Housekeeping Day"**, we will continue to implement the 5S policy in a more effective and systematic manner.

The 5S,"Oragnisation", "Neatness", "Cleaning", "Standardization", and "Discipline" which originated in Japan, is one of the efficient methods to promote cleanliness and tidiness of working environment. Besides stressing on-site management, the 5S in fact embraces the meaning of cultivating among employees a habit of maintaining a clean, tidy and well organised workplace so as to enhance the safety and healthiness of the working environment.

Organization	Efficiency begins from organization of things
Neatness	To avoid wasting time in searching, a well organized storage system is needed
Cleaning	Frequent clean-up is needed to ensure the work place being kept in a clean, tidy and safe condition
Standardization	Only a clean and dirt-free working environment allows employees to work safely and healthily
Discipline	Discipline is the first and end of 5S and it is a way of cultivating good safety culture

11.2 Tidying Up after Work

This step is designed to ensure that all the equipment, tools, instruments and environment of the workplace are tidied up after a day's work including waste storage areas to avoid windblown litter and dust nuisance throughout the works, in preparation for the next day's work. This process consists of more than a general cleaning. It is based on the 5S housekeeping practice. Everyone should have a clear understanding of the 5S concept. Based on the practice priorities, all required materials and tools are classified and stowed accordingly before the end of a day's work.

- Benefits

1. Tidying up materials, equipment and tools help reduce accidents.
2. Efficiency is enhanced.
3. After-work tidying up assists to maintain a safe environment when workers return to work the next day.

- How to implement

Participants : All workers.
Equipment : Brooms, shovels, garbage containers, wheel burrow and storage containers.

- Methods

1. Each worker must tidy up his/her own work area after he/she finishes his/her work for the day, applying the 5S techniques.
   - Basic principles:
   - Determine the location and the methods for storing the materials, equipment and tools.
   - Set aside storage stations for wastes.
   - Provide containers for different wastes.
   - Properly dispose of unused materials.
   - Keep the passageways clear.

2. In order to meet standards set up by the organization for tidying up, special attention should be paid to the following:
   - Spilled oil.
   - Water source.
   - Drainage.
   - Rubbish.
   - Passageways.
   - Fire sources.
   - Power suppliers.
   - Machineries locked.
   - Tools back in designated place.

3. There should be guidance in place for tidying up. If necessary, select specialist contractors to assist as early as possible.

- Venues : Workplace under each worker's responsibility.

- Points to note

1. Workers must understand the whole set of procedures of 5S good housekeeping practices. It is more than just discarding the trash.
2. Person-in-charge of the site must allocate sufficient space for stowing materials/wastes.
3. Since the workplace may pose a threat to safety & health before tidying up, the tidying up crew must collect, store/discard wastes, especially hazardous materials and those with toxic property according to the safety instructions.
4. Proper label should be affixed on containers for dangerous substance.
5. Rewards should be given to those workers who have done a good housekeeping work.

In addition, daily cleaning and weekly tidying record will be prepared and endorsed by AECOM representative. The checklist is attached in Annex A.

(12) MONITORING AND AUDITING

The actual amount of waste produced will be dependent on the practice and experience of each company. The wastage level should be compared with the norm, i.e. the average performance of the industry. More importantly, material and waste audits should be carried out in order to identify areas that can be improved in subsequent projects. The procedure for carrying out a material and waste audit is as follows:

- Record the quantities of materials employed on construction sites.
- Record the storage for the materials periodically.
- Record the quantities of work done using each material periodically.
- With the data available, monitor the material wastage level periodically by comparing the quantities of materials used the corresponding quantities of work done.
- Investigate the causes of material wastage.
- Evaluate the effectiveness of corrective measures.
- Compare with the company material waste level standard.
- Recommend preventative measures to reduce material wastage levels.
- Recommend methods to reduce construction waste.
- Set up a computerized data collection system for material and waste audit purposes.
- Arrange weekly inspection attended by the Site Agent, to ensure satisfactory performance on compliance with the WMP with due regards. Also ensure solid and liquid wastes generated from construction site are not disposed into surrounding river course or storm drains.

- The following items shall be included in the agenda at every Site Safety and Environmental Management Committee Meeting and the Site Safety and Environmental Committee Meeting.

    1. Review the WMP including the quantities and types of C&D materials generated, reused and disposed off-site, the amount of fill materials imported to the Site and quantify of timber used in temporary works for each construction process / activity.

    2. Monitor the achievement of the WMP to assess its effectiveness.

    3. Monitor the follow-up action of defects and deficiencies identified.

- The following performance targets should be adopted, in order to facilitate assessment of the effectiveness of the waste management measures.

    1. All excavated materials should be sorted to recover the inert portions for reuse on site or disposal to designated outlets.

    2. All metal should be recovered on site for collection by recycling contractors.

    3. All cardboard and paper packaging (for plant, equipment and materials) should be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other C&D materials.

    4. All demolition debris from demolition works should be sorted to recover on site broken concrete, reinforcement bars, mechanical and electrical fittings as well as other building services fittings / materials that have established recycling outlets.

(13) LICENSE AND PERMIT

Active License and Permit

License and Permit	STATUS
EP-404/2007	ACTIVE
WASTE DISPOSAL ACCOUNT	ACTIVE
DISCHARGE PERMIT	ACTIVE
CHEMICAL WASTE PRODUCER	ACTIVE

(14) RECORDS

The Contractor shall keep adequate and proper records (such as delivery docket, photographs and measurement records) relating to the implementation of the WMP.

The forms to be observed relevant to the execution of the Works including, but not be limited to:-

- Construction and Demolition Material Disposal Delivery Form
- Final Check List
- Other than the records in the WMP, the relevant standard tables / forms which are appropriated for this Contract, will be used.

-END-

Appendix A

Daily Cleaning and Weekly Tidying Record

Inspection Checklist for Daily Cleaning

Contract No.: CV/2013/03

Contract Title: Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 5

Inspection Location:

Inspected By: _____ Checked By: _____

Inspection Date: _____ Date: _____

Item No.	Description of Checking	Compliance			Action Required	Remarks
		Y	N	N/A		
1	Maintenance of passageways, common access and public areas free of obstructions. 保持行人路, 公共通道及公共地方暢通無阻					
2	Proper storage and stacking of materials. 適當儲存及堆放物料					
3	Proper placement and storage of tools and equipment after work. 工作後適當放置及儲存工具及設備					
4	Proper sorting, storage and / or disposal of waste materials. 適當分類, 儲存及棄置廢料					
5	Proper securing of hoarding, barriers, guarding, lighting, signing of works. 適當穩固工程的圍街板, 欄河, 照明, 標誌					
6	Prevention and removal of water ponds and flooding 清理積水, 防止水浸					
7	Clearing of stockpiling and wastes arising from the works. 清理工程所產生的貯存物及廢物					
8	Conditions of cleanliness and tidiness of the Site including Public Cleaning Areas in perspective of general public. 地盤 (包括公共地方) 的清潔及齊整					
9	Removal of rubbish and debris dumped into the Site by public 清理公眾所棄置於工地上的垃圾及殘礫					
10	Other cleaning requirements as instructed by Engineer's Representative. 工程師代表的其他清潔要求					

Y - Yes N/A - Non Applicable

N - No

Inspection Checklist for Weekly Tidying

Contract No.: CV/2013/03

Contract Title: Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 5

Inspection Location:

Inspected By: _____ Checked By: _____

Inspection Date: _____ Date: _____

Item No.	Description of Checking	Compliance			Action Required	Remarks
		Y	N	N/A		
1	Through cleaning of passageways, common access and public areas. 清潔行人路, 通道及公共地方					
2	Re-organizing of storage materials for better utilization of storage spaces and safe stacking. 重新安排物料的存放以致善用存放空間及安全的堆放					
3	Maintenance and re-conditioning of tools and equipment. 保養及維修工具和設備					
4	Collection and removal of wasted materials off site. 收集及清理廢料離開工地					
5	Cleaning, re-conditioning and replacement of hoarding, barriers, guarding, lighting, signing of works to good working conditions. 清潔, 維修及更換工地上的圍街板, 欄河, 照明, 標誌致良好的工作狀態					
6	Cleaning of drains and channels to prevent flooding. 清理排水管道及渠坑, 以防止水浸					
7	Other cleaning requirements as instructed by Engineer's Representative. 工程師代表的其他清潔要求					

Y - Yes N/A - Non Applicable

N - No

Appendix B

Monthly Waste Flow Table

Appendix B

Monthly Summary Waste Flow Table

Name of Department:

Contract No.: CV/2013/03

Monthly Summary Waste Flow Table for Reporting Month

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes :

(1) Note Used.

(2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Sites.

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.

(4) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring.

Appendix C

Estimated Timber Used Form

Appendix C

Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

Contract No.: CV/2013/03

Contract Title: Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 5

Report Period:

Item No	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m^3)	Actual Quantities used (m^3)	Remarks
		Total Estimated Quantity of Timber Used			

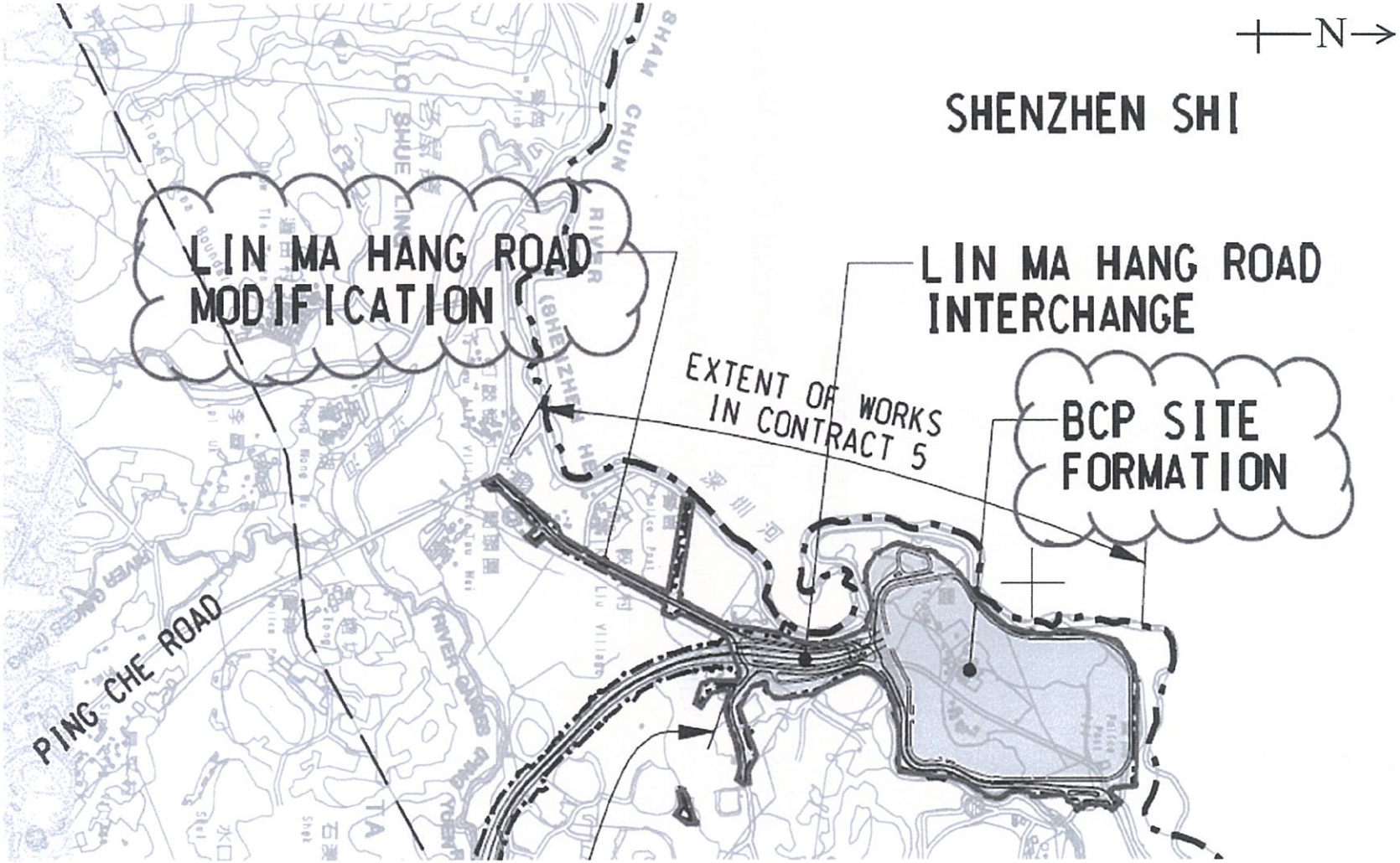
Notes

(a) The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.

(b) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring

Appendix D

Site Location Plan



Location Plan of Site

生興土木 - 顯豐機械聯營
Sang Hing Civil - Richwell Machinery JV

Appendix E

Daily Record Summary for disposal C&D Waste Material from Site (PS Appendix25.6)

Appendix 25.6
(PS Clause 25.25(6)(a)(ii))

"Daily Record Summary" to record daily disposal of construction & demolition (C&D) materials from the *Site
"每日運載記錄摘要" 記錄每日由*地盤所棄置的建築物料

(1) Contract no. & title 合約編號及名稱：_____

(2) Date of disposal 棄置日期: _____

(3) Disposal ground (s) designated in the Contract or directed by the Architect/Engineer 合約指定或建築師/工程師指示接收設施: (a)

(b) Others 其它

(4) Approved alternative disposal grounds 其可接受的接收設施_____

CHIT/ DDF no. 運送入收紙/ 拆建物料運載記錄單編號	Vehicle registration mark 車輛登記號碼	Approx. vol (e.g. Full/Three Quarter/Half/One quarter) 大約承載量 (例如全、3/4、半、1/4)	C&D materials type (e.g. inert or non-inert) 建築廢料類別 (例如惰性或非惰性)	Disposal ground 接收設施	Signature & Name of the Contractor's Designated person before departure 於離開地盤前，承建商的指定人仕姓名及簽名	Departure time from *Site 離開地盤時間	Signature & name of the Architect/Engineer's supervisory staff before departure or other times as agreed between the Architect/Engineer's Representative and the Contractor 於離開地盤前或其它經示建築工程師代表同意的時間，建築師/工程師監督人員姓名及簽名	Actual disposal ground 真正接收設施	Arrival time at disposal ground 抵達接收設施時間	Remarks 備註

Part 1[2] 甲部 — Part 2[3] 乙部

Submitted by 呈交： _____ *[Name of Contractor's Designated Person 承建商的指定人仕姓名]*

Signature 簽名： _____

Date 日期: _____

Received by 接收： _____ *[Name and signature of the Architect/Engineer's staff] 建築師/工程師監督人員姓名及簽名*

Post 職位： _____

Date & Time 日期及時間： _____

[1] For term contract, if there are no full time site supervisory staff, the Architect/Engineer's supervisory staff should spot check and then sign as appropriate in accordance with paragraph 25 of DEVB TC(W) 6/2010 定期合約，如沒有全職地盤監管人員，應根據 DEVB TC(W) 6/2010 的第 25 段進行定點檢查及簽署

[2] Part 1 甲部- The Contractor shall complete Part 1 in duplicate and a copy should be kept by the Architect's/ Engineer's Representative. 承建商須填寫甲部兩份，副本由建築師/工程師代表持有

[3] Part 2 乙部- The Contractor shall complete Part 2 and submit the whole Summary to the Architect/Engineer's Representative within 1 working day after the records are posted at the EPD web-site. 承建商須填乙部及將整份運載記錄簿要於登錄上載在環境保護署網頁後 1 個工作天內呈交給建築師/工程師代表

*Delete "Site" and substitute "Sites" for term contracts 定期合約刪"Site" 刪去及以"Sites"代替

生興土木 - 顯豐機械聯營
Sang Hing Civil - Richwell Machinery JV

Appendix F

Weekly Environmental Walk Inspection Report

Weekly Environmental Walk Inspection Report

Summary of Follow-up Actions

Part I :

Contract No. _____ Contract Title _____

Date of Inspection _____ Time _____

Persons making the inspection:

Name in Block Letters	Designation	Signature
1.	Contractor's Agent (or his representative if agreed by A/E)	
2.	Environmental Officer (or Environmental Supervisor if agreed by A/E)	
3.	Architect/Engineer's nominated site representative	
4.		

Item No.	Location	Situation Requiring Follow-up Action	Agreed Due Date for Completion	Date Completed	Remarks
1.					
2.					
3.					
4.					
5.					
6.					

To be signed at the end of inspection:
The Contractor's performance on nuisance abatement and waste management *is/is not to the satisfaction of the Architect/Engineer's nominated site representative at the time of inspection. (* delete as appropriate)

Architect/Engineer's nominated site representative _____ Contractor's Agent or his representative _____

Part II : (To be countersigned after ALL actions are completed)

Contractor's *Environmental Officer/AssignedPerson _____ Architect/Engineer's Representative _____

Date _____ Date _____

(Note: No payment will be made for the item of "Weekly Environmental Walk" under the PFSES if the Contractor's site environmental and waste management performance is not satisfactory, or any one of the follow up actions is not completed on or before the "Agreed Due Date for Completion".)

Appendix G

Summary Table for Work Processes or Activities

Requiring Timber for Temporary Works

Summary Table for Work Processes or Activities Requiring Timber for Temporary Works

Contract No.: _____

Contract Title: _____

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m^3)	Actual Quantities used (m^3)	Remarks
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
		Total Estimated Quantity of Timber Used			

Notes:
(a) The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.
(b) The summary table shall be submitted to the *Architect/Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS sub-clause 5(5) in Appendix C.