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1.0 Introduction

1.1 Project Description

One of the Government Departments of the Hong Kong Special Administrative Region (hereafter referred as 'the Client') intends to construct a Green Park in Stanley Bay of South Hong Kong Island and its essential associated infrastructure (hereafter referred as the Project). Proposed facilities include the Green Park, entertainment, retail and dining outlets, resort hotel with 100 rooms, and essential supporting services. New roads, public transport interchange, vehicle parking areas, and associated stations will provide direct transport links to the proposed park.

Wan Bao Construction Limited (WBC) has been awarded the Contract CV/2006/WMP-01 for Stanley Bay's Development Contract by Client. The construction work is scheduled to commence in Jan 2006 and will be completed tentatively by Dec 2006. The contract include the following designated projects:

Western Storm water Drainage Channel at Stanley Bay;

- Construction and operation of drainage channel which discharges into an area, where is 800 m away from the St. Stephen's Beach;

Chung Hom Kok Link Road;

- Construction of the site formation for about 1.5 km of a road, which is an expressway.

ABC Environmental Consultant Firm (ABC) has been commissioned by WBC to undertake environmental management and monitoring works in compliance with the legal and contractual requirements for the Contract CV/2006/WMP-01 of Infrastructure for Stanley Bay's development.

This WMP has been developed to properly manage the waste generated from various construction activities. The WMP, which is based on, but not limited to the following documents:

- Environmental Impact Assessment (EIA) Report – AEIAR-168/2006;
- Environmental Permit No. 168/2006/A;
- ETWBTC No. 15/2003 Waste Management on Construction site
- ETWBTC No. 34/2002 Management of Dredged / Excavated Sediment
- ETWBTC No. 33/2002 Management of Construction and Demolition Material Including Rock
- Relevant HK SAR legislation in relation to waste management, and
- Construction Program / Method Statement provided by WBC.

The WMP sets out the procedures and requirements for proper waste management throughout the contract duration.

2.0 Waste Management Policy

Waste Management Policy for Contract No. CV/2006/WMP-01

Wan Bao Construction Limited (WBC) is committed to minimizing, handling, storage, transportation and disposal the generation of Construction and Demolition (C&D) materials in an environmentally friendly manner throughout the construction period for contract CV/2006/WMP-01.

In order to minimize the C&D materials and other associated wastes, we shall:-

- Ensure all excavated materials should be sorted to recover the inert portions (e.g. soil and broken rock) for reuse on site or disposal to designated outlets (e.g. public filling areas);

- *Ensure all metal should be recovered on site for collection by recycling contractors;*
- *Ensure 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;*
- *Ensure 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.*
- *Educate, train and motivate employees to implement the waste management on the site;*
- *Provide sufficient resources and facilities for the implementation on waste management;*
- *Communicate to all levels of staff regarding to their participation in this waste management plan.*

We commit that our waste management performance will undergo continual improvement through periodic audit and inspection.

Endorsed by

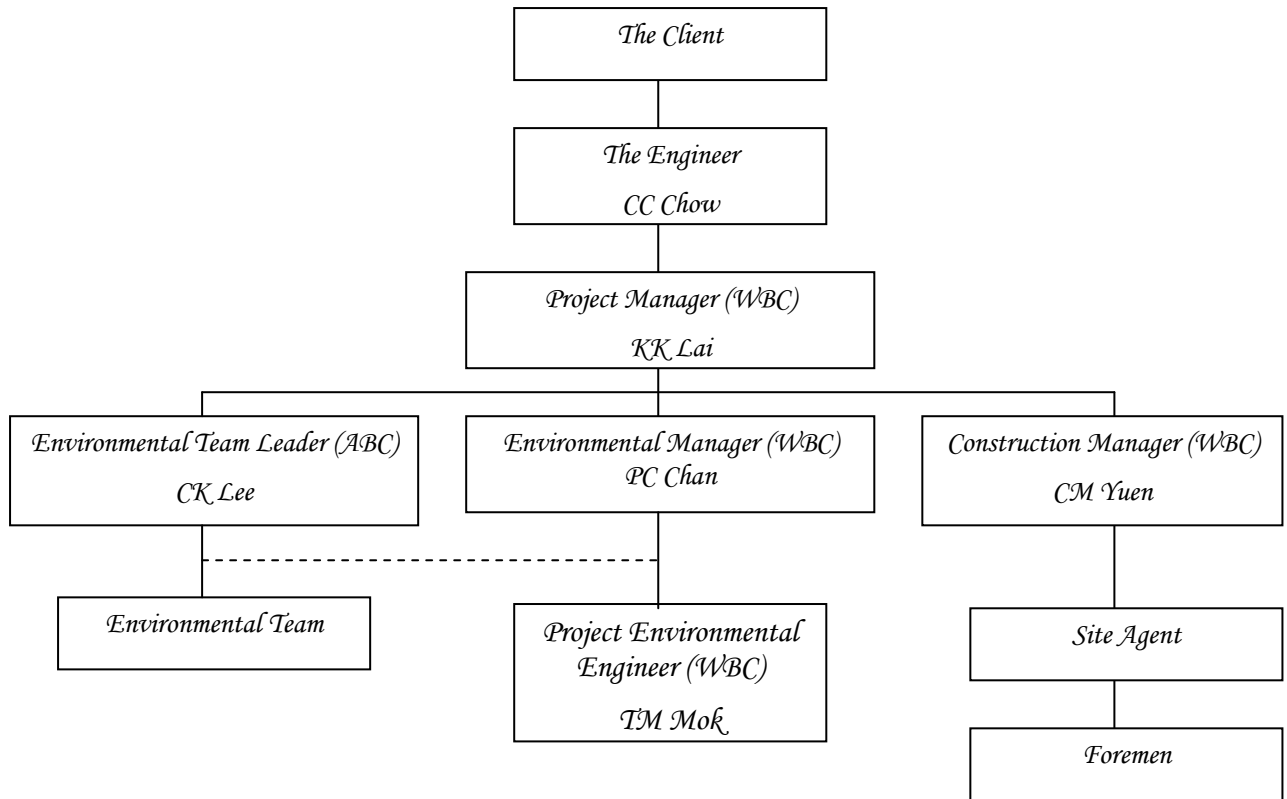


General Manager of

Wan Bao Construction Limited

1/1/2006

3.0 Organizational Structure for Waste Management



Details of contact phone list shown in Appendix A

4.0 Duties and Responsibilities

Project Manager

The Project Manager (PM) will maintain overall control of the Project and oversee the implementation of the WMP. He is also responsible to ensure adequate resources are provided for the implementation of the WMP. The PM reports to the Engineer, and Project Team on environmental matters.

Environmental Manager

The Environmental Manager (EM) is responsible for overseeing the waste management programme of the Project. He reports directly to the PM. He is also responsible for maintaining waste records and properly management of environmental emergency and preventive / corrective actions. The EM will deliver toolbox talk on waste management to site staff regularly. The EM will also coordinate with the Construction Manager to ensure proper implementation of mitigation measures on waste management.

Construction Manager

The Construction Manager (CM) is responsible for the day-to-day overview of site practices in relation to waste management. They will assign Site Agent, Foremen and Site Supervisors to assist the daily supervision and enforcement of the on-site mitigation measures. The CM communicates directly with ET and PM on waste management issues regularly. The CM will ensure all waste records are forward promptly to the EM for record and/or action as necessary.

Environmental Team Leader (ABC Environmental Services and Consulting Ltd)

Representative from ABC is responsible to become the Environmental Team Leader (ETL) and he will maintain overall control of the monitoring and professional services to be provided by the Environmental Team. He reports directly to the EM. His major responsibilities include the following:

- Provide assistance and guidance to WBC in the implementation of waste management plan;*
- Identify the potential hazardous waste whenever possible and take preventive actions;*
- Provide briefing to the project team as necessary and carry out waste management audit.*

Project Environmental Engineer

The Project Environmental Engineer (PEE) will assist the ETL to oversee and ensure the required waste management practices are properly implemented and deliver briefing sessions to site staff as necessary.

Environmental Team

WBC has set up an Environmental Team (ET), and the responsibilities of ET for waste management are:

- To ensure the wastes arising from works are collected, handled, stored, transferred and disposed of in an environmentally acceptable manner and comply with the relevant requirements under the Waste Disposal Ordinance (WDO) and its regulations;*
- To ensure that WBC properly implement the appropriate environmental protection and waste management measures to minimize and control the potential waste impacts;*
- To ensure the effective implementation of WBC Environmental Management System and WMP;*
- To monitor the environmental parameters as specified in this WMP; and*
- To encourage the reuse and recycling of materials.*

5.0 Legislation and Guidelines

Legislative Requirements

Relevant HKSAR legislation relates to the handling, treatment and disposal of wastes probably associated with the project include the following:

- The Waste Disposal Ordinance (Cap354);
- The Waste Disposal (Chemical Waste)(General) Regulation (Cap354);
- The Land (Miscellaneous Provisions) Ordinance (Cap28)
- The Public Health and Municipal Services Ordinance (Cap132) – Public Cleansing and Prevention of Nuisances
- The Storage, handling and disposal of chemical waste should be audited with reference to the requirements of the Code of Practice on the Package, Labelling and Storage of Chemical Wastes published by the EPD; and
- The Dumping at Sea Ordinance (Cap466)

WBC will observe all applicable statutory requirements, legislation and associated regulations, and/or code of practices with regard to the waste to be generated in the construction activities. WBC will also apply all necessary permits and licenses under these ordinances / regulations.

Additional Guidelines

The ET will observe throughout the construction period the following documents and guidelines that are also considered of relevance to the Project:

- Waste Disposal Plan for Hong Kong (December 1989), Planning, Environmental and Lands Branch, Hong Kong Government Secretarial;
- Environmental Guidelines for Planning in Hong Kong (1990), Hong Kong Planning Standards and Guidelines, Hong Kong Government;
- New Disposal Arrangements for Construction Waste (1992), Environmental Protection Department and Civil Engineering Department;
- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), Environmental Protection Department;
- Works Bureau Technical Circular No.22/92, Marine Disposal of Dredged Mud;
- Works Bureau Technical Circular No.2/93, Public Dumps;
- Works Bureau Technical Circular No.16/96, Wet Soil in Public Dumps;
- Works Bureau Technical Circular No.5/98, On site Sorting of Construction Waste on Demolition Sites;
- Works Bureau Technical Circular No.5/99, Trip-ticket System for Disposal of Construction and Demolition Material;
- Works Bureau Technical Circular No.6/2002, Enhanced Specification for Site Cleanliness and Tidiness;
- Works Bureau Technical Circular No.15/2003, Waste Management on Construction Sites.

License Requirement

- *Registration as a Chemical Waste Producer*

Under the Waste Disposal (Chemical Waste) (General) Regulation, producers of chemical waste (including asbestos) must register with the Environmental Protection Department (EPD).

- *Dumping License to Public Filling Area*

The Land (Miscellaneous Provisions) Ordinance requires that individuals or companies who deliver suitable construction waste to public filling areas should hold dumping licenses. The license is issued by the Civil Engineering Department (CED) under delegated powers from Director of Lands. These licenses will be applied for as required.

6.0 Classification and Estimation of Construction & Demolition (C&D) Materials**6.1 Excavated Materials**

Excavated materials are defined as inert virgin or reclamation fill materials removed from the ground and sub-surface. The excavated surplus materials will be generated substantially from the works for box culvert construction, water drainage channel, flood storage pond and site formation of temporary road and permanent road.

The excavated materials from the construction works of the Project are mainly sand / soil / rock. The estimated volumes of these excavated materials are:

- *Excavated surplus material from formation work of box culvert, approximately 200,000m³ for a duration 24 months (from January 2006 to December 2008)*
- *Excavated surplus materials from formation work of drainage channel, approximately 250,000m³ for a duration of 7 months (from January 2006 to July 2006)*
- *Excavated surplus materials from slope cutting for preparation of temporary road and permanent road, approximately 640,000m³ for a duration of 18 months (from January 2006 to June 2008); and*
- *Material from blasting, with an approximate volume of surplus material of 260,000m³ for a duration of 6 months (from June 2007 to November 2007).*

About 2 to 3 million m³ surplus material will also be generated from the site of multi-functional lake where presently is being surcharge, and the planned handover date to WBC for the works in this area will be August 2006. This surplus material (classified as Public Fill Material) together with the quantity mentioned above will be reused on-site, subject to the confirmation and instruction from the Engineer and the Civil Engineering Department.

6.2 C&D Materials

In general, the C&D materials to be generated from the construction works include the following categories:

Site Clearance:

- *Brick, concrete, reinforcement bars, H-beam pile and pipe-work and other rubble;*
- *Derelict equipment, plant and furniture;*
- *Wood and general refuse.*

Construction Works:

- *Wood from formwork and false work;*

- Equipment and vehicle maintenance parts;
- Material and equipment wrappings;
- Spoil materials;
- Unusable or surplus cement / grouting mixes; and
- Damaged / surplus / contaminated construction materials.

It is also expected that the volume of C&D material during construction works would be less than those generated from excavation and demolition operations. Some structural segments will be pre-cast off-site, and be delivered to the workplace for erection so as to minimize on-site concreting activities. Thus, the volume of C&D material generated from surplus construction material from concreting works and demolition activities can be further reduced.

For the C&D material generated from demolition activities, the estimated total amount is about 13,500m³, throughout the construction period of the Project, and this will be stockpiled on site as Public Fill Material to be re-used for other contracts.

The C&D materials arising throughout the construction period are generally classified into inert and non-inert material.

6.2.1 Inert C&D Materials (Public Fill Material)

Inert demolition and excavation materials include earth, building debris, broken rocks, asphaltic concrete, dirt/soil, bricks, tiles, masonry, mortar, plastic, ceramic/ceiling tiles, etc., which comply with the requirements of the Public Dumping License issued by Civil Engineering Department (CED). These materials can be delivered to construction sites by dump trucks through internal haul roads used as fill materials and to public filling areas for disposal. The above surplus excavated material also classified as inert C&D material.

6.2.2 Non-inert C&D Materials (C&D Waste)

Non-inert C&D materials include demolition waste containing plastic, glass, wood, bamboo scaffolding, reinforced concrete, etc., which consist of less than 20% by volume or 30% by weight of inert material. These C&D materials will be transported to landfill sites for final disposal.

The below Waste Flow Table (WFT) – Table 1, provides the estimated quantities of inert and non-inert C&D materials specified in the Contract CV/2006/WMP-01 to be imported for use in the Project. WBC will update the yearly WFT on a half-yearly basis and submit it to the Engineer for incorporation into this WMP (Appendix B shown a yearly WFT table to be implemented by WBC). A monthly WFT to record the actual quantities of C&D materials will be generated each month on the site and submit the WFT to the Engineer, together with other updated sections of the WMP (if any). (Appendix C shows a monthly WFT table to be implemented by WBC)

Table 1 – Waste Flow Table (WFT)

<u>Type of C&D Material</u>	<u>Estimated QTY (m³)</u>	<u>Duration of C&D Material Generation</u>	<u>Remark</u>
Inert Portion of C&D Material (Public Fill)			
Public fill that can be reused and/or recycled.	<ul style="list-style-type: none"> • From excavation works for box culvert construction, 200,000m³ • From excavation works for drainage channel construction, 250,000m³ • From slope cutting, 	<ul style="list-style-type: none"> • 24 months (from Jan 2006 to Dec 2008) • 7 months (from Jan 2006 to Jul 2006) 	The total amount of public fill generated will be in the range of approximately 3.36 to 4.36 Mm ³ . All the materials will be stockpiled within the works

	<p>640,000m³</p> <ul style="list-style-type: none"> • From blasting operation 260,000m³ • From demolition activities, 13,500m³ • From excavated surplus material at the present work area of multi-function lake, 2-3 Mm³ 	<ul style="list-style-type: none"> • 18 months (from Jan 2006 to Jun 2008) • 6 months (from Jun 2007 to Nov 2007) • Throughout the duration of the Contract. • Approx. 6 months starting from Aug 2006 	<p>area of Stanley Bay to be re-used by other contracts subject to the confirmation of the Engineer and Client.</p>
Surplus public fill to be delivered to public filling facilities	Nil	N/A	N/A
Surplus public fill to be delivered and re-used at WBC outlets as approved by the Engineer	Nil	N/A	None approved by the Engineer
Non-inert portion of C&D Material (C&D Waste)			
C&D waste to be recycled	Nil	N/A	N/A
C&D waste to be reused	Nil	N/A	N/A
C&D waste to be returned	Nil	N/A	N/A
C&D waste which has to be disposed of at landfills	Nil	N/A	N/A

6.3 Chemical Wastes

Chemical waste, as defined under the Waste Disposal (Chemical Waste)(General) Regulation, includes any substance being scrap material, or unwanted substances specified under Schedule 1 of the Waste Disposal Regulations. The following items are chemical waste that may be generated during the construction stage:

- Scrap batteries or spent acid / alkali from maintenance;
- Oil retrofitting and used engine oil;
- Hydraulic fluids;
- Used air, oil and fuel filters from machinery;
- Spent mineral oils / cleaning fluids from machinery; and
- Spent solvents / solutions from equipment cleaning activities.

Although chemical waste will be generated throughout the whole construction period, it is anticipated that the quantity, in particular the lubricating oil and solvent chemicals produced from plant usage and maintenance, will not be significant. The estimated monthly generation of used lubricant will be approximately 200 litres/month.

6.4 General Refuse and Other Wastes

General refuse and food waste generated on site will be collected and stored in enclosed bins and plastic bags in the refuse storage yards. Waste collector will be employed to remove the refuse from the site on a daily basis.

Paper Wastes

Office paper will be the major waste generated from the site office. It is estimated that the weight of waste paper generated for the project will be around 5 – 10 tons per year. Waste paper reduction programme will be implemented, and use of both sides of office paper will be encouraged. In addition, subcontractor will collect waste paper for site recycling.

Plastic Wastes

Plastic wastes identified from the construction site include plastic bottles / containers, plastic sheets / foam from equipment or material packaging. The estimated amount of plastic wastes to be generated throughout the construction period will be 3 tons, and they will be collected by the licensed local waste plastic collector for proper treatment and recycling if possible.

Metal Wastes

Sources of potential metal wastes are including the reinforcement bars and metal parts, etc. Any metal waste generated from the construction site, they will be reused as far as possible, otherwise licensed collectors will be employed to collect and recycle the waste metal properly. The estimated quantities of metal wastes are 10 – 20 tons per month.

7.0 Measures to Reduce / Minimize Generation of C&D Materials

WBC shall identify and list out the work processes or activities that will generate C&D materials during construction and the proposed effective measures to reduce / minimize such generation in particular metallic waste, timber, paper / cardboard packaging and chemical waste. In addition, WBC shall ensure:

- Proper planning for works,
- Good management such as minimizing over-ordering,
- Avoiding cross contamination to reusable and/or recyclable materials collected,

- *Optimising the use of metal formwork or other work process to reduce or minimize the use of timber in temporary works construction and*
- *Maximising the reuse of excavated inert C&D materials within the site etc.*

To demonstrate WBC's commitment on good waste management, the following performance targets should be adopted:

- *All excavated materials should be sorted to recover the inert portions (e.g. soil and broken rock) for reuse on site or disposal to designated outlets (e.g. public filling areas);*
- *All metal should be recovered on site for collection by recycling contractors;*
- *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;*
- *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.*

7.1 General Refuse and Other Wastes

Paper wastes from site offices is expected to be the predominant waste type. WBC will take every attempt to minimize waste generation by:

- *Reducing the number of photocopies to a minimum;*
- *Utilizing notice board to deliver message to site staff and minimizing printing hard copies of correspondence where possible;*
- *Copying documents on both sides of paper for both internal and external documents where possible; and*
- *Providing electronic communication facilities (e.g. email) to further reducing printing of hard copies for daily correspondence where possible.*

Packaging of materials (e.g. polystyrene sheets) shall be minimized at all times. Briefing to workers about the concepts of site cleanliness and appropriate use of materials, including reduction, reuse and recycling shall be prepared by PEE to ensure initiation measures are properly implemented.

Site staff shall be encouraged to use reusable rather than disposable dishware on site. If there is any generation of food wastes, they should enter the provided garbage bin around the site for proper collection by appointed collectors. PEE is responsible to ensure all garbage bins equip with a cover. In case of rainy season, all garbage bins must be covered properly to prevent any breeding of mosquito or other disease, and this verification can be achieved via regular environmental inspection.

For the food waste handling, WBC shall consider the possibility of adopting the food composting method to handle the generation of food waste in construction site. Environmental Manager of WBC and ET shall establish the study of food composting and its advantage / disadvantage for the construction site.

In addition, recyclable waste collection bins shall be provided on site to encourage the collection of recyclable wastes. The waste collection bins proposed shall include aluminum cans, waste paper, and plastic bottles to facilitate subsequent waste recycling.

7.2 Construction Waste

The use of pre-cast structural segments, which will be prefabricated off-site as far as practicable, will minimize the waste generation. Packaging for pre-cast materials will be minimized to avoid packaging waste. The predominant use of steel formwork for main structure will greatly reduce the amount of timber

used when compared with the traditional cast in-situ method.

All hoardings will be made of reusable or recyclable durable materials (e.g. steel) to further reduce the amount of timber used and thus reduce the timber waste. In order to minimize waste arising, the following mitigation measures will adopted, if possible:

- Careful design, planning and good site management to minimize over ordering and wastage of materials;*
- The use of efficient plants to minimize the wastage of materials;*
- Design of formwork will maximize the use of standard wooden panels so that high reuse levels can be achieved; and*
- Alternatives such as steel formwork or plastic facing will be used as appropriate to increase the potential for reuse.*

7.3 Reuse of Materials

Completely Decomposed Granite (CDG) will be reused for landscape and reclamation works under Infrastructure for Stanley Bay Development Contract. Excess CDG material will be reused for other government approved construction site. As previously mentioned, all the materials suitable for public fill will be reused on-site for other work in Stanley Bay, subject to the confirmation and instruction from the Engineer and the CED. Concrete and rubble will be reused for backfilling on site.

7.4 Recycling

WBC will encourage and foster a culture of recycling waste on site. Wastes of paper, aluminum cans and plastic bottles will be collected and recovered from waste stream by licensed collectors. Labelled waste collection bins will be provided on site.

Sorted steel reinforcing bars or off-cuts will be collected as appropriate and sold to scrap steel mills for recycling by sub-contractors of WBC.

Demolition waste including brick, concrete, reinforcing bars arising from site clearance will be sorted for reuse and recycling if possible and practicable on-site. Useful materials such as steel pipes, reinforcement, will be collected for recycling as scrap metal by WBC's sub-contractor. The scrap metal generated will be delivered to local metal mills for recycling. All hoardings and formworks will be reused prior to be sold to recyclers for beneficial reuse.

8.0 On-site Sorting, Storage and Disposal of C&D Materials

All C&D materials arising from or in connection with the Project shall be sorted on-site to recover the inert C&D materials and reusable and/or recyclable materials prior to disposal of the waste portions off-site. All inert C&D materials shall also be broken down according to the Dumping Licence conditions before disposal to public filling outlets.

8.1 Excavated Materials

Sorting and temporary storage of recyclable waste / materials, including C&D materials, will be located at a designated area. Project Environmental Engineer of WBC will ensure all excavated materials that are transported by dump truck with proper record filings (e.g. similar to the existing 'trip-ticket' system) and the stockpile will be hydro-seeded or covered entirely by impervious sheeting where applicable if the volume is greater than 50m³.

8.2 Construction and Demolition Materials

Generation of inert C&D material will be minimized by using pre-cast structural segments, which will be prefabricated off-site as far as practicable. Packaging for pre-cast materials will be minimized to avoid waste production. In case waste generation is not avoidable, it will be sorted by both manually and automatically with the simple aid of machinery equipment into inert C&D materials, metals, timber and other non-inert C&D waste in the workplaces to prevent cross-contamination. Waste containing in excess of 20% by volume or 30% by weight of inert material will be segregated from waste. In order to minimize the potential dust and water quality impacts, sorted excavated material and other inter materials will be disposed to the SENT Landfill every 2 to 3 days when required and subject to the approval by the Engineer. Sorted steel reinforcing bars or off-cuts will be collected and sold to scrap steel mills for recycling by licensed collectors.

All hoardings and formworks will be reused prior to be sold to recyclers for beneficial reuse. All non-inert C&D waste such as packaging waste and unwanted timber will be temporary store in movable skips at the workplaces and together with removed vegetation to be collected and disposed of at SENT Landfill.

Demolition materials including brick, concrete, H-beam pile and reinforcing bars arising from site clearance will be sorted for reuse and recycling if possible. Selective sequential demolition will be adopted to enhance reuse of waste.

Designated areas are located to carry out the on-site sorting, storage and disposal processes. The sorting and storage areas will be arranged where near the front entrance of construction site, thus the appointed collectors are enable to transport these wastes easily and without any interruption to the works. The sorting and temporarily storage areas (reusable and recyclable scrap material) for the scrap steel and C&D materials are shown in the separate layout plan of temporary storage area for C&D materials. (refer site layout plan at the end of this WMP) WBC shall make arrangements with licensed recycling contractors to facilitate that recyclable materials sorted from the construction site are collected with reasonable care. In addition, WBC shall record the quantities of all the recyclable materials before removal off sites by the recycling contractors and include the details in the WFT for submission to the Engineer. Therefore, the handling method of waste is similar to the existing method of waste chemical disposal - 'trip-ticket' system.

8.3 Chemical Waste

Any chemical wastes to be generated will be sorted and handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.

Packaging:

- Chemical waste will be packed and held in containers so as to prevent leakage, spillage or escape of the contents under normal conditions of handling, storage and transport;
- The containers for chemical waste will be securely closed or sealed, correctly stored and kept clean;
- Separate containers will be used to hold different types or different sources of chemical wastes;
- About 100mm air space will be allowed between the top of the container and the level of any liquid contents;
- Appropriate labels will be affixed on the sides of each of the containers of chemical waste;
- Drums and jerry cans will be used as chemical waste containers, the use of any container with a capacity exceeding 450 litres is subject to the approval of the EPD; and
- The information contained on the label will be accurate and sufficient so as to enable proper and safe handling, storage and transportation of the chemical waste.

Storage:

- A storage area located close to the source of waste generation will be designated for temporary storage of chemical waste;

- *The main storage area will be covered and rigidly enclosed on at least 3 sides by a wall, partition or fence with a height of not less than 2 meters or the total height of containers in the stack;*
- *Adequate ventilation will be allowed and adequate space will be allowed within the storage area for chemical waste container handling;*
- *The chemical waste storage will be bunded to retain potential leakage of the capacity to 110% of the largest container or 20% of the storage capacity;*
- *A small quantity of chemical waste, not exceeding 50 litres, will be stored at the working area with bunding of sufficient capacity to accommodate 110% of the volume of the container*

Disposal:

- *Disposal of chemical waste will be regular and via a licensed waste collector;*
- *The chemical waste will be transported to Chemical Waste Treatment Centre (CWTC) located at Tsing Yi, they offer chemical waste collection and treatment service and can supply the necessary storage containers;*
- *WBC will register with the EPD as a chemical waste producer before the generation of chemical wastes;*
- *A trip ticket will be maintained for the removal of chemical wastes from site. Tickets will be issued by the storekeeper for the disposal of material. This will record vehicle licenses; loads and types of chemical waste carried and time on and off site for each trip leaving the work site. The records will be kept properly by WBC.*

Emergency response:

A Spill Response Plan has been established and will be implemented to deal with any accidental spillage of chemical on site. The spill response plan contains the following procedures and is shown in Appendix D.

- *Spill prevention and precaution;*
- *Response actions; and*
- *Spill clean up and disposal.*

8.4 General Refuse

- *Food waste will be collected and stored in enclosed bins and plastic bags in the refuse storage yards. A waste collector will be employed to remove the refuse from the site on daily basis.*
- *Office waste paper will be reduced through recycling of paper if volumes are large enough to warrant collection. WBC will consider participating in a local waste recycling collection scheme if one is available.*
- *Labelled recyclable waste collection bins will be provided on site for other recyclable wastes with insignificant amount including aluminium cans, glass and plastic bottles to facilitate subsequent waste recycling;*
- *General refuse generated on-site will be stored in movable skips at workplaces. Licensed waste collector will be employed to remove general refuse from the site every alternative day or as appropriate to the quantities of waste produced.*

9.0 Identification of Temporary Storage Areas

WBC shall identify and provide sufficient space for the temporary storage of C&D materials to facilitate collection and / or sorting on the site. The space provided should be commensurate with the estimated quantity for each type of C&D materials generated on the site as indicated in the waste flow table. (For detail of temporary storage area, it can be referred to site layout plan at the end of this WMP)

10.0 Arrangement for Collection of Recyclable Materials by Recycling Contractors

All recyclable materials will be located at the designated area for the recycling purpose. Possible recyclable materials are such as:

- *Excavated materials (non-contaminated)*
- *C&D materials (e.g. hoardings and formworks, steel, reinforcing bars, concrete or bricks)*
- *Office waste paper*
- *Aluminium cans, glass and plastic bottles*

The recycling contractors should be operated with environmental and safety manners for waste handling and transporting to designated areas, etc. For examples :

- *Ensure regular monitoring / maintenance of trucks / vehicles, in order to ensure the exhausted system with low air emission of dark smoke;*
- *In addition with the regular monitoring / maintenance of the air emission for trucks / vehicles, the general conditions of truck / vehicle are also important to carry out. Thus, it can reduce the possibility of accident (mechanical fault), oil leakage while driving on the road and increase the lifetime of trucks / vehicles.*
- *Where a truck leaving a construction site is carrying a load of dusty materials, cover the load entirely by clean impervious sheeting, which extends over the edges of properly fitting side and tail boards and dampen materials before transportation.*
- *Restrict trucks / vehicles to minimum practicable speed limits (< 10 km/h) within the construction areas.*
- *The licensed collector's works shall be programmed to avoid the rainy season whenever possible to minimise storm runoff. If work during rainy season cannot be avoided, precautions shall be taken to prevent soil erosion*

11.0 Mechanism for Recording C&D Materials Removed Off Site

WBC shall establish a disposal recording system similar to the trip-ticket system, to ensure proper disposal of C&D materials.

The disposal recording system shall include the followings but not limited to:

- a form to be prepared in duplicate for each and every vehicular trip of transporting C&D materials off site:*
 - *Name of contractor;*
 - *Name of responsible department;*
 - *Contract No.;*
 - *Contract title*
 - *Location of the site;*
 - *Nature of the C&D materials to be disposed of;*
 - *Approximate load;*
 - *Location of outlets;*

- *Date and time of departure;*
 - *Acknowledgement by receptor.*
- * An example of disposal record form shown in Table 2*
- ii) *a method for estimation of the load for inert C&D materials, metals, papers/cardboard or other C&D wastes from the Project.*
- iii) *a mechanism for collection of the returned form together with the receipt from public filling areas or landfill sites after each vehicular trip; due regards should be given for other trips not to public filling areas or landfill sites; and*
- iv) *a register for each vehicular trip to be ready for inspection by the Engineer upon request.*

Table 2 – Example of Disposal Record Form

Disposal Record Form	
Name of Contractor	WBC
Name of responsible department	Project Department
Contract No.	CV/2006/WMP-01
Contract Title	Green Park Development
Location of the site	Stanley Bay of South Hong Kong Island
Approximate Load	1,500 m ³
Location of Outlets	SENT Landfill
Date and time of departure	Jan 21, 2006
Acknowledgement by receptor	(signed signature from receptor)

12.0 Inspection Programme

Waste inspection will be incorporated in the general environmental inspection. The general environmental inspection will be undertaken weekly to check all construction activities for compliance with all appropriate environmental protection and pollution control measures, including those set up in this WMP. WBC shall arrange weekly inspection attended by the Agent, in order to ensure satisfactory performance on compliance with the WMP with due regards to the followings but not limited to:

- *Inert C&D materials suitable for recycling into aggregates are recovered and delivered to designated areas or other designated recycling facilities as notified by the Engineer;*
- *Any demolition works, appropriate sequential demolition has been employed to facilitate recovering as much as possible reusable and recyclable materials;*
- *A disposal recording system that is operating satisfactory for recording C&D materials removed from the Project;*
- *Paper/cardboard packaging, and metals including aluminum cans are recovered and collected by recycling contractors;*
- *Plastic bottles/containers or plastic sheets/foam from packaging are collected as far as possible for recycling.*

** Example of minimum weekly inspection requirements shown in below table 3*

** Weekly inspection on waste management performance may arrange to be carried out along with the weekly safety walks for safety or other site inspections.*

ET is responsible for the formulation of the environmental inspection, deficiency and action reporting system, and a comprehensive inspection checklist for carrying out the waste monitoring site inspection works. The areas of inspection will not only cover the current environmental situation, pollution control and mitigation measures within the site, but also include the environmental situation outside the site area that is likely to be affected, directly or indirectly, by site activities. In conducting the inspection, the ET will make reference to the following in relation to waste management practices:

- This WMP;
- The Environmental Management Plan (EMP) for the Project;
- The Environmental Mitigation and Implementation Schedule (EMIS) for the Project;
- Works progress and the construction programme;
- Contractual requirements for waste management practices;
- Relevant environmental protection and pollution control regulations; and
- Previous site inspection results.

* For example of environmental inspection checklist, it can be referred to Environmental Instruction EI-04 for further reference.

Immediately after the weekly inspection, ET shall prepare the summary table of follow-up actions that should be agreed and signed by the responsible staff. Thus, PM shall take prompt action to rectify the deficiencies identified and shall report the status of action taken before the forthcoming weekly inspection.

Table 3 – Example of Minimum Weekly Inspection Requirements

Activity to Check	Frequency	Corrective Action for NC
Wastes are removed from site in a timely manner. General refuse is collected on a daily basis	Regularly on a weekly basis	ET will instruct WBC to remove waste accordingly
Chemical wastes are disposed of in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, published by EPD	Regularly on a weekly basis	ET will instruct WBC to rectify the problems immediately. Warning will be given if corrective actions are not taken within 24 hours and the Waste Control Group of EPD will be notified.
Waste storage areas are properly cleaned and do not cause windblown litter or dust nuisance	Regularly on a weekly basis	ET will instruct WBC to clean the storage area and/or cover waste.
Demolition materials/wastes in dump trucks are properly covered before leaving the site	Regularly on a weekly basis	WBC will not allow vehicles leave the site until wastes are properly covered.

13.0 Performance Monitoring

ET and Environmental Manager (EM) of WBC shall be responsible to review the overall results of WMP including the quantities and types of C&D materials generated, reused and disposed of off-site; the amount of fill materials imported to the construction site and quantity of timber used in temporary works for each construction process / activity. In addition, ET and EM of WBC shall monitor the achievement of the WMP to assess its effectiveness.

In case if there is any nonconformity from the WMP (e.g. nonconformity from environmental inspection / complaint, etc), then corrective and preventive actions are necessary to be taken by responsible staff. ET and EM of WBC shall also need to monitor the follow-up action on these defects and deficiencies identified.

** Should any non-compliance of the waste control measures are identified during the environmental inspection by the ET / Project Environmental Engineer, WBC shall formulate and implement remedial measures promptly to rectify the situation. If non-compliance persists, alternative and/or additional control measures shall be proposed. An Event Contingency Plan in relation to non-compliance revealed or compliant received is given in Table 4.*

Table 4 – An Event Contingency Plan

Event	Action by		
	Assistant Project Manager	Environmental Engineer	Foreman
<i>Non-Compliance</i>	<ol style="list-style-type: none"> 1. Discuss with Construction Manager to formulate mitigation measure. 2. Delegate foreman to undertake mitigation measures. 3. Propose further mitigation measures if necessary. 	<ol style="list-style-type: none"> 1. Log Non-Compliance into NCR and NCR Logbook. 2. Conduct follow-up inspection. 3. Close out NC and report to Assistant Project Manager. 4. Keep record of NCR. 	<ol style="list-style-type: none"> 1. Undertake mitigation measures. 2. Report to Environmental Engineer on completion of mitigation measures. 3. Undertake further mitigation measures if necessary.
<i>Complaint</i>	<ol style="list-style-type: none"> 1. Discuss with Construction Manager to formulate mitigation measure. 2. Delegate foreman to undertake mitigation measures. 3. Propose further mitigation measures if necessary. 	<ol style="list-style-type: none"> 1. Inform Assistant Project Manager upon receipt of complaint. 2. Investigate validity of complaint. 3. Log complaint into Environmental Complaint Record if complaint is valid. 4. Conduct follow-up inspection. 5. Close out complaint and report to Assistant Project Manager. 6. Communicate with complainant if necessary. 7. Keep record of Environmental Complaint Record. 	<ol style="list-style-type: none"> 1. Undertake mitigation measures. 2. Report to Environmental Engineer on completion of mitigation measures. 3. Undertake further mitigation measures if necessary.

14.0 Provision of Training

Briefing and instruction on waste management will be given to site staff as well as subcontractors to increase awareness and draw attention to waste management issues and the need to minimize waste generation. Table 5 shows the outline of training requirements for all relevant staff. A copy of the WMP will also be distributed to relevant site staff and contractors etc.

Toolbox talk will be delivered from time to time by the Environmental Manager (EM), or other competent management personnel of WBC to site staff. Briefing on waste management will be delivered on an as-needed basis. The scope of the waste management briefing will include, but not limited to, the needs, the approach and the methodology of implementing waste management practice on site. Other environmental issues and the benefits of waste minimization will also be explained in the briefing and toolbox talks.

Table 5 – An Outline of Training Requirement for all Relevant Staff

<i>Staff</i>	<i>Training Needs</i>	<i>Schedule</i>
<i>Project Manager / Construction Managers</i>	<i>Distribution of Waste Management Plan</i>	<i>Beginning of Work</i>
<i>Relevant site supervisors / foremen identified by Environmental Manager</i>	<i>Waste management procedures specific to their scope of work,</i>	<i>Before the staff commences the particular work,</i>
<i>All site worker (including sub-contractor site staff)</i>	<i>General waste management procedures, including site house keeping, waste reduction, reuse, recycling, waste management policy, targets, measures for on-site sorting C&D materials and measurement on waste management performance</i>	<i>Induction for the workers</i>

*Appendix A – Details of Contact Phone List**Contact Details (Waste Management)*

	<i>Name</i>	<i>Telephone</i>	<i>Fax</i>
<u><i>Wan Bao Construction Limited (WBC)</i></u>			
<i>Project Engineer</i>	<i>KK Lai</i>	<i>11110000</i>	<i>24681011</i>
<i>Environmental Manager</i>	<i>PC Chan</i>	<i>11112222</i>	<i>24681011</i>
<i>Construction Manager</i>	<i>CM Yuen</i>	<i>22223333</i>	<i>24681011</i>
<i>Project Environmental Engineers</i>	<i>TM Mok</i>	<i>33334444</i>	<i>24681011</i>
<u><i>ABC Environmental Services & Consulting Company (ABC)</i></u>			
<i>Environmental Team Leader</i>	<i>CK Lee</i>	<i>99889988</i>	<i>135799113</i>
<u><i>Environmental Protection Department</i></u>			
<i>Local Control Office</i>	<i>General Enquiry</i>	<i>12345678</i>	<i>98765432</i>
<u><i>Fire Services Department</i></u>			
<i>Hong Kong Fire Protection Regional office</i>	<i>General Enquiry</i>	<i>87654321</i>	<i>23456789</i>

Appendix B – A Yearly WFT table to be implemented by WBC:

Yearly Summary Waste Flow Table

Year	<u>Estimated Annual Quantities of Inert C&D Materials</u> (in '000m ³)										<u>Estimated Annual Quantities of C&D Wastes</u>										
	Total Quantity Generated		Broken Concrete (see note 3)		Reused in the Contract		Reused in other Projects		Disposed as Public Fill		Metals		Paper / cardboard packaging		Plastics (see note 2)		Chemical Waste		Others (general refuse)		
	a		b		c		d		(a-b-c-d)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m ³)		
	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	Est.	Act.	
2006																					
2005																					
Grand Total																					

Appendix C – A Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for _____ (year)

<i>Month</i>	<u><i>Annual Quantities of Inert CSLD Materials Generated Monthly (in '000m³)</i></u>					<u><i>Annual Quantities of CSLD Wastes Generated Monthly</i></u>				
	<i>Total Quantity Generated</i>	<i>Broken Concrete (see note 3)</i>	<i>Reused in the Contract</i>	<i>Reused in other Projects</i>	<i>Disposed as Public Fill</i>	<i>Metals</i>	<i>Paper / cardboard packaging</i>	<i>Plastics (see note 2)</i>	<i>Chemical Waste</i>	<i>Others (general refuse)</i>
	<i>(in '000m³)</i>	<i>(in '000m³)</i>	<i>(in '000m³)</i>	<i>(in '000m³)</i>	<i>(in '000m³)</i>	<i>(in '000kg)</i>	<i>(in '000kg)</i>	<i>(in '000kg)</i>	<i>(in '000kg)</i>	<i>(in '000m³)</i>
<i>Jan</i>										
<i>Feb</i>										
<i>Mar</i>										
<i>Apr</i>										
<i>May</i>										
<i>June</i>										
<i>Sub-total</i>										
<i>July</i>										
<i>Aug</i>										
<i>Sept</i>										
<i>Oct</i>										
<i>Nov</i>										
<i>Dec</i>										
<i>Total</i>										

*Appendix D – Spill Prevention and Precaution***SPILL RESPONSE PLAN**1.0 *SPILL PREVENTION AND PRECAUTION*1.1 *General Precaution*

- Avoid disorder and storage of unnecessary materials in working areas*
- Prevent obstructions and tripping hazards*
- Prepare all required equipment prior to commencement of work*
- Prohibit smoking at or near the dangerous goods stores*

1.2 *Storage Precautions*

- Use solid and impermeable enclosure walls or storage containers*
- Reduce the danger of falling of stacked containers*
- Provide tightly closed lips to avoid leakage of chemical wastes to further reduce the danger of container falling*
- Store compatible chemical wastes in the same storage area*
- Inspect the storage area to detect if any leakage of defective containers on a regular basis*
- Use suitable containers, which are resistant to the stored chemical wastes, to avoid leakage or spillage*
- Check the conditions of the storage containers regularly*
- Identify and provide suitable notices in storage area*
- Provide adequate ventilation in the storage area*
- Prohibit open flame and smoking near the chemical waste storage area*
- Prevent mixing of incompatible chemical wastes*
- Carry out mixing of compatible chemical wastes outside the storage area*
- Store large and heavy containers on the floor as far as possible or avoid storage of these containers higher than 2 feet from the floor*
- Keep chemical waste containers below eye level*
- Provide adequate space for handling of the containers*
- Maintain a log of chemical wastes*
- Separate incompatible chemical from each other*

1.3 *Transfer and Transport Precautions*

- Consider the size of the container to avoid overfilling*
- Use pumps to transfer chemical wastes instead of simple pouring*
- Provide containment structure to hold the chemical wastes when leakage or spillage of chemical waste occurs*
- Use safety and suitable labelled containers*
- Use suitable carriers to transfer the chemical waste containers from one location to another*
- Employ licensed waste collectors to be responsible for chemical waste transportation*

2.0 *RESPONSE ACTIONS*

- Workers shall be aware of emergency telephone numbers, locations of emergency showers, locations of spill kits, emergency exit and evacuation routes*
- Medical emergency response shall be undertaken whenever necessary. The response actions to an accident would include the following steps*
 - *Keep untrained personnel away from the spillage area or evacuate all personnel and call the emergency service if the spills are highly toxic and volatile*
 - *Provide forced ventilation in the spillage area*
 - *Allow only trained persons who have equipped with protective clothing and equipment to enter the spillage area for clean up*
 - *Transfer the spills back into containers using suitable equipment whenever practicable*
 - *Use suitable absorbing materials to clean up the spills and dispose of the absorbing materials as chemical waste*
 - *Use suitable solvent to clean the spillage area after removing the spills*
 - *Prepare necessary protective devices, safety equipment, containers and clean up materials for emergency use*
 - *Train staff to handle the spillage of chemical*
 - *Evaluate the potential hazard of the chemical waste*

3.0 *SPILL CLEAN UP AND DISPOSAL*

- Prevent spreading of fumes and vapour by closing doors and windows of spillage area*
- Control the leakage of the chemical waste and absorb the spill using suitable absorbing materials*
- Use acidic or alkaline solution for neutralization whenever appropriate*
- Take special precautions for flammable wastes and wastes in power form*
- Keep and label the clean up wastes*
- Clean the spillage area and equipment used in the response actions*
- Disposal of the clean up wastes as chemical wastes*

4.0 *SAFETY EQUIPMENT*

- Fire extinguishers*
- Brush, dustpan, mop and bucket*
- Dry sand*
- Tissue and towelling*
- Containers including plastic bags, drums, etc.*
- Absorbing materials*
- Pumps*
- Sampling devices*

Appendix E – A Monthly Waste Management Audit Checklist

Checklist on Waste Management

Project:	_____	Date:	_____
		Time Period:	_____
Inspected by:	_____	Weather:	Sunny / Cloudy / Rainy
	_____		_____
	_____		_____

	<i>Applicable</i>	<i>Acceptable</i>	<i>Remarks/Photos</i>
<u>General Refuse</u>			
1. Is accumulation avoided?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
2. Are sufficient rubbish bins available?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
3. Is there regular and proper disposal?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<u>Construction Waste</u>			
1. Is there on site segregation as far as practicable for reuse and recycling?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
2. Is construction waste reused where practicable?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
3. Is construction waste disposed of at public filling areas or landfills?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
4. Are trip tickets/disposal records available for inspection?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<u>Chemical Waste</u>			
1. Is there a designated storage area?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
2. Is the chemical waste storage area marked with words "CHEMICAL WASTE" and "化學廢物" in red?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
3. Is chemical waste stored properly?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
4. Are chemical waste containers fitted with proper labels?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
5. Are there proper disposal by licensed chemical waste collector?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
6. Are trip tickets/disposal records available for inspection?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
7. Are spill kits available on site?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
8. Did the contractor register as a chemical waste producer?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
9. Are dip pans used during oil filling or equipment maintenance?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
<u>Chemical</u>			
1. Is chemical stored in bunded area?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
2. Is the storage area locked to prevent unauthorized entering?	<input type="checkbox"/>	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

Excavated Material

- 1. Does excavated material appear uncontaminated? Yes No _____
- 2. If suspected contaminated, is appropriate actions followed? Yes No _____
- 3. Are trip tickets/disposal records available for inspection? Yes No _____

Site Layout Plan for Waste Management

