

3.1 INTRODUCTION

The EIA Study concluded that, during the construction phase of the Project, environmental monitoring of air, noise and water quality will not be required. However, it is recommended that an environmental audit programme shall be implemented out to ensure that the mitigation measures recommended in the EIA Study are implemented during the various stages of construction for the Sha Tin STW Stage III Extension.

3.2 ENVIRONMENTAL CONTROL AND MITIGATION MEASURES DURING THE CONSTRUCTION PHASE

This section presents the pollution control and mitigation measures that are recommended for the construction phase in the *EIA Report*. These mitigation measures and those shown in the Implementation Schedule of Mitigation Measures in *Annex B* shall form the basis of environmental inspection and audit requirements of the Project.

3.2.1 Water Quality

The following mitigation measures to minimise and control the water quality impacts during the construction phase of the Stage III Extension have been recommended in the *EIA Study Report*. Where applicable, these measures shall be enforced throughout the construction period.

- Surface run-off from the Stage III site shall be directed into storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers shall be provided on site to properly direct stormwater to such silt removal facilities.
- Silt removal facilities, channels and manholes shall be maintained and the deposited silt and grit shall be removed regularly, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.
- For the purpose of preventing soil erosion, when foundation excavation is to be carried out during raining seasons, temporarily exposed soil surfaces shall be covered e.g. by tarpaulin, and temporary access roads shall be protected by crushed stone or gravel, as excavation proceeds.
- Earthworks final surfaces shall be well compacted and the subsequent permanent work or surface protection shall be carried out as soon as practical after the final surfaces are formed to prevent erosion caused by rainstorms. Appropriate intercepting channels shall be provided where necessary.
- Open stockpiles of construction materials (e.g. aggregates and sand) on site shall be covered with tarpaulin or similar fabric during rainstorms. Measures shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.

- Groundwater pumped out of wells, etc. for the lowering of ground water level in foundation construction of the Stage III facilities shall be discharged into storm drains after the removal of silt in silt removal facilities.
- If practicable wash-water for the wheel washing bay at the site exist shall have sand and silt settled out or removed before being discharged into the storm drains.
- The section of construction road between the wheel washing bay and the public road shall be paved with backfall to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.
- Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall undergo large object removal by installing bar traps at the drain inlets.
- Sewage from toilets, kitchens and similar facilities for the construction workers shall be discharged into chemical toilets or other forms of portable containers.
- Vehicle and plant servicing areas, vehicle wash bays and lubrication bays shall, as far as possible, be located within roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor.
- Oil leakage or spillage shall be contained and cleaned up immediately. Waste oil shall be collected and stored for recycling or disposal, in accordance with the *Waste Disposal Ordinance*.

3.2.2

Air Quality

The *EIA Study Report* has recommended dust control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

For the control of potential dust impacts, the following control measures, as specified in the *Air Pollution Control (Construction Dust) Regulation*, shall be carried out during the construction phase of the Stage III Extension.

- The area in which demolition of the existing structures of the STW takes place shall be sprayed with water immediately prior to, during and immediately after the demolition activities to minimise dust generation.
- Any debris from the demolition or construction of the Stage III Extension shall be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and at three sides.
- Any dusty material remaining after a stockpile of cement or other materials is removed shall be wetted and cleared from the surface of roads.
- Any skip hoist for material transport shall be totally enclosed by impervious sheeting.
- Vehicle washing facilities, including a high pressure water jet, shall be provided at the designated vehicle exit point. Immediately before leaving the

STW construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels.

- The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point, as well as the main haul road to the Stage III works site shall be paved with concrete, bituminous materials, hardcore or metal plates and kept clear of dusty materials.
- The main haul road to the Stage III site shall be sprayed with water to keep the entire road surface wet and to minimise dust generation.
- Every stock of more than 20 bags of cement shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and at 3 sides.
- Cement bags or any other dusty materials collected during the work shall be disposed of in totally enclosed containers.
- Every belt conveyor used for the transfer of dusty materials shall be enclosed. Every transfer point between any two belt conveyors shall be totally enclosed.

If the above measures are not sufficient to maintain the air quality at acceptable levels, upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on further mitigation measures. There will be proposed to the ER for approval and then implemented.

3.2.3

Waste Management

General Provisions

The Contractor is responsible for waste control within the construction site, removal of the waste material produced from the site and the implementation of any mitigation measures to minimise waste or redress problems arising from waste from the site during construction. The waste material may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the site onto any adjoining land, storm sewer, sanitary sewer, river and sea, or any waste matter or refuse to be deposited anywhere within the site or onto any adjoining land.

When handling the waste material, the following general measures shall be undertaken:

- avoidance and minimisation of waste generation;
- reuse of materials as far as practicable;
- recovery and recycling of residual materials where possible;
- treatment and disposal, according to relevant laws, guidelines and good practices.

This hierarchy shall be used to evaluate waste management options, thus maximising waste reduction and often reducing costs.

- Construction wastes shall be handled and stored in a manner to ensure that they are held securely without loss or leakage, thereby minimising the

potential for pollution.

- Licensed waste hauliers for contaminated materials/ chemical wastes and construction waste to be disposed of at public filling areas (if required) shall be used and they shall only collect wastes prescribed by their permits.
- Construction wastes shall be removed in a timely manner.
- Waste storage areas shall be maintained and cleaned regularly.
- Windblown litter and dust during transportation shall be minimised by either covering trucks or transporting wastes in enclosed containers.
- The necessary waste disposal permits from the appropriate authorities shall be obtained, if required, in accordance with the *Waste Disposal Ordinance (Cap 354)*, *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354)*, the *Crown Land Ordinance (Cap 28)*.
- Wastes shall be disposed of at licensed waste disposal facilities.
- Procedures such as a ticketing system to facilitate tracking of loads, particularly for chemical waste, shall be developed to ensure that illegal disposal of wastes does not occur.
- Excavated material may have to be temporarily stockpiled on-site for subsequent re-use. Control measures as described in the above two sections shall be taken to prevent the generation of dust and pollution of the stormwater drainage systems.
- Careful design, planning and good site management shall be adopted to minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork shall maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing shall be considered to increase the potential for reuse.
- Wherever practical, the production of construction and demolition materials shall be avoided by the careful control of ordering procedures to minimise the amount of surplus materials.
- The handling and disposal of bentonite slurries shall be undertaken in accordance with *Practice Note for Professional Persons - Construction Site Drainage* (ProPECC PN 1/94) on construction site drainage.
- Chemical waste that is produced, during construction shall be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes*.
- Containers used for the storage of chemical wastes shall be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; and display a label in English and Chinese in accordance with instructions prescribed in *Schedule 2 of the Chemical Waste Regulations*.
- The storage area for chemical wastes shall be clearly labelled and used solely

for the storage of chemical waste; enclosed on at least 3 sides; and have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest.

- The chemical waste storage area shall also have adequate ventilation; be covered to prevent rainfall entering; and be arranged so that incompatible materials are adequately separated.
- Disposal of chemical waste shall be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre (CWTC) which also offers a chemical waste collection service and can supply the necessary storage containers.
- General refuse shall be stored in enclosed bins or compaction units separate construction/demolition waste from chemical wastes. A licensed waste collection contractor shall be employed to remove general refuse from the site, on a daily basis to minimise any potential odour, pest and litter impacts. Burning of refuse on construction sites is strictly prohibited by law.

The Contractor shall also pay attention to the *Dumping at Sea Ordinance*, the *Public Health and Municipal Services Ordinance* and the *Water Pollution Control Ordinance*, and carry out the appropriate waste management work during the construction phase. The relevant licences/permits, such as the effluent discharge licence, the chemical waste producer registration, etc. shall be obtained. The Contractor shall refer to the relevant booklets issued by EPD when applying for these licences/permits.

During the site inspections and the document reviews as described in this Manual, the ET Leader shall pay special attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of the Hong Kong SAR.

Special Mitigation Measures for the Excavation of Contaminated Materials

Since land contamination in the sludge lagoon area (see *Annex B*) has been identified during the EIA study and soil will be removed for the foundation works, any potential exposure to the contaminated materials by the construction workers shall be avoided by implementing the following measures.

- Bulk earth moving equipment shall be used to minimise potential contact with site construction workers.
- Exposure to any contaminated materials present shall be minimised by wearing appropriate clothing and personal protective gear such as gloves, when interacting directly with contaminated material, providing adequate hygiene and washing facilities, and preventing smoking and eating during such activities.
- The Contractor shall ensure that rainfall and surface run-off is diverted around any areas currently being worked.
- The use of clean top soil and the use of suitable barrier systems in areas to be used for landscaping (i.e. those areas not covered by concrete foundations).

The timely placement of the fill top soil layer, or the concrete foundation on top of the native materials, shall be considered to bring the site to finished grade.

- Stockpiling of contaminated soils and excavated materials shall be prohibited unless covered. Vehicles/lorries containing any contaminated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off under wet conditions.
- The Contractor shall obtain the necessary waste disposal permits from the appropriate authorities, if they are required, in accordance with appropriate regulations such as the *Waste Disposal Ordinance (Cap 354)*, and *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354)*;
- The Contractor shall obtain an admission ticket from the Facilities Management Group of EPD for disposal of contaminated soil at Landfills.
- Only licensed waste hauliers shall be employed for contaminated wastes and disposal of waste to appropriately licensed waste facilities. This shall be performed under a ticketing system to facilitate tracking of loads, particularly contaminated wastes, and to ensure that illegal disposal of wastes does not occur.

Where applicable, the above measures shall also be adopted for the off-site disposal of the contaminated excavation materials.

3.2.4

Noise Control

Although it is envisaged that noise criterion can be met without mitigation measures, construction noise shall be minimized by the use of quiet construction methods and equipment. Construction activities shall be limited to the daytime hours (0700 to 1900) on Monday to Saturday. In addition, Good site practice and noise management by the DSD's Contractors can effectively reduce the construction noise impacts at the identified NSRs. Overall, the following measures shall be followed.

- The Contractor shall comply with and observe the *Noise Control Ordinance* and its subsidiary regulations in force in Hong Kong.
- Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing measures intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the Project.
- The Contractor shall ensure that all plant and equipment to be used on the site are properly maintained in good operating condition.
- Machines and plant (such as trucks) that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum.
- Plant known to emit noise strongly in one direction, shall, where possible, be orientated so that the noise is directed away from noise sensitive receivers (NSRs).
- Silencers or mufflers on construction equipment shall be utilised, if found

necessary to further reduce noise, and shall be properly maintained during the construction phase.

- Mobile plant shall be sited as far away from NSRs as possible.

3.3 ENVIRONMENTAL AUDIT PROGRAMME

3.3.1 Site Inspections

Site inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures for the Project. They shall be undertaken routinely to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the proposed site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works during the construction of the Stage III Extension. He shall submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval.

Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site; it shall also review the environmental conditions outside the site area which has the potential to be affected, directly or indirectly, by the site activities. The ET Leader shall make reference to the following information in conducting the inspection:

- the EIA recommendations on environmental protection and pollution control mitigation measures as described in *Section 3.2*;
- works progress and programme;
- individual works methodology proposals (which shall include proposal on associated pollution control measures);
- the contract specifications on environmental protection;
- the relevant environmental protection and pollution control laws;
- previous site inspection results.

The Contractor shall update the ET Leader with all relevant information on the progress of the construction contract prior to conducting the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the IC(E), the Contractor and the ER within 24 hours, for reference and for immediate action to be taken if required. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and

action reporting system formulated by the ET Leader, to report on any remedial measures subsequent to the site inspections.

Ad hoc site inspections shall also be carried out if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

Figure 3.3a is a flow diagram showing the inspection and follow-up procedures of the environmental audit programme.

3.3.2 *Compliance with Legal and Contractual Requirements*

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong which the construction activities shall comply with.

In order that the works are in compliance with the contractual requirements, all the contractor's works method statements submitted by the Contractor to the ER for approval shall be vetted and endorsed by the ET Leader to determine whether or not sufficient environmental protection and pollution control measures have been included.

The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different licences/permits under the environmental protection laws, and copies of all of the valid licences/permit. The site diary shall also be available for the ET Leader's inspection upon his request.

After reviewing the document, the ET Leader shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status of the licence/permit application and any environmental protection and pollution control preparation works may not be able to cope with the works programme or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall also advise the Contractor and the ER accordingly.

Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

Applicable environmental regulations relevant to this Project are listed follow for reference:

- *Air Pollution Control Ordinance (APCO) (Cap 311);*
- *Technical Memorandum on Environmental Impact Assessment Process (EIA TM);*
- *Air Pollution Control (Construction Dust) Regulations;*

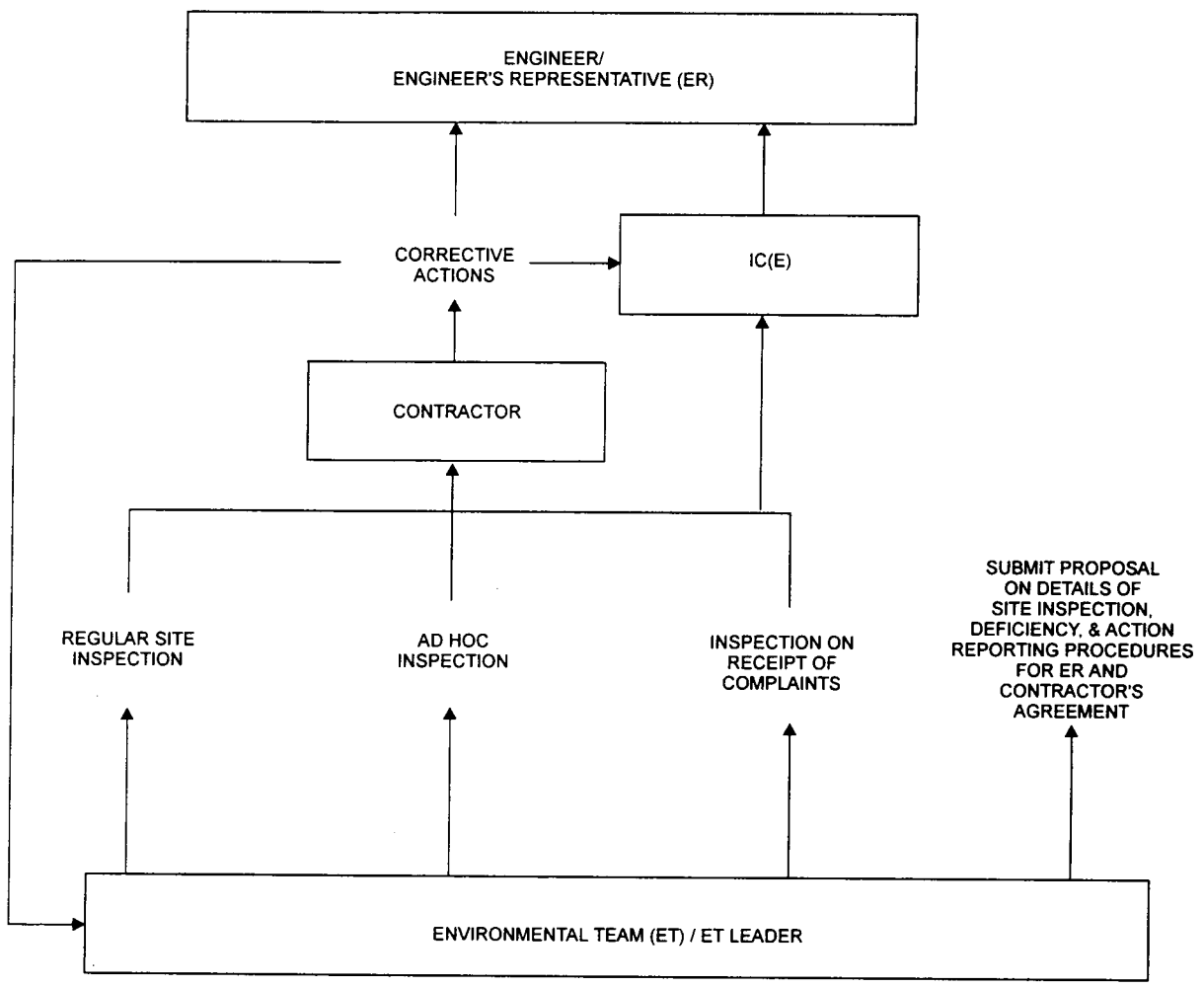


FIGURE 3.3a

INSPECTION AND FOLLOW-UP PROCEDURES

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Environmental
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- *Air Pollution Control (Open Burning) Regulations;*
- *Noise Control Ordinance (NCO) (Cap 400);*
- *Technical Memorandum on Noise from Construction Works other than Percussive Piling;*
- *Technical Memorandum on Noise from Construction Works in Designated Areas;*
- *Water Pollution Control Ordinance (WPCO) (Cap 358);*
- *Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters;*
- *Waste Disposal Ordinance (WDO) (Cap 354);*
- *Waste Disposal (Chemical Waste)(General) Regulation (Cap 354);*
- *Public Health and Municipal Services Ordinance (Cap 132);*
- *Public Cleansing and Prevention of Nuisances (Urban Council) and (Regional Council) By-laws;*
- *New Disposal Arrangements for Construction Waste (1992);*
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992);*
- *Works Branch Technical Circular No 2/93, Public Dumps;*
- *Works Branch Technical Circular No 16/96, Wet Soil in Public Dumps;*
- *Practice Notes for Professional Persons - Construction Site Drainage (ProPECC PN 1/94), Professional Persons Consultative Committee (1994);*
- *Practice Notes for Professional Persons - Contaminated Land Assessment and Remediation (ProPECC PN3/94), Professional Persons Consultative Committee (1994);*
- *Summary Offences Ordinance (Cap 228).*

The Independent Checker (Environmental), IC(E) should review the EM&A works performed by the ET; audit the construction activities, and the reports of environmental inspections conducted by the ET; report the audit results to the ER; review the EM&A reports submitted by the ET; and review the proposal on mitigation measures submitted by the Contractor in accordance with the findings of the regular environmental inspections and the corrective action plans recommended by the ET.

3.4

ENVIRONMENTAL COMPLAINTS

Complaints shall be referred to the Engineer or Engineer's Representative who should request the ET Leader to carry out and report complaint investigation. The ET Leader shall undertake the following procedures upon receipt of the complaints:

- log complaint and date of receipt onto the complaint database and inform the Engineer, Contractor and IC(E) immediately;
- investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- if a complaint is valid and due to the construction works, identify effective mitigation measures;
- if mitigation measures are required, advise the Contractor accordingly;
- review the Contractor's response on the identified mitigation measures, and the updated situation;
- if the complaint is transferred from EPD or other government departments,

submit interim report to ER and the ER shall then liaise with EPD or other government departments on status of the complaint investigation and follow-up action within the time frame assigned by the concerned department;

- undertake additional monitoring and audit to verify the situation if necessary, and review that any valid reason for complaint does not recur;
- report the investigation results and the subsequent actions to the ER who shall then report the source of complaint for responding to complainant (If the source of complaint is EPD, the results should be reported within the time frame assigned by EPD);
- record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

During the complaint investigation work, the Contractor and ER shall cooperate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry them out. The ER shall ensure that the measures have been carried out by the Contractor.

The IC(E) shall review the procedures for carrying out complaint investigation and ensure the complaints are properly dealt with by the ET and Contractor. Any findings shall be reported to the ER.

A flow chart of the complaint response procedures is shown in *Figure 3.4a*.

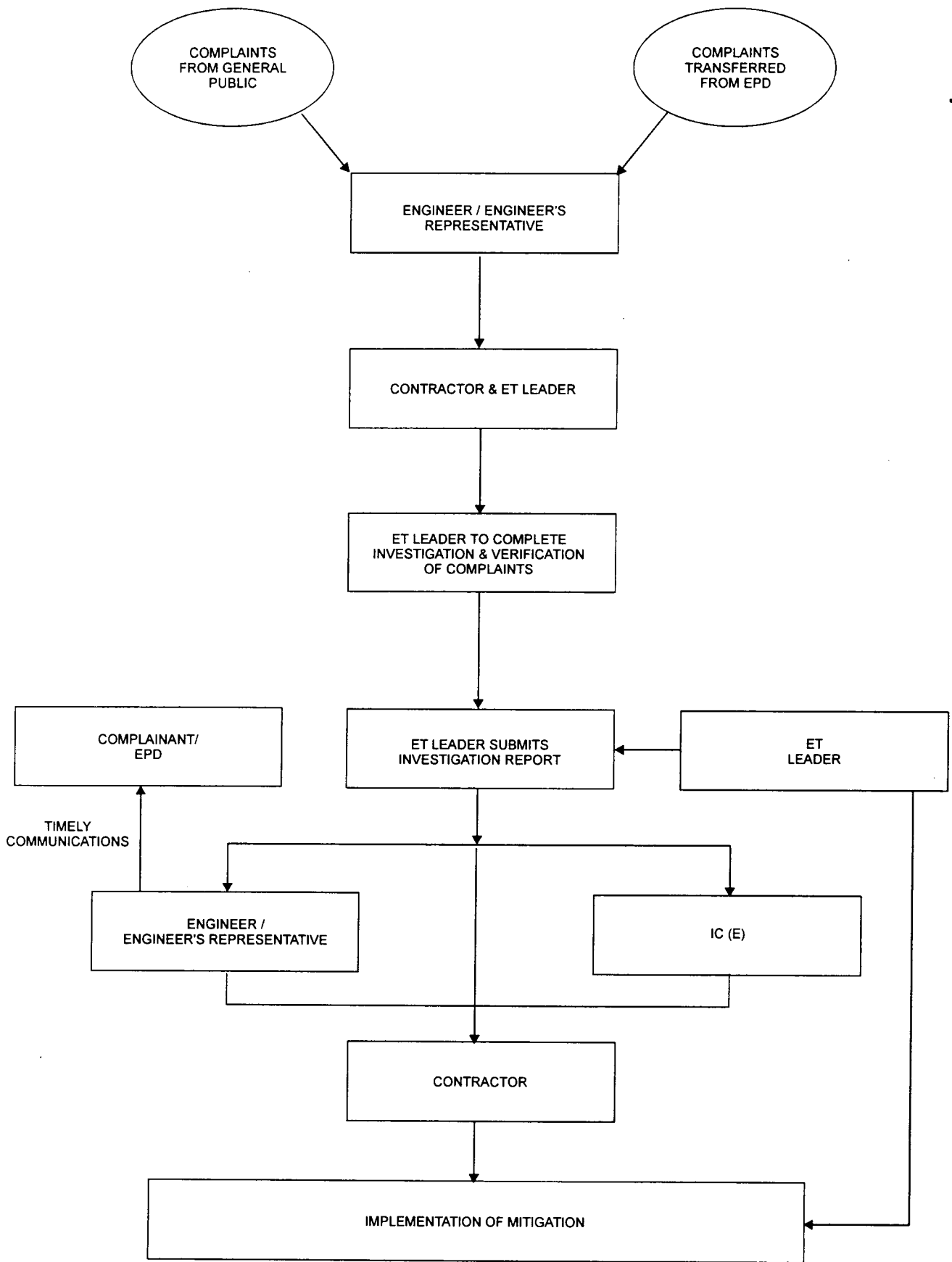


FIGURE 3.4a

COMPLAINT RESPONSE PROCEDURES