



顧問合約編號 NEX/1050
灣仔站利東街行人隧道
詳細設計

提交文件編號 D2.7A
工程項目簡介
E 修訂版

2012 年 8 月
香港鐵路有限公司



顧問合約編號 **NEX/1050**
灣仔站利東街行人隧道
詳細設計

提交文件編號 **D2.7A**
工程項目簡介
E 修訂版

2012 年 8 月

香港鐵路有限公司

目錄

章節	標題	頁數
1.	基本資料	1
1.1	工程項目名稱 _____	1
1.2	工程項目目的及性質 _____	1
1.3	工程項目簡介所涵蓋的指定工程數目和類別 _____	1
1.4	項目倡議人 _____	1
1.5	工程項目地點 _____	1
1.6	聯絡人姓名及電話號碼 _____	2
1.7	擬建的增補、改良及修改 _____	2
2.	規劃及實施時間表	3
2.1	工程項目規劃及實施 _____	3
2.2	工程項目時間表 _____	3
2.3	同時進行的其他工程項目 _____	4
3.	周圍環境的主要元素	6
3.1	概述 _____	6
3.2	噪音 _____	6
3.3	空氣質素 _____	6
3.4	水質 _____	7
3.5	景觀及視覺 _____	7
3.6	文化遺產 _____	7
4.	對環境可能造成的影響	8
4.1	施工期間的影響 _____	8
4.2	營運期的影響 _____	11
5.	環境保護措施及其他環境關聯	14
5.1	減低環境影響的措施 _____	14
5.2	環境監察及審核要求 _____	20
5.3	工程實施時間表 _____	20
5.4	對環境影響的嚴重性、分佈位置及時間 _____	20
5.5	進一步的影響 _____	20
6.	使用先前批准的環境影響評估報告	21
7.	總結	22

附表

表 2.1	暫定工程項目時間表	3
表 2.2	主要同時進行的工程項目	4
表 3.1	具代表性的噪音敏感受體	6
表 3.2	在中西區空氣質素監測站中記錄的 5 年平均污染物濃度	6
表 3.3	具代表性的空氣敏感受體	7
表 3.4:	在工程範圍附近已評級的歷史建築	7
表 4.1	各項建築活動的最大聲功率級	8
表 4.2	在具代表性的噪音敏感受體的預計噪音水平 - 沒有緩解措施的情況	9
表 4.3	擬建的通風設施與噪音敏感受體的距離	11
表 4.4	可接受的噪音聲級	11
表 4.5	固定設備的最大可容許的聲功率級	12
表 5.1	低噪音機動設備一覽	14
表 5.2	對各種機動設備使用的環境保護措施	15
表 5.3	每項建築活動的最大聲功率級 - 實施環保措施的情況下	16
表 5.4	在噪音敏感受體的預測噪音水平 - 實施環保措施的情況下	16

附圖

NEX1050/2.7A/001	施工位置圖
NEX1050/2.7A/002	行人隧道平面圖
NEX1050/2.7A/003	行人隧道立視圖
NEX1050/2.7A/004	通風設施平面及立視圖
NEX1050/2.7A/005	噪音敏感受體位置圖
NEX1050/2.7A/006	空氣敏感受體位置圖
NEX1050/2.7A/007	活動隔音屏障結構圖
NEX1050/2.7A/008	機動設備隔音罩結構圖
NEX1050/2.7A/009	已評級的歷史建築位置圖

附錄

附錄 I	建築活動的機動設備清單
附錄 II	對具代表性噪音敏感受體的建築噪音評估
附錄 III	探井記錄
附錄 IV	樹木狀況調查
附錄 V	固定設備噪音評估
附錄 VI	建築活動的機動設備清單 - 有環境保護措施
附錄 VII	對具代表性噪音敏感受體的建築噪音評估 - 有環境保護措施
附錄 VIII	景觀綠化措施
附錄 IX	環境監察及審核計劃
附錄 X	實施時間表

1. 基本資料

1.1 工程項目名稱

本工程項目名稱為港鐵灣仔站利東街行人隧道（下稱“項目”）。

1.2 工程項目目的及性質

市區重建局提議把重建利東街（市區重建計劃 H15 區）列入灣仔區重建計劃的一部分。此項目被規劃署、運輸署及社區視為給港鐵或非港鐵乘客提供更好的通道橫跨皇后大道東地區至港鐵灣仔站。特別減低行人因不遵守交通規則而橫過莊士敦道的危險。因此，建議在莊士敦道地底興建利東街行人隧道連接市區重建計劃 H15 區及港鐵灣仔站。重建項目亦考慮到增加非港鐵的乘客的使用量。項目的主要優點如下：

- 提供安全、舒適及方便的通道給港鐵和非港鐵乘客橫過莊士敦道；
- 加強來往港鐵灣仔站的通道；
- 加強灣仔北區及莊士敦道南面地區之間的連接；及
- 加強港鐵灣仔站乘客的流動性和舒緩站內擠塞的情況。

1.3 工程項目簡介所涵蓋的指定工程數目和類別

項目將涉及灣仔站新的出入口興建及站內相關的修改工程，隧道的興建通往市區重建計劃 H15 區的綜合出入口。擬建隧道備有空氣調節，共長 100 米連接至市區重建計劃 H15 區。擬建隧道將會是港鐵灣仔站的一部分，並根據《鐵路條例》（香港法例第 519 章）刊登。

根據《環境影響評估條例》（香港法例第 499 章）附表 2 第 I 部 A.2 項“鐵路及其相聯車站”，灣仔站屬指定工程項目。由於灣仔站在 1998 年 4 月 1 日《環境影響評估條例》生效之前已經投入服務，所以根據該條例第 9(2)(g) 條規定，此工程被確認為受豁免指定工程項目。根據《環境影響評估程序的技術備忘錄》，由於擬建工程包括對現有港鐵站帶來實質變動及構成潛在環境影響（詳見第 1.7 章），此工程將構成獲豁免的《環境影響評估條例》附表 2 的指定工程項目的實質變動。因此，必須按照《環境影響評估條例》之程序，項目在施工及營運前均須取得環境許可証。

根據《環境影響評估條例》的要求，本工程項目簡介旨在為直接申請環境許可證提供所需的資料。

1.4 項目倡議人

香港鐵路有限公司

1.5 工程項目地點

工程項目位於混合了商業、住宅發展及康樂地方的灣仔市區。擬建工程將沿修頓遊樂場及莊士敦道進行，交通非常繁忙，人流眾多。隧道的位置及工程界線如圖 NEX1050/2.7A/001 所示。隧道規劃及立視圖如圖 NEX1050/2.7A/002 及圖 NEX1050/2.7A/003 所示。通風設施的位置及立視圖如圖 NEX1050/2.7A/004 所示。

1.6 聯絡人姓名及電話號碼

所有有關此項目的疑問可以向以下人士提出：

關健恩先生
環境經理
香港鐵路有限公司
電話：2688 1179
傳真：2145 4269

1.7 擬建的增補、改良及修改

項目將興建新的行人隧道，連接港鐵灣仔站西面的新建出入口及市區重建計劃 H15 區地庫。擬建工程包括：

- 興建行人隧道連接市區重建計劃 H15 區及港鐵灣仔站，並改善現有地鐵站。所有隧道的工程除了兩個通風設施外，都是在地面以下進行。在擬建行人隧道內將不會興建任何商店。擬建的通風設施將設於兒童遊樂場。
- 利東街行人隧道工程將涉及由現時的地面水平（即垂直高度 +3.8mPD 至 -4.0mPD）挖掘 8 米深的行人隧道，由港鐵灣仔站通往市區重建計劃 H15 區。隧道將以明挖的方式興建，用臨時管壁和板樁方法，透過一系列的橫向板作支撐。在挖掘工程期間，不會使用爆炸品。當莊士敦道的板樁工程完成後，便會進行路面鋪蓋，此部分的挖掘工程將會在蓋板下進行。在電車路軌下的隧道興建，將會使用基礎支撐方法，在施工期間承托電車軌道。

2. 規劃及實施時間表

2.1 工程項目規劃及實施

港鐵公司為項目倡議人，負責策劃、計劃、建築及營運。莫特麥克唐納香港有限公司獲委任為工程及環境顧問。擬建工程由港鐵公司外聘承建商進行。

2.2 工程項目時間表

擬建行人隧道的建造工程包括遷移及改道現有公共設施、設置樁及中柱、明挖回填、修復及建造通風設施，將由 2013 年 4 月至 2015 年 5 月進行，為期 29 個月。工程項目分為四階段。暫定工程項目時間表如表 2.1 所示。

表 2.1 暫定工程項目時間表

年/月 建築活動	2013												2014												2015				
	4月	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月
第 1a 階段 (工程在路面鋪蓋下進行) - 莊士敦道部分路段																													
遷移及改道現有公共設施																													
設置管樁、板樁及中柱																													
明挖工程																													
挖掘工程 (有路面鋪蓋)																													
興建隧道 (有路面鋪蓋)																													
回填及修復																													
第 1b 階段 (挖掘位置 - 莊士敦道部分路段)																													
遷移及改道現有公共設施																													
設置管樁、板樁及中柱																													
明挖工程																													
挖掘工程																													
興建隧道																													
回填及修復																													
第 1c 階段 (工程在路面鋪蓋下進行) - 莊士敦道部分路段																													
遷移及改道現有公共設施																													

年/月 建築活動	2013												2014												2015							
	4月	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月	4月	5月	6月	7月	8月			
設置管樁、板樁及中柱																																
明挖工程																																
挖掘工程（有路面鋪蓋）																																
興建隧道（有路面鋪蓋）																																
回填及修復																																
第 2 階段（明挖回填）- 康樂及文化事務署 遊樂場部分																																
遷移及改道現有公共設施																																
設置管樁、板樁及中柱																																
明挖工程																																
挖掘工程																																
興建隧道																																
興建通風井																																
回填及修復																																
樹木移植及植樹活動																																
樹木移植																																
植樹																																

2.3 同時進行的其他工程項目

在項目附近同時進行的工程項目列在表 2.2。潛在的累積環境影響將會適當地考慮。

表 2.2 主要同時進行的工程項目

工程項目	項目倡議人/負責單位	預計施工時間
市區重建計劃 H15 區（A 工地）發展項目	市區重建局	H15 區的地基建造工程於 2010 年開始，上蓋建造工程將於 2011 年第三季進行，並在 2014 年第一季完工。
鄰近恆生莊士敦道大廈的發展項目	私人	沒有資料

暫定項目施工時間將會與市區重建計劃 H15 區發展項目於 2013 年 4 月同時進行。根據 2012 年 5 月的最新進度，該項目的地基建造工程已經完成，現正進行挖掘工程。根據市區重建局的項目時間表，地基及上蓋

建造工程將會在本項目開始前完成，餘下的只有輕型的建築活動。因此，該項目預計沒有累積的環境影響。

2011年5月20日在項目附近進行了實地考察，發現鄰近恆生莊士敦道大廈將會發展新項目。根據2012年5月3日的實地考察，該項目的上蓋建造工程正在進行中。建築活動將會被鄰近的建築物遮擋，所以噪音敏感受體的視線被攔截。因此，該項目預計不會產生累積的環境影響。

根據灣仔區的最新分區計劃大綱圖（圖則編號 S/H/26），在工程範圍附近沒有新的規劃申請。因此，在環境評估中沒有計劃的環境敏感受體。

3. 周圍環境的主要元素

3.1 概述

隧道的建造及其相關工程和將來營運時所帶來的潛在環境影響將會根據《環境影響評估程序的技術備忘錄》附表中的標準進行評估。將會評估項目施工及營運時的潛在環境影響，包括噪音、空氣質素、水質、廢物管理和景觀及視覺的影響。

3.1.1 工程範圍的歷史及現有/過去土地用途

根據 1859 年歷史地圖上的航空照片，當時利東街的土地還未進行填海工程。莊士敦道以南的土地在 1866 年前已經形成，並與填海的邊界相連。為了香港島北面沿岸的進一步發展，在利東街工程範圍內及附近開墾了很多土地。根據 1945 年的航空照片，修頓遊樂場已經建成，莊士敦道和軒尼詩道都已經成形。在 1963 年，利東街工程範圍以東的兩棟大廈已經落成，並在 1982 年拆卸。根據 1977 年的航空照片，利東街工程範圍以南的昭憲大廈已經落成。在 1982 年的航空照片中，部分修頓遊樂場被封閉作為興建港鐵香港島線。工程範圍被用作臨時辦公室和淺土挖掘工程。在 1988 年的航空照片，再沒有看到臨時建築物。到了 1988 年，修頓花園、修頓中心及修頓室內場館已經完成。修頓遊樂場內的兒童遊樂區在 1992 年已經建成，包括兒童遊樂設備、樹木、花槽、安全地墊、圍牆、籬笆及長椅。在 1995 年以後的照片已沒有發現重大的轉變。

3.2 噪音

為了評估項目對噪音的影響，在距離項目工程範圍最近的位置選定了具代表性的噪音敏感受體，評估是基於最大噪音的情況下作假設。兩個距離擬建行人隧道最近及工程範圍對開的位置被選定為具代表性的噪音敏感受體。此噪音敏感受體都列在表 3.1，並在圖 NEX1050/2.7A/005 所示。

表 3.1 具代表性的噪音敏感受體

噪音敏感受體	說明	離工程範圍的最短水平距離 (米)	用途
N1	軒尼詩大廈 (117 - 123 軒尼詩道)	48	商業/住宅混合
N2	昭憲大廈 (94 - 102 莊士敦道)	10	商業/住宅混合

3.3 空氣質素

環保署的中西區固定空氣質素監測站是距離工程範圍最近的監測站。根據環保署從 2006 年至 2010 年發出的《香港空氣質素報告》內的中西區空氣質素監測站中的污染物濃度全年平均值，可計算出總懸浮粒子的 5 年平均濃度，詳見表 3.2。

表 3.2 在中西區空氣質素監測站中記錄的 5 年平均污染物濃度

污染物	5 年平均濃度 (微克/立方米)	空氣質素指標的全年平均值 (微克/立方米)
總懸浮粒子	76	80

於距離工程範圍最近的位置選定了具代表性的空氣敏感受體，此敏感受體列在**表 3.3**，並在**圖 NEX1050/2.7A/006**所示。

表 3.3 具代表性的空氣敏感受體

空氣敏感受體	說明	離工程範圍的最短水平距離 (米)	用途
A1	昭憲大廈 (94 - 102 莊士敦道)	10	商業/住宅混合
A2	軒尼詩大廈 (117 - 123 軒尼詩道)	48	商業/住宅混合
A3	修頓遊樂場的球場	14	康樂 - 體育及其他活動

3.4 水質

由於建築活動將以地面工程為主，而且工程項目屬小型工程，預計不會對水質造成影響。

3.5 景觀及視覺

部分工程範圍位於修頓遊樂場的兒童遊樂場及籃球場。目前在兒童遊樂場內共有 13 棵樹木，其中一些樹木將會受建築活動所影響。由於項目位於混合了商業、住宅及康樂地方的市區，人車繁忙，所以現時的視覺質素並不高。

3.6 文化遺產

根據第 3.1.1 章，工程範圍屬於高度發展地區，因此沒有任何考古潛力。位於工程範圍附近已評級的歷史建築列在**表 3.4**中，並在**圖 NEX1050/2.7A/009**所示。

表 3.4: 在工程範圍附近已評級的歷史建築

已評級的歷史建築	歷史建築位置	評級資料	與工程範圍的距離
H1	莊士敦道 60A, 62, 64 和 66 號	二級 (於 2009 年 12 月 18 日確定評級)	距離工程範圍東面 140 米
H2	船街 18 號	二級 (於 2009 年 12 月 18 日確定評級)	距離工程範圍南面 90 米
H3	皇后大道東 186, 188 和 190 號	三級 (於 2010 年 8 月 31 日確定評級)	距離工程範圍南面 160 米

4. 對環境可能造成的影響

4.1 施工期間的影響

4.1.1 噪音

所有建築活動在現階段不會被安排在早上 7 時至下午 7 時以外進行。倘因工程進度所需，建築活動需要在下午 7 時至早上 7 時進行，承建商必須事先申請建築噪音許可證，確保符合噪音管制條例的要求，方可在其他時間施工。除非工程師代表認為是無可避免及有需要，所有建築活動均不能在晚上 11 時至上午 7 時期間進行。

施工工程將包括不同的建築活動如表 2.1 所示。擬建隧道的第 1a 和 1c 階段在明挖工程後，將會在有路面鋪蓋的情況下採用明挖回填方法。而位於莊士敦道的第 1b 階段，在挖掘位置將採用明挖回填方法，此部分沒有路面鋪蓋。位於康樂及文化事務署遊樂場的第 2 階段工程將採用明挖回填方法，如圖 NEX1050/2.7A/005 所示。每個階段均會配以一套機動設備以進行工程活動。

施工期間現場的機動設備將會是噪音影響的主要來源。項目中採用的機動設備及其在沒有緩解措施下的聲功率級已列在附錄 I。據此，表 4.1 總結了每項建築活動的最大聲功率級。

表 4.1 各項建築活動的最大聲功率級

建築活動	最大聲功率級, 分貝 (A)
第 1a 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	114
設置管樁、板樁及中柱	116
明挖工程	111
挖掘工程 (有路面鋪蓋)	111
興建隧道 (有路面鋪蓋)	104
回填及修復	114
第 1b 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	114
設置管樁、板樁及中柱	115
明挖工程	111
挖掘工程	117
興建隧道	113
回填及修復	114
第 1c 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	114
設置管樁、板樁及中柱	115
明挖工程	111

建築活動	最大聲功率級, 分貝 (A)
挖掘工程 (有路面鋪蓋)	110
興建隧道 (有路面鋪蓋)	104
回填及修復	114
第 2 階段 - 康樂及文化事務署 遊樂場	
遷移及改道現有公共設施	115
設置管樁、板樁及中柱	116
明挖工程	114
挖掘工程	119
興建隧道	114
興建通風井	112
回填及修復	114

評估是根據《管制建築工程噪音（撞擊式打樁除外）技術備忘錄》內列明的方法，評估了建築噪音對兩個具代表性的噪音敏感受體的影響。詳細評估結果已概述在附錄 II。評估結果顯示在沒有緩解措施的情況下，噪音敏感受體因大部分的建築活動而受到的預計噪音水平，都會高於日間噪音標準的 75 分貝 (A)，見表 4.2。故項目需要實施噪音緩解措施，把噪音減至可接受水平。

表 4.2 在具代表性的噪音敏感受體的預計噪音水平 - 沒有緩解措施的情況

噪音敏感受體	施工期間噪音水平預測, 分貝 (A)	環境影響評估程序的技術備忘錄 日間噪音評估標準, 分貝 (A)
N1	74 - 83	75
N2	78 - 93	75

4.1.2 空氣質素

施工期間的主要空氣質素影響來自沿隧道挖掘及回填工程、露天範圍的風化及建築物料的運送/處理時所產生的建造工程塵埃。由於工程範圍有限，大部分所挖掘的建築物料將會被運走，只有少量作現場儲存。承建商須在施工期間嚴格遵守《空氣污染管制（建造工程塵埃）規例》（香港法例第 311R 章）的要求，實施塵埃管制措施。當上述的緩解措施實施後，預計工程將不會對空氣質素造成不良影響。

施工期間，承建商須按《空氣污染管制條例》的規定進行改道或移除石棉水泥管。

4.1.3 水質

施工期間，管樁及板樁工程包括挖掘與側向承托系統。板樁本身是防滲透的，而管樁則可進行水泥灌漿隔牆，兩種方法都可以在挖掘工程中防止地下水流入工地。在挖掘工程進行前將會進行抽水試驗，確保板樁或灌漿隔牆的功用。所以由挖掘工程所引起的地下水位下降的風險會減低。施工期間的主要潛在水質污染將會是來自工地徑流的排放和在挖掘工程時脫水工序的污水排放到雨水渠。其他潛在的水質污染包括實施抑制塵埃措施、工作人員及意外溢出的污水。污水排出前需要經過污水處理設施。承建商需要確保在排沙設施排放的污水符合《水污染管制條例》及相關的《技術備忘錄：排入去水渠及污水渠系統，內陸及海岸水域的污水標準》。

承建商必須實施良好工地作業守則及遵守以下法規：

- 《水污染管制條例》及其法規；及
- 《專業人士環保事務諮詢委員會專業守則第 1/94 號 - 建築工地排水》

施工期間實施污染控制措施及良好工地作業守則，預期工程將不會對水質帶來不良影響。

4.1.4 廢物管理

施工期間主要產生的固體廢物包括搭建廢物、化學廢料及垃圾，大部分的廢物源頭是搭建廢物。根據航空照片所顯示（見第 3.1.1 章），工程範圍原是一塊填海土地，主要的土地用途是遊樂場及建築物，並沒有任何工業活動，所以工程範圍內預計不會有任何潛在的土地污染問題。

估計項目的地下挖掘工程會產生約 7,250 立方米的搭建物料。由於工地範圍小，挖掘物料循環再用並不可行。加上工地範圍有限，現場儲存物料將會對公眾造成影響。挖掘物料將會轉運到公眾填土區作處置。實施適當的措施如《空氣污染管制（建造工程塵埃）規例》及《專業人士環保事務諮詢委員會專業守則第 1/94 號 - 建築工地排水》中的良好工地作業守則，以避免因臨時儲存物料而帶來的環境影響。項目已取得土木工程拓展署的公眾填土委員會的同意對惰性搭建物料作處置。惰性搭建物料，除瀝青外，將會棄置在柴灣公眾填土躉船轉運站，所有瀝青將會棄置在將軍澳第 137 區的填料庫。由於項目所產生的搭建物料量少，預計不會帶來不良的影響。

2011 年 1 月於擬建行人隧道的深基坑位置現場進行初步調查，在填海工程的填料以下未有發現海洋沉積物。探井記錄在附錄 III 所示。所選擇的探井是代表工地的最近位置。然而，施工期間如發現海泥並需要棄置在工地以外，需要準備海泥的採樣及測試計劃，估計海泥的數量及質量。計劃書需要提交給環保署，按作業備考編號 252《海上填料及挖掘海泥卸置管理》中的程序作審批。

化學廢料的數量取決於施工設備的數量及現場維修要求，實際的化學廢料數量難以預計。由於項目屬小型項目，預計只會產生小量的化學廢料，每月約少於數個立方米。

施工期間所產生的非惰性搭建廢料只屬小量，非惰性搭建廢料將會盡快轉運至新界西堆填區，以減低對環境造成不良的影響，所以預計沒有潛在的廢物影響。

施工期間所產生的垃圾數量取決於工作人員的數量，估計只會產生少量垃圾。只要適當地處理、儲存、盡量將物料循環再用，以及按照良好廢物管理守則及《廢物處置條例》內有關規例及要求處置，預計施工期間所產生的廢物將不會對環境造成不良影響。

4.1.5 景觀及視覺

由於擬建工地位於修頓遊樂場的兒童遊樂場及籃球場，而 2 個通風設施將設在兒童遊樂場現有的種植範圍內。施工期間潛在的景觀影響包括在兒童遊樂內的 3 棵樹木將會永久移植和 1 棵樹木將會被移除。

在 2011 年 2 月進行了樹木狀況調查。修頓遊樂場內共有 13 棵樹木（見附錄 IV），其中 4 棵樹木將會受到擬建工程影響。現場沒有發現已註冊的古樹名木，全部都是用於綠化園林的常見品種。受影響的樹木包括洋紫荊，黃槐，細葉榕及火焰木。建議將這些受影響的樹木移植在臨時養植處，當工程完成後，樹木將會被移植到最終的位置。只有一棵樹（火焰木）因為健康狀況不佳，所以不能移植而被移除。考慮到受影響的面積小及其可復原性，景觀影響是非實質性及可接受的。

莊士敦道、軒尼詩道及駱克道附近的居民和遊樂場的使用人士將會看到施工現場、機動設備及設施，對他們造成潛在的視覺影響。由於灣仔區的道路交通繁忙及人流眾多，所以現時的視覺質量並不高，加上影響屬暫時性質，故預計施工期間帶來的視覺影響是可接受的。

4.1.6 文化遺產

建築活動只在工程範圍內進行，對已評級的歷史建築預計沒有直接的干擾。此外，項目屬小型工程，只會採用小量的施工設備，而且項目與這些已評級的歷史建築有足夠的緩衝距離（即最少 90 米），所以預計不會因震動而造成影響。

4.2 營運期的影響

4.2.1 噪音

擬建隧道工程包括兩個通風設施，位於莊士敦道修頓室內場館旁邊的遊樂場內種植地區上，見圖 NEX1050/2.7A/004 所示，預計營運時將會產生噪音影響。通風設施的主要噪音影響來自新鮮空氣進氣口、緊急排煙系統及例行維修時因管道和風扇震動所發出的噪音。固定機動設備所產生的營運噪音對敏感受體的影響是根據《噪音管制條例》及《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》來評估。每個噪音敏感受體和擬建通風設施的最短水平距離在表 4.3 所示。

表 4.3 擬建的通風設施與噪音敏感受體的距離

來源位置	通風設施的進出氣口方向	與敏感受體的最短水平距離（米）	
		N1	N2
通風設施 （新鮮空氣進氣口） - 修頓兒童遊樂場	北面（修頓兒童遊樂場）	110	29
	西面（修頓兒童遊樂場）	111	27
	南面（莊士敦道）	113	26
通風設施 （排煙口） - 修頓兒童遊樂場	南面（莊士敦道）	113	23

固定機動設備例如通風設施的噪音應符合《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》內可接受的噪音聲級。根據《環境影響評估程序的技術備忘錄》中附件 5 所提及，固定噪音的規劃用途噪音標準應該是（a）低於可接受噪音聲級 5 分貝（A）或（b）現時的背景噪音聲級（適用於比可接受的噪音聲級低 5 分貝（A）的低噪音地方）。《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》內根據地區對噪音敏感程度的級別而定的可接受噪音聲級見表 4.4。

表 4.4 可接受的噪音聲級

時間	地區對噪音感應程度的級別		
	A	B	C
日間（0700 至 1900 小時）	60 dB(A)	65 dB(A)	70 dB(A)
傍晚（1900 至 2300 小時）			
晚間（2300 至 0700 小時）	50 dB(A)	55 dB(A)	60 dB(A)

《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》中界定當道路的年平均每日交通流量超過 30,000，主要道路屬於影響因素。敏感受體 N1 和 N2 分別位於軒尼詩道和莊士敦道，根據 2010 年運輸署的

每年交通調查，軒尼詩道和莊士敦道的年平均每日交通流量分別為 27,200 和 11,220。因此，噪音敏感受體附近的道路不被視為影響因素。

根據《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》中的地區界定，項目應列為市區。由於項目的敏感受體不會受影響因素所影響，噪音敏感受體之地區對噪音感應程度的級別應為“B”級。根據 2011 年 5 月的實地視察，發現現時的環境噪音主要是來自道路交通噪音。預計該區的背景噪音聲級不會低於可接受的噪音聲級 5 分貝 (A)，所以敏感受體的固定噪音評估標準將會採用低於《非住用所、非公眾地方或非建築地盤噪音技術備忘錄》所示可接受的噪音聲級 5 分貝 (A)。故此，用於日間和傍晚 (0700 至 2300 小時) 的噪音評估標準是 60 分貝 (A)，而晚間 (2300 至 0700 小時) 則是 50 分貝 (A)。

評估是以最大允許噪音排放來設計擬建固定設備。以下的假設將採用在評估中：

- 所有的進出氣口都在運作；
- 不包括周圍的大廈/建築物的隔音修正；及
- 若進出氣口沒有在直接視線範圍內，將會減 10 分貝 (A) 來計算。

如果其中一個敏感受體超過噪音標準，主要源頭的最初聲功率級會逐漸降至該敏感受體可接受的噪音聲級。此過程會反復使用在其他超標的敏感受體中，直至所有已更改的聲音率級符合噪音標準。

按照上述的方法，固定機動設備在“B”級地區對噪音感應程度的噪音評估列在表 4.5 中。詳細的評估計算在附錄 V 所示。

表 4.5 固定設備的最大可容許的聲功率級

進出氣口號	最大可容許的聲功率級, 分貝 (A)	
	日間和傍晚	晚間
北面 (修頓兒童遊樂場)	90	80
西面 (修頓兒童遊樂場)	90	80
南面 (莊士敦道)	88	78
南面 (莊士敦道)	88	78

固定設備將會在地鐵站營運時間及限制時間 (即 23:00 至 07:00) 運作，擬建固定設備是根據晚間的最大許可的聲功率級來設計，加上適當的噪音減低措施，預計營運期間不會帶來不良噪音影響。

4.2.2 空氣質素

由於隧道僅供行人使用，通風設施是用作隧道內的供氣及排氣。項目在運行期間沒有排放空氣污染物，所以預計在營運階段沒有不良的空氣質素影響。

4.2.3 水質

項目在營運過程中，不會產生污水，所以預計在營運階段沒有不良的水質污染影響。

4.2.4 廢物管理

在隧道營運期間，除了行人棄置的垃圾外，一般不會產生其他廢物。這些垃圾將會由廢物收集商每天收集及清理，以減低臭味、蟲害及垃圾的滋擾。故此，預計不會構成廢物方面的不良影響。

4.2.5 景觀及視覺

樹木將被移植到臨時養植處，工程竣工後，樹木將被永久移植在復原後的遊樂場。1 棵樹木因健康狀況欠佳而被移除，所以預計營運期間不會造成不良的景觀影響。

項目將採用明挖回填的方法進行，修頓遊樂場的兒童遊樂場及籃球場內受工程影響的設施，包括兒童遊樂設施、部分種植範圍、安全地墊、部分的圍牆和籬笆及長椅，將會於工程竣工後復原。營運期間的視覺影響將會是修頓遊樂場東南面新建的通風設施。擬建的兩個通風設施將會設於復原後的種植範圍內，見圖 **NEX1050/2.7A/004** 所示。根據港鐵的設計標準手冊第 5.6.4.8 條，排煙管需與現時的建築物距離 5 米，因此交換兩個通風設施位置的方法並不可行。不過，部分的視線將會被現有遊樂場的圍牆阻擋，建議實施綠化措施以減低視覺影響。緩解措施的細節見 **第五章**。實施建議的措施後，景觀和視覺的影響是可以接受的。

4.2.6 文化遺產

由於隧道只供行人來往市區重建 H15 區和港鐵灣仔站，預計在營運期間不會對已評級的歷史建築帶來影響。

5. 環境保護措施及其他環境關聯

5.1 減低環境影響的措施

5.1.1 噪音

5.1.1.1 施工期間的措施

為減低項目施工期間的噪音，建議執行以下的環境保護措施：

- 採用低噪音機動設備及施工方法；及
- 加置活動隔音屏障、隔音罩和消聲器。

採用低噪音機動設備

採用低噪音機動設備以減低源頭噪音，是減少建築噪音影響的最有效措施。**表 5.1** 詳列於項目的建築噪音評估採用的機動設備清單，根據《管制建築工程噪音（撞擊式打樁除外）技術備忘錄》，這些機動設備較標準型號產生少噪音。承建商不需要一定採用評估中的機動設備，其他類型的低噪音機動設備也可以採用，但採用的機動設備的聲功率級須等於或低於評估中的類型。

表 5.1 低噪音機動設備一覽

低噪音機動設備	參考 ¹	聲功率級，分貝 (A)
破碎機	BS Table D8 Ref 12	106
圓鋸	BS Table D7 Ref 78	106
混凝土攪拌	BS Table D6 Ref 33	96
混凝土泵	BS Table D6 Ref 36	106
起重機	BS Table D7 Ref 101	94
挖土機	BS Table D8 Ref 15	103
卡車	BS Table D9 Ref 19	102
管樁機	BS Table D4 Ref 46	102
震動機	BS Table D6 Ref 40	98
道路滾壓機	BS Table D8 Ref 30	101
低噪音打樁機	GIKEN ²	94
貨車	BS Table D9 Ref 39	103

- 註：
- 1) 英國標準 5228:2009 – 施工工地及露天場所得噪音及震動管制
 - 2) 參考尖沙咀站改建工程的更改環境許可證，申請書編號 VEP-072/2002

加置活動隔音屏障、隔音罩和消音器

為了盡量減低建築噪音的影響，應採用隔音罩及活動隔音屏障，阻止噪音由源頭傳至噪音敏感受體。活動隔音屏障及隔音罩分別顯示在圖 NEX1050/2.7A/007 和圖 NEX1050/2.7A/008。各項機動設備的環境保護措施詳列於表 5.2。根據活動隔音屏障和隔音罩的實際尺寸來減低噪音，一般活動隔音屏障能減低可移動機動設備的噪音達 5 分貝(A)，而減低固定機動設備的噪音達 10 分貝(A)，隔音罩則可減低機動設備的噪音達 15 分貝(A)。為了進一步減低第 1b 階段莊士敦道挖掘工程的噪音影響，見圖 NEX1050/2.7A/005 所示，在明挖工程完成後建議加置隔音罩，以減低因挖掘工程和興建隧道時帶來的噪音影響。隔音罩的設計應配備隔音門作出用途，並應在施工期間常關閉，或應根據敏感受體和機動設備之間的攔截視線的要求來設計。

表 5.2 對各種機動設備使用的環境保護措施

機動設備	建議措施	隔聲修正系數, 分貝 (A)
空氣壓縮機	隔音罩	15
破碎機	活動隔音屏障	10
圓鋸	活動隔音屏障	10
混凝土泵	活動隔音屏障	10
挖土機	活動隔音屏障	5
發電機	隔音罩	15
灌漿機	活動隔音屏障	10
管樁機	活動隔音屏障	10
震動機	活動隔音屏障	10
低噪音打樁機	活動隔音屏障	10
起重機/卡車	活動隔音屏障	5
通風機	消音器	15
水泵	活動隔音屏障	10
混凝土攪拌	活動隔音屏障	5
道路滾壓機	活動隔音屏障	5
貨車	活動隔音屏障	5

本項目將採用的屏障為典型的直立式 / 懸臂式鋼框設計，屏障將設置在機動設備發出噪音部分的附近。為達到最大的隔音效果，隔音屏障需要用表面質量多於 7 千克/平方米的材料（而隔音罩則用表面質量不少於 10 千克/平方米的材料）。隔音屏障的長度一般最少是其高度的 5 倍，而隔音屏障的最低高度應使噪音敏感受體看不到噪音源任何一部分。曾在尖沙咀站改建工程中採用的隔音布 KYOWA#1000 將建議在項目中使用。承建商亦可以選擇不同類型的隔音布，以達到類似的功能和效益從而減低噪音影響。

剩餘建築噪音評估

在實施建議的緩解措施後，每一項建築活動的最大聲功率級和兩個噪音敏感受體的剩餘建築噪音已依照《管制建築工程噪音（撞擊式打樁除外）技術備忘錄》指定的方法作出評估，如表 5.3 及 5.4 所示。評估結果顯示施工期的建築噪音介乎 57 分貝(A)至 75 分貝(A)。低噪音機動設備的清單及詳細的評估計算分別在附錄 VI 及附錄 VII 顯示。

表 5.3 每項建築活動的最大聲功率級 - 實施環保措施的情況下

建築活動	最大聲功率級, 分貝 (A)
第 1a 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	98
設置管樁、板樁及中柱	96
明挖工程	95
挖掘工程 (有路面鋪蓋)	95
興建隧道 (有路面鋪蓋)	93
回填及修復	97
第 1b 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	98
設置管樁、板樁及中柱	87
明挖工程	95
挖掘工程	97
興建隧道	97
回填及修復	94
第 1c 階段 - 莊士敦道部分路段	
遷移及改道現有公共設施	98
設置管樁、板樁及中柱	87
明挖工程	95
挖掘工程 (有路面鋪蓋)	94
興建隧道 (有路面鋪蓋)	93
回填及修復	97
第二階段 - 康樂及文化事務署 遊樂場	
遷移及改道現有公共設施	99
設置管樁、板樁及中柱	93
明挖工程	95
挖掘工程	104
興建隧道	100
興建通風井	96
回填及修復	97

表 5.4 在噪音敏感受體的預測噪音水平 - 實施環保措施的情況下

噪音敏感受體	預測施工期間噪音水平, 分貝 (A)	參照環境影響評估程序技術備忘錄的日間噪音標準, 分貝 (A)
N1	57 - 67	75
N2	61 - 75	75

一般建築噪音管理措施

預計採用建議的緩解措施後，工程不會構成剩餘建築噪音影響。但為減低工程進行期間的噪音影響，承建商應該遵守以下的建築噪音管理措施：

- 遵守環保署出版的「防止違反《噪音管制條例》(第 400 章)良好管理業務守則(供建造業界使用)」；
- 符合法定及非法定的要求和指引；
- 在任何工作開始前，承建商應提交將採用的施工方法、機器和噪音緩解措施，以取得工程師代表的認可；
- 應策劃和實行有效消滅噪音的方法，減少對周圍噪音敏感受體的噪音影響，及提供有經驗和曾受訓練的人員以確保這些方法得以實施；
- 高噪音機器和活動應盡可能遠離噪音敏感受體；
- 關掉閒置的設備；
- 減少運作中的機動設備數量，盡可能避免同一時間使用高噪音設備或機器；
- 定期檢查及維修所有機器和設備；及
- 在可行的情況下，有效地利用貯存物料和其他結構作噪音隔音屏障。

5.1.1.2 營運期間的措施

若擬建固定設備的設計符合表 4.5 中最大的聲功率級，預計沒有營運期間的不良噪音影響。

5.1.2 空氣質素

5.1.2.1 施工期間的措施

實施《空氣污染管制(建造工程塵埃)規例》(香港法例第 311R 章)內的塵埃緩解措施，以控制塵埃排放。建議主要的塵埃管制措施如下：

- 在工地所有露天地方定期灑水，特別是在乾燥天氣期間，以減少塵埃排放；
- 在多塵的建築範圍及鄰近敏感受體的地方增加灑水次數；
- 使用防水的物料遮蓋所有挖掘或堆存的易生塵埃物料，如需要，在表面灑水維持濕潤；
- 在工地出口處提供車輛清洗設施；
- 車輛離開工地時，應以防水物料遮蓋車上運載的易生塵埃物料；
- 把機動設備設置離空氣敏感受體的最大距離；及

- 由於工程規模屬小型工程和範圍有限，沒有空間堆存物料，挖掘物料將會馬上轉運。如有任何堆存物料，應使用防水的物料遮蓋並盡快轉運，以免造成塵埃影響。

施工期間實施上述措施後，預期不會帶來空氣質素的不良影響。

5.1.2.2 營運期間的措施

由於在營運期間預計沒有空氣質素的影響，所以沒有需要實施緩解措施。

5.1.3 水質

5.1.3.1 施工期間的措施

承建商必須遵守《水污染管制條例》及其法規，有效地管制工地的污水排放，以確保施工不會構成任何影響。承建商須按照《專業人士環保事務諮詢委員會專業守則第 1/94 號—建築工地排水》及《建議給建築合約的防污條款》內所載的地盤運作守則，設計及實行緩解措施。建議主要的管制措施如下：

- 收集污水在沉澱池處理後排放至公共排水系統；
- 提供淤泥收集器和集油器，在廢水排到公共雨水疏導系統前，清除所有油、潤滑劑、油脂、淤泥、砂礫、碎屑等，並定期清理和維修淤泥收集器及集油器；
- 安裝輪胎清洗設施，以減少沙泥徑流；
- 定期維修和檢查排水系統、控制泥土流失和淤泥清除設施；
- 污水處理設施的管理和監控（如有）；
- 除非承建商獲得《水污染管制條例》的污水排放證，否則所有污水不能排入公共污水管或雨水疏導渠；
- 在暴雨期間遮蓋堆存拆建物料（如有）；及
- 如工地上設有洗手間，應確保污水接駁到污水管內，否則必須採用化學式洗手間。

施工期間實施上述的污染控制措施及良好工地作業守則，預計不會帶來不良的水質污染。

5.1.3.2 營運期間的措施

由於在營運期間預計沒有水質污染的影響，所以沒有需要實施緩解措施。

5.1.4 廢物管理

5.1.4.1 施工期間的措施

適當利用廢物管理策略，包括避免、減少、再用、循環再用四種方式，能有效減少廢物的產生及施工期間對環境的影響。然而承建商須遵守《廢物處置條例》及其法規，實施必須的廢物管理措施。建議的管制措施如下：

- 廢棄的金屬或器具亦應盡可能循環再用；
- 盡量減少產生廢物，並應採取恰當的處理、運送及處置方法；
- 承建商運送拆建物料到指定的公眾填土區或堆填處置時，應採用「運載紀錄」系統。獨立審核人員及駐工地人員須進行監察，以保證廢物的運送及處置過程恰當；
- 處理化學廢物時必須執行《包裝、標識及存放化學廢物的工作守則》的要求；及
- 確保所有垃圾存放於有蓋垃圾箱或密封箱內，並提供廢物分隔設施，分開收集廢紙、鋁罐及膠樽等，盡量使廢物可循環再用及得到適當的處置。

5.1.4.2 營運期間的措施

營運期間適當地收集和清除行人隧道內的垃圾，預計沒有不良的廢物影響，所以沒有需要實施緩解措施。

5.1.5 景觀及視覺

5.1.5.1 施工期間的措施

施工期間建議實施以下的措施，以減低潛在的景觀和視覺影響：

- 明確劃分施工區，以防止對附近現有樹木的損害；
- 保護工程範圍內所有保留的樹木；
- 在情況許可下，移植所有受影響的樹木；樹木移植和移除申請須按《樹木保育技術指引》（ETWB TCW 3/2006）提交並經審批；及
- 工程範圍用顏色不顯眼的圍板/隔音屏圍繞。

5.1.5.2 營運期間的措施

營運期間建議實施以下措施，以減低潛在的景觀及視覺影響：

- 工程完成後，將復原現有的兒童遊樂場及籃球場；
- 在建築物上使用適當的建築物料及顏色（不顯眼和不反光）；及

- 用攀緣植物綠化通風設施外牆，見**附錄 VIII** 所示。建議使用較常見和較少維護的攀緣植物，如爬牆虎、常春藤及羊蹄甲藤。

實施建議的措施後，施工和營運期間的景觀及視覺影響是可以接受的。

5.1.6 文化遺產

由於在施工和營運期間預計沒有文化遺產的影響，所以沒有需要實施緩解措施。

5.2 環境監察及審核要求

施工期間的環境影響只屬暫時性，預計當實行建議的緩解措施後，將不會對環境構成任何不良影響。然而，項目倡議人仍承諾在施工期間實行監察及審核計劃，以監察緩解措施落實的情況。

本簡介建議環境監察及審核計劃應包括定期監測建築噪音和塵埃水平。噪音監測站將設於軒尼詩大廈及昭憲大廈作每週的監測，而空氣監測站亦將設於軒尼詩大廈進行 24 小時空氣質素監測。樹木保護及景觀綠化工程的環境監察及審核要求已包括在計劃內。承建商須實施環境監察及審核計劃，該計劃考慮所有環境問題，同時承建商亦須進行實地審查。有關監察的程序、方法、補救行動以及投訴處理程序，將會參考先前批准之「尖沙咀站北行人隧道工程環境影響評估」的環境監察及審核計劃的內容。環境監察及審核計劃的詳細資料見**附錄 IX**。

5.3 工程實施時間表

工程實施時間表包括所有建議的環境緩解措施（見**附錄 X**）。針對每個主要環境問題所建議的緩解措施、位置、時間及各個負責實施的人員已包括在實施時間表內。

5.4 對環境影響的嚴重性、分佈位置及時間

建築工程只會影響局部區域，建議的項目範圍和實施良好工地作業守則，預計沒有不良的環境影響。

5.5 進一步的影響

行人隧道的營運將會遵守香港鐵路有限公司根據相關條例、法規和標準而制定的操作及維修手冊，所以預計沒有久遠的影響。

6. 使用先前批准的環境影響評估報告

本簡介參考了香港鐵路有限公司其它規模相若的，並通過了直接申請環境許可證批准的項目，資料如下：

- 地鐵荔枝角站長荔街行人隧道及出入口建造項目（登記冊編號：DIR-132/2005）
- 太子站行人隧道延展及出入口修改工程（登記冊編號：DIR-124/2005）
- 旺角地鐵站出口 C3 及 C4 改善工程（登記冊編號：DIR-078/2003）

上述項目與本項目的規模及工程相若，並已經成功通過了直接申請環境許可證的批准。

本簡介亦參考了根據《環境影響評估條例》於 2008 年 12 月 31 日批准的「尖沙咀站北行人隧道工程環境影響評估」（登記冊編號：AEIAR-127/2008）所載之低噪音機動設備的聲功率級。

7. 總結

擬建的行人隧道將會對現時的港鐵灣仔站進行改動，根據《環境影響評估條例》本項目屬實質改變獲豁免的指定工程，因此本簡介是根據《環境影響評估條例》提交足夠資料，為項目直接申請環境許可證。

本簡介已探討工程對環境可能造成的影響，其中包括空氣質素、噪音、水質、廢物管理、景觀及視覺和文化遺產。預計當實施所有建議的緩解措施和工地管制後，施工和營運期間均不會對環境構成任何不良影響。

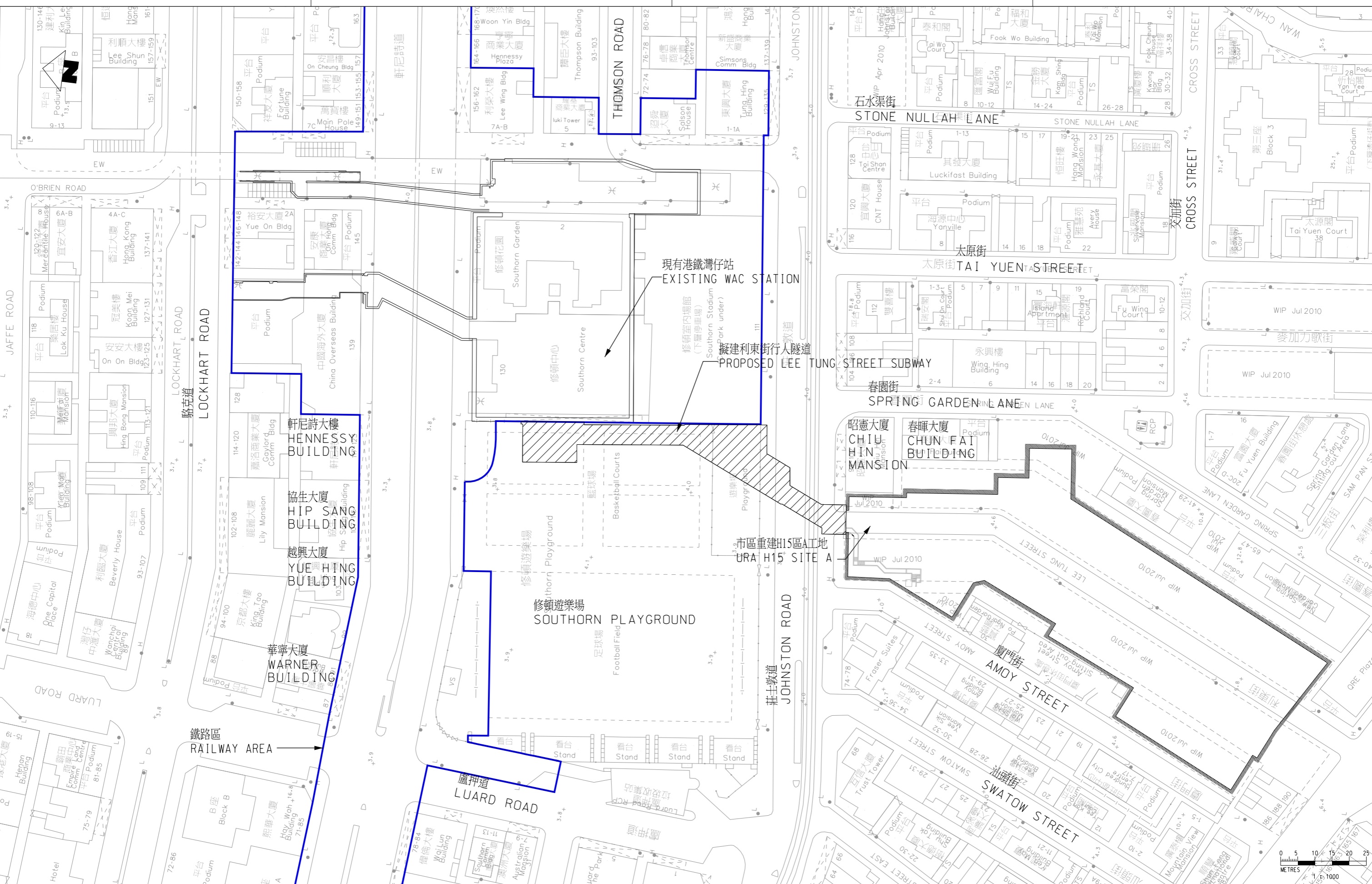
本簡介建議項目在施工期間執行環境監察及審核計劃，除了可確保所有緩解措施能落實進行外，更可定期監測附近地區的環境影響。

顧問合約編號 NEX/1050
灣仔站利東街行人隧道
詳細設計
工程項目簡介



附圖

C:\ProgramData\Bentley\MicroStation\B1\SELECTseries\WorkSpace\System\p1c1g\WTR_PDF_BW_COL_300DP.dgn
 Diecad: H051494 PRINTED BY: 20/06/2012 16:56
 MODELNAME: ENV\202056\NEX1050_2.7A_000.dgn
 PLOT DRW: J:\28245\REPORT\ENV\202056\NEX1050_2.7A_000.dgn



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION		16MAY12	AFK					
C	GENERAL REVISION		12AUG11	AFK					
B	GENERAL REVISION		18JUL11	AFK					
A	PROJECT PROFILE		04MAY11	AFK					

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	04MAY2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

Mott MacDonald

20/F Two Landmark East
 100 Hoo Ming Street
 Kowloon, Hong Kong
 Tel: +852 2808 8257
 Fax: +852 2807 1893
 www.mottmacdonald.com.hk

CADD REF. NEX1050_2.7A_0010.dgn

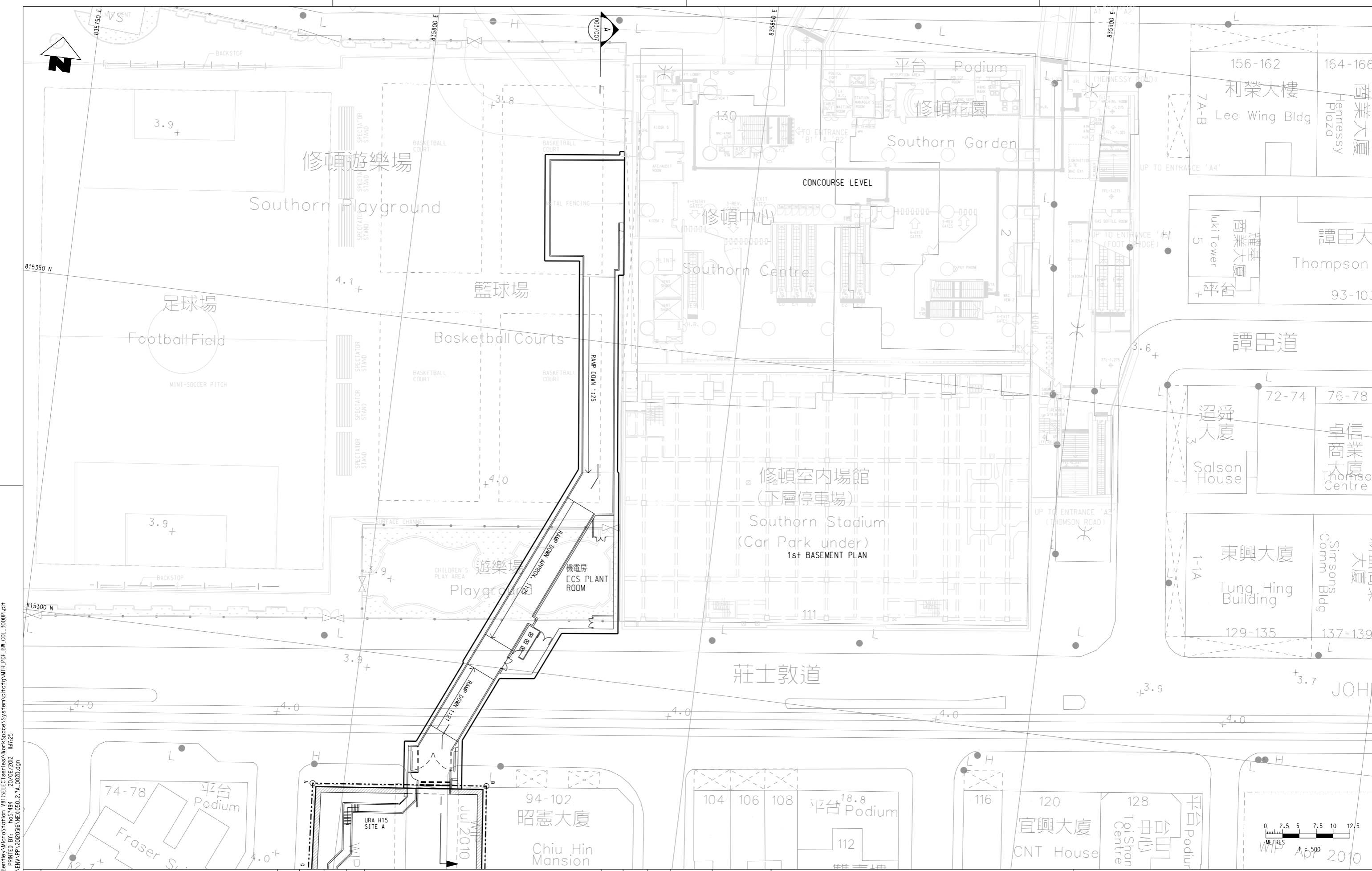
TITLE

CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 施工位置圖

SCALE 1:1000 (A3)

DRAWING NO. NEX1050/2.7A/001

REV. D



C:\ProgramData\Bentley\MicroStation\B1\SELECT\series\WorkSpace\System\p1\c1\g\MTR_PDF_BW_COL_300DP.dgn
 Die Date: 20/06/2012 11:25
 MODELNAME: J:\28245\REPORT\ENV\202056\NEX1050_2_7A_002.dgn
 PLOT DRW:

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION		16MAY12	AFK	HO				
C	GENERAL REVISION		12AUG11	AFK	HO				
B	GENERAL REVISION		18JUL11	AFK	HO				
A	PROJECT PROFILE		09MAY11	AFK	HO				

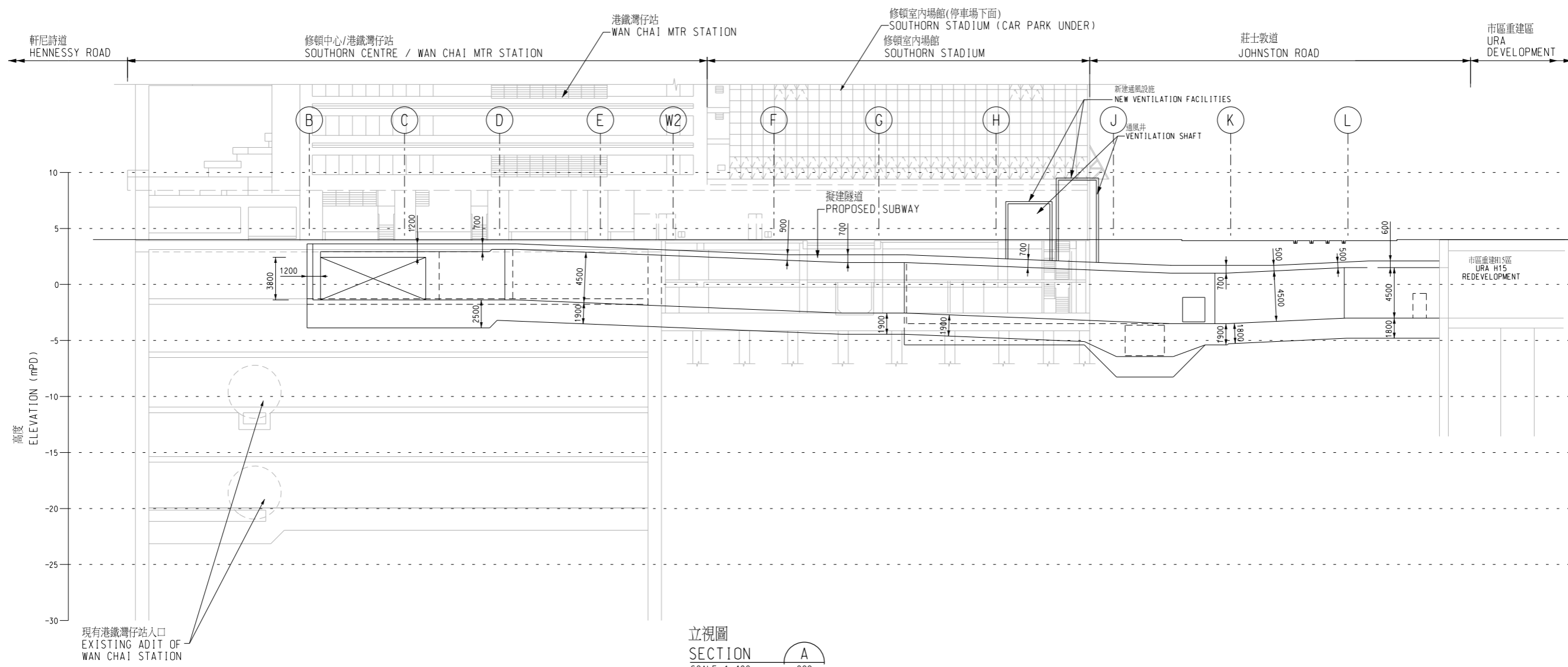
DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	09MAY2011


WAC STATION LEE TUNG STREET SUBWAY
 ORIGINATOR

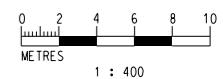
 20/F Two Landmark East
 100 How Ming Street
 Kowloon, Hong Kong
 Tel: +852 2808 2527
 Fax: +852 2807 1823
 www.mottmac.com.hk

TITLE
 CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 行人隧道平面圖
SCALE 1:500 (A3) **DRAWING NO.** NEX1050/2.7A/002 **REV.** D
 DATE: Jul 2010
 METRES: 0 2.5 5 7.5 10 12.5
 WIP: Apr 2010

C:\ProgramData\Bentley\MicroStation\B1\SELECTseries\WorkSpace\System\p1\c1\cg\MTR_PDF_PDF_BW_COL_3000P.dgn
 PLOT DRW: D:\cad\B1\PRINTED BY: h051494_20/06/2012 16:38:29
 MODELNAME: J:\282455\REPORT\ENV\VPY200802\NEX1050_2.7A_003C.dgn



立視圖
SECTION A
SCALE 1:400



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
					C	GENERAL REVISION	HO	12AUG11	AFK
					B	GENERAL REVISION	HO	18JUL11	AFK
					A	PROJECT PROFILE	HO	09MAY11	AFK

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	09MAY2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

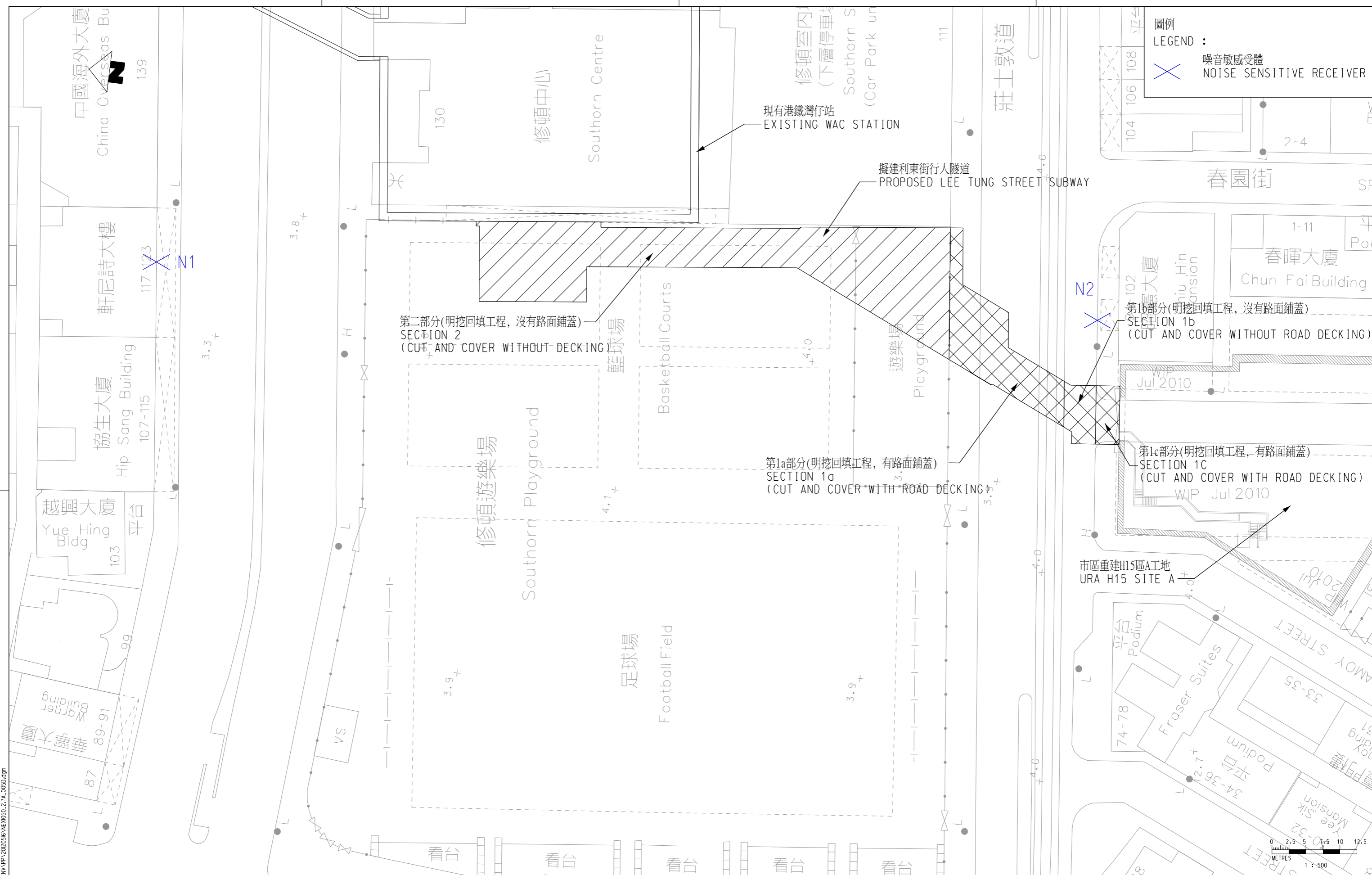
Mott MacDonald

20/F Two Landmark East
100 Hoi Ming Street
Kowloon, Kowloon
Hong Kong
T +852 2808 9257
F +852 2807 1823
www.mottmac.com.hk

CADD REF. NEX1050_2.7A_003C.dgn

TITLE		CONSULTANCY AGREEMENT NO. NEX/1050 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY 行人隧道立視圖	
SCALE	DRAWING NO.	REV.	
1:400 (A3)	NEX1050/2.7A/003	C	

PLOT DRW: C:\ProgramData\Bentley\MicroStation\B1\SELECT\series\WorkSpace\System\p1\c1\g\MTR_PDF_BW_COL_3000P.dgn
 MODELNAME: NEX1050_2.7A_0050.dgn
 FILENAME: J:\2010\2010\REPORT\ENV\NEX1050_2.7A_0050.dgn



圖例
 LEGEND :
 X 噪音敏感受體
 NOISE SENSITIVE RECEIVER

REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION	HO	16MAY12	AFK
C	GENERAL REVISION	HO	12AUG11	AFK
B	GENERAL REVISION	MING	18JUL11	AFK
A	PROJECT PROFILE	MING	04MAY11	AFK

REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION	HO	16MAY12	AFK
C	GENERAL REVISION	HO	12AUG11	AFK
B	GENERAL REVISION	MING	18JUL11	AFK
A	PROJECT PROFILE	MING	04MAY11	AFK

DRAWN MING
 DESIGNED BW
 CHECKED BL
 APPROVED AFK
 DATE 04MAY2011

ORIGINATOR
MTR
 WAC STATION LEE TUNG STREET SUBWAY

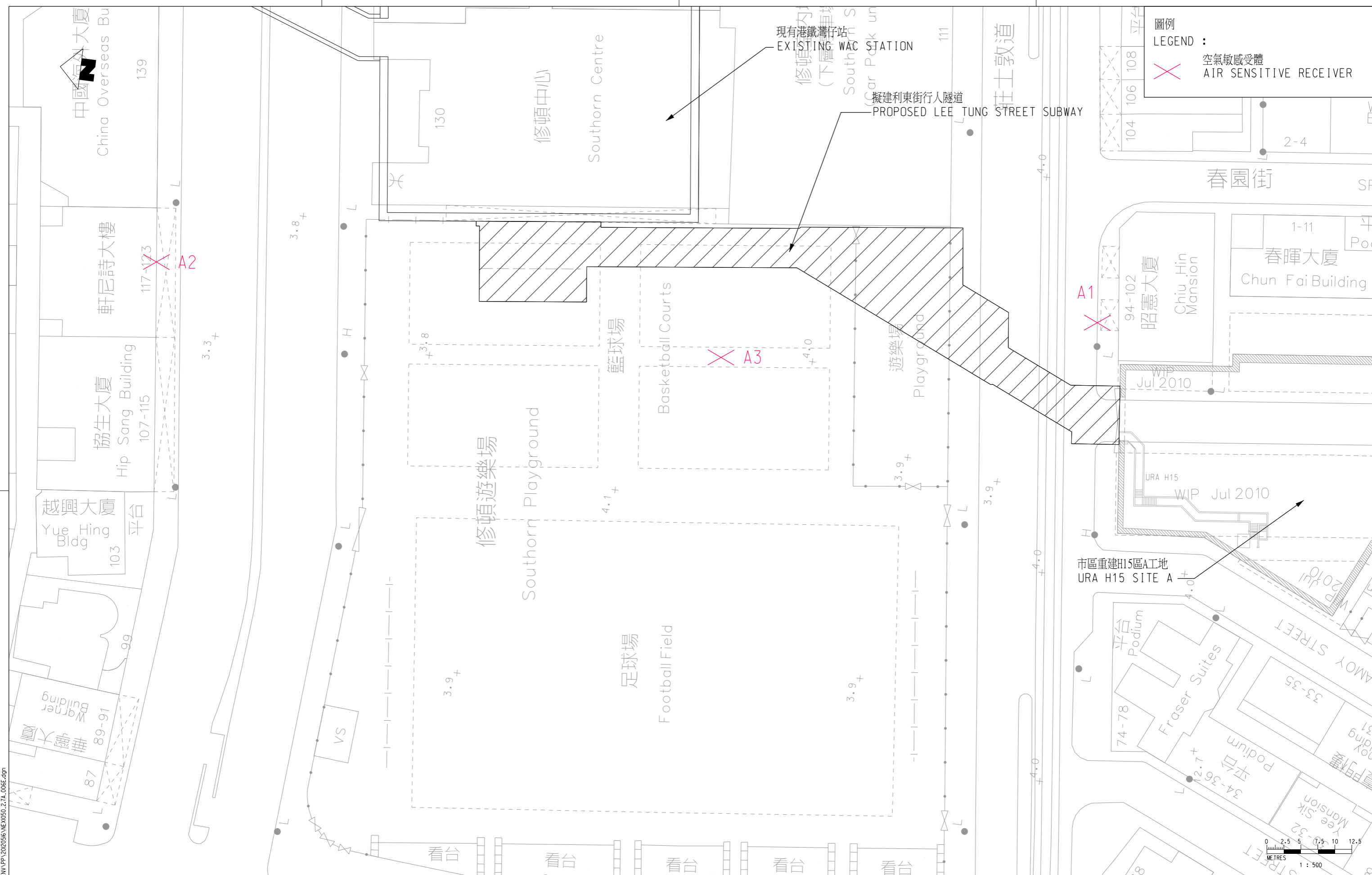
20/F Two Landmark East
 100 Hoi Ming Street
 Kowloon, Hong Kong
 Tel: +852 2828 5257
 Fax: +852 2827 1823
 www.motdmac.com.hk

CADD REF. NEX1050_2.7A_0050.dgn

TITLE
 CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 LOCATIONS OF NOISE SENSITIVE RECEIVERS
 噪音敏感受體位置圖

SCALE 1:500 (A3)
 DRAWING NO. NEX1050/2.7A/005
 REV. D

C:\ProgramData\Bentley\MicroStation\B1\SELECT\series\WorkSpace\System\p1\c1\g\MTR_PDF_BW.COL_3000P.dgn
 MODELNAME: NEX1050_2.7A_006E.dgn
 FILENAME: J:\282455\REPORT\ENV\VPY202056\NEX1050_2.7A_006E.dgn



圖例
 LEGEND :
 ✕ 空氣敏感受體
 AIR SENSITIVE RECEIVER

REV	DESCRIPTION	BY	DATE	APPROVED
E	GENERAL REVISION	HO	16MAY12	AFK
D	GENERAL REVISION	HO	27MAR12	AFK
C	GENERAL REVISION	HO	12AUG11	AFK
B	GENERAL REVISION	HO	18JUL11	AFK
A	PROJECT PROFILE	HO	04MAY11	AFK

REV	DESCRIPTION	BY	DATE	APPROVED
DESIGNED		HO		BW
CHECKED				BL
APPROVED				AFK
DATE			04MAY2011	

DRAWN HO
 DESIGNED BW
 CHECKED BL
 APPROVED AFK
 DATE 04MAY2011

DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE.
 © MTR CORPORATION LIMITED 2008. COPYRIGHT IN RESPECT OF THIS DRAWING / DOCUMENT IS OWNED BY THE MTR CORPORATION LIMITED OF HONG KONG. NO REPRODUCTION OF THE DRAWING / DOCUMENT OR ANY PART BY WHATEVER MEANS IS PERMITTED WITHOUT THE PRIOR WRITTEN CONSENT OF THE MTR CORPORATION LIMITED.

MTR
 WAC STATION LEE TUNG STREET SUBWAY
 ORIGINATOR

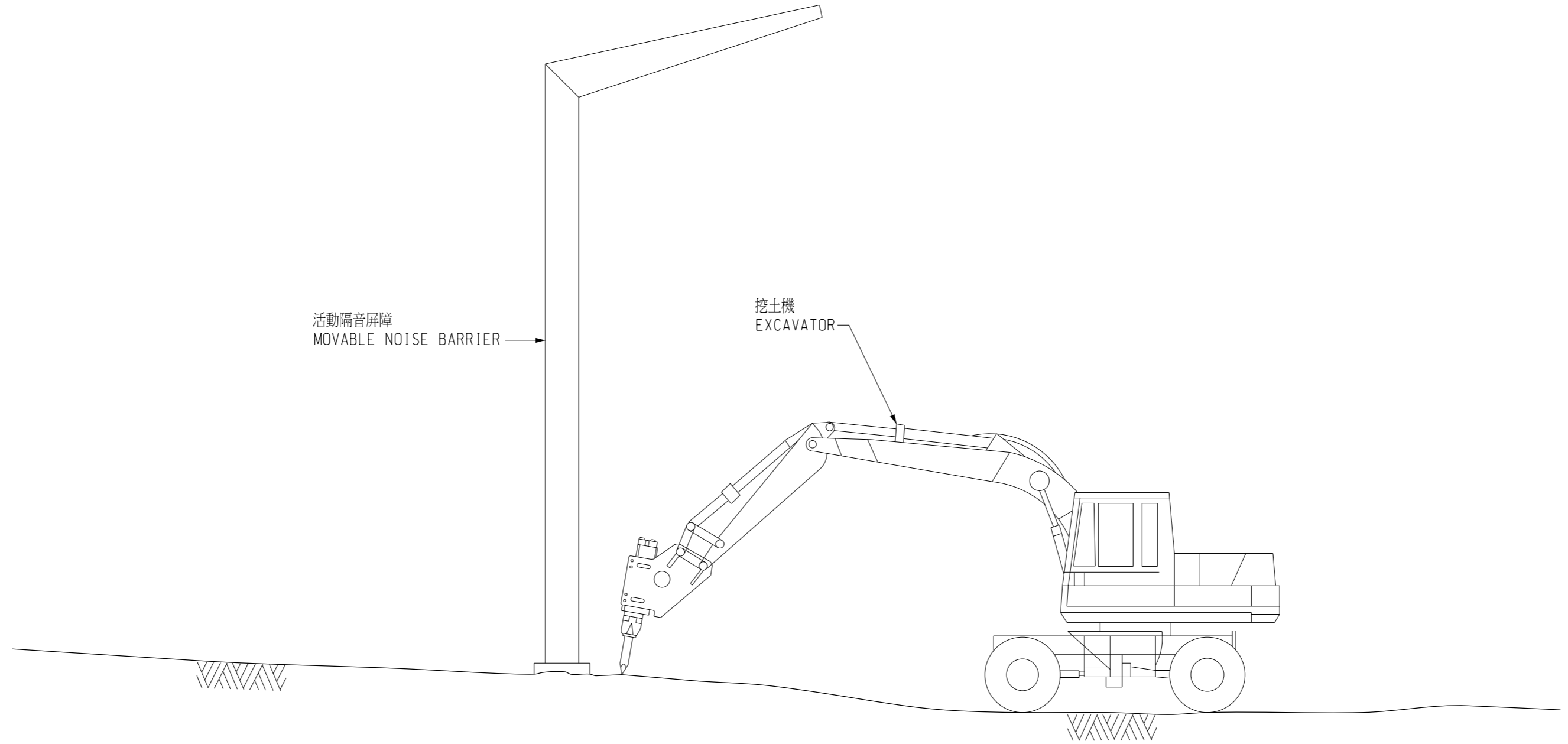
Mott MacDonald
 20/F Two Landmark East
 100 Hoi Ming Street
 Kowloon, Hong Kong
 T +852 2808 8257
 F +852 2807 1823
 www.mottmac.com.hk

CADD REF. NEX1050_2.7A_006E.dgn

TITLE
 CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 LOCATIONS OF AIR SENSITIVE RECEIVERS
 空氣敏感受體位置圖

SCALE 1:500 (A3)
 DRAWING NO. NEX1050/2.7A/006
 REV. E

PLOT DIR: C:\ProgramData\Bentley\MicroStation\8\SELECTseries\WorkSpace\System\p1\c1\cg\MTR_PDF_PDF_BW_COL_3000P.dgn
 MODELNAME: MTR_PDF_PDF_BW_COL_3000P.dgn
 FILENAME: J:\2010\2010\REPORT\ENV\VPY\2010118\NEX1050_2.7A_007A.dgn



活動隔音屏障
MOVABLE NOISE BARRIER

挖土機
EXCAVATOR

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
A	PROJECT PROFILE	HWC	18 JUL 11	AFK					

DRAWN	HWC
DESIGNED	SC
CHECKED	BL
APPROVED	AFK
DATE	18 JUL 2011

DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE VERIFIED ON SITE.
 © MTR CORPORATION LIMITED 2008. COPYRIGHT IN RESPECT OF THIS DRAWING / DOCUMENT IS OWNED BY THE MTR CORPORATION LIMITED OF HONG KONG. NO REPRODUCTION OF THE DRAWING / DOCUMENT OR ANY PART BY WHATEVER MEANS IS PERMITTED WITHOUT THE PRIOR WRITTEN CONSENT OF THE MTR CORPORATION LIMITED.

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

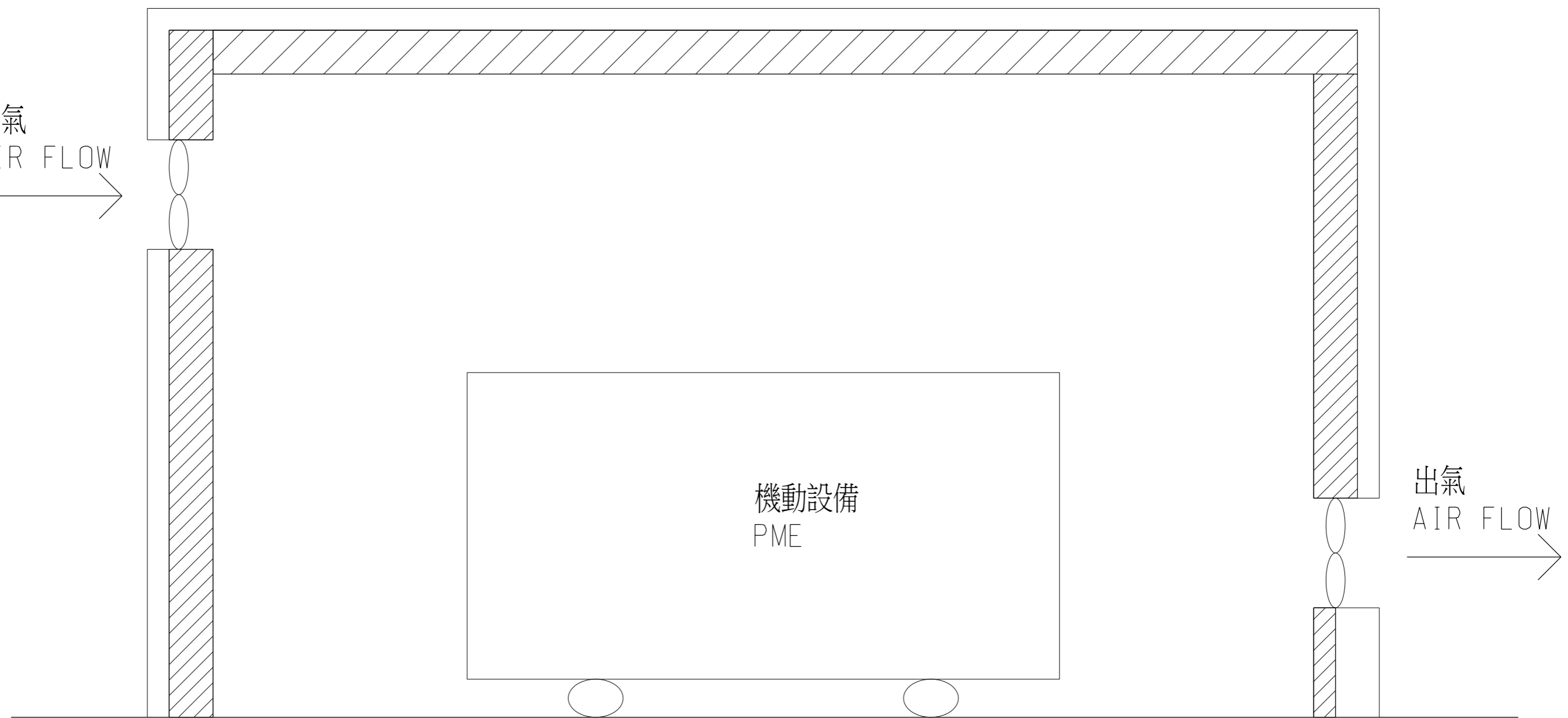
Mott MacDonald

20/F Two Landmark East
 100 Hoi Ming Street
 Kowloon, Hong Kong
 T +852 2808 9257
 F +852 2807 1823
 www.mottmac.com.hk

CADD REF. NEX1050_2.7A_007A.dgn

TITLE	CONSULTANCY AGREEMENT NO. NEX/1050 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY SCHEMATIC CONFIGURATION OF MOVABLE NOISE BARRIER 活動隔音屏障結構圖	
SCALE	N.T.S.	REV. A
DRAWING NO.	NEX1050/2.7A/007	

進氣
AIR FLOW

出氣
AIR FLOW



機動設備
PME

C:\ProgramData\Bentley\MicroStation\B8\SELECTseries\WorkSpace\System\p1\c1\cg\MTR_PDF_BW_COL_3000P.dgn
 MODELNAME: NEX1050_2.7A_008A.dgn
 FILENAME: J:\2010\2010\REPORT\ENV\VPY\2010118\NEX1050_2.7A_008A.dgn
 PLOT DRW: Diecad
 PRINTED BY: H051494
 DATE: 20/06/2012 10:44:47

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
A	PROJECT PROFILE	HWC	18 JUL 11	AFK					

DRAWN	HWC
DESIGNED	SC
CHECKED	BL
APPROVED	AFK
DATE	18 JUL 2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

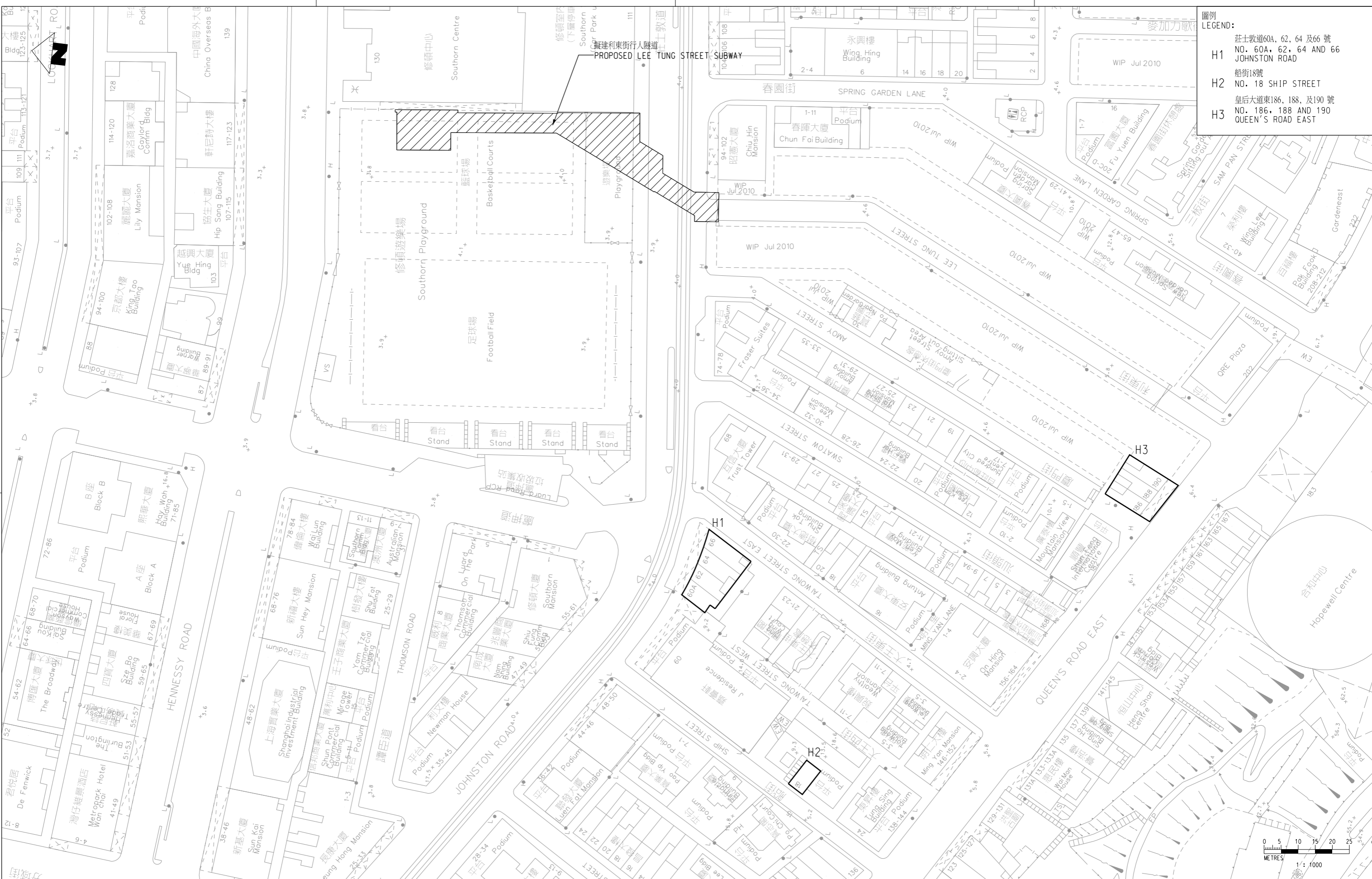
Mott MacDonald

20/F Two Landmark East
100 Hoo Ming Street
Kowloon, Kowloon
Hong Kong
T +852 2808 9257
F +852 2807 1823
www.mottmac.com.hk

CADD REF. NEX1050_2.7A_008A.dgn

TITLE		CONSULTANCY AGREEMENT NO. NEX/1050	
		DETAILED DESIGN FOR LEE TUNG STREET SUBWAY	
		SCHEMATIC CONFIGURATION OF FULL NOISE ENCLOSURE FOR PME	
		機動設備隔音罩結構圖	
SCALE	N.T.S.	DRAWING NO.	NEX1050/2.7A/008
REV.	A		

C:\ProgramData\Bentley\MicroStation\B8\SELECT\series\WorkSpace\System\p1c1g\MTR_PDF_BW_COL_300DP.dgn
 Diehard: 1051494 20/06/2012 12:05:24
 FILENAME: J:\282455\REPORT\ENV\2010056\NEX1050_2.7A_009B.dgn



圖例
 LEGEND:
 H1 莊士敦道60A, 62, 64 及 66 號
 NO. 60A, 62, 64 AND 66
 JOHNSTON ROAD
 H2 船街18號
 NO. 18 SHIP STREET
 H3 皇后大道東186, 188, 及190 號
 NO. 186, 188 AND 190
 QUEEN'S ROAD EAST

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	27MAR2012

MTR
 WAC STATION LEE TUNG STREET SUBWAY
 ORIGINATOR
Mott MacDonald
 20/F Two Landmark East
 100 How Ming Street
 Kowloon, Hong Kong
 Tel: +852 2808 8257
 Fax: +852 2807 1823
 www.mottmac.com.hk

TITLE CONSULTANCY AGREEMENT NO. NEX/1050 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY LOCATIONS OF GRADED HISTORICAL BUILDINGS 已評級的歷史建築位置圖	
SCALE 1:1000 (A3)	DRAWING NO. NEX1050/2.7A/009
REV. B	

REV	DESCRIPTION	BY	DATE	APPROVED
B	GENERAL REVISION	HO	16MAY12	AFK
A	PROJECT PROFILE	HO	27MAR12	AFK

DO NOT SCALE DRAWINGS. ALL DIMENSIONS SHALL BE
 VERIFIED ON SITE.
 © MTR CORPORATION LIMITED 2008 COPYRIGHT IN
 RESPECT OF THIS DRAWING / DOCUMENT IS OWNED BY THE
 MTR CORPORATION LIMITED OF HONG KONG. NO
 REPRODUCTION OF THE DRAWING / DOCUMENT OR ANY PART
 BY WHATEVER MEANS IS PERMITTED WITHOUT THE PRIOR
 WRITTEN CONSENT OF THE MTR CORPORATION LIMITED.

CADD REF. NEX1050_2.7A_009B.dgn

顧問合約編號 NEX/1050
灣仔站利東街行人隧道
詳細設計
工程項目簡介



附錄

附錄 I. 建築活動的機動設備清單

Appendix I
Plant Inventory for Various Construction Activities

Consultancy Agreement No. NEX/1050
Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1a - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Breaker, hand-held, mass > 35kg	CNP 026	1	114	40%	-	0	110
Lorry	CNP 141	1	112	20%	-	0	105
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	40%	-	0	108
Generator, silenced, 75 dB(A) at 7 m	CNP 102	1	100	100%	-	0	100
Lorry	CNP 141	1	112	20%	-	0	105
						Total	114
Installation of Pipepile, Sheet Pile and King Posts							
Lorry	CNP 141	1	112	20%	-	0	105
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Grout mixer	CNP 105	1	90	100%	-	0	90
Pipe piling rig	CNP 162	2	105	100%	-	0	108
Vibrating hammer	CNP 172	1	115	100%	-	0	115
						Total	116
Open Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Generator, silenced, 75 dB(A) at 7 m	CNP 102	1	100	100%	-	0	100
						Total	111
Further Excavation (Works under Road Decking)							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	#Underground Work	20	91
Lorry	CNP 141	2	112	15%	-	0	107
Excavator/ loader, wheeled/ tracked	CNP 081	2	112	100%	#Underground Work	20	95
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Dump truck	CNP 067	1	117	15%	-	0	109
Water pump (petrol)	CNP 282	2	103	100%	#Underground Work	20	86
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	111
Construction of Subway (Works under Road Decking)							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	#Underground Work	20	82
Saw, circular, wood	CNP 201	1	108	50%	#Underground Work	20	85
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Concrete pump, stationary/ lorry mounted	CNP 047	1	109	50%	#Underground Work	20	86
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	104
Backfill and Reinstatement							
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	50%	-	0	109
Poker, vibratory, hand-held	CNP 170	1	113	20%	-	0	106
Road roller	CNP 185	1	108	15%	-	0	100
Dump truck	CNP 067	1	117	15%	-	0	109
						Total	114
MAXIMUM amongst the Activities							116

Appendix I
Plant Inventory for Various Construction Activities

Consultancy Agreement No. NEX/1050
Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/ unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1b - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Breaker, hand-held, mass > 35kg	CNP 026	1	114	40%	-	0	110
Lorry	CNP 141	1	112	20%	-	0	105
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	40%	-	0	108
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Lorry	CNP 141	1	112	20%	-	0	105
						Total	114
Installation of Pipepile, Sheet Pile and King Posts							
Lorry	CNP 141	1	112	20%	-	0	105
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Vibrating hammer	CNP 172	1	115	100%	-	0	115
						Total	115
Open Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
						Total	111
Further Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Lorry	CNP 141	1	112	15%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	100%	-	0	112
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Dump truck	CNP 067	1	117	15%	-	0	109
Water pump (petrol)	CNP 282	1	103	100%	-	0	103
Ventilation fan	CNP 241	1	108	100%	-	0	108
						Total	117
Construction of Subway							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Concrete pump, stationary/ lorry mounted	CNP 047	1	109	50%	-	0	106
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Ventilation fan	CNP 241	2	108	100%	-	0	111
						Total	113
Backfill and Reinstatement							
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	50%	-	0	109
Poker, vibratory, hand-held	CNP 170	1	113	20%	-	0	106
Road roller	CNP 185	1	108	15%	-	0	100
Dump truck	CNP 067	1	117	15%	-	0	109
						Total	114
MAXIMUM amongst the Activities							117

Appendix I
Plant Inventory for Various Construction Activities

Consultancy Agreement No. NEX/1050
Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/ unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1c - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Breaker, hand-held, mass > 35kg	CNP 026	1	114	40%	-	0	110
Lorry	CNP 141	1	112	20%	-	0	105
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	40%	-	0	108
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Lorry	CNP 141	1	112	20%	-	0	105
						Total	114
Installation of Pipepile, Sheet Pile and King Posts							
Lorry	CNP 141	1	112	20%	-	0	105
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Vibrating hammer	CNP 172	1	115	100%	-	0	115
						Total	115
Open Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
						Total	111
Further Excavation (Works under Road Decking)							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	#Underground Work	20	91
Lorry	CNP 141	1	112	15%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	100%	#Underground Work	20	92
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Dump truck	CNP 067	1	117	15%	-	0	109
Water pump (petrol)	CNP 282	1	103	100%	#Underground Work	20	83
Ventilation fan	CNP 241	1	108	100%	#Underground Work	20	88
						Total	110
Construction of Subway (Works under Road Decking)							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	#Underground Work	20	82
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Concrete pump, stationary/ lorry mounted	CNP 047	1	109	50%	#Underground Work	20	86
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	104
Backfill and Reinstatement							
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	50%	-	0	109
Poker, vibratory, hand-held	CNP 170	1	113	20%	-	0	106
Road roller	CNP 185	1	108	15%	-	0	100
Dump truck	CNP 067	1	117	15%	-	0	109
						Total	114
MAXIMUM amongst the Activities							115

Appendix I
Plant Inventory for Various Construction Activities

Consultancy Agreement No. NEX/1050
Lee Tung Street Subway (Section 2)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 2 - LCSD Playground Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Lorry	CNP 141	1	112	30%	-	0	107
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	50%	-	0	109
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Lorry	CNP 141	1	112	30%	-	0	107
						Total	115
Installation of Pipepile, Sheet Pile and King Posts							
Lorry	CNP 141	1	112	20%	-	0	105
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Grout mixer	CNP 105	1	90	100%	-	0	90
Pipe piling rig	CNP 162	1	105	100%	-	0	105
Vibrating hammer	CNP 172	1	115	100%	-	0	115
						Total	116
Open Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Dump truck	CNP 067	1	117	20%	-	0	110
						Total	114
Further Excavation							
Breaker, hand-held, mass > 35kg	CNP 026	1	114	50%	-	0	111
Lorry	CNP 141	2	112	15%	-	0	107
Excavator/ loader, wheeled/ tracked	CNP 081	2	112	100%	-	0	115
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Dump truck	CNP 067	1	117	15%	-	0	109
Water pump (petrol)	CNP 282	2	103	100%	-	0	106
Ventilation fan	CNP 241	2	108	100%	-	0	111
						Total	119
Construction of Subway							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	-	0	102
Saw, circular, wood	CNP 201	1	108	50%	-	0	105
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Concrete pump, stationary/ lorry mounted	CNP 047	1	109	50%	-	0	106
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Ventilation fan	CNP 241	2	108	100%	-	0	111
						Total	114
Construction of Ventilation Shaft							
Saw, circular, wood	CNP 201	1	108	50%	-	0	105
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Concrete pump, stationary/ lorry mounted	CNP 047	1	109	30%	-	0	104
Crane, mobile/ barge mounted (diesel)	CNP 048	1	112	30%	-	0	107
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	-	0	95
Poker, vibratory, hand-held	CNP 170	1	113	20%	-	0	106
						Total	112
Backfill and Reinstatement							
Concrete lorry mixer	CNP 044	1	109	30%	-	0	104
Excavator/ loader, wheeled/ tracked	CNP 081	1	112	50%	-	0	109
Poker, vibratory, hand-held	CNP 170	1	113	20%	-	0	106
Road roller	CNP 185	1	108	15%	-	0	100
Dump truck	CNP 067	1	117	15%	-	0	109
						Total	114
MAXIMUM amongst the Activities							119

附錄 II. 對具代表性噪音敏感受體的 建築噪音評估

附錄 III. 探井記錄



FUGRO
GEOTECHNICAL
SERVICES LTD

DRILLHOLE RECORD

HOLE No. **912/SIL/WAC/BH01**

CONTRACT No.: **MTR contract 912**

SHEET: **1** of **7**

PROJECT: **Ground Investigation for South Island Line (East)**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No. **N/A**

MACHINE & No.: **FDR-31**

E **835831.89**
 N **815317.87**

DATE from: **11/01/2011** to **26/01/2011**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL **+ 3.97** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type	Depth					
14/01/2011	SW											3.97	0.00			Grey (7.5YR/6/1), CONCRETE.
1												3.67	0.30			Firm, light yellowish brown (2.5Y/6/4), sandy SILT with some angular fine to medium gravel. (FILL)
2																
3								62 bls				0.97	3.00			Medium dense, dark grey (5YR/4/1), fine to coarse SAND with some angular fine to medium gravel. (FILL)
4								2, 3, 2, 3, 3, 4 N=12				-0.03	4.00			4.00 - 4.40m : Band/pocket of orangish black, slightly gravelly, slightly sandy SILT / CLAY.
5								52 bls				-0.43	4.40			
6								k=6.43E-5m/s				-2.03	6.00			6.00 - 7.00m : Loose
7								2, 1, 1, 1, 1 N=4				-3.03	7.00			Soft, grey (7.5YR/6/1), sandy SILT with occasional angular fine to medium gravel of rock and coal fragments. (FILL)
8	SW 7.50 PW							39 bls				7.45	7.50			
9								k=8.93E-6m/s				8.00	8.10			
10								2, 1, 1, 0, 1, 2 N=4				-5.03	9.00			9.00 - 9.45m : Band/pocket of slightly silty, clayey gravelly SAND with shell fragments.
11								34 bls				-5.49	9.45			Soft, light yellowish brown (2.5Y/6/4), sandy clayey SILT. (ALLUVIUM)
12												-6.03	10.00			

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiometer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
 DATE 25/01/2011
 CHECKED A.B-Hollinshead
 DATE 07/02/2011

REMARKS

- An inspection pit was excavated to a depth of 2.80m.
- Falling head permeability test was performed from 5.00m to 6.50m below existing ground level on 15/01/2011.
- Constant head permeability tests were performed from 7.00m to 8.50m, 13.10m to 14.60m and 22.60m to 24.10m below existing ground level on 17/01/2011 to 19/01/2011 respectively.
- A piezometer was installed at 14.50m below ground level on 26/01/2011.
- A standpipe was installed at 8.50m belowground level on 26/01/2011.



FUGRO
GEOTECHNICAL
SERVICES LTD

DRILLHOLE RECORD

HOLE No. **912/SIL/WAC/BH01**

CONTRACT No.: **MTR contract 912**

SHEET: **2** of **7**

PROJECT: **Ground Investigation for South Island Line (East)**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No. **N/A**

MACHINE & No.: **FDR-31**

E **835831.89**
 N **815317.87**

DATE from: **11/01/2011** to **26/01/2011**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL **+ 3.97** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type	Depth					
								1, 2, 2, 2, 2, 2 N=8	21	U76 Undisturbed Sample	10.00					As sheet 1 of 7.
11			70	100					22	U100 Undisturbed Sample	10.00					
12			70	100					23	U76 Undisturbed Sample	11.00	-7.03	11.00			Soft, light yellowish brown (2.5Y/6/4), slightly sandy, clayey SILT. (ALLUVIUM)
13			70	100				1, 0, 1, 0, 1, 1 N=3	24	U76 Undisturbed Sample	12.00					
14			70	100					25	U100 Undisturbed Sample	12.10					
15			80	100				k=2.98E-7m/s	26	U76 Undisturbed Sample	12.20					
16			80	100				1, 0, 1, 1, 1, 2 N=5	27	U76 Undisturbed Sample	13.00					
17			80	100					28	U76 Undisturbed Sample	14.00					
18			80	100				1, 1, 1, 1, 2, 2 N=6	29	U76 Undisturbed Sample	14.10					
19			80	100					30	U76 Undisturbed Sample	14.20					
20			80	100				2, 2, 3, 4, 6, 7 N=20	31	U76 Undisturbed Sample	15.00	-11.03	15.00	V		Extremely weak, reddish brown (5YR/4/3), completely decomposed medium to coarse grained GRANITE. (Slightly sandy, clayey SILT)
			80	100					32	U76 Undisturbed Sample	16.00					
			80	100					33	U76 Undisturbed Sample	16.10					
			80	100					34	U76 Undisturbed Sample	16.20					
			80	100					35	U76 Undisturbed Sample	17.00					
			80	100					36	U76 Undisturbed Sample	18.00					
			80	100					37	U76 Undisturbed Sample	18.10					
			80	100					38	U76 Undisturbed Sample	18.20					
			80	100					39	U76 Undisturbed Sample	19.00	-15.03	19.00	V		Extremely weak, yellowish brown (10YR/5/6), completely decomposed medium to coarse grained GRANITE. (Sandy clayey SILT with occasional angular fine gravel)
			80	100							-16.03	20.00				

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiometer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
 DATE 25/01/2011
 CHECKED A.B.Hollinshead
 DATE 07/02/2011

REMARKS



**FUGRO
GEOTECHNICAL
SERVICES LTD**

DRILLHOLE RECORD

HOLE No. 912/SIL/WAC/BH01

CONTRACT No.: MTR contract 912

SHEET: 3 of 7

PROJECT: Ground Investigation for South Island Line (East)

METHOD: Rotary Drilling

CO-ORDINATES:

WORKS ORDER No. N/A

MACHINE & No.: FDR-31

E 835831.89
N 815317.87

DATE from: 11/01/2011 to 26/01/2011

FLUSHING MEDIUM: Water

ORIENTATION: Vertical

GROUND LEVEL + 3.97 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type	Depth					
21	0.70m at 18:00 2.10m at 08:00							2, 2, 2, 4, 6, 7 N=19	41	U76	20.20	20.00				As sheet 2 of 7.
									42	U100	20.50					
									43	U76	21.00					
									44	U76	22.00					
								3, 3, 3, 5, 7, 9 N=24	45	U100	22.10					
									46	U100	22.20					
									47	U76	23.00					
								k=4.21E-7m/s	48	U76	24.00					
									49	U100	24.10					
									50	U100	24.20					
25	0.60m at 18:00 1.95m at 08:00							3, 3, 3, 6, 6, 9 N=24	51	U76	24.50					
26									52	U76	25.00					
									53	U100	26.00					
								6, 8, 10, 12, 15, 18 N=55	54	U100	26.10					
									55	U76	26.20					
27	PW 27.00 HW								56	U76	26.50					
28									57	U76	27.00					
									58	U100	28.00					
								7, 11, 12, 13, 17, 20 N=62	59	U76	28.10					
29										U76	28.20					
										U76	28.50					
30										U76	29.00	-25.03	29.00		V	Extremely weak, yellowish brown (10YR/5/6), completely decomposed medium grained GRANITE. (Silty fine to coarse SAND with some angular fine gravel)
										U76	29.50	-26.03	30.00			

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
DATE 25/01/2011
CHECKED A.B.Hollinshead
DATE 07/02/2011

REMARKS



FUGRO
GEOTECHNICAL
SERVICES LTD

DRILLHOLE RECORD

HOLE No. 912/SIL/WAC/BH01

CONTRACT No.: MTR contract 912

SHEET: 4 of 7

PROJECT: Ground Investigation for South Island Line (East)

METHOD: Rotary Drilling

CO-ORDINATES:

WORKS ORDER No. N/A

MACHINE & No.: FDR-31

E 835831.89
 N 815317.87

DATE from: 11/01/2011 to 26/01/2011

FLUSHING MEDIUM: Water

ORIENTATION: Vertical

GROUND LEVEL + 3.97 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description	
									No.	Type						
31				100				5, 9, 11, 15, 16, 17 N=59	61, 62		-26.03	30.00		V	As sheet 3 of 7.	
32				80				7, 10, 11, 11, 13, 15 N=60	63, 64, 65, 66							
33				100					67							
34				80				8, 11, 14, 15, 20, 23 N=72	68, 69, 70							
35				100					71							
36				80				10, 12, 15, 20, 21, 23 N=60	72, 73, 74							
37				100					75							
38				80				14, 17, 22, 34, 44 / 60mm 100 bls / 210mm	76, 77, 78							
39		0.55m at 18:00 2.10m at 08:00		100					79		-35.03	39.00		IV		Weak, light yellowish brown, highly decomposed medium to coarse grained GRANITE. Recovered as sandy angular fine to coarse gravel.
40				80							-36.03	40.00				

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocure Sample
- 100mm Vibrocure Sample
- Vibrocure Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiometer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
 DATE 25/01/2011
 CHECKED A.B-Hollinshead
 DATE 07/02/2011

REMARKS



FUGRO
GEOTECHNICAL
SERVICES LTD

DRILLHOLE RECORD

HOLE No. **912/SIL/WAC/BH01**

CONTRACT No.: **MTR contract 912**

SHEET: **5** of **7**

PROJECT: **Ground Investigation for South Island Line (East)**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No. **N/A**

MACHINE & No.: **FDR-31**

E **835831.89**
 N **815317.87**

DATE from: **11/01/2011** to **26/01/2011**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL **+ 3.97** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples			Reduced Level	Depth (m)	Legend	Grade	Description		
									No.	Type	Depth							
41								43, 7 / 5mm, 100 / 50mm 100 bls / 50mm	80 81 82	□ □ □	20.00 23.10 26.20	-36.03	40.00	+	IV	As sheet 4 of 7.		
42				84	80	80	NI						41.04	-37.13	41.10	+	II	Strong, pinkish grey, spotted black, slightly decomposed medium to coarse grained GRANITE.
42				85	45	45	NR						41.54			+	V	Joints are medium spaced, stepped, very narrow, clay infilled (3-5mm), dipping at 5715? (CORESTONE)
43				100									42.20	-38.23	42.20	+	V	41.84 - 42.20m : No recovery, assumed to be completely decomposed GRANITE.
44								12, 17, 22, 25, 30, 23 / 35mm 100 bls / 260mm	83 84 85 86	▨ □ □ □	43.20 43.30 43.40 43.66							Extremely weak, yellowish brown (10YR/5/6), completely decomposed medium to coarse grained GRANITE. (Sandy SILT with some angular fine gravel)
45				100														
46		0.65m at 18:00 2.20m at 08:00						12, 20, 23, 30, 47 / 60mm 100 bls / 210mm	87 88 89 90	▨ □ □ □	44.20 45.20 45.30 45.40 45.64							
47				100														
48								13, 27, 38, 51, 11 / 10mm 100 bls / 160mm	91 92 93 94	▨ □ □ □	46.20 47.20 47.30 47.40 47.56							
49				100														
50								14, 23, 38, 40, 24 / 20mm 100 bls / 170mm	95 96 97 98	▨ □ □ □	48.20 49.20 49.30 49.40 49.52		-45.33	49.30	+	V	Extremely weak, yellowish brown (10YR/5/6), completely decomposed medium to coarse grained GRANITE. (Silty fine to coarse SAND with some angular fine gravel)	

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
 DATE 25/01/2011
 CHECKED A.B.Hollinshead
 DATE 07/02/2011

REMARKS



**FUGRO
GEOTECHNICAL
SERVICES LTD**

DRILLHOLE RECORD

HOLE No. **912/SIL/WAC/BH01**

CONTRACT No.: **MTR contract 912**

SHEET: **6** of **7**

PROJECT: **Ground Investigation for South Island Line (East)**

METHOD: **Rotary Drilling**

CO-ORDINATES:

WORKS ORDER No. **N/A**

MACHINE & No.: **FDR-31**

E **835831.89**
N **815317.87**

DATE from: **11/01/2011** to **26/01/2011**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL **+ 3.97** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	R.Q.D %	F.I	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
51				100				16, 27, 35, 55, 10 / 10mm 100 bls / 160mm	99 50.20 100 51.20 101 51.30 102 51.40				V	As sheet 5 of 7.
52				90					103 52.20					
53				80				41, 9 / 5mm, 100 / 60mm 100 bls / 60mm	104 53.20 105 53.30					
54				90					106 54.20					
55		0.65m at 18:00 2.00m at 08:00		80				50 / 40mm, 100 / 30mm 100 bls / 30mm	107 55.20 108 55.30					
56				80	55	49	33		T2101 55.78	-51.81	55.78	+	III	Moderately strong, light yellowish brown, moderately decomposed medium to coarse grained GRANITE. Joints are closely spaced, stepped, extremely narrow, iron and manganese oxide stained, dipping at 5?15?and 65?75? (CORESTONE)
57				80					T2101 56.52	-52.25	56.52	+	V	
57				80					T2101 57.20	-52.55	57.20	+	III	
58				80					109 57.20	-52.81	57.20	+	V	56.22 - 56.52m : No recovery, assumed to be completely decomposed GRANITE. 56.78 - 57.20m : No recovery, assumed to be completely decomposed GRANITE. 57.20 - 59.50m : Weak, highly decomposed medium to coarse grained GRANITE. Recovered as sandy angular fine to medium gravel.
59				80					110 58.20 58.30	-53.23	57.20	+	IV	
60		HW 59.40		80					111 59.30 59.40	-55.53	59.50	+	III	59.70 - 59.95m : Weak, highly decomposed
60				80					T2101 59.70	-55.73	59.70	+	IV	

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
DATE 25/01/2011
CHECKED A.B.Hollinshead
DATE 07/02/2011

REMARKS



FUGRO
GEOTECHNICAL
SERVICES LTD

DRILLHOLE RECORD

HOLE No. 912/SIL/WAC/BH01

CONTRACT No.: MTR contract 912

SHEET: 7 of 7

PROJECT: Ground Investigation for South Island Line (East)

METHOD: Rotary Drilling

CO-ORDINATES:

WORKS ORDER No. N/A

MACHINE & No.: FDR-31

E 835831.89
 N 815317.87

DATE from: 11/01/2011 to 26/01/2011

FLUSHING MEDIUM: Water

ORIENTATION: Vertical

GROUND LEVEL + 3.97 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/end	Water Return %	TCR %	SCR %	ROD %	FI	Tests	Samples		Reduced Level	Depth (m)	Legend	Grade	Description
									No.	Type					
61			80	71	37	31	5.0	NI NR			-56.03	60.00		III	medium to coarse grained GRANITE. Recovered as sandy angular fine to medium gravel.
									T2101		-56.38	60.35		IV	
62			80	100	100	100	0.6				-56.48	60.45		V	60.35 - 60.45m : Weak, highly decomposed medium to coarse grained GRANITE. Recovered as sandy angular fine to medium gravel. 60.45 - 60.87m : No recovery, assumed to be completely decomposed GRANITE.
									T2101		-56.90	60.87		II	
63			80	100	100	87	0.0	>20			-58.48	62.45		III	Strong, pinkish grey, slightly decomposed medium to coarse grained GRANITE. Joints are medium to widely, locally very closely to closely spaced, rough planar and stepped, extremely narrow, iron and manganese oxide stained, dipping at 57°15' 30°40' and 65°75'
									T2101		-58.68	62.65		II	
65		0.70m at 16:00 2.20m at 08:00	80	100	100	83	6.2				-60.18	64.15		III	62.45 - 62.65m : Moderately strong, moderately decomposed medium to coarse grained GRANITE. 64.15 - 64.80m : Moderately strong, moderately decomposed medium to coarse grained GRANITE.
									T2101		-60.83	64.80		II	
66			80	100	100		0.8				-65.47				
											-66.05	66.05			End of investigation hole at 66.05m.

- Small Disturbed Sample
- Piston sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- 76mm Vibrocore Sample
- 100mm Vibrocore Sample
- Vibrocore Sub-sample
- SPT Liner Sample
- Standard Penetration Test
- In-situ Vane Shear Test
- Permeability Test
- Pressuremeter Test
- Televiwer Survey
- Packer Test
- Impression Packer Test
- Water Sample
- Standpipe
- Piezometer Tip

LOGGED P. Zhang
 DATE 25/01/2011
 CHECKED A.B.Hollinshead
 DATE 07/02/2011

REMARKS




附錄 IV. 樹木情況調查

Appendix IV - Tree Survey Schedule

Item	Tree No.	Species		Tree Size			Health	Form	OVT	Amenity Value	Survival Rate after Transplanting	Recommended Treatment
		Scientific Name	Chinese Name	Height (m)	Spread (m)	DBH (m)	(G/F/P)	(G/F/P)	(Y/N)	(H/M/L)	(H/M/L)	
1	TR-01	<i>Cassia surattensis</i>	黃槐	6.00	4.00	120	F	F	N	M	H	To be permanent transplanted
2	TR-02	<i>Ficus microcarpa</i>	細葉榕	4.00	3.00	100	F	F	N	M	H	To be permanent transplanted
3	TR-03	N/A (Tree no. not used)	--	--	--	--	--	--	--	--	--	--
4	TR-04	<i>Aleurites moluccana</i>	石栗	10.00	10.00	530	F	F	N	M	M	To be retained
5	TR-05	<i>Spathodea camoanulata</i>	火焰木	13.00	5.75	450	F	P	N	L	M	To be retained
6	TR-06	<i>Bauhinia blakeana</i>	洋紫荊	8.00	6.50	250	F	F	N	M	M	To be retained
7	TR-07	<i>Bauhinia blakeana</i>	洋紫荊	9.00	6.00	310	F	P	N	L	M	To be retained
8	TR-08	<i>Bauhinia blakeana</i>	洋紫荊	7.00	7.00	210	F	P	N	L	M	To be retained
9	TR-09	<i>Bauhinia blakeana</i>	洋紫荊	9.00	5.50	260	F	P	N	L	M	To be retained
10	TR-10	<i>Bauhinia blakeana</i>	洋紫荊	13.00	6.00	230	F	P	N	L	M	To be retained
11	TR-11	<i>Spathodea camoanulata</i>	火焰木	12.00	5.00	240	F	P	N	L	M	To be retained
12	TR-12	<i>Bauhinia blakeana</i>	洋紫荊	9.00	6.25	210	F	P	N	L	M	To be retained
13	TR-13	<i>Spathodea camoanulata</i>	火焰木	13.00	9.25	420	F	P	N	L	M	To be felled
14	TR-14	<i>Bauhinia blakeana</i>	洋紫荊	11.00	9.25	350	F	F	N	M	M	To be permanent transplanted

Note:

- 1) OVT: Old & Valuable Tree defined by ETWB TCW 29/2004
- 2) G/F/P = Good/Fair/Poor
- 3) Y/N = Yes/No
- 4) H/M/L = High/Medium/Low

 <p>TR-01</p>	 <p>TR-02</p>
<p>TR-03 (Tree Number Not Used)</p>	 <p>TR-04</p>



TR-05



TR-06



TR-07



TR-08



TR-09





TR-10

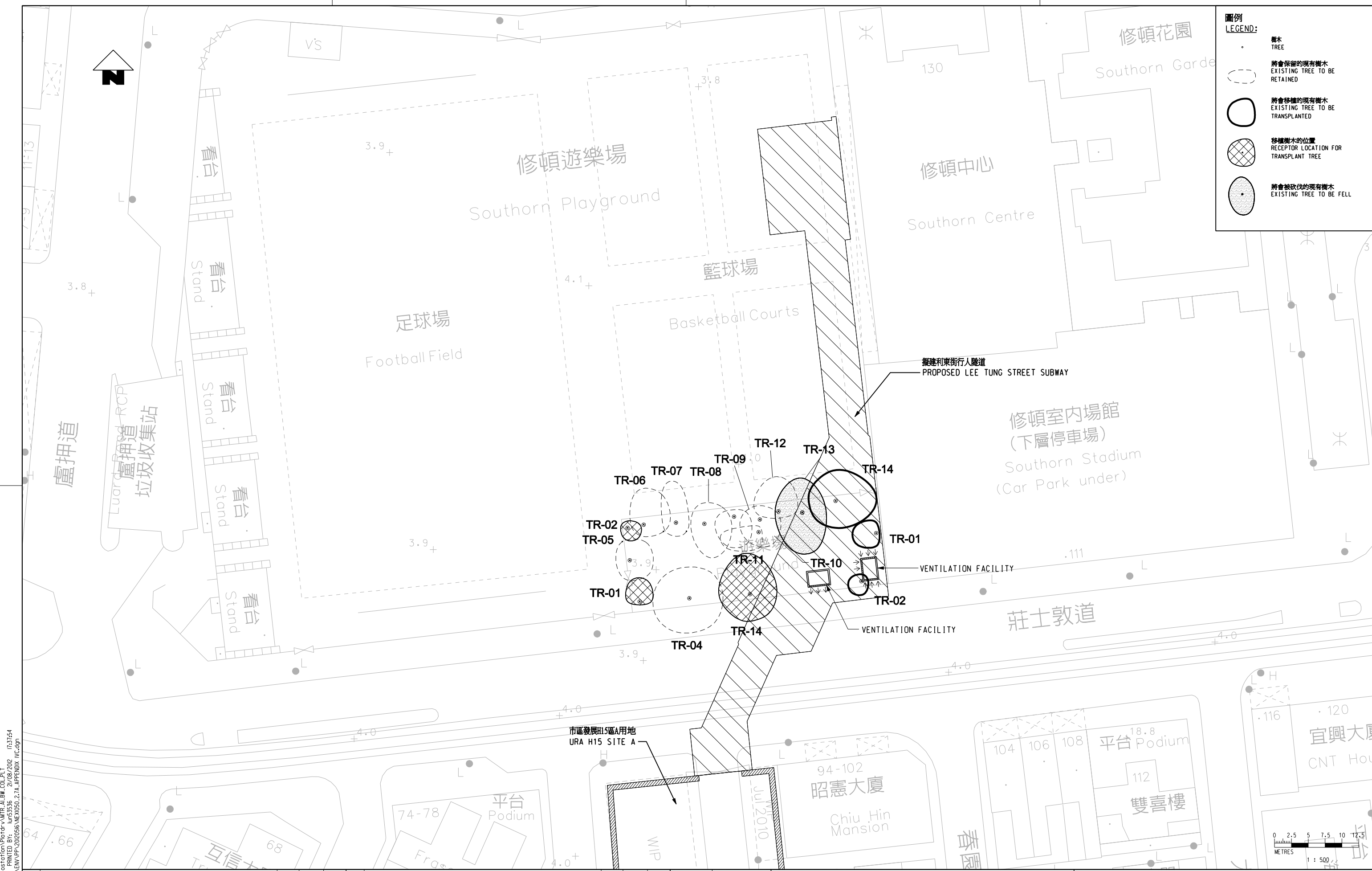


TR-11



TR-12

	
<p>TR-13</p>	<p>TR-14</p>



PLOT: D:\ADMIN\micr\os\chic\B\tr\y\NTR_AL\BW_C01_P11
 MODEL NAME: NEX1050_2.7A_APPENDIX_IV.dgn
 FILE NAME: J:\2010\2010\REPORT\ENV\PPA_2010\56\NEX1050_2.7A_APPENDIX_IV.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
C	GENERAL REVISION	HWC	21AUG12	AFK					
B	GENERAL REVISION	HWC	16MAY12	AFK					
A	PROJECT PROFILE	HWC	12AUG11	AFK					

DRAWN	HWC
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	12MAY2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

Mott MacDonald

20F Two Landmark East
100 Hing Ming Street
Kowloon, Kowloon
Hong Kong
T +852 2508 5707
F +852 2527 1823
www.mottmac.com.hk

CADD REF. NEX1050_2.7A_APPENDIX_IV.dgn

TITLE		CONSULTANCY AGREEMENT NO. NEX/1050 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY 樹木調查計劃	
SCALE	DRAWING NO.	REV.	
1:500 (A3)	NEX1050/2.7A/APPENDIX IV	C	

附錄 V. 固定設備噪音評估

Fixed Plant Noise Assessment

Day Time and Evening Time Fixed Plant Noise Assessment

NSR ID	Description	Plant Inventory	Source ID	Source Height (mPD)	SWL, dB(A)	Receiver Height (mPD)	Horizontal Distance (m)	Source - receiver	*Distance (m)	Distance Attenuation dB(A)	Tonality Correction dB(A)	#Screening Correction dB(A)	Facade Correction dB(A)	SPL, $L_{eq(30min)}$, dB(A)	Resultant SPL, $L_{eq(30min)}$, dB(A)	Daytime and Evening Time Noise Criteria, dB(A)
N1	Hennessy Building	Opening of Ventilation Facility (Fresh air intake)	North Elevation (V1a)	2.5	90	10.8	110	-8.3	110	-49	0	0	3	44		
			West Elevation (V1b)	2.5	90	10.8	111	-8.3	111	-49	0	0	3	44		
			South Elevation (V1c)	2.5	88	10.8	113	-8.3	113	-49	0	-10	3	32		
		Opening of Ventilation Facility (Smoke extraction)	South Elevation (V2)	4.0	88	10.8	113	-6.8	113	-49	0	-10	3	32		
N2	Chiu Hin Mansion	Opening of Ventilation Facility (Fresh air intake)	North Elevation (V1a)	2.5	90	10.8	29	-8.3	30	-37	0	-10	3	46		
			West Elevation (V1b)	2.5	90	10.8	27	-8.3	28	-37	0	0	3	56		
			South Elevation (V1c)	2.5	88	10.8	26	-8.3	27	-37	0	0	3	54		
		Opening of Ventilation Facility (Smoke extraction)	South Elevation (V2)	4.0	88	10.8	23	-6.8	24	-36	0	0	3	55		

Note: (*) Shortest horizontal distances have been adopted for Planned NSRs for conservative reason.

(#) While the sources fall within the view angle of the NSR but with no direct line of sight to the opening, a 10 dB(A) attenuation would be applied.

Fixed Plant Noise Assessment

Night Time Fixed Plant Noise Assessment

NSR ID	Description	Plant Inventory	Source ID	Source Height (mPD)	SWL, dB(A)	Receiver Height (mPD)	Horizontal Distance (m)	Source - receiver	*Distance (m)	Distance Attenuation dB(A)	Tonality Correction dB(A)	#Screening Correction dB(A)	Facade Correction dB(A)	SPL, $L_{eq(30min)}$, dB(A)	Resultant SPL, $L_{eq(30min)}$, dB(A)	Night Time Noise Criteria, dB(A)
N1	Hennessy Building	Opening of Ventilation Facility (Fresh air intake)	North Elevation (V1a)	2.5	80	10.8	110	-8.3	110	-49	0	0	3	34	37	50
			West Elevation (V1b)	2.5	80	10.8	111	-8.3	111	-49	0	0	3	34		
			South Elevation (V1c)	2.5	78	10.8	113	-8.3	113	-49	0	-10	3	22		
		Opening of Ventilation Facility (Smoke extraction)	South Elevation (V2)	4.0	78	10.8	113	-6.8	113	-49	0	-10	3	22		
N2	Chiu Hin Mansion	Opening of Ventilation Facility (Fresh air intake)	North Elevation (V1a)	2.5	80	10.8	29	-8.3	30	-37	0	-10	3	36	50	50
			West Elevation (V1b)	2.5	80	10.8	27	-8.3	28	-37	0	0	3	46		
			South Elevation (V1c)	2.5	78	10.8	26	-8.3	27	-37	0	0	3	44		
		Opening of Ventilation Facility (Smoke extraction)	South Elevation (V2)	4.0	78	10.8	23	-6.8	24	-36	0	0	3	45		

Note: (*) Shortest horizontal distances have been adopted for Planned NSRs for conservative reason.

(#) While the sources fall within the view angle of the NSR but with no direct line of sight to the opening, a 10 dB(A) attenuation would be applied.

附錄 VI. 建築活動的機動設備清單 – 有環境保護措施

Appendix VI

Plant Inventory for Various Construction Activities - With Environmental Protection Measures

Consultancy Agreement No. NEX/1050

Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1a - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m ³ /min and <= 30m ³ /min	CNP 002	1	102	100%	Noise Enclosure	15	87
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	40%	Movable Barrier	10	92
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Excavator (57kW)	BS 5228 Table D.8/15	1	103	40%	Movable Barrier	5	94
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Lorry (20 t)	BS 5228 Table D.9/19	1	102	20%	Movable Barrier	5	90
						Total	98
Installation of Pipepile, Sheet Pile and King Posts							
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Grout mixer	CNP 105	1	90	100%	Movable Barrier	10	80
Pipe piling rig (0.225 dia) (39 kW)	BS 5228 Table D.4/46	2	102	100%	Movable Barrier	10	95
Silent Piler Machine	GIKEN **	1	94	100%	Movable Barrier	10	84
						Total	96
Open Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Movable Barrier	5	90
						Total	95
Further Excavation (Works under Road Decking)							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	#Underground Work	20	83
Lorry with Crane	BS 5228 Table D.7/101	2	94	15%	Movable Barrier	5	84
Excavator (57kW)	BS 5228 Table D.8/15	2	103	100%	#Underground Work	20	86
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
Water pump (petrol)	CNP 282	2	103	100%	#Underground Work	20	86
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	95
Construction of Subway (Works under Road Decking)							
Air compressor, air flow > 10m ³ /min and <= 30m ³ /min	CNP 002	1	102	100%	#Underground Work	20	82
Saw, circular, wood (660mm blade)	BS 5228 Table D.7/78	1	106	50%	#Underground Work	20	83
Concrete lorry mixer (6m ³)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Concrete pump (100kW)	BS 5228 Table D.6/36	1	106	50%	#Underground Work	20	83
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	93
Backfill and Reinstatement							
Concrete lorry mixer (6m ³)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Excavator (57kW)	BS 5228 Table D.8/15	1	103	50%	Movable Barrier	5	95
Poker, vibratory, hand-held	BS 5228 Table D.6/40	1	98	20%	Movable Barrier	10	81
Road roller	BS 5228 Table D.8/30	1	101	15%	Movable Barrier	5	88
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
						Total	97
						MAXIMUM amongst the Activities	98

** Reference was made to VEP Application No. VEP-072/2002 for Modifications to MTRC TST Station

Appendix VI

Plant Inventory for Various Construction Activities - With Environmental Protection Measures

Consultancy Agreement No. NEX/1050

Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1b - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m ³ /min and <= 30m ³ /min	CNP 002	1	102	100%	Noise Enclosure	15	87
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	40%	Movable Barrier	10	92
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Excavator (57kW)	BS 5228 Table D.8/15	1	103	40%	Movable Barrier	5	94
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Lorry (20 t)	BS 5228 Table D.9/19	1	102	20%	Movable Barrier	5	90
						Total	98
Installation of Pipepile, Sheet Pile and King Posts							
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Silent Piler Machine	GIKEN **	1	94	100%	Movable Barrier	10	84
						Total	87
Open Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Movable Barrier	5	90
						Total	95
Further Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Noise Enclosure	15	88
Lorry with Crane	BS 5228 Table D.7/101	1	94	15%	Movable Barrier	5	81
Excavator (57kW)	BS 5228 Table D.8/15	1	103	100%	Noise Enclosure	15	88
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
Water pump (petrol)	CNP 282	1	103	100%	Noise Enclosure	15	88
Ventilation fan	CNP 241	1	108	100%	Silencer	15	93
						Total	97
Construction of Subway							
Air compressor, air flow > 10m ³ /min and <= 30m ³ /min	CNP 002	1	102	100%	Noise Enclosure	15	87
Concrete lorry mixer (6m ³)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Concrete pump (100kW)	BS 5228 Table D.6/36	1	106	50%	Noise Enclosure	15	88
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Ventilation fan	CNP 241	2	108	100%	Silencer	15	96
						Total	97
Backfill and Reinstatement							
Concrete lorry mixer (6m ³)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Excavator (57kW)	BS 5228 Table D.8/15	1	103	50%	Noise Enclosure	15	85
Poker, vibratory, hand-held	BS 5228 Table D.6/40	1	98	20%	Noise Enclosure	15	76
Road roller	BS 5228 Table D.8/30	1	101	15%	Movable Barrier	5	88
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
						Total	94
						MAXIMUM amongst the Activities	98

** Reference was made to VEP Application No. VEP-072/2002 for Modifications to MTRC TST Station

Appendix VI

Plant Inventory for Various Construction Activities - With Environmental Protection Measures

Consultancy Agreement No. NEX/1050

Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 1c - Johnston Road Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	Noise Enclosure	15	87
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	40%	Movable Barrier	10	92
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Excavator (57kW)	BS 5228 Table D.8/15	1	103	40%	Movable Barrier	5	94
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Lorry (20 t)	BS 5228 Table D.9/19	1	102	20%	Movable Barrier	5	90
						Total	98
Installation of Pipepile, Sheet Pile and King Posts							
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Silent Piler Machine	GIKEN **	1	94	100%	Movable Barrier	10	84
						Total	87
Open Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Movable Barrier	5	90
						Total	95
Further Excavation (Works under Road Decking)							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	#Underground Work	20	83
Lorry with Crane	BS 5228 Table D.7/101	1	94	15%	Movable Barrier	5	81
Excavator (57kW)	BS 5228 Table D.8/15	1	103	100%	#Underground Work	20	83
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
Water pump (petrol)	CNP 282	1	103	100%	#Underground Work	20	83
Ventilation fan	CNP 241	1	108	100%	#Underground Work	20	88
						Total	94
Construction of Subway (Works under Road Decking)							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	#Underground Work	20	82
Concrete lorry mixer (6m3)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Concrete pump (100kW)	BS 5228 Table D.6/36	1	106	50%	#Underground Work	20	83
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	#Underground Work	20	75
Ventilation fan	CNP 241	2	108	100%	#Underground Work	20	91
						Total	93
Backfill and Reinstatement							
Concrete lorry mixer (6m3)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Excavator (57kW)	BS 5228 Table D.8/15	1	103	50%	Movable Barrier	5	95
Poker, vibratory, hand-held	BS 5228 Table D.6/40	1	98	20%	Movable Barrier	10	81
Road roller	BS 5228 Table D.8/30	1	101	15%	Movable Barrier	5	88
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
						Total	97
						MAXIMUM amongst the Activities	98

** Reference was made to VEP Application No. VEP-072/2002 for Modifications to MTRC TST Station

Appendix VI

Plant Inventory for Various Construction Activities - With Environmental Protection Measures

Consultancy Agreement No. NEX/1050

Lee Tung Street Subway (Section 1)

PME	TM or other reference	No. of PME	SWL, dB(A)/unit	% on time	Mitigation measures	Reduction dB(A)	Total SWL, dB(A)
Section 2 - LCSD Playground Portion							
Activities							
Utilities Diversion							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	Noise Enclosure	15	87
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Lorry with Crane	BS 5228 Table D.7/101	1	94	30%	Movable Barrier	5	84
Excavator (57kW)	BS 5228 Table D.8/15	1	103	50%	Movable Barrier	5	95
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Lorry (20 t)	BS 5228 Table D.9/19	1	102	30%	Movable Barrier	5	92
						Total	99
Installation of Pipepile, Sheet Pile and King Posts							
Lorry with Crane	BS 5228 Table D.7/101	1	94	20%	Movable Barrier	5	82
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Grout mixer	CNP 105	1	90	100%	Movable Barrier	10	80
Pipe piling rig (0.225 dia) (39 kW)	BS 5228 Table D.4/46	1	102	100%	Movable Barrier	10	92
Silent Piler Machine	GIKEN **	1	94	100%	Movable Barrier	10	84
						Total	93
Open Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Dump truck (50t)	BS 5228 Table D.9/39	1	103	20%	Movable Barrier	5	91
						Total	95
Further Excavation							
Breaker, excavator mounted (hydraulic), 52kW	BS 5228 Table D.8/12	1	106	50%	Movable Barrier	10	93
Lorry with Crane	BS 5228 Table D.7/101	2	94	15%	Movable Barrier	5	84
Excavator (57kW)	BS 5228 Table D.8/15	2	103	100%	Movable Barrier	5	101
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
Water pump (petrol)	CNP 282	2	103	100%	Movable Barrier	10	96
Ventilation fan	CNP 241	2	108	100%	Silencer	15	96
						Total	104
Construction of Subway							
Air compressor, air flow > 10m3/min and <= 30m3/min	CNP 002	1	102	100%	Noise Enclosure	15	87
Saw, circular, wood (660mm blade)	BS 5228 Table D.7/78	1	106	50%	Movable Barrier	10	93
Concrete lorry mixer (6m3)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Concrete pump (100kW)	BS 5228 Table D.6/36	1	106	50%	Movable Barrier	10	93
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Ventilation fan	CNP 241	2	108	100%	Silencer	15	96
						Total	100
Construction of Ventilation Shaft							
Saw, circular, wood (660mm blade)	BS 5228 Table D.7/78	1	106	50%	Movable Barrier	10	93
Concrete lorry mixer (6m3)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Concrete pump (100kW)	BS 5228 Table D.6/36	1	106	30%	Movable Barrier	10	91
Lorry with Crane	BS 5228 Table D.7/101	1	94	30%	Movable Barrier	5	84
Generator, super silenced, 70 dB(A) at 7 m	CNP 103	1	95	100%	Noise Enclosure	15	80
Poker, vibratory, hand-held	BS 5228 Table D.6/40	1	98	20%	Movable Barrier	10	81
						Total	96
Backfill and Reinstatement							
Concrete lorry mixer (6m3)	BS 5228 Table D.6/33	1	96	30%	Movable Barrier	5	86
Excavator (57kW)	BS 5228 Table D.8/15	1	103	50%	Movable Barrier	5	95
Poker, vibratory, hand-held	BS 5228 Table D.6/40	1	98	20%	Movable Barrier	10	81
Road roller	BS 5228 Table D.8/30	1	101	15%	Movable Barrier	5	88
Dump truck (50t)	BS 5228 Table D.9/39	1	103	15%	Movable Barrier	5	90
						Total	97
						MAXIMUM amongst the Activities	104

** Reference was made to VEP Application No. VEP-072/2002 for Modifications to MTRC TST Station

附錄 VII. 對具代表性噪音敏感受體的建築噪音評估 - 有環境保護措施

Appendix VII

Construction Noise Assessment for Representative NSR - With Environmental Protection Measures

Consultancy Agreement No. NEX/1050

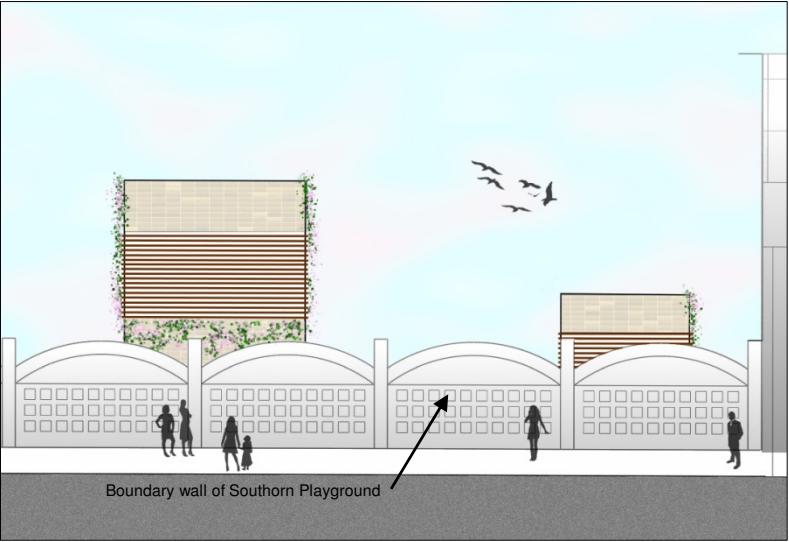
Lee Tung Street Subway

Noise Sensitive Receiver						2013												2014												2015									
N1 - Hennessy Building						04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08					
SWL	Dist.(m) ¹	DC ²	FC ³	CNL																																			
Section 1a - Johnston Road Portion																																							
Utilities Diversion	98	117	49	3	51		51	51						51		51																							
Installation of Pipepile, Sheet Pile and King Posts	96	117	49	3	49				49	49					49		49																						
Open Excavation	95	117	49	3	48						48	48	48	48				48																					
Further Excavation (Works under Road Decking)	95	117	49	3	49													49	49	49																			
Construction of Subway (Works under Road Decking)	93	117	49	3	47															47	47																		
Backfill and Reinstatement	97	117	49	3	51																	51	51																
Section 1b - Johnston Road Portion																																							
Utilities Diversion	98	133	50	3	50				50	50																													
Installation of Pipepile, Sheet Pile and King Posts	87	133	50	3	40				40	40																													
Open Excavation	95	133	50	3	47								47																										
Further Excavation (Full enclosure provided at this mucking out area)	97	133	50	3	50								50								50																		
Construction of Subway (Full enclosure provided at this mucking out area)	97	133	50	3	50																	50																	
Backfill and Reinstatement	94	133	50	3	46																		46																
Section 1c - Johnston Road Portion																																							
Utilities Diversion	98	137	51	3	50		50	50																															
Installation of Pipepile, Sheet Pile and King Posts	87	137	51	3	39				39																														
Open Excavation	95	137	51	3	47				47																														
Further Excavation (Works under Road Decking)	94	137	51	3	46								46																										
Construction of Subway (Works under Road Decking)	93	137	51	3	45								45																										
Backfill and Reinstatement	97	137	51	3	49																		49																
Section 2 - LCSD Playground Portion																																							
Utilities Diversion	99	57	43	3	59	59	59	59	59																														
Installation of Pipepile, Sheet Pile and King Posts	93	57	43	3	53	53	53	53	53	53	53	53																											
Open Excavation	95	57	43	3	55	55	55	55	55	55	55	55																											
Further Excavation	104	57	43	3	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64				
Construction of Subway	100	57	43	3	59																																		
Construction of Ventilation Shaft	96	57	43	3	56																																		
Backfill and Reinstatement	97	57	43	3	57																																		
Total						59	66	67	67	66	66	66	66	66	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65			
Remarks:																																							
1. Slant distance is adopted for the construction noise assessment																																							
2. Distance correction in dB(A)																																							
3. Facade correction in dB(A)																																							

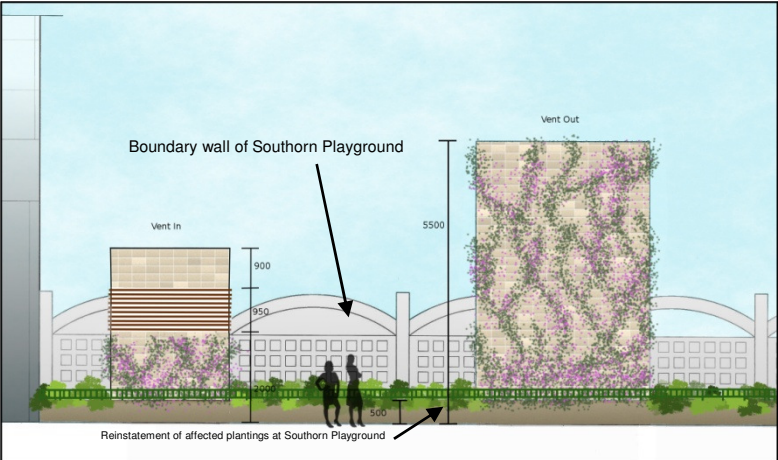
附錄 VIII. 景觀綠化措施



Plan View of Ventilation Shaft



Elevation View A from Johnston Road



Elevation View B from Southern Playground

Appendix VIII – Landscape Screening Measure

附錄 IX. 環境監察及審核計劃

Appendix IX - Environmental Monitoring and Audit Plan

1. Introduction

1.1 Purpose of EM&A Plan

According to EPD's EM&A Guidelines for Development Projects in Hong Kong, an EM&A plan is required for projects which have a potential of causing construction noise impacts to the sensitive receivers close to the proposed work areas if the recommended mitigation measures are not properly implemented.

1.2 Project Background

It is indicated that noise impact is predicted during the construction phase at Hennessy Building and Chiu Hin Mansion, hence the mitigation measures stated in this Report are recommended to be implemented in order to reduce the noise impact to the nearby NSRs. The monitoring programme should be carried out by the ET.

The recommended noise mitigation measures are presented in Section 5 of the Project Profile (PP). The monitoring requirements and methodology for monitoring of noise impacts are provided below.

1.3 Project Organisation

An organisation consisting of Engineer's Representative (ER), Contractor, Independent Environmental Checker (IEC), and Environmental Team (ET) should be formed to take the responsibilities of the environmental protection matters. MTRC should appoint the IEC and establish the ET for compliance with the EP requirements. The responsibilities of respective parties are detailed in the following:

The Engineer or the Engineer's Representative (ER)

The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A are:

- Monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Participate in site inspections undertaken by the ET; and
- Co-operate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works.

Independent Environmental Checker (IEC)

The IEC should advise the ET and ER on environmental issues related to the project. The IEC should audit from an independent viewpoint on the environmental performance during the construction of the project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;

- Validate and confirm the accuracy of monitoring results, appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc;
- Conduct random site inspection;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- On an as-need basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the environmental permit. Where necessary, the IEC should agree in consultation with the ET and the Contractor least impact alternative;
- Check complaint cases and the effectiveness of corrective measures;
- Verify EM&A report certified by the ET Leader; and
- Feedback audit results to ER/ET according to the Event/Action Plan.

The Environmental Team (ET)

The ET should conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental performance requirements during construction. The ET should plan, organise and manage the implementation of the EM&A programme and ensure that the EM&A works are undertaken to the required standard.

The ET should be led and managed by the ET Leader. The ET Leader should have relevant professional qualifications in environmental control and possess at least 7 years experience in EM&A. The ET Leader should be responsible for the implementation of the EM&A programmes in accordance with the EM&A requirements. The duties and responsibilities of the ET include:

- Sampling, analysis and statistical evaluation of monitoring parameters;
- Environmental site surveillance;
- Inspection and audit of compliance with environmental protection, and pollution prevention and control regulations;
- Assess the effectiveness of the environmental mitigation measures implemented;
- Monitor compliance with the environmental protection clauses/specifications in the Contract;
- Review construction programme and comment as necessary;
- Review work methodologies which may affect the extent of environmental impact during the construction phase and comment as necessary;
- Complaint investigation, evaluation and identification of corrective measures;
- Liaison with the IEC on all environmental performance matters, and timely submission of all relevant EM&A proforma for IEC's approval; and
- Advice to the Contractor on environmental improvement, awareness and enhancement matters, etc.

The Contractor

The Contractor should report to the ER. The duties and responsibilities of the Contractor are:

- Comply with the relevant contract conditions and specifications on environmental protection
- Participate in the site inspections undertaken by the ET;
- Provide assistance to ET to carry out monitoring;
- Provide requested information to the ET in the event of any exceedance in the environmental criteria (Action/Limit levels);
- Submit proposals on mitigation measures in case of exceedance of Action and Limit levels in accordance with the Event/Action Plans; and

- Cooperate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works. If mitigation measures are required following the investigation, the Contractor should promptly carry out these measures.

2. Construction Noise Impact

2.1 Monitoring Requirements

The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30 \text{ minutes})}$ should be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays.

2.2 Monitoring Equipment

With reference to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level metres in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications should be used for carrying out the noise monitoring. The calibration of the sound level meters and their respective calibrators should be carried out in accordance with the manufacturer's requirements.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5 ms^{-1} or wind with gusts exceeding 10 ms^{-1} .

The ET is responsible for the provision and maintenance of the monitoring equipment. The ET should ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation should be clearly labelled.

2.3 Monitoring Locations

The noise monitoring location will be set up at Hennessy Building and Chiu Hin Mansion.

The monitoring station should normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above the ground. If there is a problem with access to the normal monitoring position, an alternative nearby position may be chosen, and a correction to the measurements should be made. For reference, a correction of +3dB(A) should be made to the free field measurements. The ET should agree with the EPD on the correction adopted.

2.4 Baseline Monitoring

The ET should carry out baseline noise monitoring prior to the commencement of the construction works. There should not be any construction activities in the vicinity of the stations during the baseline monitoring.

Baseline noise monitoring for the A-weighted levels LA_{eq} , LA_{10} and LA_{90} should be carried out daily for a period of at least two weeks at a minimum logging interval of 30 minutes between 0700 and 1900.

In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, the ET should liaise with the Contractor to agree on an appropriate set of data to be used as a baseline reference.

2.5 Impact Monitoring

During normal construction working hour (0700-1900 Monday to Saturday), monitoring of $LA_{eq, 30min}$ noise levels should be carried out at the agreed monitoring locations once every week in accordance with the methodology in the TM.

Other noise sources such as road traffic may make a significant contribution to the overall noise environment. Therefore, the results of noise monitoring activities would take into account such influencing factors, which may not be presented during the baseline monitoring period.

General construction work carried out during restricted hours is controlled by Construction Noise Permit (CNP) under the NCO.

In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Event and Action Plan in **Table 1.2** should be carried out. This additional monitoring should be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

2.6 Event and Action Plan

The Action and Limit (AL) Levels for construction noise are defined in **Table 2.1**. Should non-compliance of the criteria occurs, action in accordance with the Event and Action Plan in **Table 2.2**, should be carried out.

Table 2.1 : Typical Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one valid documented complaint is received.	75* dB(A)

Note: *70 dB(A) for schools and 65 dB(A) during school examination periods.

If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

Table 2.2: Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and Contractor. 4. Discuss with the Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analyzed result submitted by ET. 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and Contractor, and 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedances 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further

Event	Action			
	ET	IEC	ER	Contractor
	follow other actions 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Check Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD, ER informed of the results 8. If exceedance stops, cease additional monitoring	potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly 3. Supervise the implementation of remedial measures	2. Notify Contractor 3. Require Contractor to propose remedial measures 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notifications 3. Implement the agreed proposals 4. Revise and resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

2.7 Construction Noise Mitigation Measures

To minimize the noise emissions during construction phase, appropriate mitigation measures and good site practices are recommended to be implemented. The proposed mitigation measures are summarized below:

- Use quieter plants and working methods;
- Use of movable noise barrier;
- Use of noise enclosure;
- Use of silencer; and
- Implementation of general construction noise control measures.

3. Construction Air Impact

3.1 Monitoring Requirement

Monitoring and audit of the Total Suspended Particulate (TSP) levels should be carried out by the ET to ensure that any deterioration in air quality could be readily detected and timely actions taken to rectify the situation.

1-hour or 24-hour TSP levels should be measured to indicate the impacts of construction dust on air quality. The TSP levels can be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B or be measured by direct reading methods which are capable of producing comparable results to that of the high volume sampling method.

All relevant data including temperature, pressure, wind speed and direction, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and

weight of the filter paper, other local atmospheric factors affecting or affected by site conditions and work progress of the concerned site, etc. should be recorded in detail. A sample data record sheet is shown below. The ET may develop project specific data record sheet to suit this EM&A programme.

3.2 Monitoring Equipment

The ET is responsible for provision of the monitoring equipment. The ET should provide a sufficient number of high volume sampler (HVS) and/or direct reading dust meters with appropriate calibration available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs should be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment should be clearly labelled.

Calibration of dust monitoring equipment should be conducted as specified by the manufacturer. The calibration data should be properly documented for future reference. All the data should be converted into standard temperature and pressure condition.

HVS in compliance with the following specifications should be used for carrying out the 24-hour TSP monitoring:

- 0.6 – 1.7 m³/min (20 – 60 standard cubic feet per minute) adjustable flow range;
- Equipped with a timing/control device for 24 hours operation;
- Installed with elapsed-time meter with +/- 5 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406cm² (63 in²);
- Flow control accuracy: +/- 2.5% deviation over 24-hour sampling period;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;
- Incorporated with manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easy to change the filter, and
- Capable of operating continuously for 24-hour period.

Calibration of dust monitoring equipment should be conducted as specified by the manufacturer. Initial calibration of the dust monitoring equipment should be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard should be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data should be properly documented for future reference. All data should be converted into standard temperature and pressure condition.

The ET should obtain representative wind data near the dust monitoring locations for reference.

3.3 Laboratory Measurement / Analysis

Filter paper should be labelled before sampling. It should be a clean filter paper with no pinholes, and should be conditioned in a humidity-controlled chamber for over 24-hour and be pre-weighed before use for the sampling.

After sampling, the filter paper loaded with dust should be kept in a clean and tight sealed bag. The filter paper should then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance. The balance should be regularly calibrated against a traceable standard.

All the collected samples should be kept in a good condition for 6 months before disposal.

3.4 Monitoring Locations

The air monitoring location will be set up at Chiu Hin Mansion.

When alternative monitoring locations are proposed, approval from the ER and agreement from the IEC is required. The following criteria, as far as practicable, should be followed:

- at the project area boundary or such locations close to the major dust emission source;
- close to the sensitive receivers;
- proper position/sitting and orientation of the monitoring equipment; and
- take into account the prevailing meteorological conditions.

When positioning the samplers, the following points should be noted:

- a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
- no two samples should be placed less than 2m apart;
- the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler where possible;
- a minimum of 2m of separation from walls, parapets and penthouses is required for rooftops samplers;
- a minimum of 2m of separation from any supporting structure, measured horizontally is required;
- no furnace or incinerator flue or building vent is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20m from the dripline;
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

3.5 Baseline Monitoring

Baseline monitoring should be carried out to determine the ambient 1-hour and 24-hour TSP levels at the monitoring locations prior to the commencement of the Project work. During the baseline monitoring, there should not be any construction or dust generation activities in the vicinity of the monitoring stations. The baseline monitoring will provide data for the determination of the appropriate Action levels with the Limit levels set against statutory or otherwise agreed limits.

Baseline monitoring should be carried out at each designated monitoring location for a continuous period of at least 14 days prior to the commissioning of the construction works to obtain daily 24-hour TSP samples. 1-hour sampling should also be done at least 3 times per day. Baseline monitoring should be carried out under typical weather conditions. General metrological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources should also be recorded throughout the baseline monitoring period.

In case the baseline monitoring cannot be carried out at the designated monitoring location during the baseline monitoring period, the ET should carry out the monitoring at an alternative location that can effectively represent the baseline conditions at the impact monitoring location. The alternative baseline monitoring location should be approved by the ER and agreed with IEC.

In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET should liaise with IEC and EPD to agree on an appropriate set of data to be used as a baseline reference.

If the ET considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring may be carried out to update the baseline levels. The monitoring should be at times when the Contractor's activities are not generating dust. The revised baseline levels and air quality criteria should be agreed with IEC and EPD.

3.6 Impact Monitoring

The ET is responsible for impact monitoring during the course of the Works. For regular impact monitoring, 24-hour TSP monitoring should be in the sampling frequency of at least once every week.

In case of non-compliance with the air quality criteria, a more frequent monitoring exercise adopting 1-hr TSP monitoring undertaken when the highest dust impact occurs, as specified in the Event and Action Plan in **Table 3.2**, should be conducted within 24 hours after the result is obtained. This additional monitoring should be continued until the excessive dust emission or the deterioration in air quality is rectified.

3.7 Event and Action Plan

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET should compare the impact monitoring results with air quality criteria set up for 24-hour TSP level. **Table 3.1** shows the air quality criteria, namely Action and Limit (AL) Levels to be used. Should non-compliance of the air quality criteria occur, actions in accordance with the Event and Action Plan in **Table 3.2** should be carried out.

Table 3.1 : Typical Action and Limit Levels for Air Quality

Parameters	Action	Limit
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action level = (130% of baseline level + Limit level)/2 For baseline level $> 200 \mu\text{g}/\text{m}^3$, Action level = Limit level	260
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = (130% of baseline level + Limit level)/2 For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit Level	500

Table 3.2: Event and Action Plan for Air Quality

Event	Action Contractor			
	ET	IEC	ER	
Action Level				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. If valid, inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC and EPD; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency to daily; 5. Discuss with IEC and Contractor on remedial action required; 6. If exceedance continues, arrange meeting with IEC and ER; 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervisor implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measure properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for remedial action to IEC within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit Level				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. Inform ER and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and the Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action Contractor			
	ET	IEC	ER	
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Identify sources; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

3.8 Mitigation Measure of Air Quality

Although most of the construction works would be carried out underground, appropriate dust mitigation measures stipulated in the Air Pollution Control (Construction Dust) Regulation should be implemented to control fugitive dust emission. The following key dust suppression measures are recommended:

- Regular watering of all exposed site surfaces to reduce dust emissions, particularly during dry weather;
- Frequent watering of particularly dusty construction areas and areas close to air sensitive receivers;
- Covering of stockpile of excavated dusty materials, if any, with impervious sheeting or spraying with water to maintain the entire surface wet;
- Provision of vehicle washing facilities at the entry and exit points of site;
- Tarpaulin covering of any dusty materials being transported to and from site by vehicle;
- Positioning of construction plant at the maximum practicable distance from air sensitive receivers; and

- Due to the small size of the works sites and lack of space for stockpiling, excavated materials should be hauled off-site almost immediately. However, in the event of any stockpiled excavated materials, they should be covered with tarpaulin and be removed off-site as soon as practicable to avoid any dust nuisance arising.

4. Landscape and Visual

4.1 Audit Requirement

The Project Profile has recommended landscape and visual mitigation measures to be undertaken during construction and operational phases of the project.

The proposed mitigation measures of landscape and visual impacts are summarised in the Implementation Schedule in **Appendix X**. The proposed landscape and visual mitigation measures should be incorporated in the detailed landscape and engineering design. All measures undertaken by Contractor during the construction phase should be audited by the ET to ensure compliance with the recommended mitigation measures in the Project Profile. Site Inspection should be undertaken at least once every two weeks throughout the construction period.

5. Environmental Audit

5.1 Site Inspection

Site inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They should be undertaken routinely by the ET 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 site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET is responsible for formulating the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. The ET should in consultation with the IEC, prepare a procedure for site inspection, deficiency and action reporting requirement; and submit to the Contractor for agreement.

Regular site inspections at least once a week should be led by the ET. The areas of inspection should not be limited to the pollution control and mitigation measures within the site; the environmental situation outside the site area which is likely to be affected, directly or indirectly by the site activities should be reviewed. The ET makes reference to the following information in conducting the inspection:

- EM&A recommendations on environmental protection and pollution control mitigation measures;
- Works progress and programme;
- Individual works methodology proposals (which should include proposal on associated pollution control measures);
- Contract specifications on environmental protection
- Relevant environmental protection and pollution control laws; and
- Previous site inspection results.

The Contractor should update the ET with all relevant information on the construction contract necessary for him to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works should be passed to the IEC, ER and the Contractor, for reference and for taking immediate action. The Contractor should follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET to report on any remedial measures subsequent to the site inspections.

Ad hoc site inspections should be carried out by the ET and / or IEC 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.

5.2 Compliance with Legal and Contractual Requirement

There are environmental protection and pollution control laws in Hong Kong, which the construction activities should comply with.

In order to comply with the contractual requirements, all works method statements submitted by the Contractor to the ER for approval should be sent to the ET for vetting, to see whether sufficient environmental protection and pollution control measures have been included.

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

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

Upon receipt of the advice, the Contractor should undertake immediate actions to rectify the situation. The ET should follow up to ensure that appropriate action has been taken by the Contractor such that the environmental protection and pollution control requirements are fulfilled.

5.3 Environmental Complaints

Complaints should be referred to the ET for action. The ET should undertake the following procedures upon receipt of any valid complaint:

- Investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
- Log complaint and date of receipt onto the complaint database and inform the ER and IEC if valid;

- Identify mitigation measures if a complaint is valid and due to the works of the Project;
- Advise the Contractor if mitigation measures are required;
- Review the Contractor's response to identified mitigation measures, and the updated situation;
- Undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;
- If the complaint is referred by EPD, keep EPD informed on the status of the complaint investigation and follow-up action and report to EPD upon completion of the investigation; and
- Report the investigation results and the subsequent actions to the complainant (If the source of complaint is identified through 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 should cooperate with the ET in providing all necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor should promptly carry out the mitigation. The ER should ensure that the measures have been carried out by the Contractor. A flow chart of complaint response procedure is enclosed in this EM&A plan.

6. Reporting Requirement

6.1 Introduction

The reporting requirements of EM&A are based upon a paper-documented approach. However, the same information can be provided in an electronic medium upon agreeing the format with the IEC, the ER and EPD (for construction phase), and with the Environmental Consultant and EPD (for operation phase). This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach.

For construction phase of EM&A, the types of reports that the ET should prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report. In accordance with Annex 21 of the EIAO-TM, a copy of the monthly, quarterly summary and final review EM&A reports shall be submitted to the Director of Environmental Protection. The exact details of the frequency, distribution and time frame for submission shall be agreed with the IEC, the ER and EPD prior to commencement of works

6.2 Baseline Monitoring Report

The ET should prepare and submit to EPD a Baseline Environmental Monitoring Report two weeks prior to the commencement of construction or otherwise as specified by EPD. The baseline monitoring report shall include at least the following:

- (i) Executive summary;
- (ii) Brief project background information;
- (iii) Drawings showing locations of the baseline monitoring stations;
- (iv) An updated construction programme with milestones of environmental protection/mitigation activities annotated;

- (v) Monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration dates;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - QA/QC results and detection limits.
- (v) Details of influencing factors, including:
 - major activities, if any, being carried out on the site during the period;
 - weather conditions during the period;
 - other factors which might affect the results.
- (vi) Determination of the Action and Limit Levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data. The analysis should conclude if there is any significant difference between control and impact stations for the parameters monitored;
- (vii) Revisions for inclusion in the EM&A Manual; and
- (viii) Comments and conclusions.

6.3 Monthly EM&A Reports

The results and findings of all construction phase EM&A work required in the Manual should be recorded in the monthly EM&A reports prepared by the ET. The EM&A report should be endorsed by IEC and submitted within 10 working days from the end of each reporting period, with the first report due one month after construction commences. Copies of each monthly EM&A report should be submitted to the Contractor, IEC, ER and EPD.

6.4 First Monthly EM&A Report

The first monthly EM&A report shall include at least but not be limited to the following:

- (i) Executive summary:
 - breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and status of prosecutions;
 - reporting changes; and
 - future key issues.
- (ii) Basic project information:
 - project organisation including key personnel contact names and telephone numbers;
 - construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;
 - management structure; and
 - works undertaken during the month.
- (iii) Environmental status:
 - works undertaken during the month with illustrations (such as location of works, daily dredging/filling rates, percentage fines in the fill material used); and
 - drawing showing the project area, any key environmental sensitive receivers and the locations of the monitoring and control stations.

- (iv) A brief summary of EM&A requirements:
 - all monitoring parameters;
 - environmental quality performance limits (Action and Limit levels);
 - event-Action Plans;
 - environmental mitigation measures; and
 - environmental requirements in contract documents.

- (v) Monitoring results:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration dates;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - weather conditions during the period;
 - graphical plots of monitored parameters in the month annotated;
 - the major activities being carried out on site during the period;
 - weather conditions that may affect the results; and
 - any factors which might affect the monitoring results.
 - QA/QC results and detection limits.

- (vi) Report on non-compliance, complaints, notifications of summons and successful prosecutions:
 - record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of complaints received, including locations and nature of complaints, investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of actions taken in the event of non-compliance and deficiency reporting, and follow-up actions related to earlier non-compliance.

- (vii) Others
 - an account of the future key issues as reviewed from the works programme and work method statements; and
 - advice on the solid and liquid waste management status during the month.

6.5 Subsequent Monthly EM&A Reports

Subsequent monthly EM&A reports should include the following:

- (i) Executive summary
 - breaches of Action and Limit levels;
 - complaint log;
 - notifications of any summons and successful prosecutions;
 - report changes; and
 - future key issues.

- (ii) Environmental status:
 - construction programme with fine tuning of construction activities showing the inter-relationship with environmental protection/mitigation measures for the month;

- works undertaken during month with illustration including key personnel contact names and telephone numbers; and
 - drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (iii) Implementation status:
- advice on the status of compliance with the Environmental Permit (EP), submission status under the EP, implementation status of environmental protection and pollution control / mitigation measures, as recommended in the PP
- (iv) Monitoring results
- monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - weather conditions during the period;
 - graphical plots of the monitored parameters in the month annotated;
 - the major activities being carried out on site during the period;
 - weather conditions that may affect the results;
 - any factors which might affect the monitoring results;
 - QA/QC results and detection limits.
- (v) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:
- Record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - Record of all complaints received, including locations and nature of complaints, investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - Record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - Review of reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - A description of the actions taken in the event of non-compliance and deficiency, and follow-up actions related to earlier non-compliance
- (vi) Others
- an account of the future key issues as reviewed from the works programme and work method statements; and
 - advice on the solid and liquid waste management.

6.6 Quarterly EM&A Reports

A quarterly EM&A report should be produced and should contain at least the following information. In addition, the first quarterly summary report should also confirm if the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

- (i) Executive summary;
- (ii) Basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of works undertaken during the quarter;

- (iii) A brief summary of EM&A requirements including:
 - monitoring parameters
 - environmental quality performance limits (Action and Limit levels)
 - environmental mitigation measures, as recommended in the PP
- (iv) advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the PP, summarised in the updated implementation schedule;
- (v) Drawings showing the project area, environmental sensitive receivers and the locations of the monitoring and control stations;
- (vi) Graphical plots of the monitored parameters over the past four months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated:
 - the major activities being carried out on site during the period
 - weather conditions during the period
 - any other factors which might affect the monitoring results
- (vii) Advice on the solid and liquid waste management status during the quarter including waste generation and disposal records;
- (viii) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (ix) A brief review of the reasons for and the implications of any non-compliance, including a review of pollution sources and working procedures;
- (x) A summary description of actions taken in the event of non-compliance and any follow-up procedures related to any earlier non-compliance;
- (xi) A summary of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xii) A summary record of notifications of summons and successful prosecution for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (xiii) Comments on the effectiveness and efficiency of the mitigation measures); recommendations on any improvement in the EM&A programme and conclusions for the quarter; and
- (xiv) Proponents' contacts and any hotline telephone number for the public to make enquiries.

6.7 Final EM&A Review Report

The EM&A program could be terminated on the following basis:

- (i) completion of construction activities and insignificant environmental impacts of the remaining outstanding construction works;

- (ii) trends analysis to demonstrate the narrow down of monitoring exceedances due to construction activities and the return of ambient environmental conditions in comparison with baseline data; and
- (iii) no environmental complaints and prosecution involved.

The proposed termination may need to be consulted with the related local community and the proposal should be endorsed by the IEC, ER and the project proponent prior to final approval from the Director of Environmental Protection.

The final EM&A report should include, inter alia, the following information:

- (i) Executive summary;
- (ii) Basic project information including a synopsis of the project organisation, programme, contracts of key management, and synopsis of work undertaken during the entire construction period;
- (iii) Brief summary of EM&A requirements including:
 - monitoring parameters
 - environmental quality performance limits (Action and Limit levels)
 - environmental mitigation measures, as recommended in the PP.
- (iv) Advice on the implementation status of the environmental protection and pollution control/mitigation measures, as recommended in the PP, summarised in the updated implementation status;
- (v) Drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- (vi) Graphical plots of the trends of monitored parameters over the construction period for representative monitoring stations annotated against:
 - the major activities being carried out on site during the period
 - weather conditions during the period
 - any other factors which might affect the monitoring results
 - the return of ambient environmental conditions in comparison with baseline data
- (vii) Compare and contrast the EM&A data with the PP predictions and annotate with explanation for any discrepancies;
- (viii) Provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
- (ix) Advice on the solid and liquid waste management status;
- (x) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- (xi) A brief account of the reasons for and the implications of the non-compliance including a review of pollution sources and working procedures as appropriate;
- (xii) A summary description of the actions taken in the event of the non-compliance and any follow-up procedures related to earlier non-compliance;

- (xii) A summary record of all complaints received, liaison and consultation undertaken, actions and follow-up procedures taken;
- (xiii) Review the monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
- (ixx) A summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of the breaches, investigation, follow-up actions taken and results;
- (xx) A review of the effectiveness of the mitigation measures; and
- (xxi) A conclusion to state the return of ambient and/or the predicted scenario.

6.8 Data Keeping

All site document such as monitoring field records, laboratory analysis records, site inspection forms, calibration certifications, etc. are required to be included in the EM&A reporting documents. However, any such document should be well kept by the ET and be ready for inspection upon request. Soft copies of all documents and data should be kept for at least six months following completion of the construction phase EM&A.

6.9 Interim Notifications of Environmental Quality Limit Exceedances

For construction phase EM&A, with reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET should immediately notify the IEC, the ER and EPD, as appropriate. The notification should be followed up with advice to EPD on results of investigation, proposed action and success of the action taken, with any necessary follow-up proposals.

Sample Environmental Monitoring Data Recording Sheet

Noise Monitoring Field Record Sheet

Monitoring Location							
Details of Location							
Date of Monitoring							
Measurement Start Time (hh:mm)							
Measurement Time Length (min.)							
Weather Conditions	Fine / Sunny / Cloudy / Rainy						
Wind Speed (m/s)							
Noise Meter Model/Identification							
Calibrator Model/Identification							
Calibration Before Measurement (dB(A))							
Calibration After Measurement (dB(A))							
Measurement Result	5min	5min	5min	5min	5min	5min	30min
L ₉₀ (dB(A))							
L ₁₀ (dB(A))							
L _{eq} (dB(A))							
Major Construction Noise Source(s) During Monitoring							
Other Noise Source(s) During Monitoring							
Remarks							

Name & Designation

Signature

Date

Record by:

Checked by:

**Sample template for the interim notifications of
Environmental Quality Limits Exceedances**

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

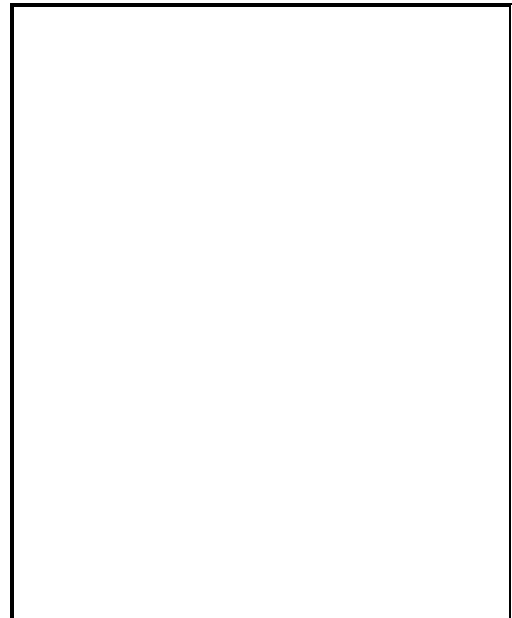
Location Plan

Prepared by:

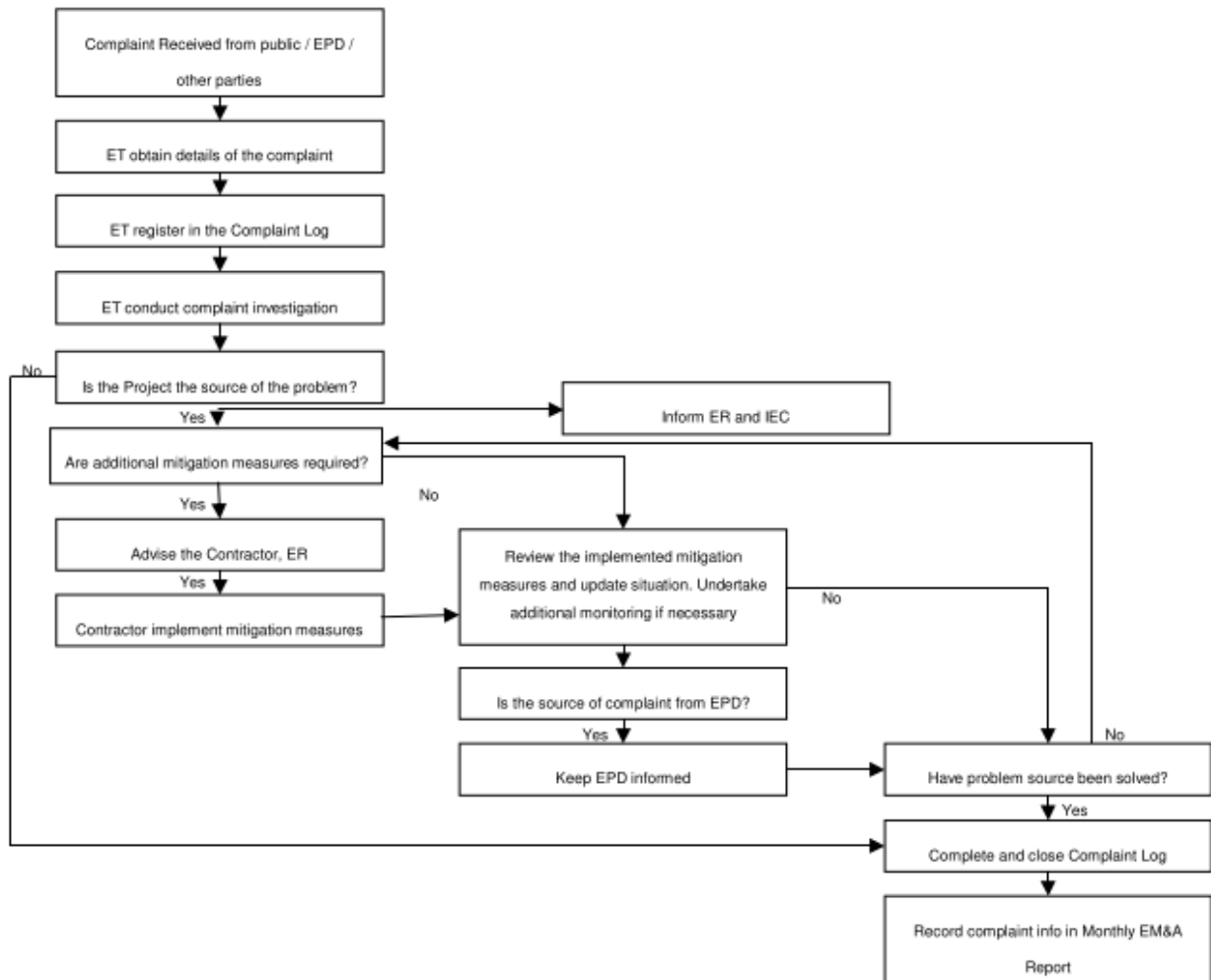
Designation:

Signature:

Date:



Complaint Response Procedure



附錄 X. 實施時間表

Appendix X - Implementation Schedule

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	Noise Impact					
S.5.1.1	Use of quieter plant	To minimise construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance
S.5.1.1	Use of noise enclosure and movable barrier <ul style="list-style-type: none"> • movable barrier can achieve a 5 dB(A) reduction for movable PME and 10 dB(A) reduction for stationary PME; • noise enclosure can achieve 15dB(A) reduction for PME; • noise enclosure is proposed to be built after open excavation in order to minimize the noise impact due to further excavation work and construction of subway. The enclosure should either be provided with acoustic door for access purpose which should be kept closed during the construction works or should be designed with no direct line of sight from the open side to the NSRs; • A typical design barrier with a steel frame of vertical / cantilever type would be adopted and located close to the noise generating part of PME; • Barrier material of surface mass in excess of 7kg/m² shall be required to achieve the maximum screening effect (and minimum 10kg/m² for noise enclosure); • The length of barrier should generally be at least five times greater than its height and the minimum height of a barrier should be such that no part of the noise 	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93, Noise Control Ordinance and EIAO Guidance Note NO. 9/2010

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	source will be visible from the noise sensitive receiver being protected.					
S.5.1.1	<p>General Construction Noise Control Measures</p> <ul style="list-style-type: none"> • The Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD shall be adopted; • The statutory and non-statutory requirements and guidelines shall be complied with; • Approval for the method of working, equipment and noise mitigation measures intended to be used at the site shall be granted from the Project Engineer before commencing any work; • Working methods to minimize the noise impact on the surrounding NSRs shall be formulated and executed, and the implementation of these methods shall be monitored by experienced personnel with suitable training; • Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical; • Unused equipment shall be turned off; • PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided; • All plant and equipment shall be maintained regularly; and • Material stockpiles and other structures shall be effectively utilized as noise barriers, whenever practicable. 	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	Air Quality Impact					
S.5.1.2	<p>Construction Dust Control Measures</p> <ul style="list-style-type: none"> • Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • Covering of stockpile of excavated dusty materials, if any, with impervious sheeting or spraying with water to maintain the entire surface wet; • Provision of vehicle washing facilities at the entry and exit points of site; and • Tarpaulin covering of any dusty materials being transported to and from site by vehicle; • Positioning of construction plant at maximum practicable distance from air sensitive receivers; and • Due to the small size of the works sites and lack of space for stockpiling, excavated materials should be hauled off-site almost immediately. However, in the event of any stockpiled excavated materials, they should be covered with tarpaulin and be removed off-site as soon as practicable to avoid any dust nuisance arising. 	To minimise the dust impacts arising from the construction works	Contractor	Work site	Construction Stage	Air Pollution Control (Construction Dust) Regulation
	Water Quality Impact					
S.5.1.3	<p>Construction Water Quality Impact Measures</p> <ul style="list-style-type: none"> • Collection of wastewater into a sedimentation tank for treatment before discharge into the public drainage system; • Provision of silt trap and oil interceptor to remove the 	To reduce water quality impact induced by the construction work	Contractor	Work Site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<p>oil, lubricants, grease, silt, grit and debris from the wastewater prior to discharge to the public stormwater system. The silt traps and oil interceptors should be cleaned and maintained regularly;</p> <ul style="list-style-type: none"> • Installation of wheel washing facilities to minimise muddy runoff; • Regular maintenance and inspection of drainage systems and erosion control and silt removal facilities; • Management and monitoring of sewage treatment facilities (if any); • Any foul effluent should not be discharged into any public sewer and stormwater drain, unless an effluent discharge permit is obtained under the WPCO by the Contractor; • Coverage of stockpiles of C&D materials (if any) during rainstorms; and • Site toilet facilities, if needed, should be chemical toilets or should have the sewage discharge directed to a foul sewer. 					
	Waste Management					
S.5.1.4	<p>Construction Waste Management Measures</p> <ul style="list-style-type: none"> • Scrap metals or abandoned equipment should be recycled if possible; • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; • The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designated 	To adopt waste management measures in the way of avoiding, minimising, reusing and recycling so as to reduce waste generation	Contractor	Work Site	Construction Stage	Waste Disposal Ordinance (Cap. 354); Waste Disposal (Chemical Waste) (General) Regulation; DEVB TCW No. 6/2010;

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<p>public filling facility and/or landfill. Independent audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed;</p> <ul style="list-style-type: none"> • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes; and • All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminium cans, plastic bottles etc. should be provided to facilitate reuse or recycling of materials and their proper disposal. 					ETWB TCW No. 19/2005.
	Landscape and Visual Impact					
S.5.1.5	<p>Landscape and Visual Measures</p> <ul style="list-style-type: none"> • Clear demarcation of works area to prevent damages to existing trees in close proximity; • Protection of all trees planned to be retained onsite; • Preserving all affected trees by transplanting where practical. Tree transplanting application and tree removal application shall be submitted for approval in accordance with ETWB TCW 3/2006; and • Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours. 	To reduce landscape and visual impact by construction works.	Contractor	Work Site and nearby playground	Construction Stage	EIAO; ETWB TCW No. 3/2006.
S.5.1.5	<ul style="list-style-type: none"> • Reinstating the playground after the completion of works; • Using appropriate (visually unobtrusive and non-reflective) building materials and colours in built 	To prevent loss of planter after construction; to minimise potential	Contractor	Work Site and nearby playground	Operation Stage	ETWB TCW No. 2/2004

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	structures; and <ul style="list-style-type: none"> Greening of vertical walls of ventilation blocks with climbers. The proposed treatment is illustrated in Appendix VIII. Climbing plant species of <i>Parthenocissus dalzielii</i>, <i>Hedera helix</i> and <i>Bauhinia glauca</i> are recommended for their high amenity and low maintenance requirements. 	landscape and visual impacts.				