MOTT MACDONALD

Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Quarterly EM&A Summary Report for November 2018 – January 2019 (Rev A)

March 2019

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Contents

Executive summary 1

1 Introduction 2

1.1 Background 2
1.2 Project Organization 2
1.3 Environmental Status in the reporting period 2
1.4 Summary of EM&A Requirements 3
1.5 Recommended Mitigation Measures 4

2 Summary of Monitoring Results 5

2.1 Air Quality Monitoring 5
2.2 Construction Noise Monitoring 5
2.3 Water Quality Monitoring 5
2.4 Ecological Monitoring 6
2.5 Landscape and Visual Monitoring 9

3 Environmental Site Inspection and Audit 12

3.1 Site Inspection 12
3.2 Solid and Liquid Waste Management Status 12

4 Report on Non-compliance and Complaints 13

4.1 Record on Non-compliance of Action and Limit Levels 13
4.2 Record on Environmental Complaints Received 15
4.3 Follow-up Actions Taken 15

5 Future Key Issues 16

5.1 Construction Works for the Coming Months 16
5.2 Key Issues for the Coming Months 16
5.3 Conclusions and Recommendations 16

Appendices 19

A. Project Organization Chart 21

B. Tentative Construction Programme 23

C. Action and Limit Levels for Construction Phase 25

D. Summary and Graphical Plots of the Monitoring Results 27

E. Summary of Ecological Monitoring Results 29

F. Environmental Mitigation Measures - Implementation Status 37

G. Landscape and Visual Audit Photos 43

Tables

Table 1.1: Summary of Impact EM&A Requirements 3
Table 2.1: Construction Audit Summary on Landscape and Visual 9
Table 4.1: Comparison of Monitoring Data of Suspended Solids 13
Table 4.2: Summary of Exceedance Investigations 14

Figures

Figure 1.1 General Site Layout and Locations of Monitoring Stations

Figure 2.1 Survey Area and Transect Walked

Executive summary

Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by Heng Shung Construction Co. Ltd. to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long. From August 2016, the Project Proponent, Profit Point Enterprises Limited, commissioned MMHK to continue the ET services.

This is the 35th Quarterly EM&A Summary report and this report summarises the findings on EM&A during the period from 1 November 2018 to 31 January 2019.

Exceedance of Action and Limit Levels

There was no breach of Action or Limit Levels for Air Quality (1-hr TSP and 24-hr TSP) and Noise level in the reporting period. However, for Water Quality, 24 Action Level exceedances of pH were recorded at MP3, MP5 and MP6 on different monitoring dates; two Action Level exceedance of SS were recorded at MP4; and one Limit Level exceedance of SS was recorded at MP4 in the reporting period.

The summary of measured water quality is presented in **Section 2.3**.

Investigations have been carried out to identify the causes of exceedance. From investigation, the contractor has implemented water quality mitigation measures as recommended in the EIA report. With external factors affecting the adjacent environments, such as pond fish culture activities, rainfall and natural variations in the open ditch, the exceedances were considered not due to the project construction works.

Implementation of Mitigation Measures

Site audits were carried out on a weekly basis during the monitoring period to confirm the implementation of environmental mitigation measures undertaken by the Contractor in the reporting period. The status of implementation of mitigation measures in the site is shown in **Appendix F**.

Record of Complaints

There was no record of complaints received in the reporting period.

Future Key Issues

The major site works scheduled to be commissioned in the coming three months include site formation, foundation work and regular maintenance work for the Wetland Restoration Area (including lowering of the water level and removal of unwanted species in the pond). Potential environmental impacts due to the construction activities, including air quality, noise, water quality, ecology and landscape and visual, will be monitored.

Environmental mitigation measures will be implemented on site as recommended and weekly site audits will be carried out to ensure that the environmental conditions are acceptable.

1 Introduction

1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site in Yuen Long at Wo Shang Wai. An Environmental Impact Assessment (EIA) was then carried out under the EIA Ordinance (EIAO), and the Environmental Permit (EP-311/2008) for construction of the comprehensive development in Wo Shang Wai was first granted by EPD on 9 September 2008 and has been subsequently varied, with the current version (EP-311/2008/E) issued by EPD on 19 December 2017.

The Project involves the residential development and associated infrastructure and wetland restoration area and linear landscape area. The construction works under the Environmental Permit commenced on 12 May 2010. The site formation construction works of the Wetland Restoration Area (hereafter WRA) were completed on 15 November 2010, and the WRA was established by October 2012, within 30 months from the commencement of construction as stipulated in the EP. This indicated that planting works as scheduled in the approved Wetland Restoration and Creation Scheme (WRCS; November 2009) were complete, except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which a Variation to Environmental Permit (EP-311/2008/C) to defer planting at the location was approved. Consequently, EP (EP-311/2008/D) including specific mitigation measures to minimise certain identified noise impacts during the operation phase was approved. The current valid EP (EP-311/2008/E) comprises varied conditions for the implementation and maintenance of visual and landscape measures, and for the implementation of noise mitigation measures.

Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by the Contractor, Heng Shung Construction Co. Ltd., to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long. From August 2016, the Project Proponent, Profit Point Enterprises Limited, commissioned MMHK to continue the ET services.

This report summarises the findings during the period from 1 November 2018 to 31 January 2019.

1.2 Project Organization

The organisation chart and lines of communication with respect to the on-site environmental management structure together with the contact information of the key personnel are shown in **Appendix A**.

1.3 Environmental Status in the reporting period

During the reporting period, construction works of the Project undertaken include:

- Removal of filling materials from site was in progress
- Regular maintenance work for the Wetland Restoration Area (including lowering of the water level and removal of unwanted species in the pond)

- Foundation Work (provision of temporary site drainage)

The Construction Works Programme of the Project is provided in **Appendix B**. The general layout plan of the Project site is shown in **Figure 1.1**.

1.4 Summary of EM&A Requirements

The EM&A programme requires environmental monitoring of air quality, noise, water quality, ecology and landscape and visual as specified in the approved EM&A Manual.

A summary of impact EM&A requirements is presented in **Table 1.1** below:

Table 1.1: Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Frequencies
Air Quality	24-Hour TSP	ASR1, ASR2A, ASR3, ASR4(1)	Once every 6 days
	1-Hour TSP	ASR1, ASR2A, ASR3, ASR4(1)	3 times every 6 days
Noise	L_{eq}, 30min	NSR1, NSR3, NSR5(2), NSR7	Weekly
Water Quality	Dissolved Oxygen (DO), temperature, pH, suspended solids (SS) and Biological Oxygen Demand (BOD)	MP1 to MP6(3)	3 days per week
Ecology	Birds	Within the Project Area and Assessment Area of 500m	Weekly
	Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during March and September to November, and twice per month during April to August
	Herpetofauna	Within the Project Area and Assessment Area of 500m	Day-time: Once per month during April to November Night-time: Once per month during March to August
	Water quality of Wetland Restoration Area (WRA)	WRA	After filling of WRA with water, monthly for in situ water quality and every six months (end of wet season and end of dry season) for laboratory testing
	Site Inspections	Within the Project Area and Assessment Area of 500m	Weekly
Landscape and Visual	Auditing of protection of existing trees, the transplanting of existing trees, the creation of new wetland, the planting of new trees and shrubs and other landscape and visual mitigation measures	CM1 to CM10 and OM1 to OM7 within the Project Area	Site inspections once every two weeks during construction phase; once every two months during operational phase

Notes:
(1) The air quality stations ASR1 and ASR4 were relocated to new locations on 5 June 2018 as the previous locations will be affected by upcoming construction activities. All monitoring data at ASR1 and ASR4 from June 2018 is measured at the new monitoring locations.
(2) The noise impact monitoring station NSR5 was relocated to a new location on 5 June 2018 as the previous location will be affected by upcoming construction activities. All monitoring data at NSR5 from June 2018 is measured at the new monitoring location.
(3) The water quality impact monitoring at MP1 and MP2 have been terminated since July 2012 due to the withdrawal of access rights by the land owner.

The Environmental Quality Performance Limits for air quality, noise and water quality are shown in **Appendix C**.

1.5 Recommended Mitigation Measures

The EM&A programme followed the recommended mitigation measures in the EM&A Manual. The EM&A requirements as well as the summary of implementation status of the environmental mitigation measures are provided in **Appendix F**. In particular the following mitigation measures were brought to attention during the site audits during the reporting period:

Air Quality

- Dark smoke emission from equipment/plant should be avoided.

Noise

- The noise barriers and hoardings should have no gaps and openings to avoid noise leakage.

Water Quality

- Site effluent should be discharged in accordance with the discharge licence.
- The site should be confined and properly maintained to avoid silt runoff.
- Chemicals will always be stored on drip trays or in bunded areas.

Waste Management

- The chemical waste storage area should be clearly labelled.
- General refuse should be stored in enclosed bins or compaction units separate from C&D and chemical wastes.

2 Summary of Monitoring Results

2.1 Air Quality Monitoring

Results and graphical plots of 1-hour TSP and 24-hr TSP at the four monitoring locations are summarised and shown in the **Appendix D**. No exceedance of 1-hour and 24-hour TSP (Action or Limit Level) was recorded in the reporting period.

November 2018 was much gloomier than usual. As the northeast monsoon affecting the south China coast was relatively weak and southerlies were dominated in the lower atmosphere, more water vapour was built up and the weather in Hong Kong was cloudier than usual. The mean amount of cloud in the month was 79 percent, 25 percent above the normal of 54 percent and the highest on record for November. As a result, the duration of bright sunshine in the month was only 123.9 hours, about 31 percent lower than the normal figure of 180.1 hours. The mean temperature of 22.9 degrees and mean minimum temperature of 21.4 degrees were 1.1 degrees and 1.6 degrees above the respective normals. November 2018 was also wetter than usual with the monthly rainfall of 73.4 millimetres, about 95 percent above the normal of 37.6 millimetres.

December 2018 was much warmer than usual in Hong Kong. The monthly mean temperature was 19.2 degrees, 1.3 degrees above the normal of 17.9 degrees. The mean minimum temperature was 17.6 degrees, 1.7 degrees above normal of 15.9 degrees. The month was also drier than usual with a total rainfall of 11.9 millimetres, only about 44 percent of the normal of 26.8 millimetres.

January 2019 was much warmer than usual in Hong Kong. The monthly mean temperature of 18.1 degrees and monthly mean minimum temperature of 16.4 degrees were 1.8 degrees and 1.9 degrees above their corresponding normal. The month was also drier than usual with only 4.7 millimetres of rainfall recorded in the month, about one fifth of the normal of 24.7 millimetres for January.

For details of wind speed and direction during the monitoring period, please refer to the respective Monthly EM&A reports.

2.2 Construction Noise Monitoring

The construction noise monitoring results and graphical plots are shown in **Appendix D**. No exceedance (Action/Limit Level) of construction noise was recorded in the reporting period.

2.3 Water Quality Monitoring

The water quality monitoring results and the graphical plots of the monitoring data are shown in **Appendix D**.

During November 2018, a total of twenty-two Action Level exceedances were observed. Ten Action Level exceedances of pH were recorded at MP3. One Action Level exceedance of SS was recorded at MP4. Four Action Level exceedances of pH were recorded at MP5. Seven Action Level exceedances of pH were recorded at MP6.

During December 2018, a total of four Action Level exceedances and one Limit Level exceedance were observed. Three Action Level exceedances of pH were recorded at MP3. One Action Level exceedance and one Limit Level exceedance of SS were recorded at MP4.

During January 2019, there was no breach of Action or Limit Levels for Water Quality monitoring.

2.4 Ecological Monitoring

2.4.1 Monitoring of Birds

Monitoring was undertaken following the survey methodology in the EM&A Manual. The WRA was also surveyed during the reporting period as the area became accessible and site formation works for WRA has been completed. A transect was followed in the bird surveys (see **Figure 2.1**).

All bird species of conservation importance and/or wetland dependent were identified and enumerated. Flying birds were not recorded unless they were foraging and associated with the habitat (such as swifts). Further, notable bird observations during other surveys were also recorded.

A summary of the survey data of bird species of conservation importance and/or wetland-dependence recorded is provided in **Appendix E**.

Bird surveys were conducted on a weekly basis. In the survey area (excluding the WRA), a total of 39, 36 and 39 bird species were recorded in November 2018, December 2018 and January 2019 respectively. In each respective month, 21, 18 and 20 of the recorded bird species were of conservation importance and/or wetland-dependence. Within the WRA, a total of 34, 41 and 38 bird species were recorded in November 2018, December 2018 and January 2019 respectively. In each respective month, 15, 22 and 19 of the recorded bird species were of conservation importance and/or wetland-dependence.

In November 2018, of all bird target species, two were recorded within the WRA (high count[1] and mean of the two target species respectively): Chinese Pond Heron (3, 1.8) and Little Egret (4, 3.3). The WRA continues to attract a number of species of conservation importance, including Little Grebe, *Tachybaptus ruficollis,* Great Cormorant*, Phalacrocorax carbo,* Grey Heron*, Ardea cinerea,* Purple Heron*, Ardea purpurea,* Great Egret*, Ardea alba,* Yellow Bittern*, Ixobrychus sinensis,* Black Kite*, Milvus migrans* and White-throated Kingfisher*, Halcyon smyrnensis*. Little Grebe, Yellow Bittern, and White-throated Kingfisher are listed by Fellowes *et al*. as of “Local Concern” in 2002. Great Cormorant, Grey Heron and Great Egret are listed by Fellowes *et al*. “Potential Regional Concern” in 2002. Purple Heron and Black Kite are listed by Fellowes et al. as of “Regional Concern” in 2002.

In addition to wetland-dependence birds, the WRA also attracts a number of terrestrial birds including Greater Coucal, *Centropus sinensis* which is listed as vulnerable (VU) in the China Red Data Book and it is protected under terrestrial wildlife state protection (category II). Survey findings indicate that the WRA not only provides important habitat for wetland-dependence birds but also the terrestrial birds.

In December 2018, of all bird target species, two of them were recorded within the WRA (high count and mean of three target species respectively): Chinese Pond Heron (7, 4.3) and Little Egret (10, 7.8). The WRA continues to attract a number of species of conservation importance,

[1] The “high count” of a species is the highest number of that species recorded during the survey month.

including Little Grebe, *Tachybaptus ruficollis,* Great Cormorant*, Phalacrocorax carbo,* Grey Heron*, Ardea cinerea,* Purple Heron*, Ardea purpurea,* Great Egret*, Ardea alba,* Black Kite*, Milvus migrans,* Yellow Bittern*, Ixobrychus sinensis,* Black-crowned Night Heron, *Nycticorax nycticorax,* Common Greenshank*, Tringa nebularia,* Wood Sandpiper, *Tringa glareola,* White-throated Kingfisher*, Halcyon smyrnensis,* Pied Kingfisher*, Ceryle rudis,* Red-billed Starling, *Spodiopsar sericeus and* White-cheeked Starling, *Spodiopsar cineraceus*. Little Grebe, Yellow Bittern, Black-crowned Night Heron, Wood Sandpiper, White-throated Kingfisher and Pied Kingfisher are listed by Fellowes *et al*. as of "Local Concern" in 2002. Great Cormorant, Grey Heron, Great Egret and White-cheeked Starling are listed by Fellowes *et al*. "Potential Regional Concern" in 2002. Purple Heron, Black Kite, Common Greenshank are listed by Fellowes et al. as of "Regional Concern" in 2002. Red-billed Starling is listed as Regional Concern (Wetland Restoration Plan, Mott, 2008).

In addition to wetland-dependence birds, the WRA also attracts a number of terrestrial birds including Greater Coucal, *Centropus sinensis* which is listed as vulnerable (VU) in the China Red Data Book and it is protected under terrestrial wildlife state protection (category II). Survey findings indicate that the WRA not only provides important habitat for wetland-dependence birds but also the terrestrial birds.

In January 2019, of all bird target species, two were recorded within the WRA during the regular survey (high count and mean of the two target species respectively): Chinese Pond Heron (6, 4.5), Little Egret (10, 7.3). The WRA continues to attract a number of species of conservation importance, including Little Grebe, *Tachybaptus ruficollis*, Great Cormorant, *Phalacrocorax carbo*, Grey Heron, *Ardea cinerea*, Purple Heron, *Ardea purpurea*, Great Egret, *Ardea alba*, Yellow Bittern, *Ixobrychus sinensis,* Black-winged Stilt*, Himantopus himantopus,* Wood Sandpiper*, Tringa glareola,* White-throated Kingfisher, *Halcyon smyrnensis,* Red-billed Starling*, Spodiopsar sericeus and* Collared Crow*, Corvus torquatus*. Little Grebe, Yellow Bittern, Wood Sandpiper, White-throated Kingfisher and Collared Crow are listed by Fellowes *et al*. as of "Local Concern" in 2002. Great Cormorant, Grey Heron and Great Egret are listed by Fellowes *et al*. "Potential Regional Concern" in 2002. Purple Heron and Black-winged Stilt are listed by Fellowes et al. as of "Regional Concern" in 2002. Red-billed Starling is listed as Regional Concern (Wetland Restoration Plan, Mott, 2008).

In addition to wetland-dependence birds, the WRA also attracts a number of terrestrial birds. Survey findings indicate that the WRA not only provides important habitat for wetland-dependence birds but also the terrestrial birds.

2.4.2 Monitoring of Herpetofauna

Monitoring was undertaken following the survey methodology in the EM&A Manual. One day-time herpetofauna survey was scheduled in November 2018. No herpetofauna surveys were scheduled in December 2018 and January 2019. Further, notable herpetofauna observations during other surveys were also recorded.

In November 2018, no amphibian species nor reptile species were recorded in the Survey Area (excluding the WRA) during the regular survey. One reptile species was recorded in the Survey Area (excluding the WRA) during the outside survey. Within the WRA, no amphibian species nor reptile species were recorded during the regular survey and outside survey within the survey period.

In December 2018, no herpetofauna surveys were scheduled. No amphibian species nor reptile species were recorded in other surveys during the reporting month.

In January 2019, no herpetofauna surveys were scheduled. No amphibian species nor reptile species were recorded in other surveys during the reporting month.

A summary of the survey findings is provided in **Appendix E**.

2.4.3 Monitoring of Dragonflies and Butterflies

Monitoring of odonates and butterflies was conducted once in November 2018. No odonates and butterflies' surveys were scheduled in December 2018 and January 2019, in accordance with the EM&A Manual. Further, notable odonate and butterfly observations during other surveys were also recorded.

In November 2018, no odonata species nor butterfly species were recorded in the Survey Area (excluding the WRA) during the regular survey and one butterfly species was recorded in the Survey Area (excluding the WRA) during the outside survey. Within the WRA, no odonata species nor butterfly species were recorded during both the regular and outside surveys.

In December 2018, no odonates and butterflies' surveys were scheduled. No odonata species nor butterflies species were recorded in other surveys.

In January 2019, no odonates and butterflies' surveys were scheduled. No odonata species nor butterflies species were recorded in other surveys.

A summary of the survey findings is provided in **Appendix E**.

2.4.4 Monitoring of Mammals

Monitoring of mammals was conducted concurrently with other surveys.

In November 2018, no mammal species was recorded in the Survey Area (excluding the WRA) nor within the WRA during both the regular and outside surveys.

In December 2018, no mammal species was recorded in the Survey Area (excluding the WRA) nor within the WRA during the regular survey. Two unidentified bat species were observed within the WRA during the outside survey.

In January 2019, no mammal species was recorded in the Survey Area (excluding the WRA) nor within the WRA during both the regular and outside surveys.

A summary of the survey findings is provided in **Appendix E**.

2.4.5 Management Activities

2.4.5.1 Vegetation Management

Removal of exotic vegetation in all cells were undertaken; these included but not limited to *Ipomoea* sp., *Mikania* sp., *Mimosa* sp., *Pennisetum* sp. and *Typha* sp..

Vegetation management activities undertaken at the site primarily involved watering of plants, weeding and grass cutting.

2.4.5.2 Wildlife Management

Removal of Golden Apple Snail was undertaken on an "as-seen" basis.

All sighted Red Fire Ant nests were treated with approved pesticide.

Mitigation actions have been carried out in the WRA during the survey period to increase the WRA utilization by birds. Mitigation actions include:

1. Controlling the vegetation at Cell 1, Cell 2, Cell 3 and Cell 4.
2. Controlling the water level of Cell 2 and Cell 3.

2.5 Landscape and Visual Monitoring

The audit was undertaken with references to the specific mitigation measures recommended in Section 10.2 of the EM&A Manual and the audit results are summarized below in **Table 2.1**.

Representative photos showing the implementation of mitigation measures are presented in **Appendix G**.

Table 2.1: Construction Audit Summary on Landscape and Visual

Area of Works	Items to be Monitored
Works Area	The boundaries of the works area have been established on site in accordance with the contract documents and approved plans (EP), and the limit of current heavy construction activity is now confined to within the site hoardings (North side of the site / access road) and the noise barriers (other sides of the site). Minor works such as horticultural maintenance of the planting and transplanted trees, and boundary fence repair was proceeding along the Royal Palms - Palm Springs boundary. (**Appendix G** Photo 1 – Table 2.14 CM2 of Monthly EM&A Report refers) No construction works were observed to have exceeded the site boundaries. No construction was carried out at the wetland restoration area after 15 November 2010.
Protection of all trees and woodland blocks to be retained	Trees retained within the site along the northeast boundary, beside wetland restoration area, have been identified and protected by temporary protective fencing.
Streams	The works site is partly encircled by a berm / perimeter channel to intercept surface water and prevent it from washing off into any of the neighbouring sites. Surface water is collected within the site in a temporary drainage channel. Gravels beds and barriers have been installed to filter site runoff, sedimentation ponds have been provided to enable primary treatment before discharge to mains drains.
Clearance of existing vegetation	Site clearance was completed prior to the commencement of construction.
Transplanting of trees	Tree transplanting has been completed, with the trees relocated to various points within the planting strip along the southern boundary of the site, outside the noise barrier. The trees continue to re-establish well.
Topsoil stripping	Suitable pond bund and soil material which had been excavated and stockpiled from the original site, has now been re-used within the landscape works Dust suppression measures are active along all internal site access tracks.
New buildings	No new permanent buildings have yet been constructed on site.
Boundaries	Hoardings have been erected along most of the boundaries of the site. Installation of new screen fence between the future residential sites and the constructed wetland restoration areas is complete. Fence has been painted green to match with the surrounding vegetated environment. (**Appendix G** Photo 1 – Table 2.14 CM2 of Monthly EM&A Report refers)
Noise Barrier	Noise barriers have been installed along the southern and western boundaries of the site in accordance with the contract requirements. Their design complies with the mitigation requirements, with upper 6 to 7m portion of the barrier being made from a translucent material with green tinted (to match with the environment). Supporting GMS structure, likewise, has been painted green. (**Appendix G** Photo 3 – Table 2.14 CM6 of Monthly EM&A Report refers). Repair or replacement of the broken panels is recommended.
Night-time lighting	No night-time works were reported to have been carried out during the monitoring period.
Landscape and wetland treatments	Continuous belt of screen planting along the southern and western boundaries of the site has been completed. The formation, soiling and water control structures of the wetland restoration area have been completed. (**Appendix G** Photo 3 – Table 2.14 CM6 of Monthly EM&A Report refers)

	The wetland areas are being established, with the ponds are being seasonally filled with rain water. Planting of areas around the WRA cells is complete. No construction was carried out at the wetland restoration area after 15 November 2010. (**Appendix G** Photo 2 – Table 2.14 CM2 of Monthly EM&A Report refers)
Soiling, etc.	The soiling for the advance planting strip has been completed. The soil placement and grading for each of the wetland restoration areas has been completed.
Plant supply	The plant material used in the Advance Planting Strip and in the WRA are all commonly available species and came from commercial sources. Transplanted reeds (*Phragmites australis*) at the wetland habitat came from the temporary holding nursery onsite.
Planting	The tree species are all from the approved list. As a result of super typhoon Mangkhut in Hong Kong on 16 September, numbers of trees (i.e. total nos. 26) were collapsed with broken trunks. These trees need to be replaced with new specimens as soon as possible. Some of the trees that were identified having defects (i.e. broken branch, uprooted, etc.), which were mostly induced by super typhoon, proper mitigation measures are to be adopted. Some of the recently planted trees are in poor condition. These trees are under close monitoring. If the condition of these trees continues to deteriorate, tree replacement will be required. Seedling trees and shrubs, have been established at the margins of the wetland cells. Some invasive vegetation has been found during site inspection, removal of this species should be undertaken on a regular basis.
Establishment Works	**November 2018:** The advance planting, the compensatory planting and transplanted trees are generally being maintained by the landscape sub-contractor in accordance with the specification to ensure that the contract requirements are met. Some trees are in poor health condition. Close monitoring for those trees is recommended. Several trees were dead with completely dehydrated tree crown (i.e. T149, T165 and T210) and tree removal with replacement are recommended. Regular weeding for over-grown shrub is recommended. Affected by super typhoon Mangkhut in Hong Kong on 16 September, numbers of trees (i.e. total nos. 34) were collapsed with broken trunks and removal of the remaining trunks should be undertaken. These trees need to be replaced with new specimens as soon as possible. Trees with broken trunks, which induced by super typhoon Mangkhut. should be removed as soon as possible without impeding the adjacent residential lot and pathway. Tree replacement is recommended. Regular pruning of the trees should be undertaken to remove the defective parts (e.g. dead branches, dieback, broken branches, hanging branches) on the trees. Broken branches induced by super typhoon Mangkhut should be removed as soon as possible. As a result of super typhoon Mangkhut, numbers of trees were found uprooted/leaning. Re-erection of these trees and installation of proper tree support system should be undertaken. For those that might be unrecoverable, tree removal and replacement are recommended. Termite infestation was observed on numbers of trees. Proper treatment to remove these termite tracks should be undertaken immediately. For those trees with severe termite infestation, termiticide is recommended. Removal of extensive growth of weeds and invasive climbers in the space behind screen noise barrier needs to be undertaken on a monthly basis as they may inhibit the advance planting. Horticultural maintenance (grass cutting, weeding, watering etc.) in the shrubs and tree seedling areas around the WRA cells should be undertaken regularly. Large amount of Red Imported Fire Ant (RIFA) nests were observed along the maintenance path of WRA area. Pesticide should be applied to eradicate of all the nests to avoid further spreading of RIFA. Regular removal of invasive species (i.e. apple snails, Mikania micrantha, Mimosa pudica, Bidens alba and etc.) in WRA should be undertaken. The growth of shrubs / seedlings on the north side of WRA remains fair, with some of the shrub planting requiring pruning to avoid obstruction to the access path.
	December 2018: The advance planting, the compensatory planting and transplanted trees are generally being maintained by the landscape sub-contractor in accordance with the specification to ensure that the contract requirements are met. Some trees are in poor health condition. Close monitoring for those trees is recommended. Several trees were dead with completely dehydrated tree crown and tree removal with replacement are recommended.

Regular weeding for over-grown shrub is recommended. For those trees with broken trunks, which may not be recovered, some of them were removed during the arboricultural maintenance works. Tree removal works should be continued for the trees with unrecoverable health and structure problems and subsequent tree replacement are suggested. Regular pruning of the trees should be undertaken to remove the defective parts (e.g. dead branches, dieback, broken branches, hanging branches) on the trees. Broken branches induced by super typhoon Mangkhut should be removed as soon as possible. As a result of super typhoon Mangkhut, a number of trees were found uprooted/leaning. Re-erection of these trees and installation of proper tree support system should be undertaken. For those that might be unrecoverable, tree removal and replacement are recommended. Termite infestation was observed on numbers of trees. Proper treatment to remove these termite tracks should be undertaken immediately. For those trees with severe termite infestation, application of approved termiticide is recommended. Removal of extensive growth of weeds and invasive climbers in the space behind screen noise barrier needs to be undertaken on a monthly basis as they may inhibit the advance planting. Horticultural maintenance (grass cutting, weeding, watering etc.) in the shrubs and tree seedling areas around the WRA cells should be undertaken regularly. Large amount of red fire ant nests were observed along the maintenance path of WRA area. Pesticide should be applied to eradicate of all the nests to avoid further spreading of red fire ants. Regular removal of invasive species (i.e. apple snails, Mikania micrantha, Mimosa pudica, Bidens alba and etc.) in WRA should be undertaken. The growth of shrubs / seedlings on the north side of WRA remains fair..
January 2019: The advance planting, the compensatory planting and transplanted trees are generally being maintained by the landscape sub-contractor in accordance with the specification to ensure that the contract requirements are met. For those unrecoverable trees after Typhoon Mangkhut, tree removal or related arboricultural maintenance work is undergoing. Some trees are in poor health condition. Close monitoring for those trees is recommended. Several trees were dead with completely dehydrated tree crown and tree removal with replacement are recommended. Regular weeding for over-grown shrub is recommended. For those trees with broken trunks, which may not be recovered, some of them were removed during the arboricultural maintenance works. Tree removal works should be continued for the trees with unrecoverable health and structure problems and subsequent tree replacement are suggested. Regular pruning of the trees should be undertaken to remove the defective parts (e.g. dead branches, dieback, broken branches, hanging branches) on the trees. For those uprooted /leaning trees, re-erection of these trees and installation of proper tree support system are recommended. For those that might be unrecoverable, tree removal and replacement are recommended. Termite infestation was observed on numbers of trees. Proper treatment to remove these termite tracks should be undertaken immediately. For those trees with severe termite infestation, application of approved termiticide is recommended. Tree stump removal is recommended after the tree removal so as to make room for the new replacement trees. Removal of extensive growth of weeds and invasive climbers in the space behind screen noise barrier needs to be undertaken on a monthly basis as they may inhibit the advance planting. Horticultural maintenance (grass cutting, weeding, watering etc.) in the shrubs and tree seedling areas around the WRA cells should be undertaken regularly. Large amount of red fire ant nests were observed along the maintenance path of WRA area. Termiticide should be applied to eradicate of all the nests to avoid further spreading of red fire ants. Regular removal of invasive species (i.e. apple snails, Mikania micrantha, Mimosa pudica, Bidens alba and etc.) in WRA should be undertaken. The growth of shrubs / seedlings on the north side of WRA remains fair.

3 Environmental Site Inspection and Audit

3.1 Site Inspection

The ET carried out construction phase weekly site inspections on 1, 8, 15, 22 and 27 November 2018; 6, 13, 20 and 28 December 2018; and 4, 10, 14, 24 and 31 January 2019. All observations have been recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary.

3.2 Solid and Liquid Waste Management Status

The Contractor has been registered as a chemical waste producer for the Project. Construction and demolition (C&D) material sorting was carried out on site. A sufficient number of receptacles were available for general refuse collection.

As advised by the Contractor, no inert C&D material (i.e. broken concrete/ big boulders) were generated on site and sent to a sorting facility for recycling into rockfill. No metals were generated and collected by registered recycling collector. No paper/cardboard packing and no plastics were generated on site and collected by registered recycling collector. No chemical waste was generated and collected by licensed chemical waste collector. No other types of wastes (e.g. general refuse) were generated on site and disposed of at public landfill facility.

The Contractor is advised to maintain on site waste sorting and recording system and maximize reuse / recycling of C&D wastes, whenever these are generated.

4 Report on Non-compliance and Complaints

4.1 Record on Non-compliance of Action and Limit Levels

4.1.1 Record of Non-compliance

There is no breach of Action or Limit Levels for Air Quality and Noise monitoring in the reporting period.

A total of twenty-six Action Level exceedances were recorded for Water Quality at MP3, MP4, MP5 and MP6 and one Limit Level exceedance was recorded for Water Quality at MP4 during the reporting period. These are summarised as follows:

During November 2018, a total of twenty-two Action Level exceedances were observed. Ten Action Level exceedances of pH were recorded at MP3. One Action Level exceedance of SS was recorded at MP4. Four Action Level exceedances of pH were recorded at MP5. Seven Action Level exceedances of pH were recorded at MP6.

During December 2018, a total of four Action Level exceedances and one Limit Level exceedance were observed. Three Action Level exceedances of pH were recorded at MP3. One Action Level exceedance and one Limit Level exceedance of SS were recorded at MP4.

During January 2019, there was no breach of Action or Limit Levels for Air Quality, Noise and Water Quality monitoring.

4.1.2 Constructional Impacts on Water Quality

In order to determine the constructional impacts on water quality, the suspended solids level, which is a good indicator of the quality of effluent from construction site, is selected for assessment. The average value of suspended solids (SS) for water quality monitoring stations (MP3 – MP6) during baseline monitoring and construction phase monitoring for the reporting period are listed in **Table 4.1** below.

Table 4.1: Comparison of Monitoring Data of Suspended Solids

Monitoring Stations	Average Levels of Suspended Solids (mg/L)		Within 130% of mean value of Baseline data?
	During Baseline Monitoring	During Construction Phase Monitoring for the reporting period	
MP3	49.5	26	Yes
MP4	36.9	37	Yes
MP5	47.7	38	Yes
MP6	54.1	41	Yes

The average levels of suspended solids (SS) during the reporting period were within (i.e. below) 130% of the baseline values at MP3, MP4, MP5 and MP6. Although there were exceedances of water quality parameters at MP3, MP4, MP5 and MP6, the above statistics show that the water

quality at these locations during the reporting period has not significantly worsened when compared with the baseline condition.

It was noted that during the reporting period, all the water quality parameters monitored were influenced by the natural environment and other external factors, and in some cases exceedances of criteria were resulted. The exceedances have been investigated and are described in the following section.

4.1.3 Exceedance Investigations

Water Quality

From investigation, the Contractor has implemented water quality mitigation measures as recommended in the EIA report, including:

- Temporary drainage channels were provided to collect the surface runoff generated within the project site; and
- Installation of barrier at the drainage channels to intercept site runoff and pump the wastewater to the sedimentation tanks as primary treatment prior to treatment by wastewater treatment facilities (AquaSed), which will ensure all site runoff is treated to satisfactory quality before discharging into the northern ditches.

The possible causes of exceedances have been investigated and reported to the IEC during construction phase monitoring. The exceedance investigations have also been included in the monthly EM&A reports and some of them are extracted and summarised in **Table 4.2**. The causes of some of the exceedances were unknown but all of them were considered not related to the project. For details, please refer to the relevant monthly EM&A reports.

Table 4.2: Summary of Exceedance Investigations

Descriptions of exceedances	Possible causes	Exceedance related to project?
Exceedances of pH at MP3 in November and December 2018	According to the results of baseline water quality monitoring conducted prior to the commencement of construction works, the pH recorded at MP3 ranged from 7.7 to 8.6. The recorded pH exceedances (7.6 to 7.8) are therefore considered to be very close to / within the range of natural variations at this location. It is noted from AFCD's Environmental Management of Pond Fish Culture (EMPFC) guidelines from its Series of Good Aquaculture Practice that the pH level of fishpond water should be between 6 and 8.5. The recorded values are well within the guideline recommendations.	No, noting that the fish pond (MP3) was being separated from the construction site by the WRA since November 2010. It is concluded that the exceedances of pH at MP3 were possibly due to natural variations and external factors such as pond fish culture activities in the fish pond represented by MP3, which are not related to project construction activities.
Exceedance of SS at MP4 in November and December 2018	Exceedances of the Action Level of SS were observed on 28 November and 21 December 2018. Exceedance of the Limit Level of SS was observed on 19 December 2018. From the Hong Kong Observatory (HKO) records, 5-10 mm was recorded in the vicinity of the project site on 28 November 2018, one of the days of SS Action Level exceedance. The local weather became cloudy and rainy from 25 to 28 November 2018, where more than 20 millimetres of rainfall were generally recorded on 25 November 2018 alone. The rainfall may have caused surface runoff from all sources near the open ditch. It is believed that the runoff increased the turbulence and thus resulted in higher SS inside the ditch water on the day of SS exceedance.	No. It is stipulated that the exceedances recorded at MP4 were due to localized natural variations.

Descriptions of exceedances	Possible causes	Exceedance related to project?
	From HKO records, although no rain was recorded in the vicinity of the project site on 19 and 21 December 2018, the days of SS Action and Limit level exceedance respectively, it was noted that the measured turbidity levels at MP4 on both days had also increased, even though not in exceedance of its action level. It is believed that increased turbidity resulted in higher SS inside the ditch water on the days of SS exceedance. Also, on the days of SS exceedances, a slightly muddy appearance of the water body was observed at MP4. Furthermore, it is noted that SS levels recorded upstream at MP5 and MP6 on the same days were also elevated but did not exceed the respective Action Levels. As presented in the weekly site inspections checklists, no observation regarding discharge of muddy water was recorded in November and December 2018. It is believed that the discharged site effluent was not the cause the SS exceedances. It was probably due to localised natural variations instead.	
Exceedance of pH at MP5 and MP6 in November 2018	On the days of pH exceedance at MP5 and MP6, the pH levels were recorded as 7.6. As noted above, the open ditch (represented by MP4, MP5 and MP6) is separated from the fish pond near the site (represented by MP3) by the pond bund. No direct discharge from the project site to the open ditch was carried out. Hence, it is possible that these pH levels were due to natural variations affecting the vicinity in general. Furthermore, the site effluent was effectively treated by the AquaSed system and discharged from the site at a low, controlled rate during the reporting month.	No. It is stipulated that the pH exceedances recorded at MP5 and MP6 were due to natural variations.

In summary, all of the exceedances were caused by external factors such as pond fish culture activities, rainfall and natural variations in the open ditch. Moreover, as noted by the monitoring team during on-site sampling, no direct muddy water discharge was observed from the site. The exceedances were considered not due to Project works.

4.2 Record on Environmental Complaints Received

There was no new record of complaints received in the reporting period.

4.3 Follow-up Actions Taken

Non-compliance

Although it is considered that the exceedances were not related to the Project, the Contractor was reminded to implement the water quality mitigation measures in accordance with the recommendations stated in 5.6.1 – 5.6.4 of the EIA Report respectively as far as practicable and regular spot check would be conducted on the nearby discharge by Contractor and inform ET for investigation.

It was also advised that the operation condition of the Wastewater Treatment Facilities should be checked regularly to ensure proper functioning of the plant and good quality of effluent discharge.

Complaints

Not applicable for this reporting period.

5 Future Key Issues

5.1 Construction Works for the Coming Months

The major site works scheduled to be commissioned in the coming three months include:

- Site formation
- Regular maintenance work for the Wetland Restoration Area (including lowering of the water level and removal of unwanted species in the pond)
- Foundation Work

5.2 Key Issues for the Coming Months

Key issues to be considered in the coming three months include:

- Provision of water spraying or dust suppression chemical to prevent generation of dust from activities on-site and the haul road during dry weather conditions;
- Provision of wheel washing facilities at vehicle exit point;
- Generation and treatment of site surface runoffs and wastewater from activities on-site and during wet weather conditions;
- Sorting, recycling, storage and disposal of general refuse and construction waste from activities on-site; and
- Management of chemicals and avoidance of oil spillage on-site and to the drainage.

5.3 Conclusions and Recommendations

5.3.1 Conclusions

The EM&A programme as recommended in the EM&A Manual has been undertaken in the reporting period.

Monitoring of Air Quality, Noise, Water Quality, Ecology and Landscape and Visual impacts due to the Project was under way. In particular, the 1-hr TSP, 24-hr TSP, noise level (as L_{eq}) and water quality parameters (such as pH, DO, turbidity and SS) under monitoring have been checked against established Action and Limit Levels.

There was no breach of Action or Limit Levels for Air Quality and Noise in the reporting period.

Action Level exceedances of pH and SS; and one Limit Level exceedance of SS were recorded during the reporting period. However, investigations into the exceedances concluded that these were not related to the Project and may have been due to external factors including natural variations, rainfall and pond fish culture activities.

5.3.2 Recommendations

With considerations on the construction activities and environment, the following recommendations were provided:

Air Quality

- All stockpiles should be covered by tarpaulin or kept wet by water spraying;

- All vehicles should be washed to remove any dusty materials before leaving the construction sites;
- The portion of road leading the construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;
- During the dry season, sufficient water spraying should be provided at haul road to reduce dust emission; and
- Ensure proper functioning of the wheel wash facility.

Noise

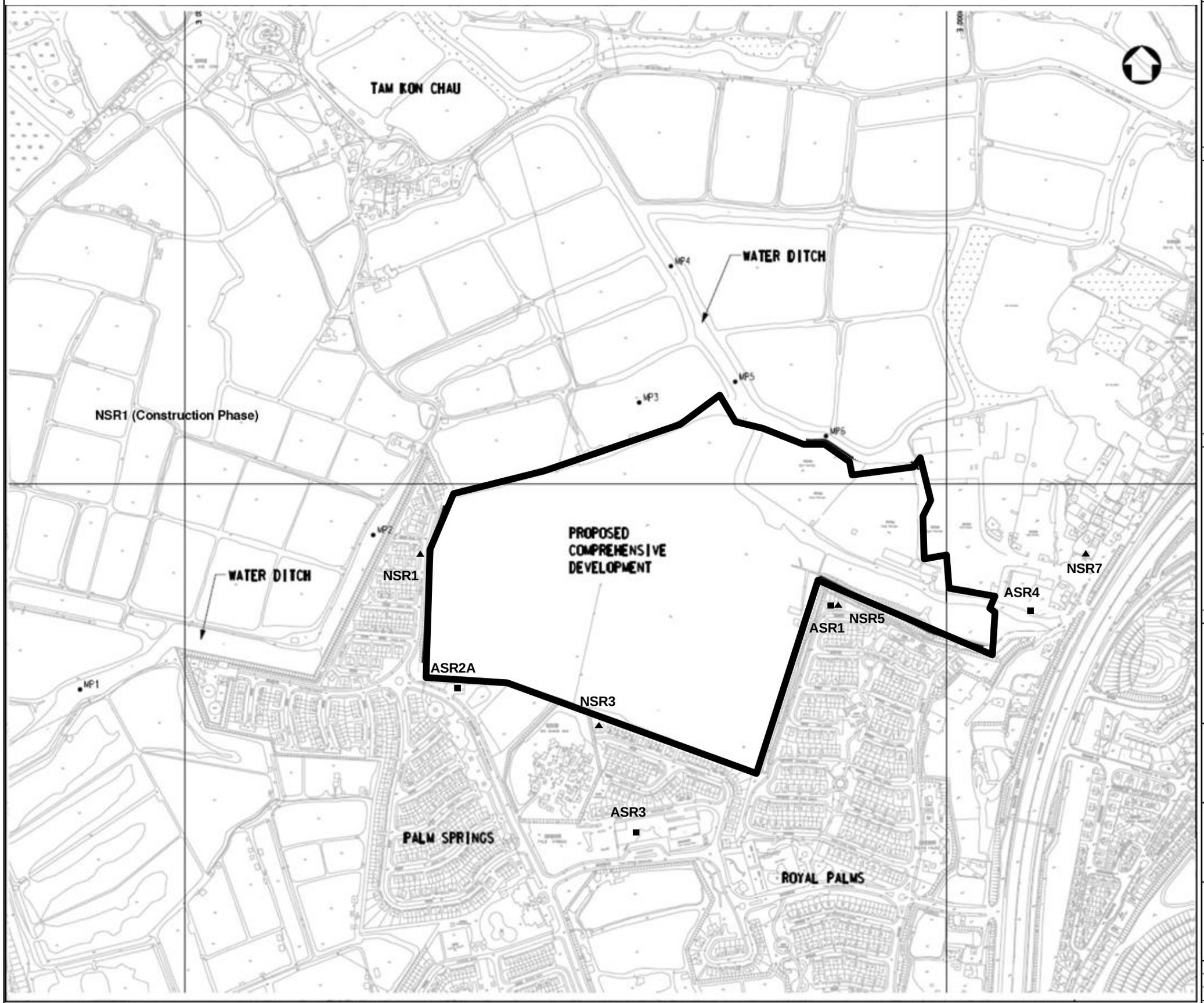
- Mobile plant should be sited as far away from NSRs as possible;
- Plant known to emit noise strongly in one direction should be orientated to direct noise away from the NSRs; and
- The construction activities should be better scheduled to reduce noise nuisance.

Water Quality

- Effluent should be discharged in accordance with the discharge licence conditions;
- Soil contaminated with chemicals/oils should be removed from site, and the voids created should be filled with suitable materials; and
- Silt and debris should be removed from the temporary drainage channel regularly.

Waste Management

- General refuse should be stored in enclosed bins or compaction units separate from C&D and chemical wastes to minimise odour, pest and litter impacts;
- Reuse the excavated materials as far as practical to reduce the amount of waste disposal;
- C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal;
- Ensure drip trays are provided for chemical containers to prevent leakage or soil contamination;
- All plants and vehicles should be properly maintained to prevent oil leakage; and
- Oil stains on soil should be cleared by disposal of contaminated soil.



Notes

Key to symbols

- ■ Air Quality Monitoring Stations
- ▲ Noise Monitoring Stations
- ● Water Quality Monitoring Stations
- ━ Site Boundary

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd

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20/F AIA Kowloon Tower
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Client

PROFIT POINT ENTERPRISES LIMITED

Project

PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG

Title

Locations of Water Quality Monitoring Stations

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number

Figure 1.1

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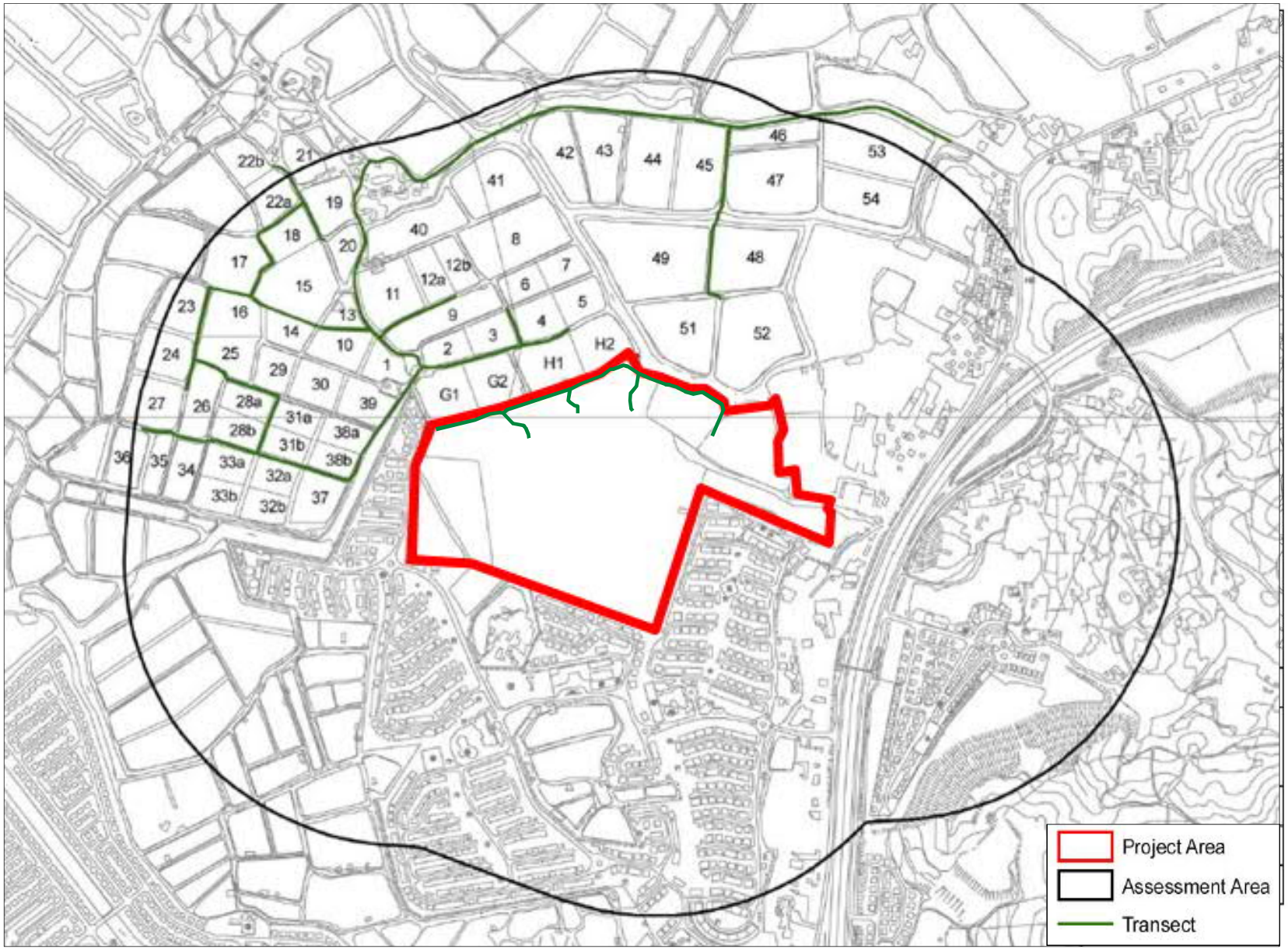

Notes

Key to symbols

Project Area
Assessment Area
Transect

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd

MOTT MACDONALD

20/F AIA Kowloon Tower
Landmark East
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Client

PROFIT POINT ENTERPRISES LIMITED

Project

PROPOSED COMPREHENSIVE DEVELOPMENT
AT WO SHANG WAI, YUEN LONG

Title

Survey Area and Transect Walked

Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	

Drawing Number

Figure 2.1

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Appendices

A.	Project Organization Chart	21
B.	Tentative Construction Programme	23
C.	Action and Limit Levels for Construction Phase	25
D.	Summary and Graphical Plots of the Monitoring Results	27
E.	Summary of Ecological Monitoring Results	29
F.	Environmental Mitigation Measures - Implementation Status	37
G.	Landscape and Visual Audit Photos	43

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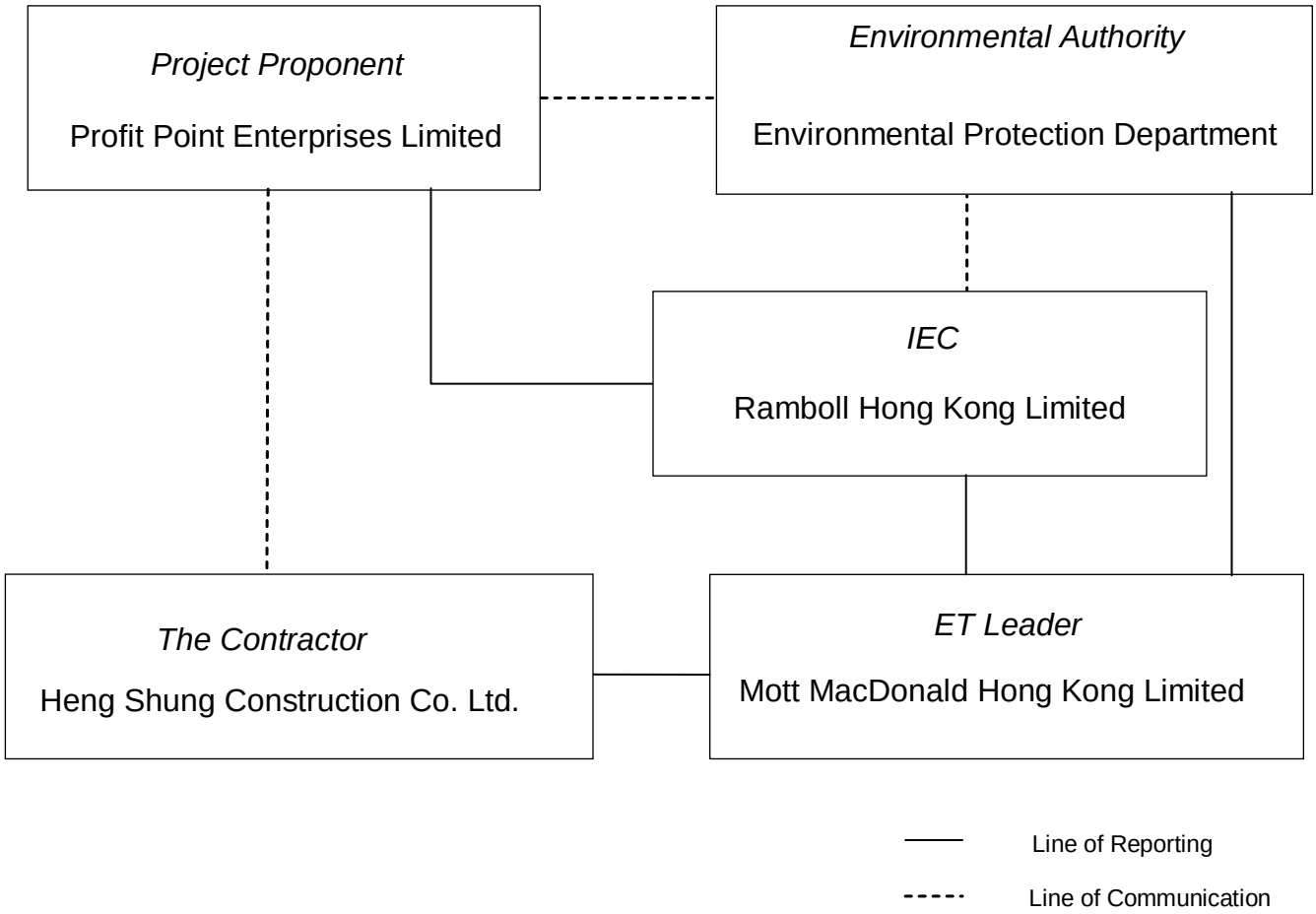
A. Project Organization Chart



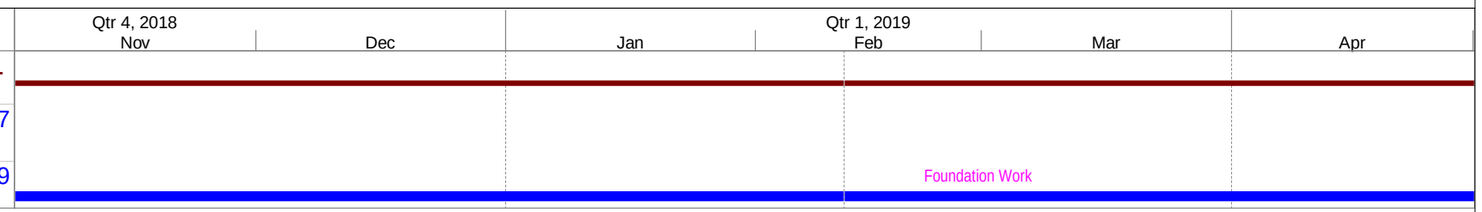
Contact information:

Company	Position	Name	Telephone
Profit Point Enterprises Limited (Project Proponent)	Project Manager	Mr. Kelvin Lau	2908 8114
Heng Shung Construction Co. Ltd. (The Contractor)	Construction Manager	Mr. Joe Chan	2908 2260
	Site Agent	Mr. Wong Shun Wah	9588 8848
	Senior Safety and Environmental Officer	Mr. Lun Ho Yin	9866 7497
Ramboll Hong Kong Limited (Independent Environmental Checker (IEC))	Independent Environmental Checker	Mr. David Yeung	3465 2888
Mott MacDonald Hong Kong Ltd. (Environmental Team (ET))	Environmental Team Leader	Mr. Brandon Wong	2828 5875

B. Tentative Construction Programme

Wo Shang Wai Construction Works Programme (Including TOA)

ID	Task Name	Working	Start	Finish
0	**Wo Shang Wai Construction Phase**	**3697 days**	**Wed 13/01/10**	**Fri 31/12/21**
5	Site Formation	2153 days	Mon 03/01/11	Sun 31/12/17
6	Foundation Work	467 days	Tue 02/01/18	Sun 30/06/19



Project : Wo Shang Wai
Revision : I
Print Date : Tue 12/02/19

Task		Inactive Milestone		Manual Summary Rollup	
Milestone		Inactive Summary		Manual Summary	
Summary		Manual Task		Start-only	
Inactive Task		Duration-only		Finish-only	

C. Action and Limit Levels for Construction Phase

Air Quality

Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level (μg/m³)	Limit Level (μg/m³)
ASR1	226	260
ASR2A	213	260
ASR3	205	260
ASR4	237	260

Action and Limit Levels for 1-hour TSP

Monitoring Station	Action Level (μg/m³)	Limit Level (μg/m³)
ASR1	378	500
ASR2A	357	500
ASR3	358	500
ASR4	372	500

Noise

Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
NSR1, NSR3, NSR5, NSR7		
0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)

Water Quality

Action and Limit Levels for Water Quality

Parameters	DO in mg/L		Turbidity in NTU		SS in mg/L		pH	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
MP1	1.23	1.17	173	177	231	299	< 5.5 or > 7.5	< 4.0 or > 8.0
MP2	1.04	0.89	132	163	170	209		
MP3	6.85	6.65	64	67	65	66		
MP4	3.91	3.82	60	64	50	53		
MP5	4.13	3.87	81	84	66	69		
MP6	4.61	4.52	94	96	75	75		

D. Summary and Graphical Plots of the Monitoring Results

Air Quality (1-hr TSP)

Station ASR1

Date	Start Time	Finish Time	TSP Concentration (μg/m³)	Weather Condition	Action Level (μg/m³)	Limit Level (μg/m³)
02-Nov-18	07:53	08:53	56	Cloudy	378	500
02-Nov-18	08:53	09:53	52	Cloudy	378	500
02-Nov-18	09:53	10:53	55	Cloudy	378	500
08-Nov-18	13:22	14:22	62	Cloudy	378	500
08-Nov-18	14:22	15:22	64	Cloudy	378	500
08-Nov-18	15:22	16:22	65	Cloudy	378	500
14-Nov-18	09:26	10:26	72	Cloudy	378	500
14-Nov-18	10:26	11:26	67	Cloudy	378	500
14-Nov-18	11:26	12:26	62	Cloudy	378	500
20-Nov-18	13:02	14:02	29	Sunny	378	500
20-Nov-18	14:02	15:02	26	Sunny	378	500
20-Nov-18	15:02	16:02	30	Sunny	378	500
26-Nov-18	09:41	10:41	43	Cloudy	378	500
26-Nov-18	10:41	11:41	45	Cloudy	378	500
26-Nov-18	11:41	12:41	44	Cloudy	378	500
30-Nov-18	13:01	14:01	40	Cloudy	378	500
30-Nov-18	14:01	15:01	43	Cloudy	378	500
30-Nov-18	15:01	16:01	44	Cloudy	378	500
06-Dec-18	13:00	14:00	32	Cloudy	378	500
06-Dec-18	14:00	15:00	36	Cloudy	378	500
06-Dec-18	15:00	16:00	38	Cloudy	378	500
12-Dec-18	08:41	09:41	28	Cloudy	378	500
12-Dec-18	09:41	10:41	27	Cloudy	378	500
12-Dec-18	10:41	11:41	25	Cloudy	378	500
18-Dec-18	13:07	14:07	30	Cloudy	378	500
18-Dec-18	14:07	15:07	34	Cloudy	378	500
18-Dec-18	15:07	16:07	36	Cloudy	378	500
22-Dec-18	09:02	10:02	71	Sunny	378	500
22-Dec-18	10:02	11:02	69	Sunny	378	500
22-Dec-18	11:02	12:02	63	Sunny	378	500
28-Dec-18	13:05	14:05	50	Sunny	378	500
28-Dec-18	14:05	15:05	52	Sunny	378	500
28-Dec-18	15:05	16:05	55	Sunny	378	500
03-Jan-19	08:34	09:34	55	Cloudy	378	500
03-Jan-19	09:34	10:34	56	Cloudy	378	500
03-Jan-19	10:34	11:34	59	Cloudy	378	500
09-Jan-19	09:02	10:02	62	Cloudy	378	500
09-Jan-19	10:02	11:02	67	Cloudy	378	500
09-Jan-19	11:02	12:02	69	Cloudy	378	500
15-Jan-19	13:00	14:00	26	Cloudy	378	500
15-Jan-19	14:00	15:00	30	Cloudy	378	500
15-Jan-19	15:00	16:00	31	Cloudy	378	500
21-Jan-19	09:01	10:01	55	Sunny	378	500
21-Jan-19	10:01	11:01	60	Sunny	378	500
21-Jan-19	11:01	12:01	70	Sunny	378	500
25-Jan-19	08:26	09:26	62	Sunny	378	500
25-Jan-19	09:26	10:26	51	Sunny	378	500
25-Jan-19	10:26	11:26	48	Sunny	378	500
31-Jan-19	08:28	09:28	57	Sunny	378	500
31-Jan-19	09:28	10:28	58	Sunny	378	500
31-Jan-19	10:28	11:28	41	Sunny	378	500
		Min.	25}	for		
		Max.	72}	reporting		
		Average	49}	period		

Air Quality (1-hr TSP)

Station ASR2A

Date	Start Time	Finish Time	TSP Concentration (μg/m³)	Weather Condition	Action Level (μg/m³)	Limit Level (μg/m³)
02-Nov-18	12:41	13:41	48	Cloudy	357	500
02-Nov-18	13:41	14:41	42	Cloudy	357	500
02-Nov-18	14:41	15:41	58	Cloudy	357	500
08-Nov-18	08:52	09:52	57	Cloudy	357	500
08-Nov-18	09:52	10:52	60	Cloudy	357	500
08-Nov-18	10:52	11:52	63	Cloudy	357	500
14-Nov-18	13:24	14:24	63	Cloudy	357	500
14-Nov-18	14:24	15:24	67	Cloudy	357	500
14-Nov-18	15:24	16:24	65	Cloudy	357	500
20-Nov-18	08:43	09:43	30	Sunny	357	500
20-Nov-18	09:43	10:43	29	Sunny	357	500
20-Nov-18	10:43	11:43	34	Sunny	357	500
26-Nov-18	13:27	14:27	46	Cloudy	357	500
26-Nov-18	14:27	15:27	50	Cloudy	357	500
26-Nov-18	15:27	16:27	51	Cloudy	357	500
30-Nov-18	08:42	09:42	39	Cloudy	357	500
30-Nov-18	09:42	10:42	40	Cloudy	357	500
30-Nov-18	10:42	11:42	43	Cloudy	357	500
06-Dec-18	08:49	09:49	40	Cloudy	357	500
06-Dec-18	09:49	10:49	39	Cloudy	357	500
06-Dec-18	10:49	11:49	37	Cloudy	357	500
12-Dec-18	13:19	14:19	30	Cloudy	357	500
12-Dec-18	14:19	15:19	27	Cloudy	357	500
12-Dec-18	15:19	16:19	25	Cloudy	357	500
18-Dec-18	08:52	09:52	30	Cloudy	357	500
18-Dec-18	09:52	10:52	31	Cloudy	357	500
18-Dec-18	10:52	11:52	34	Cloudy	357	500
22-Dec-18	13:28	14:28	81	Sunny	357	500
22-Dec-18	14:28	15:28	87	Sunny	357	500
22-Dec-18	15:28	16:28	78	Sunny	357	500
28-Dec-18	09:34	10:34	56	Sunny	357	500
28-Dec-18	10:34	11:34	56	Sunny	357	500
28-Dec-18	11:34	12:34	54	Sunny	357	500
03-Jan-19	13:27	14:27	54	Cloudy	357	500
03-Jan-19	14:27	15:27	60	Cloudy	357	500
03-Jan-19	15:27	16:27	63	Cloudy	357	500
09-Jan-19	13:24	14:24	70	Cloudy	357	500
09-Jan-19	14:24	15:24	72	Cloudy	357	500
09-Jan-19	15:24	16:24	68	Cloudy	357	500
15-Jan-19	09:31	10:31	27	Cloudy	357	500
15-Jan-19	10:31	11:31	28	Cloudy	357	500
15-Jan-19	11:31	12:31	31	Cloudy	357	500
21-Jan-19	13:13	14:13	59	Sunny	357	500
21-Jan-19	14:13	15:13	78	Sunny	357	500
21-Jan-19	15:13	16:13	55	Sunny	357	500
25-Jan-19	13:11	14:11	68	Sunny	357	500
25-Jan-19	14:11	15:11	67	Sunny	357	500
25-Jan-19	15:11	16:11	60	Sunny	357	500
31-Jan-19	13:10	14:10	67	Sunny	357	500
31-Jan-19	14:10	15:10	78	Sunny	357	500
31-Jan-19	15:10	16:10	72	Sunny	357	500
		Min.	25}	for		
		Max.	87}	reporting		
		Average	52}	period		

Air Quality (1-hr TSP)

Station ASR3

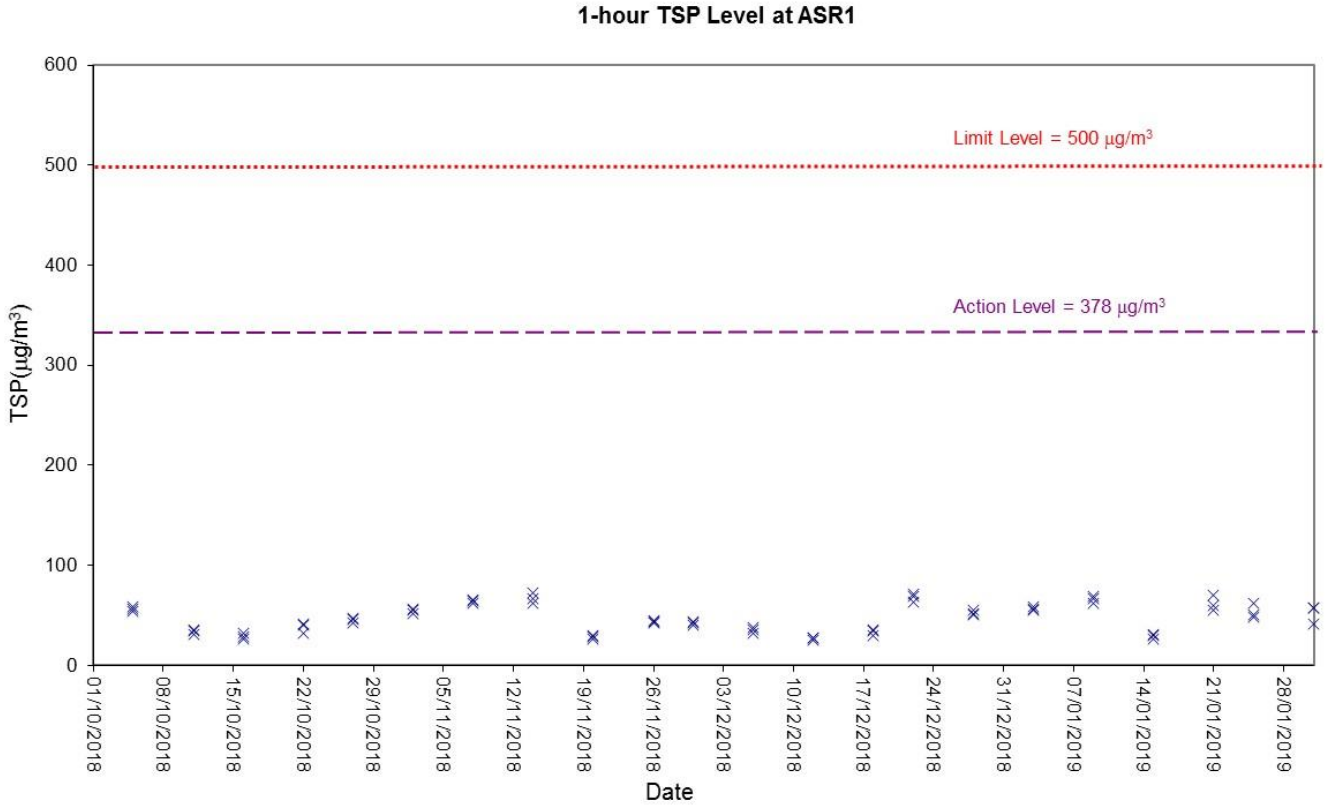
Date	Start Time	Finish Time	TSP Concentration (μg/m³)	Weather Condition	Action Level (μg/m³)	Limit Level (μg/m³)
02-Nov-18	12:26	13:26	56	Cloudy	358	500
02-Nov-18	13:26	14:26	62	Cloudy	358	500
02-Nov-18	14:26	15:26	65	Cloudy	358	500
08-Nov-18	08:37	09:37	53	Cloudy	358	500
08-Nov-18	09:37	10:37	50	Cloudy	358	500
08-Nov-18	10:37	11:37	50	Cloudy	358	500
14-Nov-18	13:01	14:01	60	Cloudy	358	500
14-Nov-18	14:01	15:01	63	Cloudy	358	500
14-Nov-18	15:01	16:01	68	Cloudy	358	500
20-Nov-18	08:36	09:36	37	Sunny	358	500
20-Nov-18	09:36	10:36	40	Sunny	358	500
20-Nov-18	10:36	11:36	43	Sunny	358	500
26-Nov-18	13:02	14:02	55	Cloudy	358	500
26-Nov-18	14:02	15:02	56	Cloudy	358	500
26-Nov-18	15:02	16:02	59	Cloudy	358	500
30-Nov-18	08:26	09:26	39	Cloudy	358	500
30-Nov-18	09:26	10:26	44	Cloudy	358	500
30-Nov-18	10:26	11:26	45	Cloudy	358	500
06-Dec-18	08:32	09:32	43	Cloudy	358	500
06-Dec-18	09:32	10:32	45	Cloudy	358	500
06-Dec-18	10:32	11:32	41	Cloudy	358	500
12-Dec-18	13:01	14:01	35	Cloudy	358	500
12-Dec-18	14:01	15:01	37	Cloudy	358	500
12-Dec-18	15:01	16:01	39	Cloudy	358	500
18-Dec-18	08:36	09:36	36	Cloudy	358	500
18-Dec-18	09:36	10:36	39	Cloudy	358	500
18-Dec-18	10:36	11:36	41	Cloudy	358	500
22-Dec-18	13:01	14:01	88	Sunny	358	500
22-Dec-18	14:01	15:01	85	Sunny	358	500
22-Dec-18	15:01	16:01	65	Sunny	358	500
28-Dec-18	09:03	10:03	63	Sunny	358	500
28-Dec-18	10:03	11:03	67	Sunny	358	500
28-Dec-18	11:03	12:03	60	Sunny	358	500
03-Jan-19	13:02	14:02	61	Cloudy	358	500
03-Jan-19	14:02	15:02	61	Cloudy	358	500
03-Jan-19	15:02	16:02	63	Cloudy	358	500
09-Jan-19	13:02	14:02	72	Cloudy	358	500
09-Jan-19	14:02	15:02	74	Cloudy	358	500
09-Jan-19	15:02	16:02	70	Cloudy	358	500
15-Jan-19	09:05	10:05	26	Cloudy	358	500
15-Jan-19	10:05	11:05	29	Cloudy	358	500
15-Jan-19	11:05	12:05	30	Cloudy	358	500
21-Jan-19	13:02	14:02	52	Sunny	358	500
21-Jan-19	14:02	15:02	54	Sunny	358	500
21-Jan-19	15:02	16:02	63	Sunny	358	500
25-Jan-19	13:00	14:00	57	Sunny	358	500
25-Jan-19	14:00	15:00	51	Sunny	358	500
25-Jan-19	15:00	16:00	46	Sunny	358	500
31-Jan-19	13:00	14:00	66	Sunny	358	500
31-Jan-19	14:00	15:00	64	Sunny	358	500
31-Jan-19	15:00	16:00	56	Sunny	358	500
		Min.	26}	for		
		Max.	88}	reporting		
		Average	53}	period		

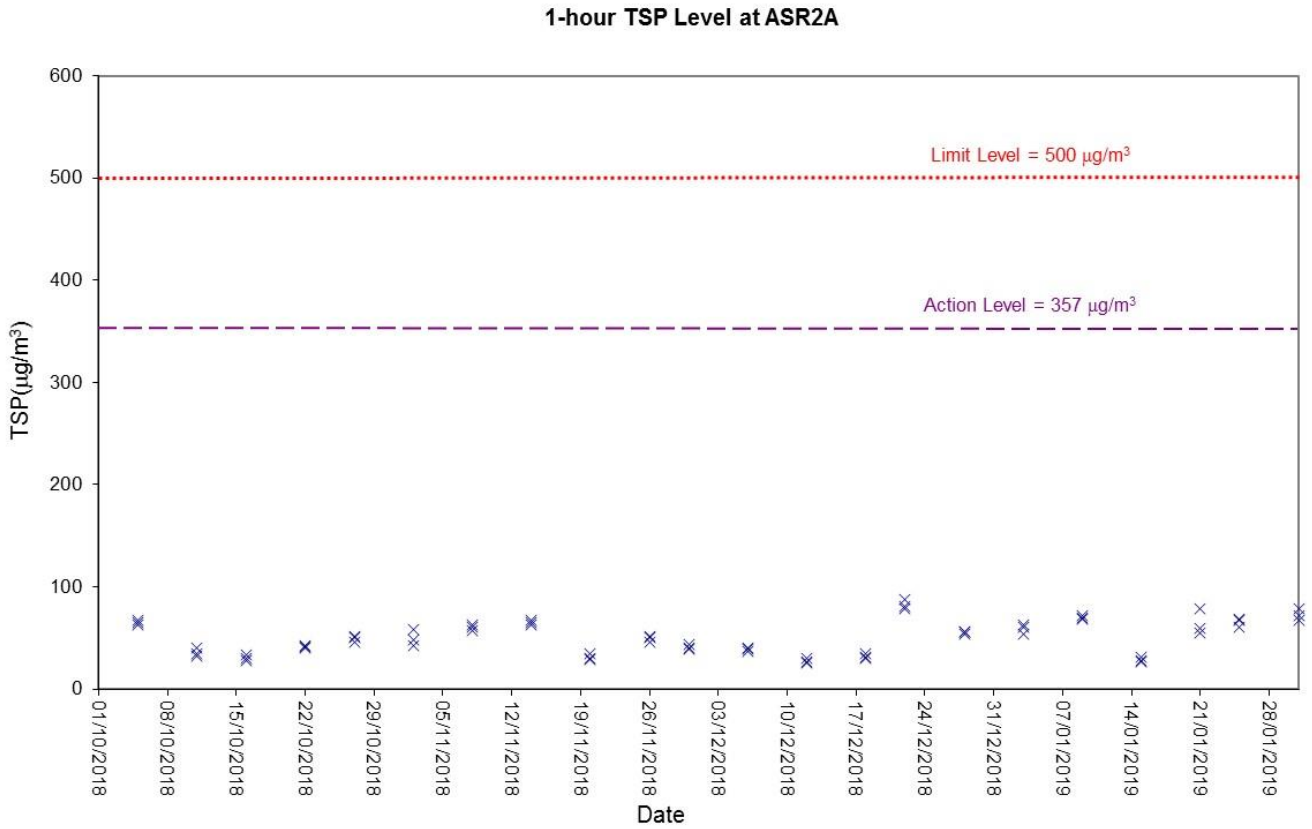
Air Quality (1-hr TSP)

Station ASR4

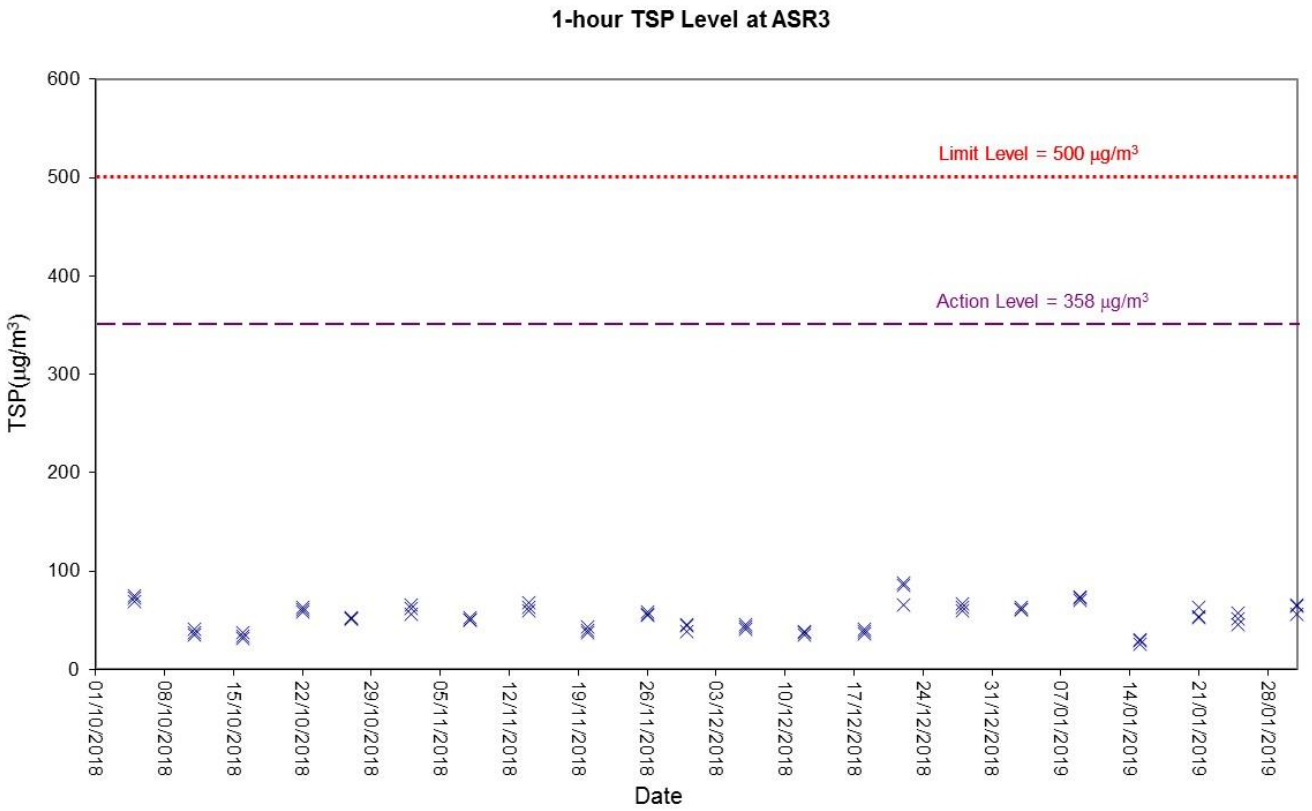
Date	Start Time	Finish Time	TSP Concentration (μg/m³)	Weather Condition	Action Level (μg/m³)	Limit Level (μg/m³)
02-Nov-18	07:36	08:36	57	Cloudy	372	500
02-Nov-18	08:36	09:36	58	Cloudy	372	500
02-Nov-18	09:36	10:36	60	Cloudy	372	500
08-Nov-18	13:06	14:06	62	Cloudy	372	500
08-Nov-18	14:06	15:06	64	Cloudy	372	500
08-Nov-18	15:06	16:06	67	Cloudy	372	500
14-Nov-18	09:01	10:01	68	Cloudy	372	500
14-Nov-18	10:01	11:01	70	Cloudy	372	500
14-Nov-18	11:01	12:01	72	Cloudy	372	500
20-Nov-18	13:26	14:26	34	Sunny	372	500
20-Nov-18	14:26	15:26	32	Sunny	372	500
20-Nov-18	15:26	16:26	30	Sunny	372	500
26-Nov-18	09:16	10:16	50	Cloudy	372	500
26-Nov-18	10:16	11:16	52	Cloudy	372	500
26-Nov-18	11:16	12:16	54	Cloudy	372	500
30-Nov-18	13:32	14:32	54	Cloudy	372	500
30-Nov-18	14:32	15:32	50	Cloudy	372	500
30-Nov-18	15:32	16:32	46	Cloudy	372	500
06-Dec-18	13:31	14:31	47	Cloudy	372	500
06-Dec-18	14:31	15:31	47	Cloudy	372	500
06-Dec-18	15:31	16:31	43	Cloudy	372	500
12-Dec-18	08:27	09:27	32	Cloudy	372	500
12-Dec-18	09:27	10:27	36	Cloudy	372	500
12-Dec-18	10:27	11:27	38	Cloudy	372	500
18-Dec-18	13:29	14:29	35	Cloudy	372	500
18-Dec-18	14:29	15:29	39	Cloudy	372	500
18-Dec-18	15:29	16:29	41	Cloudy	372	500
22-Dec-18	09:23	10:23	83	Sunny	372	500
22-Dec-18	10:23	11:23	79	Sunny	372	500
22-Dec-18	11:23	12:23	67	Sunny	372	500
28-Dec-18	13:37	14:37	60	Sunny	372	500
28-Dec-18	14:37	15:37	62	Sunny	372	500
28-Dec-18	15:37	16:37	65	Sunny	372	500
03-Jan-19	08:56	09:56	58	Cloudy	372	500
03-Jan-19	09:56	10:56	59	Cloudy	372	500
03-Jan-19	10:56	11:56	61	Cloudy	372	500
09-Jan-19	09:33	10:33	73	Cloudy	372	500
09-Jan-19	10:33	11:33	76	Cloudy	372	500
09-Jan-19	11:33	12:33	78	Cloudy	372	500
15-Jan-19	13:28	14:28	28	Cloudy	372	500
15-Jan-19	14:28	15:28	26	Cloudy	372	500
15-Jan-19	15:28	16:28	34	Cloudy	372	500
21-Jan-19	09:11	10:11	71	Sunny	372	500
21-Jan-19	10:11	11:11	72	Sunny	372	500
21-Jan-19	11:11	12:11	80	Sunny	372	500
25-Jan-19	08:37	09:37	60	Sunny	372	500
25-Jan-19	09:37	10:37	53	Sunny	372	500
25-Jan-19	10:37	11:37	44	Sunny	372	500
31-Jan-19	08:40	09:40	62	Sunny	372	500
31-Jan-19	09:40	10:40	53	Sunny	372	500
31-Jan-19	10:40	11:40	44	Sunny	372	500
		Min.	26}	for		
		Max.	83}	reporting		
		Average	55}	period		

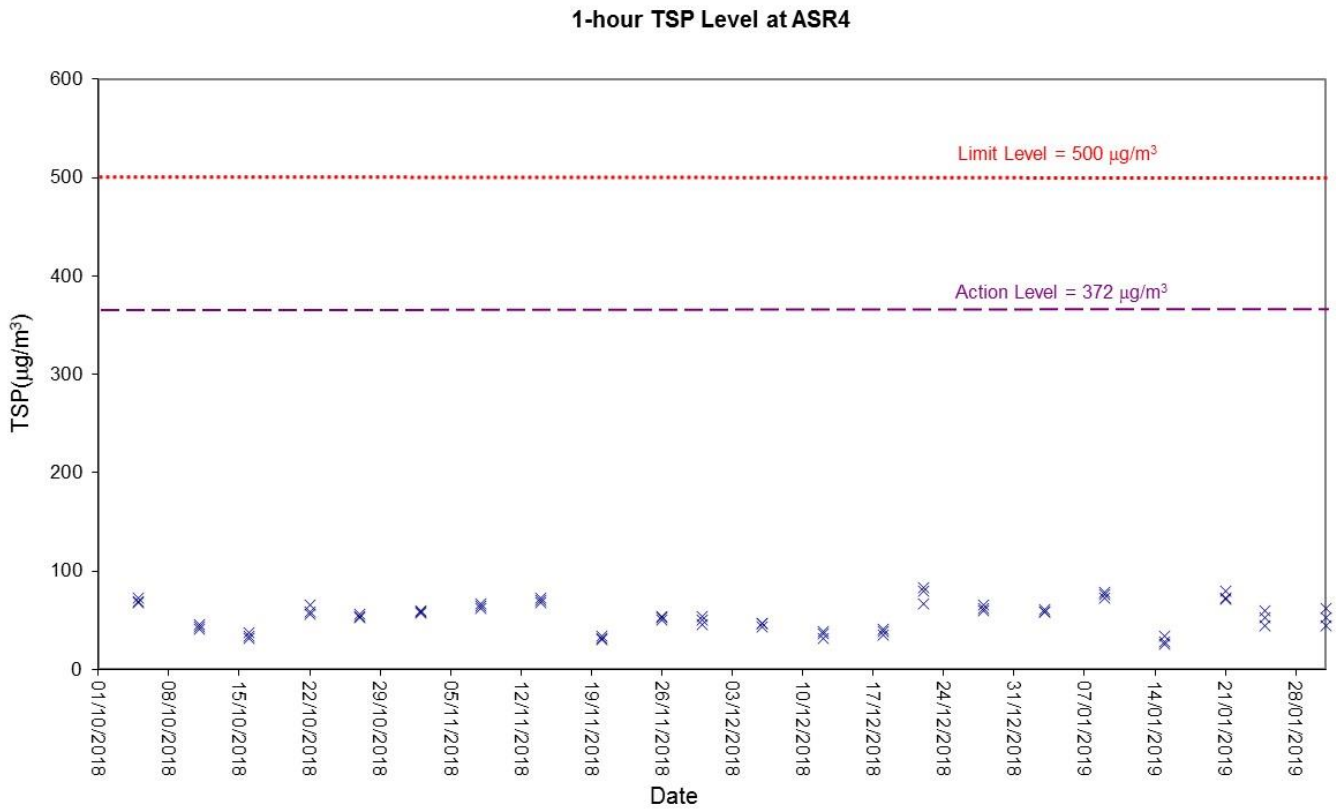
Air Quality (1-hr TSP)





Air Quality (1-hr TSP)





Air Quality (24-hr TSP)

Station ASR1

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m^3/min)			Conc. (µg/m^3)	Weather Condition	Action Level (µg/m^3)	Limit Level (µg/m^3)
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
02-Nov-18	07:54	03-Nov-18	07:54	2.6971	2.7865	23169.64	23193.64	24.00	1.1200	1.1200	1.1200	55	Cloudy	226	260
08-Nov-18	13:23	09-Nov-18	13:23	2.7006	2.8905	23193.64	23217.64	24.00	1.1500	1.1500	1.1500	115	Cloudy	226	260
14-Nov-18	09:01	15-Nov-18	09:01	2.7084	2.8092	23217.64	23241.64	24.00	1.1500	1.1500	1.1500	61	Cloudy	226	260
20-Nov-18	13:03	21-Nov-18	13:03	2.6817	2.7828	23241.64	23265.64	24.00	1.1200	1.1200	1.1200	63	Sunny	226	260
26-Nov-18	09:42	27-Nov-18	09:42	2.6879	2.7596	23265.64	23289.64	24.00	1.1200	1.1200	1.1200	44	Cloudy	226	260
30-Nov-18	06:00	01-Dec-18	06:00	2.6658	2.7884	25289.64	25313.64	24.00	1.1200	1.1200	1.1200	76	Cloudy	226	260
06-Dec-18	06:00	07-Dec-18	06:00	2.6905	2.8047	25313.64	25337.64	24.00	1.1200	1.1200	1.1200	71	Cloudy	226	260
12-Dec-18	06:00	13-Dec-18	06:00	2.6882	2.8480	25337.64	25361.64	24.00	1.1200	1.1200	1.1200	99	Cloudy	226	260
18-Dec-18	06:00	19-Dec-18	06:00	2.7010	2.8378	25361.64	25385.64	24.00	1.1200	1.1200	1.1200	85	Cloudy	226	260
22-Dec-18	10:00	23-Dec-18	10:00	2.6734	2.8397	25385.64	25409.64	24.00	1.1200	1.1200	1.1200	103	Sunny	226	260
28-Dec-18	13:06	29-Dec-18	13:06	2.7135	2.8927	23409.64	23433.64	24.00	1.1200	1.1200	1.1200	111	Sunny	226	260
03-Jan-19	08:35	04-Jan-19	08:35	2.7043	2.8493	23433.64	23457.64	24.00	1.2400	1.2400	1.2400	81	Cloudy	226	260
09-Jan-19	09:03	10-Jan-19	09:03	2.7068	2.8219	23457.64	23481.64	24.00	1.2100	1.2100	1.2100	66	Cloudy	226	260
15-Jan-19	13:01	16-Jan-19	13:01	2.7020	2.8211	23481.64	23505.64	24.00	1.2100	1.2100	1.2100	68	Cloudy	226	260
21-Jan-19	09:00	22-Jan-19	09:00	2.7009	2.9343	23505.64	23529.64	24.00	1.2100	1.2100	1.2100	134	Sunny	226	260
25-Jan-19	08:24	26-Jan-19	08:24	2.6582	2.8009	23529.64	23553.64	24.00	1.2400	1.2400	1.2400	80	Sunny	226	260
31-Jan-19	08:27	01-Feb-19	08:27	2.6629	2.8157	23553.64	23577.64	24.00	1.2700	1.2700	1.2700	84	Sunny	226	260
											Min	44	for		
											Max	134	reporting		
											Average	82	period		

Air Quality (24-hr TSP)

Station ASR2A

Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m^3/min)			Conc. (µg/m^3)	Weather Condition	Action Level (µg/m^3)	Limit Level (µg/m^3)
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
02-Nov-18	12:42	03-Nov-18	12:42	2.7000	2.9085	26264.01	26288.01	24.00	1.3800	1.3300	1.3500	107	Cloudy	213	260
08-Nov-18	08:53	09-Nov-18	08:53	2.7050	2.8186	26288.01	26312.01	24.00	1.3800	1.3800	1.3800	57	Cloudy	213	260
14-Nov-18	12:01	15-Nov-18	12:01	2.6830	2.7848	26312.01	26336.01	24.00	1.3500	1.3500	1.3500	52	Cloudy	213	260
20-Nov-18	08:44	21-Nov-18	08:44	2.6771	2.7483	26336.01	26360.01	24.00	1.3500	1.3500	1.3500	37	Sunny	213	260
26-Nov-18	13:28	27-Nov-18	13:28	2.6584	2.7452	26360.03	26384.03	24.00	1.3800	1.3800	1.3800	44	Cloudy	213	260
30-Nov-18	06:00	01-Dec-18	06:00	2.6689	2.7705	26384.03	26408.03	24.00	1.3800	1.3800	1.3800	51	Cloudy	213	260
06-Dec-18	06:00	07-Dec-18	06:00	2.6769	2.7814	26408.03	26432.03	24.00	1.3800	1.3800	1.3800	53	Cloudy	213	260
12-Dec-18	06:00	13-Dec-18	06:00	2.6824	2.8093	26432.03	26456.03	24.00	1.3800	1.3800	1.3800	64	Cloudy	213	260
18-Dec-18	06:00	19-Dec-18	06:00	2.6946	2.8282	26456.03	26480.03	24.00	1.3500	1.3500	1.3500	69	Cloudy	213	260
22-Dec-18	10:30	23-Dec-18	10:30	2.6828	2.8375	26480.03	26504.03	24.00	1.3300	1.3000	1.3200	81	Sunny	213	260
28-Dec-18	09:36	29-Dec-18	09:36	2.7200	2.8650	26504.03	26528.03	24.00	1.3800	1.3800	1.3800	73	Sunny	213	260
03-Jan-19	13:28	04-Jan-19	13:28	2.7027	2.8348	26528.03	26552.03	24.00	1.2700	1.2700	1.2700	72	Cloudy	213	260
09-Jan-19	13:25	10-Jan-19	13:25	2.6797	2.7932	26552.03	26576.03	24.00	1.2700	1.2700	1.2700	62	Cloudy	213	260
15-Jan-19	09:32	16-Jan-19	09:32	2.6969	2.8153	26576.03	26600.03	24.00	1.2000	1.2000	1.2000	69	Cloudy	213	260
21-Jan-19	13:12	22-Jan-19	13:12	2.6977	2.9199	26600.03	26624.03	24.00	1.2700	1.2700	1.2700	122	Sunny	213	260
25-Jan-19	08:00	26-Jan-19	08:00	2.6590	2.8699	26624.03	26648.03	24.00	1.2700	1.2700	1.2700	115	Sunny	213	260
31-Jan-19	08:05	01-Feb-19	08:05	2.6786	2.8223	26648.03	26672.03	24.00	1.2400	1.2400	1.2400	80	Sunny	213	260
											Min	37	for		
											Max	122	reporting		
											Average	71	period		

Air Quality (24-hr TSP)

Station ASR3

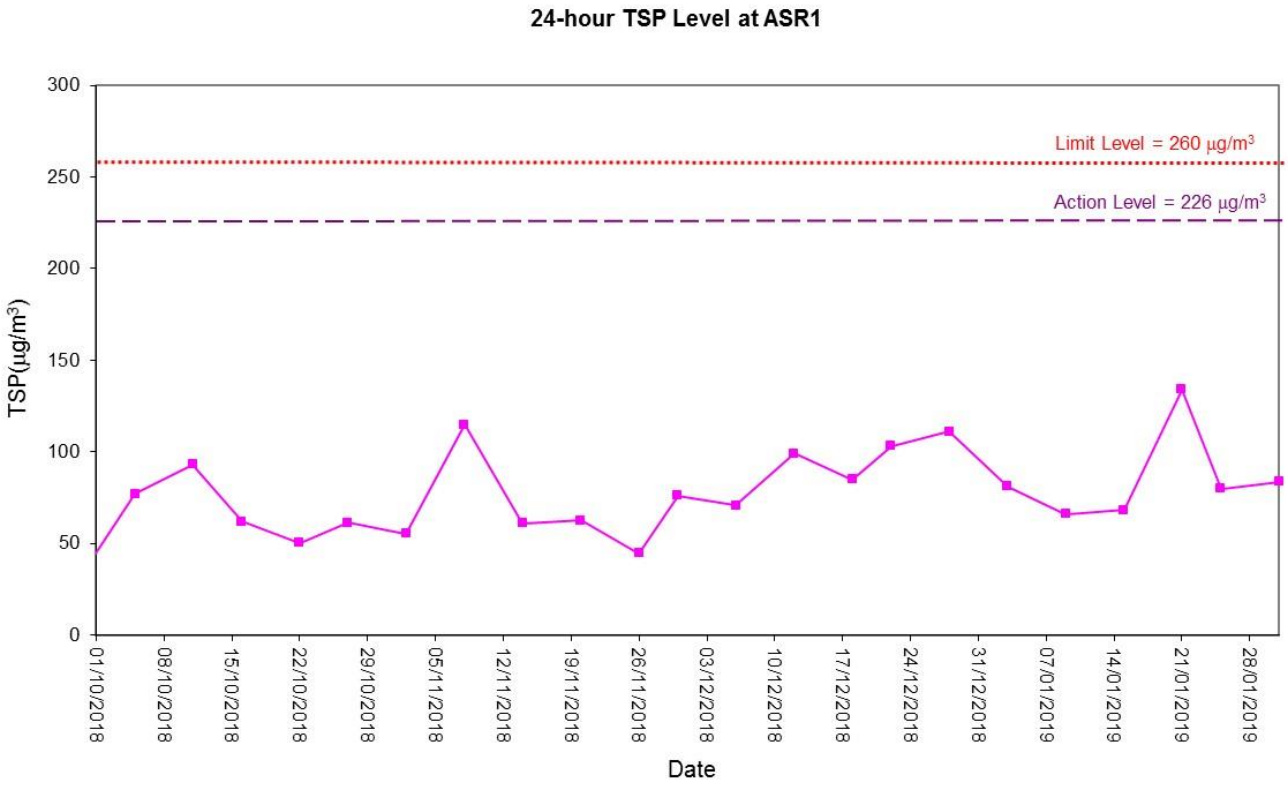
Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m^3/min)			Conc. (µg/m^3)	Weather Condition	Action Level (µg/m^3)	Limit Level (µg/m^3)
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
02-Nov-18	12:27	03-Nov-18	12:27	2.6959	2.7939	17438.90	17462.90	24.00	1.0000	1.0400	1.0200	67	Cloudy	205	260
08-Nov-18	08:38	09-Nov-18	08:38	2.6989	2.8815	17462.90	17486.90	24.00	0.9700	0.9700	0.9700	131	Cloudy	205	260
14-Nov-18	12:26	15-Nov-18	12:26	2.7147	2.7933	17486.92	17510.92	24.00	1.0700	1.0700	1.0700	51	Cloudy	205	260
20-Nov-18	08:37	21-Nov-18	08:37	2.6792	2.7707	17510.92	17534.92	24.00	1.0400	1.0400	1.0400	61	Sunny	205	260
26-Nov-18	13:03	27-Nov-18	13:03	2.6847	2.7646	17534.92	17558.92	24.00	1.0400	1.0400	1.0400	53	Cloudy	205	260
30-Nov-18	06:00	01-Dec-18	06:00	2.6960	2.7910	17558.92	17582.92	24.00	1.0000	0.9700	0.9900	67	Cloudy	205	260
06-Dec-18	06:00	07-Dec-18	06:00	2.6628	2.7552	17582.92	17606.92	24.00	1.0400	1.0400	1.0400	62	Cloudy	205	260
12-Dec-18	06:00	13-Dec-18	06:00	2.6892	2.8200	17606.92	17630.92	24.00	1.0400	1.0400	1.0400	87	Cloudy	205	260
18-Dec-18	06:00	19-Dec-18	06:00	2.6848	2.8066	17630.92	17654.92	24.00	1.0000	1.0000	1.0000	85	Cloudy	205	260
22-Dec-18	12:00	23-Dec-18	12:00	2.6992	2.8047	17654.92	17678.92	24.00	1.0400	1.0400	1.0400	70	Sunny	205	260
28-Dec-18	09:04	29-Dec-18	09:04	2.7082	2.8319	17678.92	17702.92	24.00	1.0700	1.0400	1.0600	81	Sunny	205	260
03-Jan-19	13:03	04-Jan-19	13:03	2.7150	2.8256	17702.92	17726.92	24.00	1.4100	1.4100	1.4100	54	Cloudy	205	260
09-Jan-19	13:03	10-Jan-19	13:03	2.7022	2.8054	17726.92	17750.92	24.00	1.2000	1.2000	1.2000	60	Cloudy	205	260
15-Jan-19	09:06	16-Jan-19	09:06	2.7123	2.8190	17750.92	17774.92	24.00	1.2000	1.2000	1.2000	62	Cloudy	205	260
21-Jan-19	13:00	22-Jan-19	13:00	2.7123	2.8983	17774.92	17798.92	24.00	1.2300	1.2300	1.2300	105	Sunny	205	260
25-Jan-19	08:10	26-Jan-19	08:10	2.6746	2.8605	17798.92	17822.92	24.00	1.2300	1.2300	1.2300	105	Sunny	205	260
31-Jan-19	08:16	01-Feb-19	08:16	2.6613	2.7947	17822.92	17846.92	24.00	1.2300	1.2300	1.2300	75	Sunny	205	260
											Min	51	for		
											Max	131	reporting		
											Average	75	period		

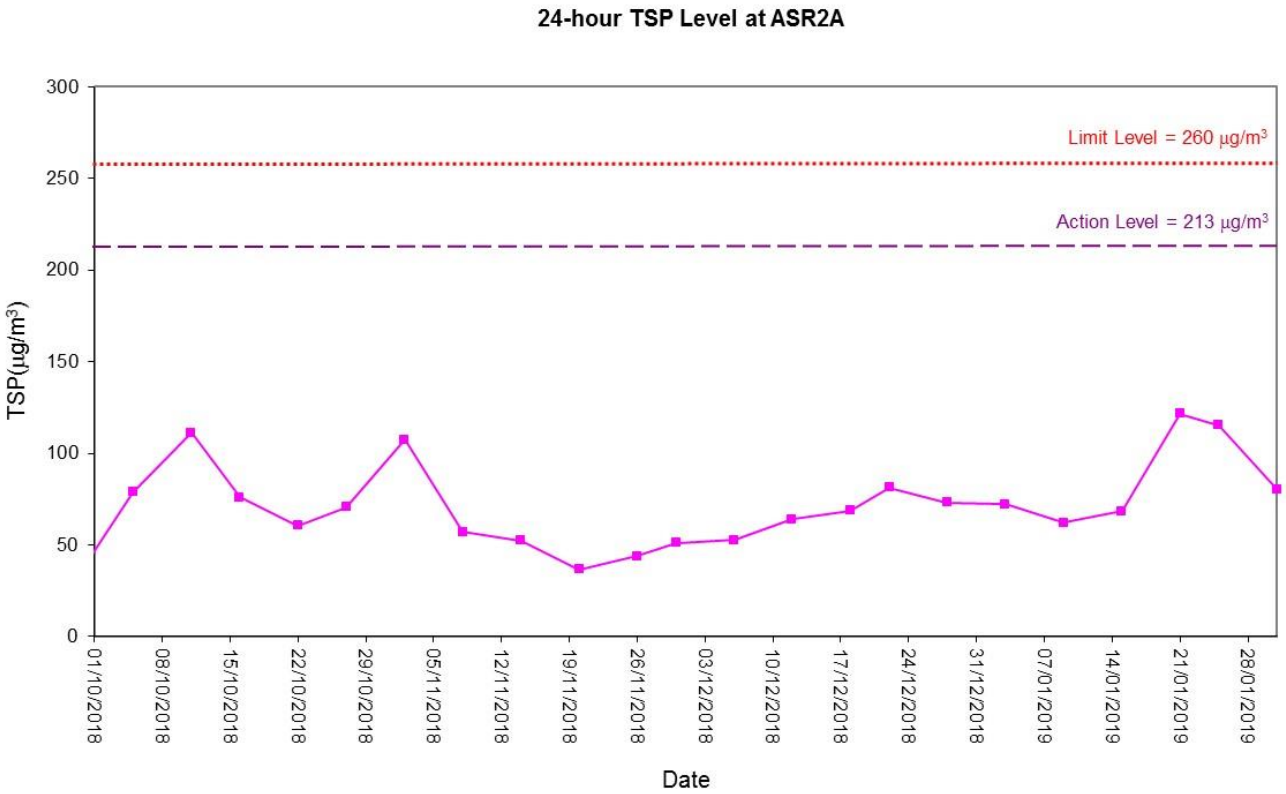
Air Quality (24-hr TSP)

Station ASR4

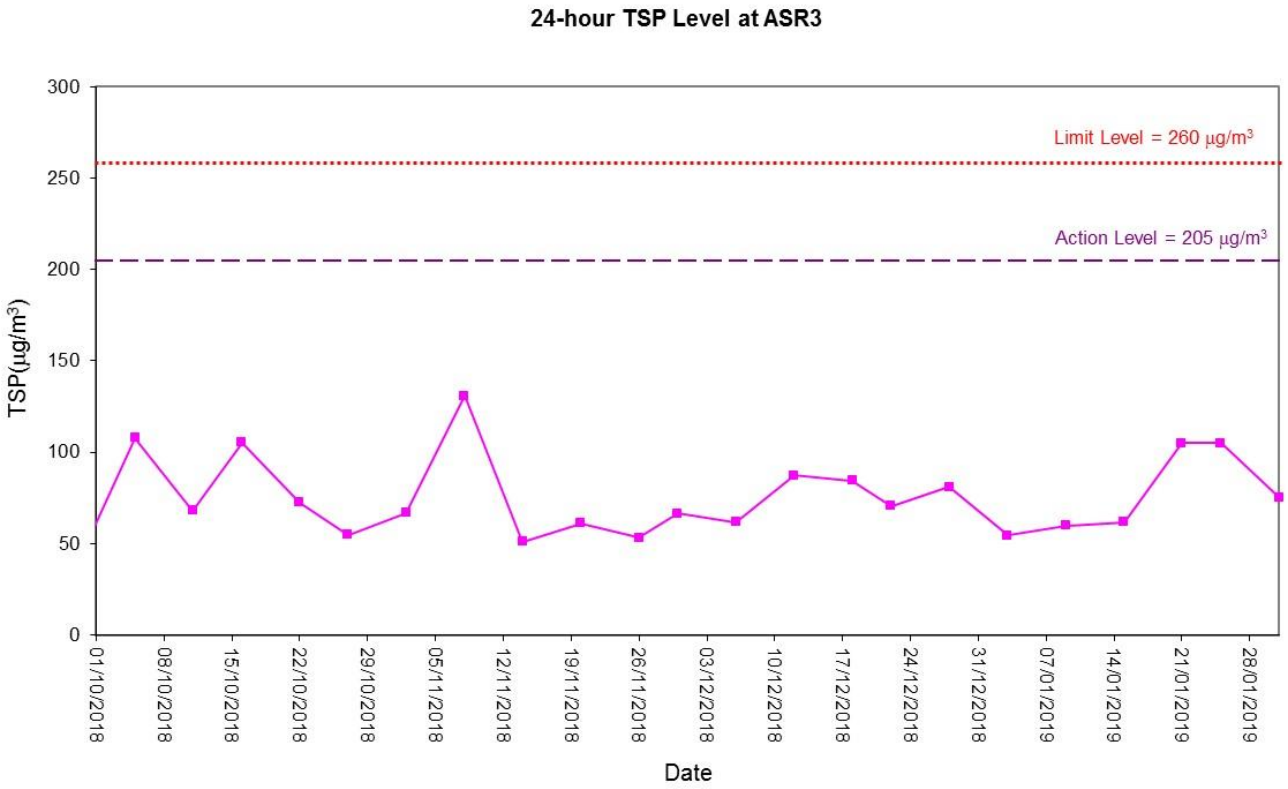
Start		Finish		Filter Weight (g)		Elapsed Time Reading		Sampling Time (hrs)	Flow Rate (m^3/min)			Conc. ($\mu g/m^3$)	Weather Condition	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/m^3$)
Date	Time	Date	Time	Initial	Final	Initial	Final		Initial	Final	Average				
02-Nov-18	07:37	03-Nov-18	07:37	2.6771	2.8704	25048.02	25072.02	24.00	1.1600	1.1600	1.1600	116	Cloudy	237	260
08-Nov-18	13:07	09-Nov-18	13:07	2.6996	2.8326	25072.02	25096.02	24.00	1.1600	1.1600	1.1600	80	Cloudy	237	260
14-Nov-18	09:26	15-Nov-18	09:26	2.6925	2.7768	25096.02	25120.02	24.00	1.1900	1.1900	1.1900	49	Cloudy	237	260
20-Nov-18	13:27	21-Nov-18	13:27	2.6639	2.7466	25120.02	25144.02	24.00	1.2200	1.2200	1.2200	47	Sunny	237	260
26-Nov-18	09:17	27-Nov-18	09:17	2.6656	2.7429	25144.02	25168.02	24.00	1.1600	1.1600	1.1600	46	Cloudy	237	260
30-Nov-18	06:00	01-Dec-18	06:00	2.6841	2.8115	25168.02	25192.02	24.00	1.1900	1.1900	1.1900	74	Cloudy	237	260
06-Dec-18	06:00	07-Dec-18	06:00	2.6905	2.8063	25192.02	25216.02	24.00	1.2200	1.2200	1.2200	66	Cloudy	237	260
12-Dec-18	06:00	13-Dec-18	06:00	2.6844	2.8474	25216.02	25240.02	24.00	1.2800	1.2800	1.2800	88	Cloudy	237	260
18-Dec-18	06:00	19-Dec-18	06:00	2.6779	2.8203	25240.02	25264.02	24.00	1.2200	1.2800	1.2500	79	Cloudy	237	260
22-Dec-18	12:30	23-Dec-18	12:30	2.6761	2.8223	25264.54	25288.54	24.00	1.1600	1.0900	1.1300	90	Sunny	237	260
28-Dec-18	13:38	29-Dec-18	13:38	2.6949	2.8867	25288.54	25312.54	24.00	1.2500	1.1900	1.2200	109	Sunny	237	260
03-Jan-19	08:57	04-Jan-19	08:57	2.6963	2.8430	25312.54	25336.54	24.00	1.2900	1.2900	1.2900	79	Cloudy	237	260
09-Jan-19	09:34	10-Jan-19	09:34	2.6822	2.8060	25336.54	25360.54	24.00	1.2900	1.2900	1.2900	67	Cloudy	237	260
15-Jan-19	13:29	16-Jan-19	13:29	2.6845	2.7958	25360.54	25384.54	24.00	1.2900	1.2900	1.2900	60	Cloudy	237	260
21-Jan-19	09:10	22-Jan-19	09:10	2.6829	2.8934	25384.54	25408.54	24.00	1.3200	1.3200	1.3200	111	Sunny	237	260
25-Jan-19	08:35	26-Jan-19	08:35	2.6680	2.8564	25408.54	25432.54	24.00	1.2600	1.2600	1.2600	104	Sunny	237	260
31-Jan-19	08:39	01-Feb-19	08:39	2.6540	2.7959	25432.54	25456.54	24.00	1.2600	1.2600	1.2600	78	Sunny	237	260
											Min	46	for		
											Max	116	reporting		
											Average	79	period		

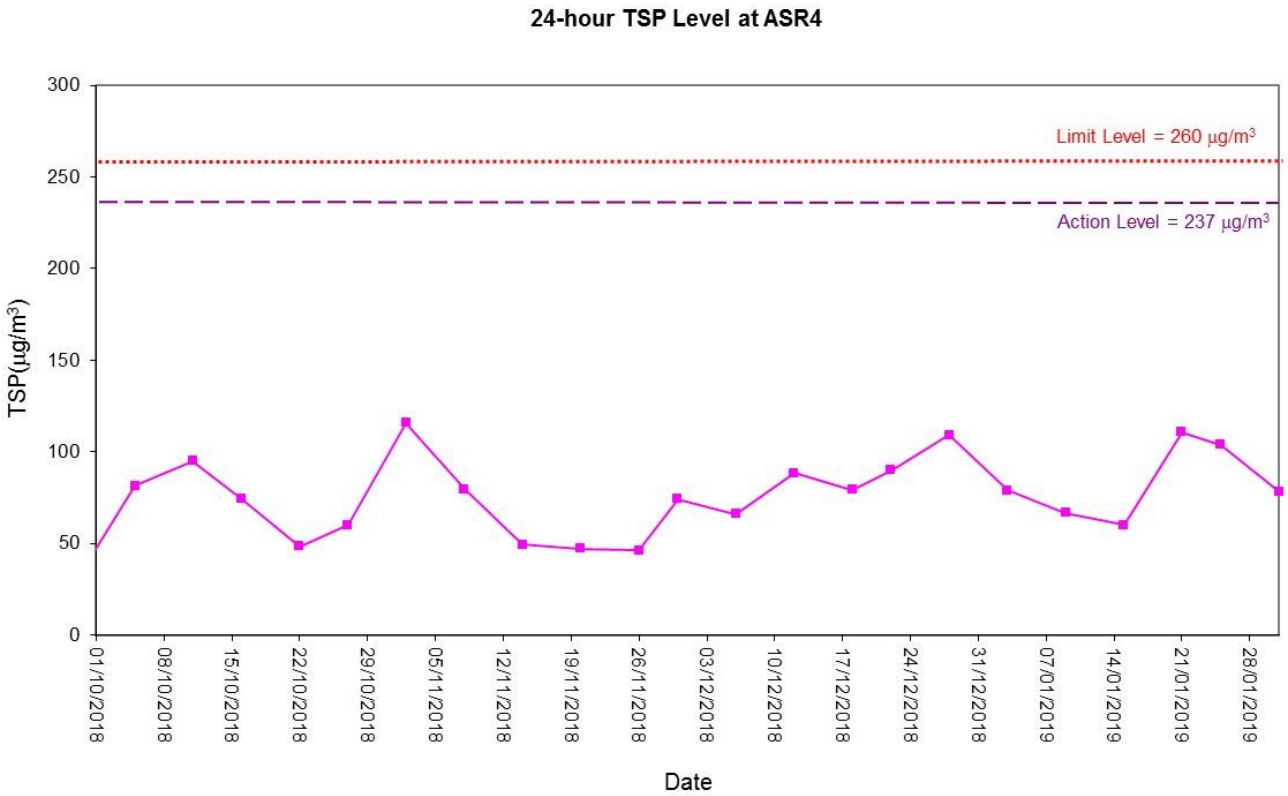
Air Quality (24-hr TSP)





Air Quality (24-hr TSP)





Noise

Station NSR1

Date	Start Time	Noise Level for 30 min, dB(A)			Wind Speed (m/s)	Weather Condition	Limit Level, dB(A)
		L_{eq}	L_{10}	L_{90}			
02-Nov-18	13:00	48	50	40	0.3	Cloudy	75
08-Nov-18	09:02	50	53	42	0.1	Cloudy	75
14-Nov-18	13:38	55	58	53	0.5	Cloudy	75
20-Nov-18	08:56	52	56	45	0.3	Sunny	75
26-Nov-18	13:41	44	46	42	0.4	Cloudy	75
06-Dec-18	08:52	53	57	51	0.4	Cloudy	75
12-Dec-18	13:27	46	47	44	0.4	Cloudy	75
18-Dec-18	09:02	49	51	46	0.4	Cloudy	75
28-Dec-18	09:53	49	52	46	0.4	Sunny	75
03-Jan-19	13:46	50	54	46	0.4	Cloudy	75
09-Jan-19	13:41	52	55	45	0.4	Cloudy	75
15-Jan-19	09:42	45	46	41	0.4	Cloudy	75
21-Jan-19	14:08	53	54	40	0.2	Sunny	75
31-Jan-19	10:57	49	50	39	0.2	Sunny	75

Station NSR3

Date	Start Time	Noise Level for 30 min, dB(A)			Wind Speed (m/s)	Weather Condition	Limit Level, dB(A)
		L_{eq}	L_{10}	L_{90}			
02-Nov-18	13:57	48	49	38	0.3	Cloudy	75
08-Nov-18	09:57	50	55	45	0.1	Cloudy	75
14-Nov-18	14:33	55	56	54	0.5	Cloudy	75
20-Nov-18	09:44	49	50	45	0.3	Sunny	75
26-Nov-18	14:36	46	47	44	0.4	Cloudy	75
06-Dec-18	09:41	54	58	45	0.4	Cloudy	75
12-Dec-18	14:14	44	46	42	0.4	Cloudy	75
18-Dec-18	09:44	51	52	47	0.4	Cloudy	75
28-Dec-18	10:41	49	52	46	0.4	Sunny	75
03-Jan-19	14:32	51	56	48	0.4	Cloudy	75
09-Jan-19	14:29	46	48	42	0.4	Cloudy	75
15-Jan-19	10:33	48	51	46	0.4	Cloudy	75
21-Jan-19	13:25	44	47	40	0.2	Sunny	75
31-Jan-19	10:12	44	45	39	0.2	Sunny	75

Noise

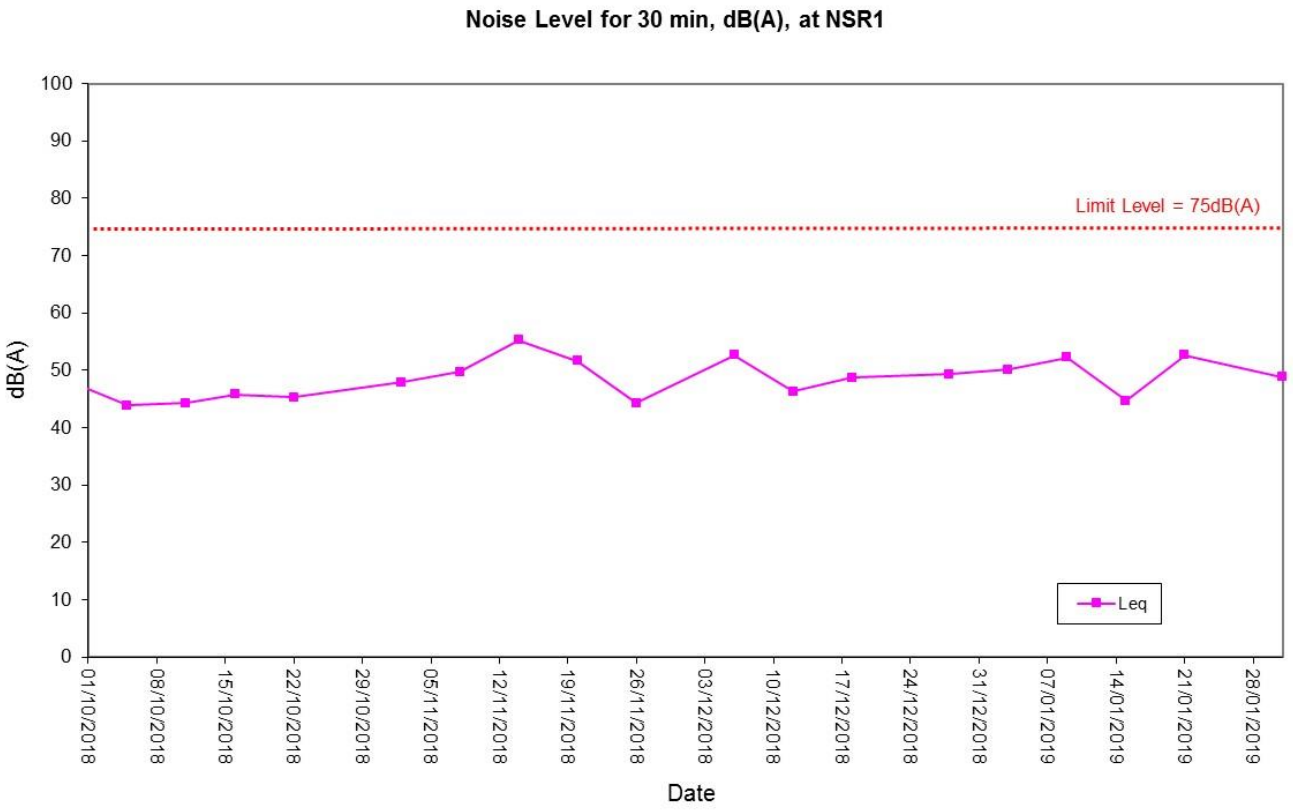
Station NSR5

Date	Start Time	Noise Level for 30 min, dB(A)			Wind Speed (m/s)	Weather Condition	Limit Level, dB(A)
		L_{eq}	L_{10}	L_{90}			
02-Nov-18	11:06	50	53	42	0.3	Cloudy	75
08-Nov-18	13:28	46	49	42	0.1	Cloudy	75
14-Nov-18	10:27	52	55	50	0.5	Cloudy	75
20-Nov-18	14:26	48	49	45	0.3	Sunny	75
26-Nov-18	09:52	51	51	45	0.4	Cloudy	75
06-Dec-18	14:27	50	53	47	0.4	Cloudy	75
12-Dec-18	08:46	51	53	49	0.4	Cloudy	75
18-Dec-18	14:27	48	49	47	0.4	Cloudy	75
28-Dec-18	14:34	47	49	44	0.4	Sunny	75
03-Jan-19	09:54	55	57	43	0.4	Cloudy	75
09-Jan-19	10:36	56	58	44	0.4	Cloudy	75
15-Jan-19	14:34	44	46	40	0.4	Cloudy	75
21-Jan-19	10:02	48	49	46	0.2	Sunny	75
31-Jan-19	09:25	46	47	43	0.3	Sunny	75

Station NSR7

Date	Start Time	Noise Level for 30 min, dB(A)			Wind Speed (m/s)	Weather Condition	Limit Level, dB(A)
		L_{eq}	L_{10}	L_{90}			
02-Nov-18	10:10	67	69	65	0.3	Cloudy	75
08-Nov-18	14:16	67	69	64	0.1	Cloudy	75
14-Nov-18	09:38	68	70	66	0.5	Cloudy	75
20-Nov-18	13:32	62	69	65	0.3	Sunny	75
26-Nov-18	10:41	68	70	66	0.4	Cloudy	75
06-Dec-18	13:38	67	69	65	0.4	Cloudy	75
12-Dec-18	09:32	68	69	66	0.4	Cloudy	75
18-Dec-18	13:34	68	70	65	0.4	Cloudy	75
28-Dec-18	13:46	68	71	67	0.4	Sunny	75
03-Jan-19	09:09	68	69	65	0.4	Cloudy	75
09-Jan-19	09:42	68	70	65	0.4	Cloudy	75
15-Jan-19	13:36	68	69	65	0.4	Cloudy	75
21-Jan-19	09:20	67	70	69	0.3	Sunny	75
31-Jan-19	08:46	68	69	64	0.2	Sunny	75

Noise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Leq
dB(A)
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90
80
70
60
50
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30
20
10
0
01/10/2018
08/10/2018
15/10/2018
22/10/2018
29/10/2018
05/11/2018
12/11/2018
19/11/2018
26/11/2018
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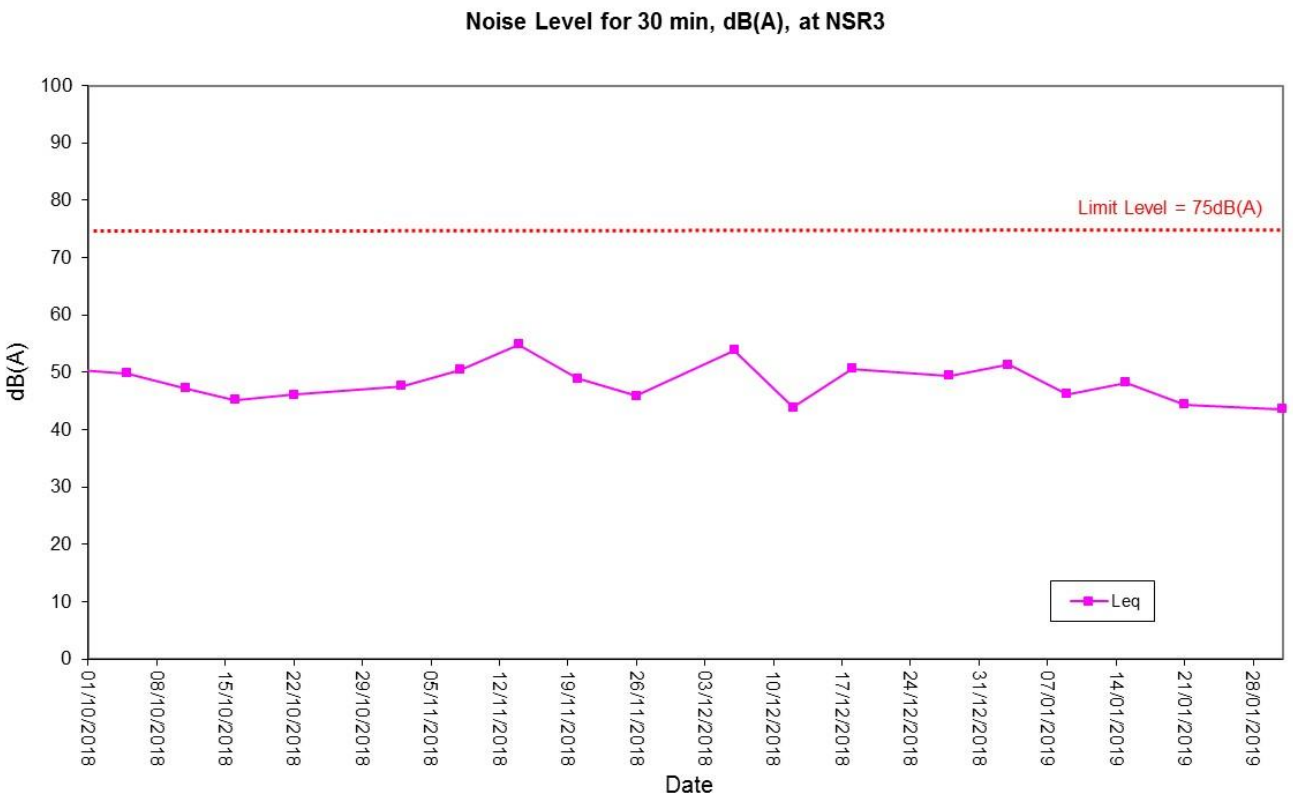
14/01/2019
21/01/2019
28/01/2019


Noise Level for 30 min, dB(A), at NSR3
Limit Level = 75dB(A)
Leq
dB(A)
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90
80
70
60
50
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30
20
10
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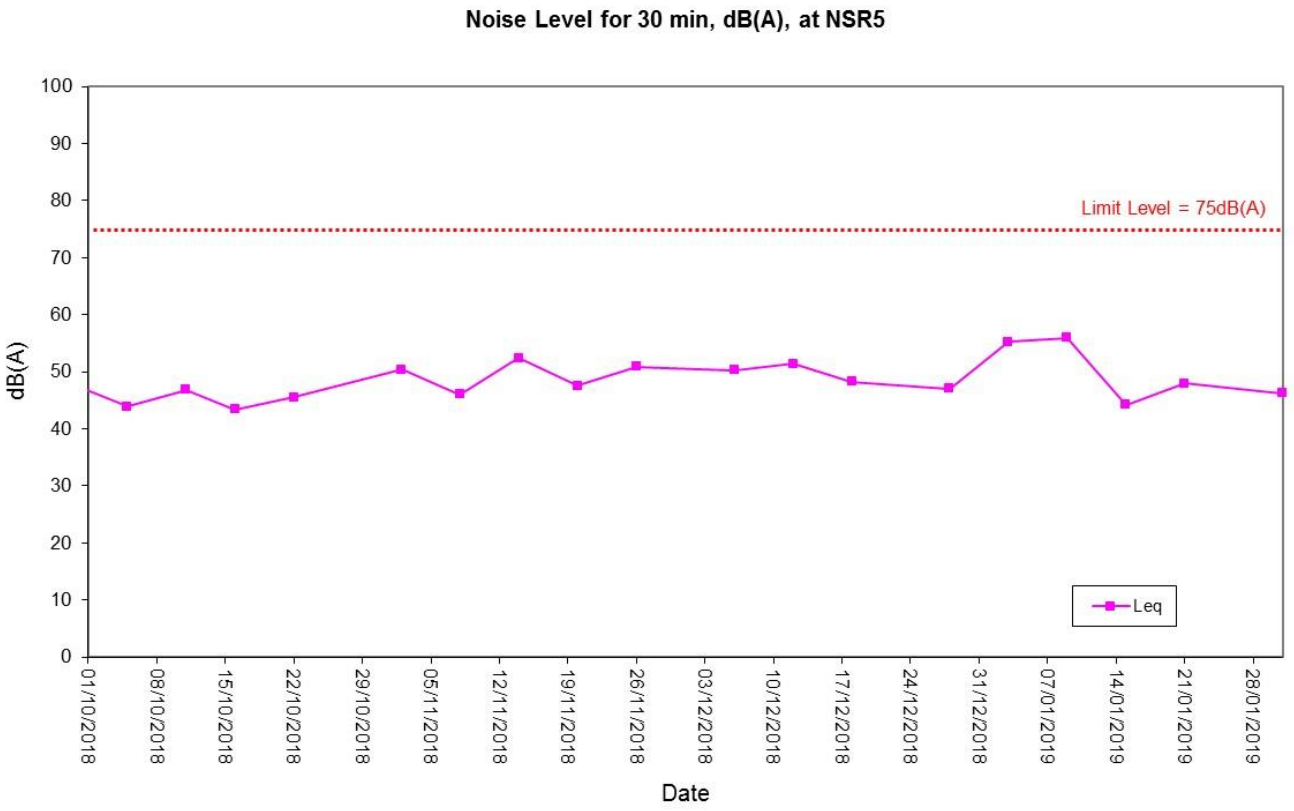
08/10/2018
15/10/2018
22/10/2018
29/10/2018
05/11/2018
12/11/2018
19/11/2018
26/11/2018
03/12/2018
10/12/2018
17/12/2018
24/12/2018
31/12/2018
07/01/2019
14/01/2019
21/01/2019
28/01/2019

Noise


Noise Level for 30 min, dB(A), at NSR5
Limit Level = 75dB(A)
Leq
dB(A)
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90
80
70
60
50
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30
20
10
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08/10/2018
15/10/2018
22/10/2018
29/10/2018
05/11/2018
12/11/2018
19/11/2018
26/11/2018
03/12/2018
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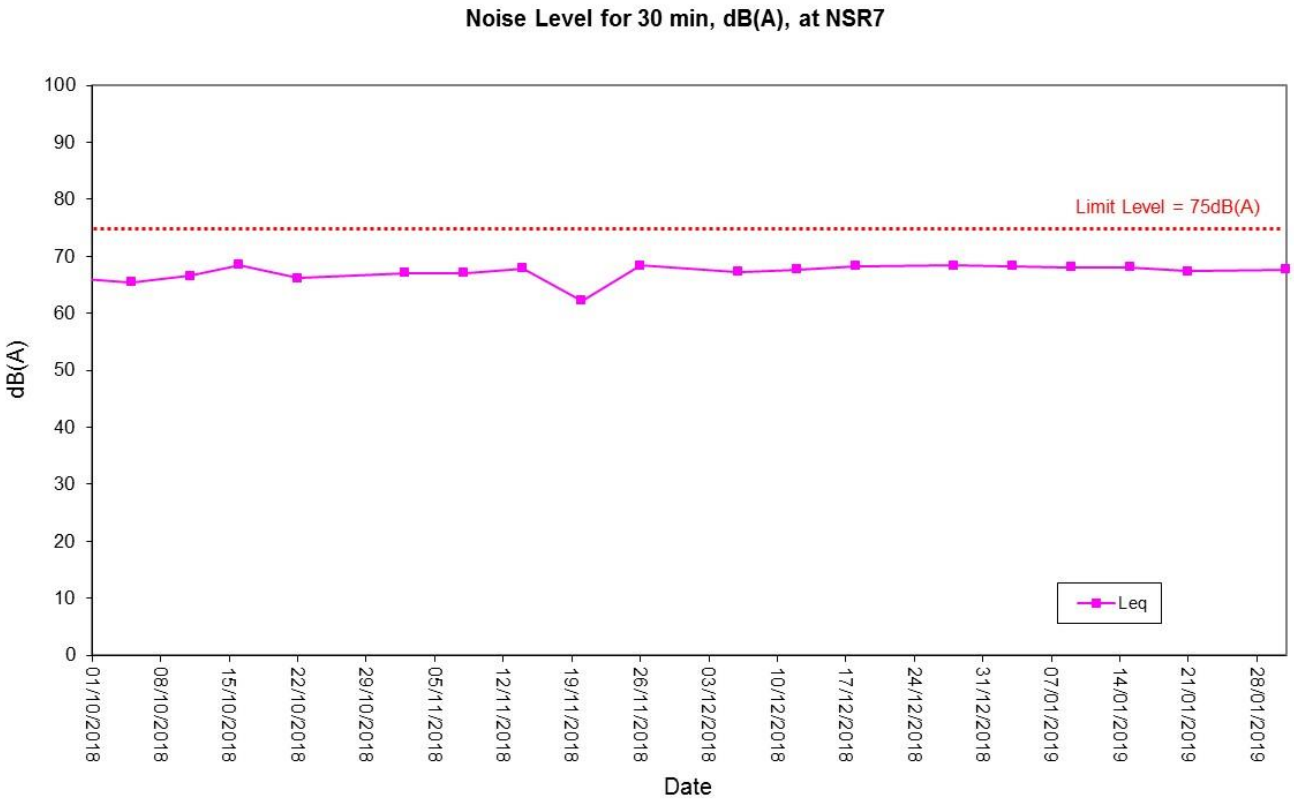
17/12/2018
24/12/2018
31/12/2018
07/01/2019
14/01/2019
21/01/2019
28/01/2019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Limit Level = 75dB(A)
Leq
dB(A)
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90
80
70
60
50
40
30
20
10
0
01/10/2018
08/10/2018
15/10/2018
22/10/2018
29/10/2018
05/11/2018
12/11/2018
19/11/2018
26/11/2018
03/12/2018
10/12/2018
17/12/2018
24/12/2018
31/12/2018
07/01/2019
14/01/2019
21/01/2019
28/01/2019

Water Quality

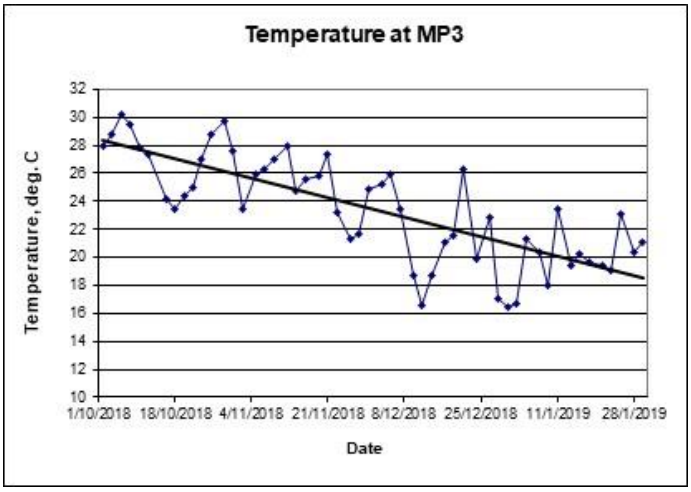
Monitoring Location MP3

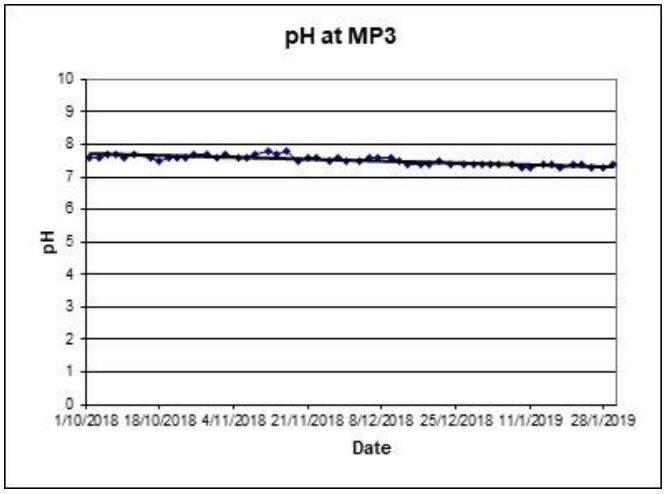
Monitoring Date	Temp (ºC)	pH	Dissolved Oxygen (mg/L)	DO (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
MP3							
02/11/2018	23.5	**7.7**	7.8	94.6	28.1	7	28
05/11/2018	25.9	**7.6**	7.7	95.9	28.0	6	28
07/11/2018	26.3	**7.6**	7.8	97.9	34.3	8	34
09/11/2018	27.0	**7.7**	7.6	94.8	15.0	7	15
12/11/2018	27.9	**7.8**	7.8	98.9	16.3	7	16
14/11/2018	24.7	**7.7**	7.7	93.6	18.5	5	18
16/11/2018	25.6	**7.8**	7.6	96.7	27.5	4	28
19/11/2018	25.8	7.5	7.7	98.5	15.7	8	15
21/11/2018	27.3	**7.6**	7.6	96.5	13.8	7	14
23/11/2018	23.2	**7.6**	7.8	96.3	18.5	5	18
26/11/2018	21.3	7.5	7.6	98.7	32.3	6	27
28/11/2018	21.7	**7.6**	7.6	93.8	31.4	11	26
30/11/2018	24.9	7.5	8.0	97.5	50.7	10	45
03/12/2018	25.2	7.5	7.5	95.0	33.3	8.5	26
05/12/2018	25.9	**7.6**	7.5	96.5	24.2	10	19
07/12/2018	23.5	**7.6**	8.3	97.2	14.3	2	12.5
10/12/2018	18.7	**7.6**	8.0	90.7	29.8	5	25
12/12/2018	16.6	7.5	9.5	98.2	25.8	10	35.5
14/12/2018	18.7	7.4	8.2	94.3	29.8	7.5	28.5
17/12/2018	21.1	7.4	8.8	97.9	17.2	6.5	17
19/12/2018	21.5	7.4	8.1	91.1	29.2	7	29
21/12/2018	26.3	7.5	7.7	95.7	58.0	18.5	51.5
24/12/2018	19.9	7.4	9.0	98.0	27.9	5	22.5
27/12/2018	22.8	7.4	7.8	92.7	26.5	10	21
29/12/2018	17.0	7.4	7.9	92.1	20.7	6	18.5
31/12/2018	16.4	7.4	8.0	91.1	41.5	16.5	37
02/01/2019	16.7	7.4	9.2	95.3	23.5	12	25
04/01/2019	21.3	7.4	7.8	87.5	21.3	8	22
07/01/2019	20.4	7.4	8.3	92.5	27.1	10	27
09/01/2019	18.0	7.3	8.7	91.2	23.0	3	23
11/01/2019	23.5	7.3	8.4	102.2	27.7	5	26
14/01/2019	19.4	7.4	9.2	100.2	26.6	5	35
16/01/2019	20.2	7.4	8.0	90.8	23.5	5	34
18/01/2019	19.6	7.3	9.1	100.4	42.3	12	34
21/01/2019	19.4	7.4	8.3	92.1	28.9	9	29
23/01/2019	19.0	7.4	8.8	96.0	29.0	12	29
25/01/2019	23.1	7.3	7.9	95.1	30.5	12	31
28/01/2019	20.4	7.3	8.0	96.5	15.7	7	18
30/01/2019	21.1	7.4	8.0	93.0	11.4	11	18
Average	22.1	7.5	8.1	95.3	26.6	8	26
Action Level	-	<5.5 or >7.5	<6.85	-	>64	-	>65
Limit Level	-	<4.0 or >8.0	<6.65	-	>67	-	>66

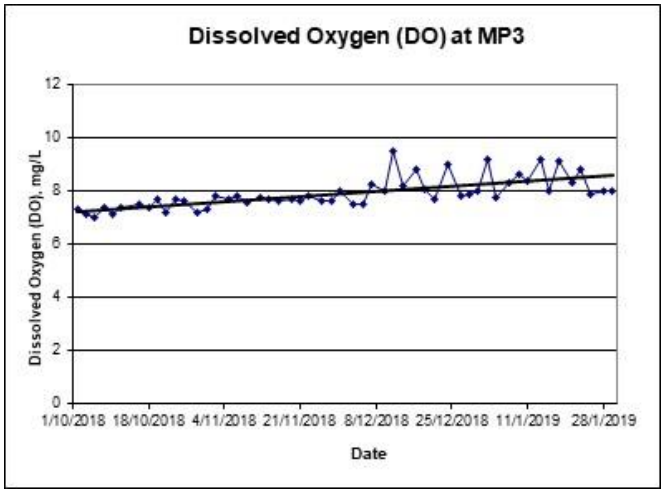
Notes:
(1) <2: Value is too low to indicate (<2mg/L).
(2) Values **Bold** indicate Action Level exceedance.
(3) Values **Underlined and Bold** indicate Limit Level exceedance.

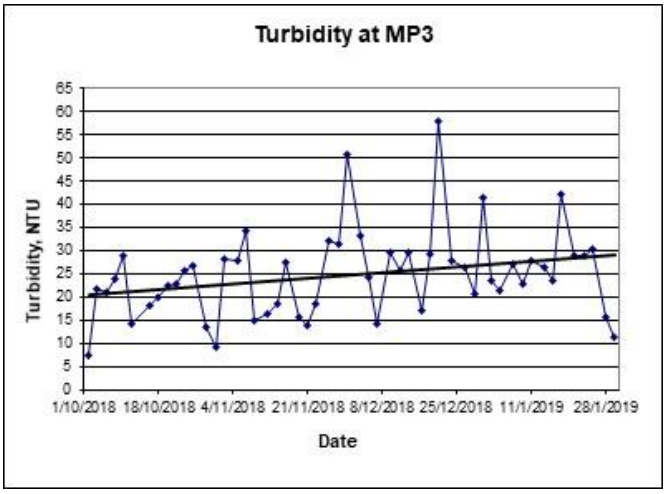
Water Quality

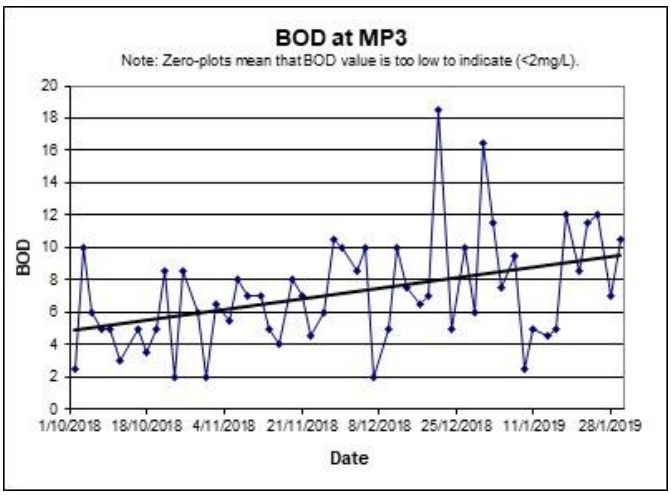
Monitoring Location MP3

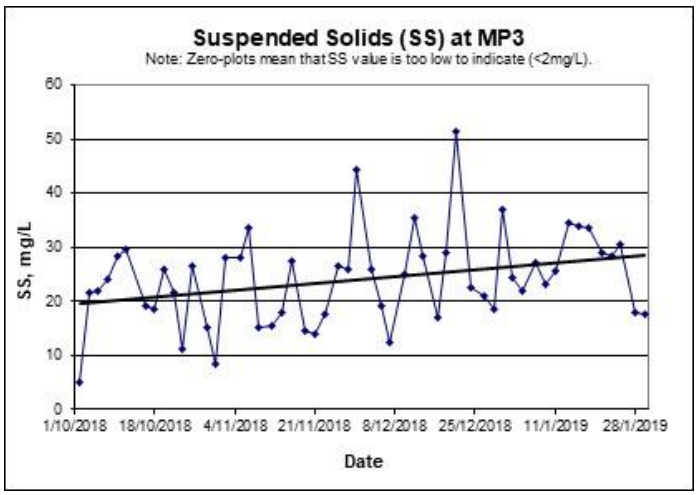












Water Quality

Monitoring Location MP4

Monitoring Date	Temp (ºC)	pH	Dissolved Oxygen (mg/L)	DO (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
MP4							
02/11/2018	23.2	7.1	6.9	76.5	48.7	12	49
05/11/2018	25.6	7.3	7.0	82.4	28.3	<2	29
07/11/2018	26.0	7.2	7.0	86.2	34.1	2	35
09/11/2018	26.7	7.4	6.8	85.8	48.5	5	49
12/11/2018	27.6	7.4	7.0	84.9	41.9	6	37
14/11/2018	24.4	7.3	7.1	88.2	34.8	8	35
16/11/2018	25.3	7.2	7.0	80.8	34.2	7	34
19/11/2018	25.5	7.2	7.0	81.2	36.5	3	36
21/11/2018	27.0	7.4	7.1	88.7	43.3	3	43
23/11/2018	22.9	7.3	7.1	81.0	47.5	7	44
26/11/2018	21.0	7.1	7.2	70.9	45.9	<2	33
28/11/2018	21.4	7.2	6.6	69.4	49.7	7	**53**
30/11/2018	24.6	7.1	6.9	77.8	49.3	6	41
03/12/2018	24.9	7.1	6.7	80.8	45.2	5	37
05/12/2018	25.6	7.3	6.6	75.0	46.0	6	34.5
07/12/2018	23.2	7.1	6.7	74.6	41.4	2	35
10/12/2018	18.4	7.2	6.9	71.8	40.8	<2	36.5
12/12/2018	15.9	7.0	6.6	66.8	33.1	3	35.5
14/12/2018	18.4	7.2	6.8	67.5	40.9	5	41.5
17/12/2018	20.8	7.0	6.8	71.6	36.4	3.5	36
19/12/2018	21.2	7.1	6.9	74.3	50.8	4.5	**55.5**
21/12/2018	26.0	7.3	7.0	86.3	50.8	4.5	**51.5**
24/12/2018	19.6	7.1	7.0	69.8	45.7	3	48
27/12/2018	22.5	7.1	6.9	72.8	31.1	2	24.5
29/12/2018	16.7	7.2	6.9	61.7	25.2	6.5	28.5
31/12/2018	16.1	7.0	6.8	54.8	49.3	<2	43.5
02/01/2019	16.4	7.2	7.1	61.2	39.4	4	40
04/01/2019	21.0	7.1	6.9	73.1	34.5	3	34
07/01/2019	20.1	7.3	7.1	69.7	36.1	4	36
09/01/2019	17.7	7.0	7.2	66.7	28.4	4	29
11/01/2019	23.2	7.1	7.2	76.9	28.7	<2	30
14/01/2019	19.1	7.2	7.1	65.0	23.3	<2	25
16/01/2019	19.9	7.1	6.8	71.4	32.0	<2	22
18/01/2019	19.3	7.1	6.8	73.4	46.8	26	42
21/01/2019	19.1	7.2	7.1	70.0	46.8	3	47
23/01/2019	18.7	7.1	7.1	66.0	27.3	3	27
25/01/2019	22.8	7.0	7.1	76.7	44.2	4	44
28/01/2019	20.1	7.1	7.1	72.0	26.5	<2	20
30/01/2019	20.8	7.1	7.2	74.9	15.8	<2	32
Average	21.8	7.2	6.9	74.3	38.7	5.4	37.1
Action Level	-	<5.5 or >7.5	<3.91	-	>60	-	>50
Limit Level	-	<4.0 or >8.0	<3.82	-	>64	-	>53

Notes:
(1) <2: Value is too low to indicate (<2mg/L).
(2) Values **Bold** indicate Action Level exceedance.
(3) Values **Underlined and Bold** indicate Limit Level exceedance
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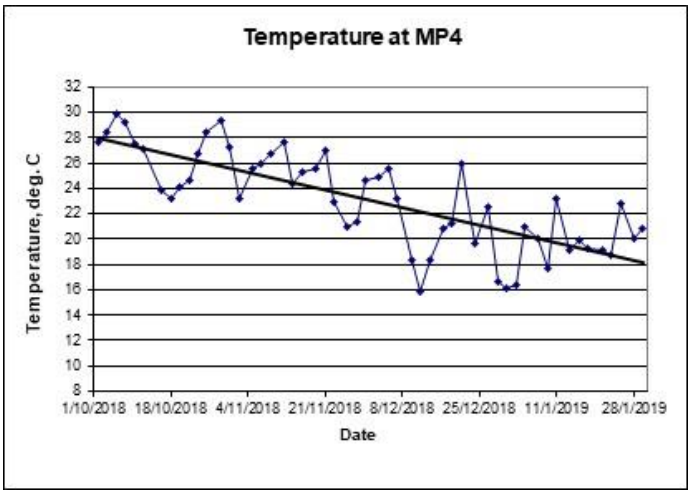
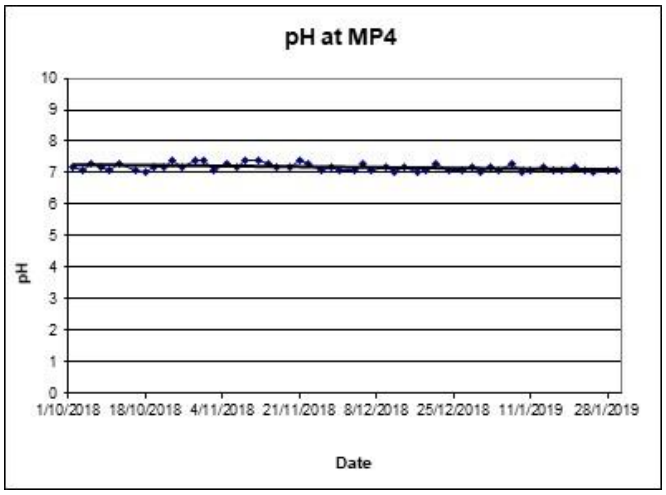
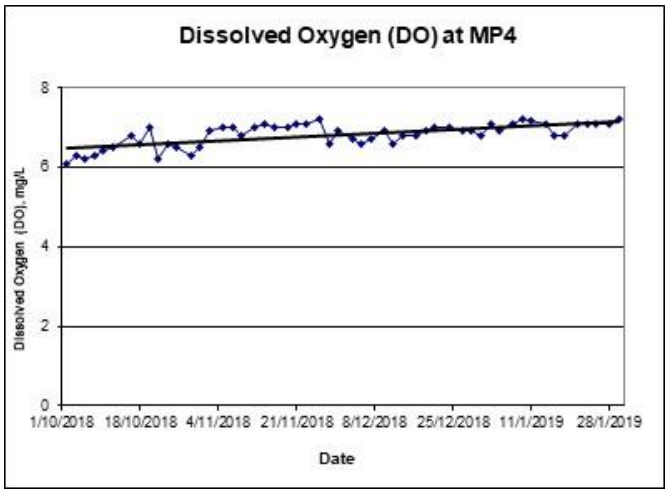
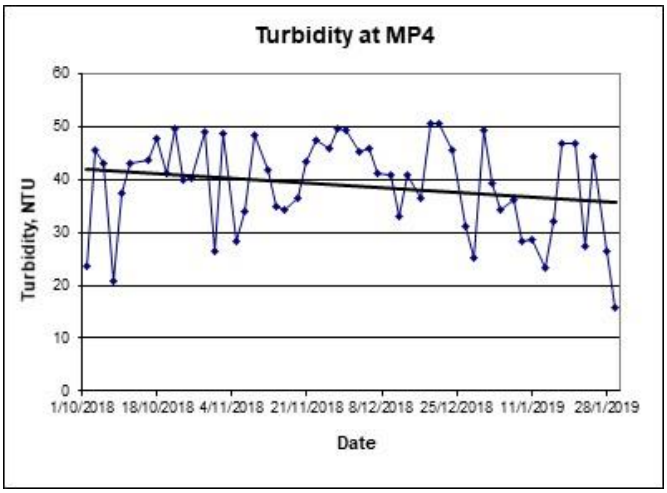
Water Quality

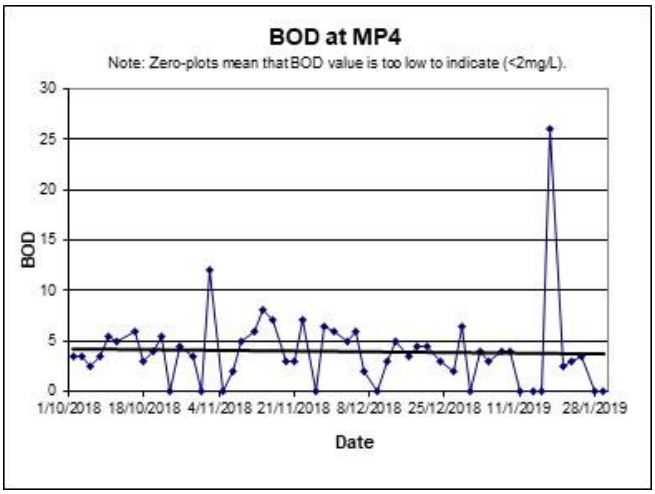
Monitoring Location MP4

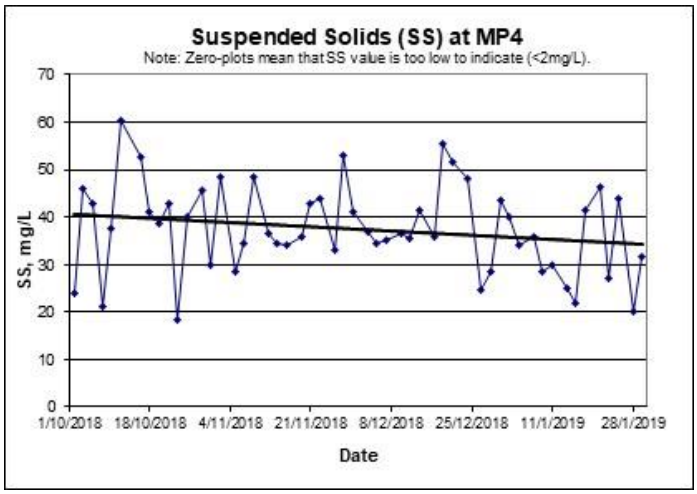












Water Quality

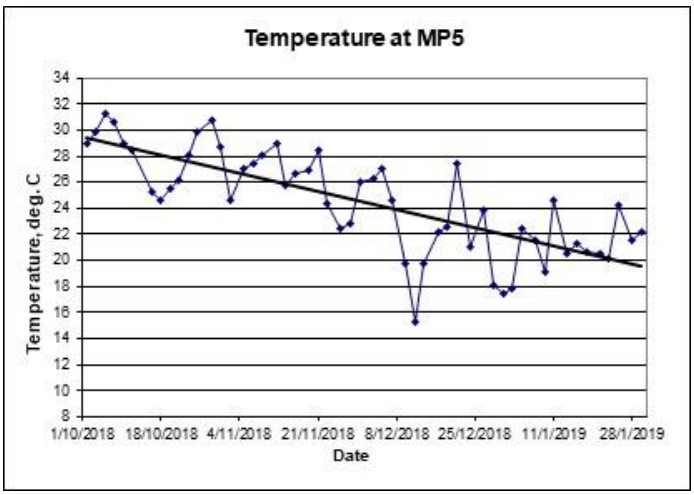
Monitoring Location MP5

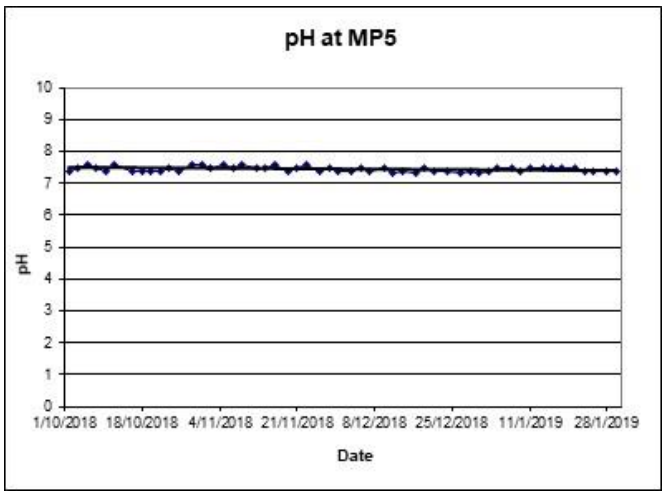
Monitoring Date	Temp (°C)	pH	Dissolved Oxygen (mg/L)	DO (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
MP5							
02/11/2018	24.6	7.5	6.8	72.8	47.8	8	48
05/11/2018	27.0	**7.6**	6.6	76.3	29.0	4	29
07/11/2018	27.4	7.5	6.6	78.7	42.0	5	42
09/11/2018	28.1	**7.6**	6.4	82.2	37.5	7	38
12/11/2018	29.0	7.5	6.7	79.9	46.4	9	43
14/11/2018	25.8	7.5	7.0	86.0	35.7	8	35
16/11/2018	26.7	**7.6**	6.7	75.1	37.0	7	37
19/11/2018	26.9	7.4	6.6	77.0	30.7	4	31
21/11/2018	28.4	7.5	6.8	79.3	44.2	5	44
23/11/2018	24.3	**7.6**	6.7	75.8	44.1	7	43
26/11/2018	22.4	7.4	6.8	70.3	50.6	7	44
28/11/2018	22.8	7.5	6.9	73.9	48.1	3	42
30/11/2018	26.0	7.4	6.8	80.3	42.5	6	39
03/12/2018	26.3	7.4	6.7	80.4	41.1	7	34.5
05/12/2018	27.0	7.5	6.7	81.0	38.3	9	31.5
07/12/2018	24.6	7.4	7.1	79.8	32.2	3	28
10/12/2018	19.8	7.5	7.1	73.6	43.4	5.5	40.5
12/12/2018	15.3	7.3	6.7	67.4	46.4	3	57
14/12/2018	19.8	7.4	7.0	67.6	41.3	5	41
17/12/2018	22.2	7.3	6.9	76.0	26.9	6.5	26.5
19/12/2018	22.6	7.5	7.0	77.8	42.0	6	43.5
21/12/2018	27.4	7.4	6.9	87.5	52.7	9	65.5
24/12/2018	21.0	7.4	6.8	69.2	51.8	7	50
27/12/2018	23.9	7.3	6.6	71.8	25.1	6	22.5
29/12/2018	18.1	7.4	6.8	55.8	40.4	6	45
31/12/2018	17.5	7.3	6.8	61.8	45.4	3	38
02/01/2019	17.8	7.4	7.1	63.1	40.8	7	40
04/01/2019	22.4	7.5	7.3	80.7	44.8	6	45
07/01/2019	21.5	7.5	7.0	71.8	37.5	6	37
09/01/2019	19.1	7.4	6.9	61.7	26.5	6	27
11/01/2019	24.6	7.5	7.0	77.2	21.6	<2	28
14/01/2019	20.5	7.5	7.2	70.8	28.3	<2	33
16/01/2019	21.3	7.5	6.9	67.6	21.0	<2	23
18/01/2019	20.7	7.5	7.0	72.9	43.1	9	38
21/01/2019	20.5	7.5	6.8	68.3	46.8	7	47
23/01/2019	20.1	7.4	7.3	71.1	29.3	7	30
25/01/2019	24.2	7.4	7.0	81.8	45.2	6	45
28/01/2019	21.5	7.4	6.7	70.1	27.2	<2	14
30/01/2019	22.2	7.4	6.7	72.3	15.4	<2	32
Average	23.1	7.5	6.9	74.0	38.2	6	37.7
Action Level	-	<5.5 or >7.5	<4.13	-	>81	-	>66
Limit Level	-	<4.0 or >8.0	<3.87	-	>84	-	>69

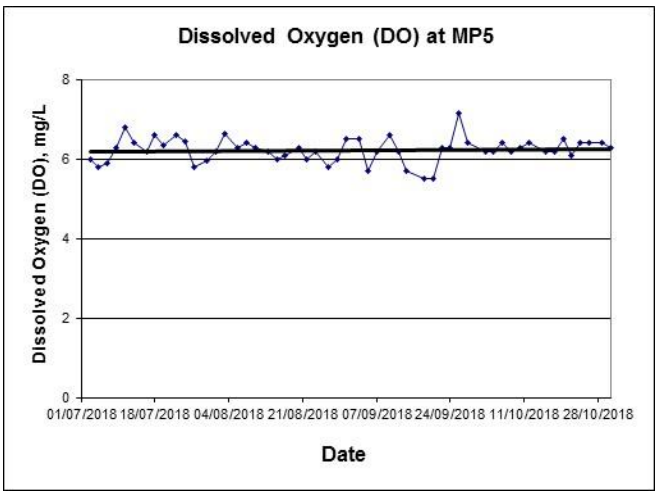
Notes:
(1) <2: Value is too low to indicate (<2mg/L).
(2) Values **Bold** indicate Action Level exceedance.
(3) Values **Underlined and Bold** indicate Limit Level exceedance.

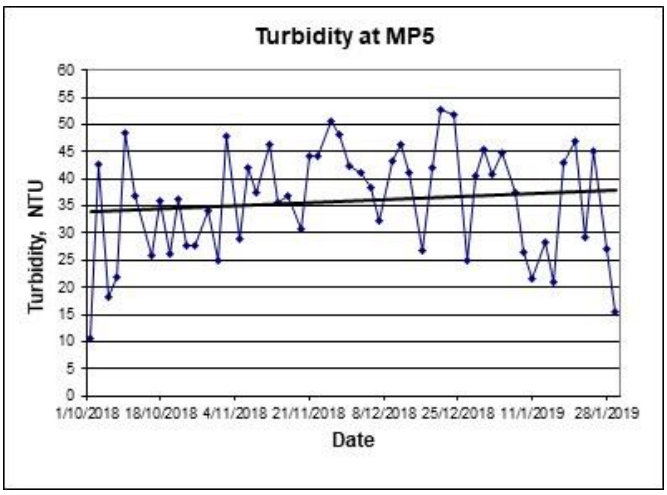
Water Quality

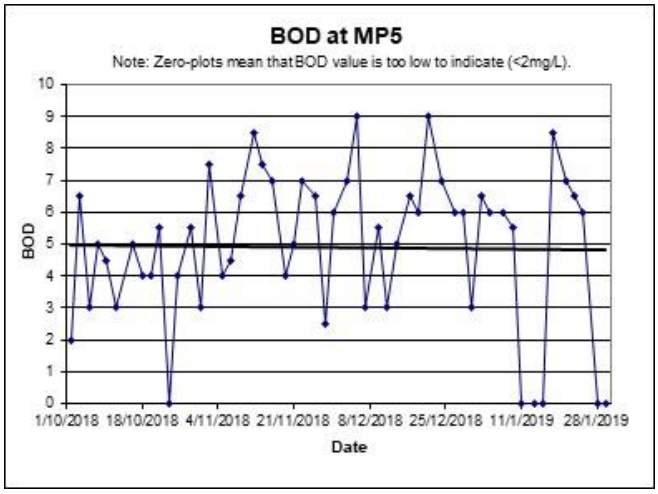
Monitoring Location MP5

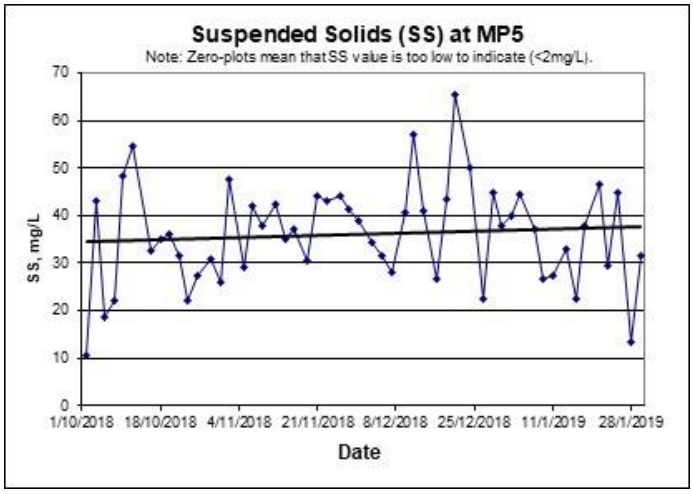












Water Quality

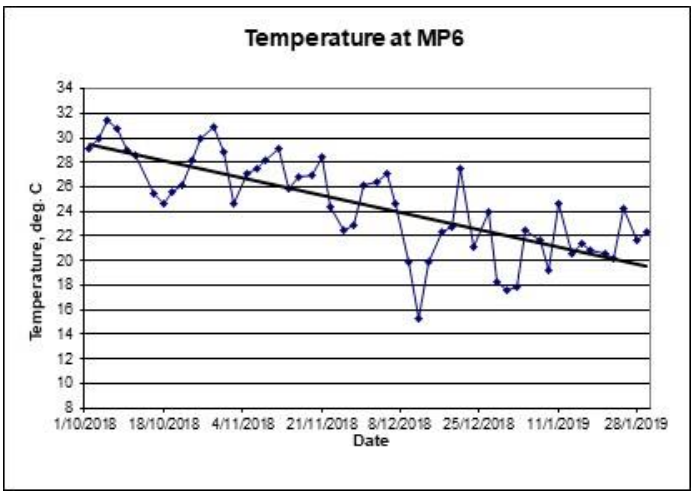
Monitoring Location MP6

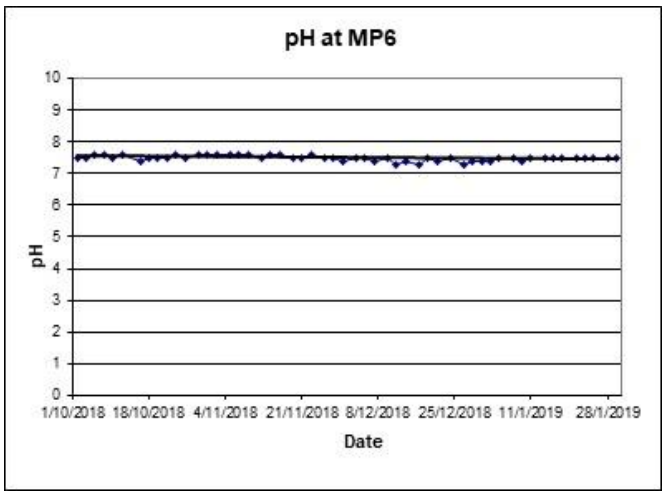
Monitoring Date	Temp (ºC)	pH	Dissolved Oxygen (mg/L)	DO (%)	Turbidity (NT)	BOD (mg/L)	Suspended Solids (mg/L)
MP6							
02/11/2018	24.7	**7.6**	6.7	81.3	51.0	8	52
05/11/2018	27.1	**7.6**	6.5	72.6	30.8	4	31
07/11/2018	27.5	**7.6**	6.9	83.2	43.4	5	44
09/11/2018	28.2	**7.6**	6.3	81.1	45.9	7	46
12/11/2018	29.1	7.5	6.4	74.2	50.8	9	50
14/11/2018	25.9	**7.6**	6.5	80.4	35.5	7	36
16/11/2018	26.8	**7.6**	6.8	76.9	34.9	7	35
19/11/2018	27.0	7.5	6.6	76.3	33.8	4	34
21/11/2018	28.5	7.5	6.5	76.0	43.3	4	44
23/11/2018	24.4	**7.6**	6.6	73.1	50.6	7	51
26/11/2018	22.5	7.5	6.7	70.9	49.8	6	41
28/11/2018	22.9	7.5	6.9	74.8	49.6	3	41
30/11/2018	26.1	7.4	6.7	82.5	44.3	6	40
03/12/2018	26.4	7.5	6.6	75.7	40.8	7	35
05/12/2018	27.1	7.5	6.5	76.7	41.4	8	35
07/12/2018	24.7	7.4	6.7	73.7	35.8	3	33
10/12/2018	19.9	7.5	6.7	69.9	45.9	6	41
12/12/2018	15.3	7.3	6.6	66.4	44.6	3	58
14/12/2018	19.9	7.4	6.5	63.8	38.5	5	39
17/12/2018	22.3	7.3	7.0	73.8	27.9	7	28
19/12/2018	22.7	7.5	6.7	74.5	47.1	6	47
21/12/2018	27.5	7.4	6.9	87.3	56.7	9	68
24/12/2018	21.1	7.5	6.6	68.5	55.9	6	62
27/12/2018	24.0	7.3	6.6	72.9	25.9	6	24
29/12/2018	18.2	7.4	6.8	57.7	41.2	7	41
31/12/2018	17.6	7.4	7.0	63.0	43.0	3	37
02/01/2019	17.9	7.4	7.2	65.6	38.0	6	38
04/01/2019	22.5	7.5	6.8	74.7	50.1	6	51
07/01/2019	21.6	7.5	6.9	70.4	50.3	5	52
09/01/2019	19.2	7.4	6.6	63.6	26.8	5	27
11/01/2019	24.7	7.5	6.7	74.4	27.4	<2	32
14/01/2019	20.6	7.5	7.2	70.5	34.9	2	40
16/01/2019	21.4	7.5	6.8	66.1	32.4	<2	44
18/01/2019	20.8	7.5	6.8	68.8	47.5	8	43
21/01/2019	20.6	7.5	7.1	69.5	45.3	8	45
23/01/2019	20.2	7.5	6.9	71.6	29.5	5	29
25/01/2019	24.3	7.5	6.9	77.7	41.0	8	41
28/01/2019	21.6	7.5	7.2	74.8	28.6	2	24
30/01/2019	22.3	7.5	6.9	79.8	16.7	<2	36
Average	23.2	7.5	6.8	73.2	40.4	5.7	40.6
Action Level	-	<5.5 or >7.5	<4.61	-	>94	-	>75
Limit Level	-	<4.0 or >8.0	<4.52	-	>96	-	>75

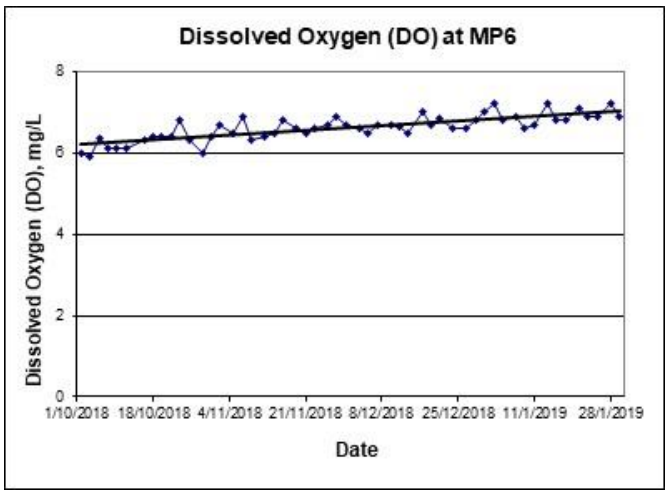
Notes:
(1) <2: Value is too low to indicate (<2mg/L).
(2) Values **Bold** indicate Action Level exceedance.
(3) Values **Underlined and Bold** indicate Limit Level exceedance.

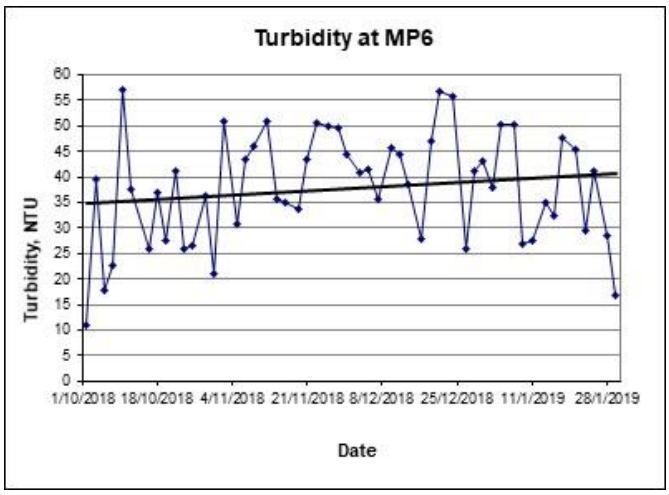
Water Quality

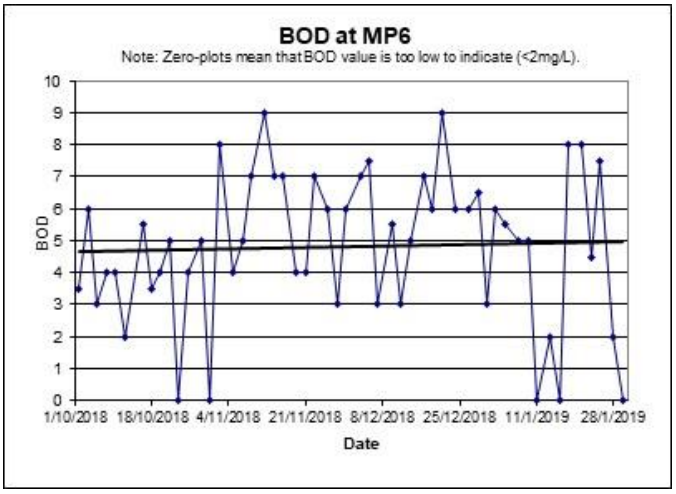
Monitoring Location MP6

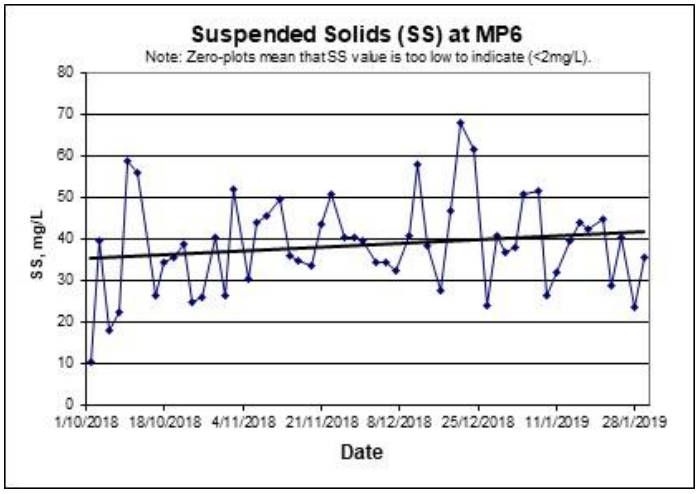












E. Summary of Ecological Monitoring Results

Table E1. Summary of bird species of conservation importance and/or wetland-dependence recorded in the Survey Area (excluding the WRA)

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Nov 2018		Records outside survey(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	4	12.0	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	4	38.8	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	5.5	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	4	6.0	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	9.8	✓
Eastern Cattle Egret	*Bubulcus coromandus*	Y	(LC)	0	0.0	✓
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	8.8	✓
Black-faced Spoonbill	*Platalea minor*	Y	PGC, EN	0	0.0	✓
Tufted Duck	*Aythya fuligula*	Y	LC	4	13.0	✓
Black Kite	*Milvus migrans*	Y	(RC)	0	0.0	✓
White-breasted Waterhen	*Amaurornis phoenicurus*	Y	-	0	0.0	✓
Eurasian Coot	*Fulica atra*	Y	RC	0	0.0	✓
Common Moorhen	*Gallinula chloropus*	Y	-	1	0.3	0
Black-winged Stilt	*Himantopus himantopus*	Y	RC	4	6.5	✓
Pied Avocet	*Recurvirostra avosetta*	Y	RC	1	0.3	0
Common Sandpiper	*Actitis hypoleucos*	Y	-	4	3.0	✓
Whiskered Tern	*Chlidonias hybrida*	Y	-	0	0.0	✓
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	1	0.3	0
Common Kingfisher	*Alcedo atthis*	Y	-	1	0.3	✓
Eastern Yellow Wagtail	*Motacilla tschutschensis*	Y	-	1	0.3	0
White Wagtail	*Motacilla alba*	Y	-	4	3.3	✓
			No. of Species Recorded			**21**

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Dec 2018		Records outside survey(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	4	9.3	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	4	35.5	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	9.8	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	4	9.0	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	7.8	✓
Eastern Cattle Egret	*Bubulcus coromandus*	Y	(LC)	1	0.8	0
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	4.0	✓
Black-faced Spoonbill	*Platalea minor*	Y	PGC, EN	2	0.8	0
Tufted Duck	*Aythya fuligula*	Y	LC	4	41.8	✓
Black Kite	*Milvus migrans*	Y	(RC)	2	0.5	0

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Dec 2018		Records outside survey(5)
				Occurrence(2)	Mean(3)	
Eurasian Coot	*Fulica atra*	Y	RC	1	0.5	✓
Black-crowned Night Heron	*Nycticorax nycticorax*	Y	(LC)	1	0.8	0
Black-winged Stilt	*Himantopus himantopus*	Y	RC	2	1.0	0
Common Sandpiper	*Actitis hypoleucos*	Y	-	3	3.0	✓
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	1	0.3	✓
Common Kingfisher	*Alcedo atthis*	Y	-	3	1.0	0
White Wagtail	*Motacilla alba*	Y	-	3	2.8	✓
Collared Crow	*Corvus torquatus*	Y	LC, NT	1	0.5	0
			No. of Species Recorded			**18**

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Jan 2019		Records outside survey(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	4	6.5	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	4	28.8	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	6.0	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	4	4.8	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	7.5	✓
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	5.0	✓
Black-faced Spoonbill	*Platalea minor*	Y	PGC, EN	1	0.3	0
Tufted Duck	*Aythya fuligula*	Y	LC	4	14.8	✓
White-breasted Waterhen	*Amaurornis phoenicurus*	Y	-	1	0.3	✓
Common Moorhen	*Gallinula chloropus*	Y	-	0	0.0	✓
Black-winged Stilt	*Himantopus himantopus*	Y	RC	3	2.8	✓
Little Ringed Plover	*Charadrius dubius*	Y	(LC)	1	0.3	0
Common Sandpiper	*Actitis hypoleucos*	Y	-	2	1.3	✓
Pied Kingfisher	*Ceryle rudis*	Y	(LC)	0	0.0	✓
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	3	1.3	✓
Common Kingfisher	*Alcedo atthis*	Y	-	4	1.8	✓
Eastern Yellow Wagtail	*Motacilla tschutschensis*	Y	-	2	0.5	✓
White Wagtail	*Motacilla alba*	Y	-	4	5.5	✓
Red-billed Starling	*Spodiopsar sericeus*	Y	(RC)*	1	0.3	✓
Collared Crow	*Corvus torquatus*	Y	LC, NT	1	0.3	0
			No. of Species Recorded			**20**

(1) Conservation status follows that of Fellowes *et al*. (2002) and Bird Life International listing (2017). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Fellowes *et al*. 2002)
(2) Indicates number of surveys recorded within each month of the reporting period.
(3) Refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA).
(4) Follows HK bird list (dated 2017-01-26).
(5) Includes observations during other surveys and/or site visits.
* Red-billed Starling is considered by Fellows *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red-billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

Table E2. Summary of bird species of conservation importance and/or wetland-dependence recorded in the WRA

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Nov 2018		Records outside surveys(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	4	3.8	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	0	0.0	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	2.0	✓
Purple Heron	*Ardea purpurea*	Y	RC	2	0.5	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	3	1.3	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	3.3	✓
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	1.8	✓
Yellow Bittern	*Ixobrychus sinensis*	Y	(LC)	1	0.3	✓
Black Kite	*Milvus migrans*	Y	(RC)	2	0.5	✓
White-breasted Waterhen	*Amaurornis phoenicurus*	Y	-	0	0.0	✓
Common Moorhen	*Gallinula chloropus*	Y	-	3	1.5	✓
Common Sandpiper	*Actitis hypoleucos*	Y	-	0	0.0	✓
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	1	0.3	✓
Common Kingfisher	*Alcedo atthis*	Y	-	2	0.5	✓
White Wagtail	*Motacilla alba*	Y	-	4	1.8	✓
			No. of Species Recorded			**15**

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Dec 2018		Records outside surveys(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	4	3.5	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	4	1.8	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	5.5	✓
Purple Heron	*Ardea purpurea*	Y	RC	0	0.0	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	4	3.8	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	7.8	✓
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	4.3	✓
Black Kite	*Milvus migrans*	Y	(RC)	1	0.3	✓
Yellow Bittern	*Ixobrychus sinensis*	Y	(LC)	0	0.0	✓
Black-crowned Night Heron	*Nycticorax nycticorax*	Y	(LC)	0	0.0	✓
White-breasted Waterhen	*Amaurornis phoenicurus*	Y	-	0	0.0	✓
Common Moorhen	*Gallinula chloropus*	Y	-	0	0.0	✓
Common Greenshank	*Tringa nebularia*	Y	RC	0	0.0	✓
Wood Sandpiper	*Tringa glareola*	Y	LC	0	0.0	✓
Common Sandpiper	*Actitis hypoleucos*	Y	-	0	0.0	✓
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	1	0.3	0
Pied Kingfisher	*Ceryle rudis*	Y	(LC)	0	0.0	✓
Common Kingfisher	*Alcedo atthis*	Y	-	1	0.3	✓

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Dec 2018		Records outside surveys(5)
				Occurrence(2)	Mean(3)	
White Wagtail	*Motacilla alba*	Y	-	2	0.8	0
Eastern Yellow Wagtail	*Motacilla tschutschensis*	Y	-	0	0.0	✓
Red-billed Starling	*Spodiopsar sericeus*	Y	(RC)*	0	0.0	✓
White-cheeked Starling	*Spodiopsar cineraceus*	Y	PRC	0	0.0	✓
			No. of Species Recorded			**22**

Species Name(4)	Scientific Name(4)	Wetland Dependence	Conservation Status(1)	Jan 2019		Records outside surveys(5)
				Occurrence(2)	Mean(3)	
Little Grebe	*Tachybaptus ruficollis*	Y	LC	3	1.5	✓
Great Cormorant	*Phalacrocorax carbo*	Y	PRC	4	6.3	✓
Grey Heron	*Ardea cinerea*	Y	PRC	4	2.8	✓
Purple Heron	*Ardea purpurea*	Y	RC	0	0.0	✓
Great Egret	*Ardea alba*	Y	PRC, (RC)	3	2.3	✓
Little Egret	*Egretta garzetta*	Y	PRC, (RC)	4	7.3	✓
Chinese Pond Heron	*Ardeola bacchus*	Y	PRC, (RC)	4	4.5	✓
Yellow Bittern	*Ixobrychus sinensis*	Y	(LC)	0	0.0	✓
Common Moorhen	*Gallinula chloropus*	Y	-	0	0.0	✓
Black-winged Stilt	*Himantopus himantopus*	Y	RC	0	0.0	✓
Wood Sandpiper	*Tringa glareola*	Y	LC	1	1.3	0
Green Sandpiper	*Tringa ochropus*	Y	-	1	0.3	0
Common Sandpiper	*Actitis hypoleucos*	Y	-	1	0.3	0
White-throated Kingfisher	*Halcyon smyrnensis*	Y	(LC)	0	0.0	✓
Common Kingfisher	*Alcedo atthis*	Y	-	2	0.8	✓
Eastern Yellow Wagtail	*Motacilla tschutschensis*	Y	-	0	0.0	✓
White Wagtail	*Motacilla alba*	Y	-	3	0.8	0
Red-billed Starling	*Spodiopsar sericeus*	Y	(RC)*	0	0.0	✓
Collared Crow	*Corvus torquatus*	Y	LC, NT	2	0.8	0
			No. of Species Recorded			**19**

(1) Conservation status follows that of Fellowes *et al*. (2002) and BirdLife International listing (2017). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Fellowes *et al*. 2002).
(2) Indicates number of surveys recorded within each month of the reporting period.
(3) Refers to the mean number of individuals recorded in each survey in the WRA.
(4) Follows HK bird list (dated 2017-01-26).
(5) Includes observations during other surveys and/or site visits.
* Red-billed Starling is considered by Fellows *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red-billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

Table E3. Summary of herpetofauna monitoring in the Survey Area (excluding the WRA)

Species Name	Scientific Name	Conservation Status(1)	Nov 2018 Occurrence(2)	Nov 2018 Mean(3)	Records outside surveys(4)
Amphibian		**No. of Species Recorded**	**0**		
(No records in November 2018)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**1**		
Red-eared Slider	*Trachemys scripta elegans*		0	0.0	✓
Species Name	**Scientific Name**	**Conservation Status(1)**	**Dec 2018 Occurrence(2)**	**Dec 2018 Mean(3)**	**Records outside surveys(4)**
Amphibian		**No. of Species Recorded**	**-**		
(No surveys in December 2018)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**-**		
(No surveys in December 2018)					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Jan 2019 Occurrence(2)**	**Jan 2019 Mean(3)**	**Records outside surveys(4)**
Amphibian		**No. of Species Recorded**	**-**		
(No surveys in January 2019)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**-**		
(No surveys in January 2019)					

(1) Conservation status follows that of Fellowes *et al*. (2002), Chan *et al.* (2005) and Karsen *et al*. (1998).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the mean number of individuals recorded in the reporting period (excluding the WRA)
(4) Includes observations during other surveys and/or site visits.

Table E4. Summary of herpetofauna monitoring in the WRA

Species Name	Scientific Name	Conservation Status(1)	Nov 2018 Occurrence(2)	Nov 2018 Mean(3)	Records outside surveys(4)
Amphibian		**No. of Species Recorded**	**0**		
(No records in November 2018)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**0**		
(No records in November 2018)					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Dec 2018 Occurrence(2)**	**Dec 2018 Mean(3)**	**Records outside surveys(4)**
Amphibian		**No. of Species Recorded**	**-**		
(No surveys in December 2018)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**-**		
(No surveys in December 2018)					

Checkered Keelback	*Xenochrophis flavipunctatus*	-	0	0.0	✓
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Jan 2019 Mean(3)**	**Records outside surveys(4)**
Amphibian		**No. of Species Recorded**	**-**		
(No surveys in January 2019)					
			Occurrence(2)	**Mean(3)**	
Reptiles		**No. of Species Recorded**	**-**		
(No surveys in January 2019)					

(1) Conservation status follows that of Fellowes *et al*. (2002), Chan *et al*. (2005) and Karsen *et al*. (1998).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the mean number of individuals recorded in the reporting period in the WRA
(4) Includes observations during other surveys and/or site visits.

Table E5. Summary of mammal monitoring in the Survey Area (excluding the WRA)

Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Nov 2018 Max (3)**	**Records outside surveys(4)**
Mammal		**No. of Species Recorded**	**0**		
(No records in November 2018)					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Dec 2018 Max(3)**	**Records outside surveys(4)**
Mammal		**No. of Species Recorded**	**0**		
(No records in December 2018)					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Jan 2019 Max(3)**	**Records outside surveys(4)**
Mammal		**No. of Species Recorded**	**0**		
(No records in January 2019)					

(1) Conservation status follows that of Fellowes *et al*. (2002) and Shek (2006).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the maximum number of individuals recorded in the reporting period (excluding the WRA).
(4) Includes observations during other surveys and/or site visits.

Table E6. Summary of mammal monitoring in the WRA

Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Nov 2018 Max(3)**	**Records outside surveys(4)**
Mammal		**No. of Species Recorded**	**0**		
(No records in November 2018)					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Dec 2018 Max(3)**	**Records outside surveys(4)**
Mammal		**No. of Species Recorded**	**2**		
Bat	*Indet sp*	-	0	0.0	✓
Bat	*Indet sp 2*	-	0	0.0	✓

Species Name	Scientific Name	Conservation Status(1)	Occurrence(2)	Jan 2019 Max(3)	Records outside surveys(4)
Mammal		**No. of Species Recorded**	**0**		
(No records in January 2019)					

(1) Conservation status follows that of Fellowes *et al*. (2002) and Shek (2006).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the maximum number of individuals recorded in the reporting period in the WRA
(4) Includes observations during other surveys and/or site visits.

^ Leopard Cat is listed on CITES Appendix II and vulnerable (VU) in China Red Data Book and it is protected under the Wild Animals Protection Ordinance (Cap. 170)

Table E7. Summary of dragonfly and butterfly monitoring in the Survey Area (excluding the WRA)

Species Name	Scientific Name	Conservation Status(1)	Occurrence(2)	Nov 2018 Mean(3)	Records Outside Surveys(4)
Odonate		**No. of Species Recorded**	**0**		
No records in November 2018					
			Occurrence(2)	Mean(3)	
Butterfly		**No. of Species Recorded**	**1**		
Three-spot Grass Yellow	*Eurema blanda hylama*	-	0	0.0	✓
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Dec 2018 Mean(3)**	**Records Outside Surveys(4)**
Odonate		**No. of Species Recorded**	**-**		
No surveys in December 2018					
			Occurrence(2)	Mean(3)	
Butterfly		**No. of Species Recorded**	**-**		
No surveys in December 2018					
Species Name	**Scientific Name**	**Conservation Status(1)**	**Occurrence(2)**	**Jan 2019 Mean(3)**	**Records Outside Surveys(4)**
Odonate		**No. of Species Recorded**	**-**		
No surveys in January 2019					
			Occurrence(2)	Mean(3)	
Butterfly		**No. of Species Recorded**	**-**		
No surveys in January 2019					

(1) Conservation status follows that of Fellowes *et al*. (2002), Lo & Hui (2004), Tam *et al*. (2011) and Young & Yiu (2002).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the mean number of individuals recorded in the reporting period (excluding the WRA)
(4) Includes observations during other surveys and/or site visits.

Table E8. Summary of dragonfly and butterfly monitoring in the WRA

Species Name	Scientific Name	Conservation Status(1)	Occurrence(2)	Nov 2018 Mean(3)	Records Outside Surveys(4)
Odonate	**No. of Species Recorded**	**0**			
No records in November 2018					
			Occurrence(2)	**Mean(3)**	
Butterfly	**No. of Species Recorded**	**0**			
No records in November 2018					

Species Name	Scientific Name	Conservation Status(1)	Occurrence(2)	Dec 2018 Mean(3)	Records Outside Surveys(4)
Odonate	**No. of Species Recorded**		**-**		
No surveys in December 2018					
			Occurrence(2)	**Mean(3)**	
Butterfly	**No. of Species Recorded**	**-**			
No surveys in December 2018					

Species Name	Scientific Name	Conservation Status(1)	Occurrence(2)	Jan 2019 Mean(3)	Records Outside Surveys(4)
Odonate	**No. of Species Recorded**		**-**		
No surveys in January 2019					
			Occurrence(2)	**Mean(3)**	
Butterfly	**No. of Species Recorded**		**-**		
No surveys in January 2019					

(1) Conservation status follows that of Fellowes *et al*. (2002), Lo & Hui (2004), Tam *et al*. (2011) and Young & Yiu (2002).
(2) Indicates number of surveys recorded within the reporting period.
(3) Refers to the mean number of individuals recorded in the reporting period in the WRA
(4) Includes observations during other surveys and/or site visits.

F. Environmental Mitigation Measures - Implementation Status

Air Quality – Recommended Mitigation Measures

Air Quality Mitigation Measures during construction	Implementation Status
• access roads should be sprayed with water or dust suppression chemical to maintain the entire road surface wet or paved;	✓
• every stock of more than 20 bags of cement or dry PFA should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;	N/A
• de-bagging, batching or mixing process should be carried out in sheltered areas during the use of bagged cement;	N/A
• use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first-floor level, from the first-floor level, up to the highest level (maximum four floors for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction;	N/A
• dump trucks for material transport should be totally enclosed using impervious sheeting;	✓
• any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated within 24 hours of the excavation or unloading;	✓
• dusty materials remaining after a stockpile is removed should be wetted with water;	✓
• the area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with e.g. concrete, bituminous materials or hardcore or similar;	✓
• the portion of road leading only to a construction site that is within 30m of a designated vehicle entrance or exit should be kept clear of dusty materials;	✓
• stockpile of dusty materials to be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;	✓
• all dusty materials to be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;	✓
• vehicle speed to be limited to 10 kph except on completed access roads;	✓
• every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;	✓
• the load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and	✓
• the working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet.	✓
Odour mitigation measures	
• all malodorous excavated material should be placed as far as possible from any ASRs;	N/A
• the stockpiled malodorous material should be removed from site as soon as possible; and	N/A
• the stockpiled malodorous material should be covered entirely by plastic tarpaulin sheets.	N/A

Noise – Recommended Mitigation Measures

Noise Mitigation Measures during construction	Implementation Status
• only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction works;	✓
• machines and plant that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;	✓
• plant known to emit noise strongly in one direction should, where possible, be orientated to direct noise away from the NSRs;	✓
• silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction period;	✓
• mobile plant should be sited as far away from NSRs as possible;	✓
• material stockpiles and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities;	✓
• air compressor and hand-held breaker should be fitted with valid noise emission labels during operation; and	N/A
• The Contractor shall at all times comply with all current statutory environmental legislation.	✓
Selection of quieter plant and working methods The Contractor shall obtain particular models of plant that are quieter than standards given in GW-TM. The list of assumed quieter plants can be found in the Table 4–14 of the EIA report. The Contractor shall select from the available models achieving the assumed sound levels while making reference to the GW-TM and BS5228: Part 1: 1997	✓
Use of Noise Barriers Noise barriers are proposed along the site boundary to block the direct line of sight from the most affected NSRs to the major noise contribution construction phases. The height of the noise barriers ranged from 9-10m. The noise barriers shall be built before the commencement of construction works in order to ensure protection to nearby NSRs. The noise barrier should have a surface density of at least 10kg/m^2 or material providing equivalent transmission loss. The noise barriers and hoardings should have no gaps and openings to avoid noise leakage.	✓

Water Quality – Recommended Mitigation Measures

Water Quality Mitigation Measures during construction	Implementation Status
• The site should be confined to avoid silt runoff to the site;	✓
• No discharge of silty water into the storm drain and drainage channel within and the vicinity of the site;	✓
• Any soil contaminated with chemicals/oils shall be removed from site and the void created shall be filled with suitable materials;	P
• Stockpiles to be covered by tarpaulin to avoid spreading of materials during rainstorms;	N/A
• Suitable containers shall be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport;	✓
• Chemical waste containers shall be labelled with appropriate warning signs in English and Chinese to avoid accidents. there shall also be clear instructions showing what action to take in the event of an accidental;	✓
• Storage areas shall be selected at safe locations on site and adequate space shall be allocated to the storage area;	✓
• Any construction plant which causes pollution to the water system due to leakage of oil or fuel shall be removed off-site immediately;	N/A
• Spillage or leakage of chemical waste to be controlled by using suitable absorbent materials;	N/A
• Chemicals will always be stored on drip trays or in bunded areas where the volume is 110% of the stored volume; and	✓
• Regular clearance of domestic waste generated in the temporary sanitary facilities to avoid waste water spillage.	✓
• Temporary sanitary facilities to be provided for on-site workers during construction;	✓

Water Quality Mitigation Measures during construction	Implementation Status
• Temporary drainage channel and associated facilities will be provided to collect the surface runoff generated within the Project Area during the construction phase;	✓
• Sandbags or silt traps will need to be placed to avoid silt runoff to the drainage channel draining the water in the northern ditch. Draining of the ditches should avoid rainy weather; and	✓
• Excavated soil which needs to be temporarily stockpiled should be stored in a specially designated area and provided with a tarpaulin cover to avoid runoff into the drainage channels.	✓

Waste Management – Recommended Mitigation Measures

Waste Management Mitigation Measures during construction	Implementation Status
Site Clearance Waste • The major construction works of Wo Shang Wai is in the development of residential buildings and other associated facilities (club house, tennis courts, etc.). The amount of site clearance works will be limited with the exception of the excavated materials. The thin layer of vegetation removed can be stored and reused for landscaping.	✓
Excavated Materials The intention is to maximize the reuse of the excavated materials on-site as fill materials.	✓
Imported Filling Material The excavated/imported filling material may have to be temporarily stockpiled on-site for the construction of road embankment and foundation of viaduct substructure. Control measures should be taken at the stockpiling area to prevent the generation of dust and pollution of stormwater channels. However, to eliminate the risk of blocking drains in the wet season, it is recommended that stockpiling of excavated materials at during wet season should be avoided as far as practicable.	✓
Construction and Demolition Materials Careful design, planning and good site management can minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork should maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork of plastic facing should be considered to increase the potential for reuse.	✓
The Contractor should reuse any C&D material on-site. C&D waste should be segregated and stored in different containers to other wastes to encourage the re-use or recycling of materials and their proper disposal.	✓
Chemical Waste For those processes which generate chemical waste, it may be possible to find alternatives which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste.	N/A
Containers used for the storage of chemical wastes should:	
• be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;	✓
• have a capacity of less than 450 litres unless the specification has been approved by the EPD; and	✓
• display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.	✓
The storage area for chemical wastes should:	
• be clearly labelled and used solely for the storage of chemical waste;	P
• be enclosed on at least 3 sides;	✓
• have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area whichever is the greatest;	✓
• have adequate ventilation;	✓
• be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and	✓
• be arranged so that incompatible materials are adequately separated.	✓

Waste Management Mitigation Measures during construction	Implementation Status
Disposal of chemical waste should:	
• be via a licensed waste collector; and	N/A
• be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers, or	N/A
• to be reuser of the waste, under approval from the EPD.	N/A
General Refuse Should be stored in enclosed bins or compaction units separate from C&D and chemical wastes. The Contractor should employ a reputable waste collector to remove general refuse from the site, separate from C&D and chemical wastes, on a regular basis to minimise odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.	P
Disposal of Excavated Sediment at Sea	
The requirements and procedures for excavated sediment disposal are specified under the ETWB TCW No. 34/2002 and PNAP 252. The management of the excavation, use and disposal of sediment is monitored by Fill Management Committee, whilst the licensing of marine dumping is the responsibility of the Director of Environmental Protection (DEP).	N/A
The excavated sediment would be loaded onto barges or other appropriate vessel and transported to the designated marine disposal site. Category L sediment and Category M sediment passing the biological test would be suitable for disposal at a gazetted open sea disposal ground. Category M sediment failing the biological test and Category H sediment passing the biological test would require confined marine disposal.	N/A
During transportation and disposal of the dredged sediment, the following measures should be taken to minimize potential impacts on water quality:	N/A
• Bottom opening transport vessels should be fitted with tight fitting seals to prevent leakage of material. Excess material should be cleaned from the decks and exposed fittings of vessels before the vessel is moved.	N/A
• Monitoring of the barge loading should be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels should be equipped with automatic self-monitoring devices as specified by the DEP.	N/A

Ecology – Recommended Mitigation Measures

Ecology Mitigation Measures during construction	Implementation Status
Clear Definition of Site Limit	
Clear definition of the site limit should be provided in order to minimize and confine the disturbance during the construction period, especially the northern limit of the Site which is adjacent to fishponds within the Conservation Area (CA) zone and are considered to be ecological sensitive receivers.	✓
During wetland construction stage the WRA boundary will be delineated using a temporary hoarding in order to reduce disturbance to off-site habitats and wildlife. During the establishment phase this hoarding will be replaced with a 1 m high chain-link fence in order to reduce disturbance to the WRA through access by humans and dogs, and a hoarding will be established around the residential construction site.	N/A (WRA construction completed)
Dust and Noise Suppression and Avoidance of Water Pollution	
Good site practices of dust and noise suppression should be strictly implemented to ensure that disturbance is minimized to acceptable levels. Mitigation measures for the off-site disturbance impacts on the fishponds in the CA include hoarding at the northern site boundary during construction of the WRA to reduce noise and dust impacts to the adjacent habitats. Through the use of quieter plant and temporary/movable noise barriers, the noise level would be reduced significantly to an acceptable level. Hoarding at the northern boundary should be replaced with a 1 m high chain-link fence following construction and the WRA will then act as a buffer between the existing wetland areas and the residential part of the site until construction is completed. Hoarding will be retained between the WRA and ongoing construction work to avoid visual disturbance and reduce noise and dust emissions. Pollution of watercourses and sedimentary runoff will be minimized by good site practice, especially the containment of water and sediment within the site for removal.	✓

Ecology Mitigation Measures during construction	Implementation Status
These standard noise and air and water quality site practices are considered to be effective measures for minimizing the disturbance impact during the construction period.	
Planning of Construction Schedule	
The construction of the proposed project should be scheduled in phases. Because mitigation is preferably carried out in advance of the main works rather than after the completion of works, the construction of the WRA will commence at the start of the project. Construction work within the WRA is scheduled to take place in a single wet season, followed by 1.5 years of wetland establishment. During the wetland establishment period no noisy work will be undertaken within the WRA to minimize the disturbance to off-site habitats and wildlife.	N/A (WRA construction completed)
Reusing Onsite Materials	
Soil and plants on-site should be reused (e.g. used as fill material) as far as practical. Stock piles of these reusable materials should be stored in an appropriate area on-site. In particular, the re-use of the wetland soils and topsoil should be considered.	✓
Construction of the Wetland Restoration Area The WRA will be operational within 2.5 years from the commencement of construction (1 year for site formation and 1.5 years for establishment) and will compensate for the predicted ecological impacts of the proposed development.	✓

Landscape and Visual – Recommended Mitigation Measures

Landscape and Visual Mitigation Measures during construction	Implementation Status
CM1 - The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	✓
CM2 - Screening of construction works by hoarding / noise barriers.	✓ (see Appendix G Photo 1 & 2 *)
CM3 - Reduction of construction period to practical minimum.	✓
CM4 - Topsoil, where identified, should be stripped and stored for re-use in the construction of the soft landscape works, where the soil material meets acceptable criteria and where practical. The Contract Specification shall include storage and reuse of topsoil as appropriate.	✓
CM5 - Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone).	✓
CM6 - Advance screen planting of noise barriers	✓ (see Appendix G Photo 3 *)
CM7 - Control night-time lighting and glare by hooding all lights.	N/A
CM8 - Ensure no run-off into streams adjacent to the Project Area.	✓
CM9 - Protection of existing trees on boundary of site shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at S16 and Tree Removal Application stage).	✓
CM10 - Trees unavoidably affected by the works shall be transplanted where practical. Trees should be transplanted straight to their destinations and not held in a nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	✓

Legend:
✓ Implemented
× Not implemented
P Partially implemented
N/A Not applicable
* Representative photos showing the implementation of mitigation measures are presented in Appendix G

G. Landscape and Visual Audit Photos

Photo 1: The Construction works have been screened by hoarding / noise barriers. (CM2)	Photo 2: The wetland areas are being established, with the ponds being seasonally filled with rain water (CM2)
Photo 3: Advance screen planting of noise barrier has been undertaken (CM6)	