APPENDIX C

PROPOSED EXECUTIVE CONDOMINIUM HOUSING DEVELOPMENT
LAND PARCEL AT SEMBAWANG ROAD

ADDITIONAL CONDITIONS OF TENDER
(TECHNICAL)

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PART I

1.0 GENERAL

1.1 The Successful Tenderer must, in addition to the Particulars and Conditions of Tender, observe and comply with these Additional Conditions of Tender (Technical) in the development and lease of the Land Parcel at Sembawang Road. The Particulars and Conditions of Tender and these Additional Conditions of Tender (Technical) shall be read in conjunction with the technical information booklet enclosed in the sale packet. The Successful Tenderer shall also comply with all applicable guidelines issued by the Competent Authorities and Public Utility Licensees. All proposals are subject to the approval of all relevant Competent Authorities and Public Utility Licensees.

1.2 The conditions and requirements of all relevant Competent Authorities and Public Utility Licensees set out in these Additional Conditions of Tender (Technical) and in the Conditions and Requirements of Relevant Competent Authorities and Public Utility Licensees and the appendices thereto (to be complied with by the Successful Tenderer at his own cost and expense) are provided to tenderers for their information only. Whilst every care and attention has been taken in the compilation and preparation of these conditions and requirements, HDB does not warrant that they constitute an exhaustive list of the conditions and requirements of the relevant Competent Authorities and Public Utility Licensees in respect of the development or that they are free from any errors or omissions. These conditions and requirements are subject to change by the relevant Competent Authorities and Public Utility Licensees and the onus lies on the Successful Tenderer to verify these conditions and requirements with HDB, the relevant Competent Authorities and Public Utility Licensees directly and comply with their prevailing conditions and requirements.

1.3 The Government and HDB are not liable to any tenderer and tenderers shall not claim against the Government and/or HDB for any errors and/or omissions in and for any loss suffered by any tenderer arising directly or indirectly from the reference to, usage of and/or reliance on the contents of these Additional Conditions of Tender (Technical), the Conditions and Requirements of Relevant Competent Authorities and Public Utility Licensees and appendices thereto.

1.4 All references to “the Successful Tenderer” herein shall be deemed to include “the approved developer” as defined in the Particulars and Conditions of Tender where the context so admits.

PART II

2.0 SUMMARY OF PLANNING REQUIREMENTS

A summary of the planning requirements is set out in Table 1. The detailed planning requirements are set out in Part III.

Table 1 – Summary of Planning Requirements for the Land

PARAMETERS	PROVISIONS / REQUIREMENTS
Site Area	18,968 sqm*
Land Use / Zoning	Residential
Type of Proposed Development	Executive Condominium Housing Development
Gross Plot Ratio	1.4
Permissible Gross Floor Area (GFA)	Maximum GFA: 26,556 sqm Minimum GFA: 23,900 sqm
Building Height (maximum)	Subject to a technical height control of 40 - 45m Singapore Height Datum (SHD). The details are set out in Part III (Clause 3.4).

*Site area is subject to cadastral survey.

PART III

3.0 PLANNING PARAMETERS

3.1 PROPOSED DEVELOPMENT

The Land Parcel at Sembawang Road ("the Land") with a site area of 18,968* sqm shall be for Executive Condominium Housing Development ("the development"). The site area is the area measured up to the boundary lines as shown on the Certified Plan No._____.

Note: Executive Condominiums are non-landed housing developments that typically come with generous provision of communal and recreational facilities for the enjoyment of the residents.

*Site area is subject to cadastral survey.

3.2 ALLOWABLE GROSS FLOOR AREA (GFA)

The total GFA for the development shall not exceed 26,556 sqm but shall not be less than 23,900 sqm. Based on the site area of 18,968 sqm, the permissible Gross Plot Ratio (GPR) should not exceed 1.4*. The total GFA shall be computed in accordance with the Urban Redevelopment Authority's (URA's) Development Control Guidelines.

*Indicated for information of the Tenderer only.

3.3 BUILDING LINE / SETBACK

The Successful Tenderer shall at all times comply with URA's and the relevant Competent Authorities' requirements on the building line setback. Notwithstanding the generality of the foregoing, the building setbacks (including basement structures) shall be based on the boundary of the Land delineated on the Certified Plan No._____.

The Successful Tenderer shall conform to URA's Current Guidelines for Condominium Housing Development with regard to Building Spacing and Setback Standards.

3.4 BUILDING HEIGHT

The development shall be subject to a technical height control of 40 - 45m Singapore Height Datum. The technical and storey height control of the development is to comply with all applicable standing guidelines issued by the Competent Authorities, including URA's Development Control Guidelines. The Successful Tenderer is to check with the Competent Authorities on the standing guidelines as the guidelines are reviewed from time to time. The lowest technical and storey height control imposed by the Competent Authorities will be applicable to the Land. The final technical and storey height are subject to the approval of the Competent Authorities.

The Successful Tenderer shall ensure that all developments, structures and fixtures on the Land do not exceed the maximum allowable height of 40 – 45m Singapore Height Datum. Such developments, structures and fixtures include those on the roof tops, whether permanent or temporary, transient or stationary (including but not limited to building superstructure, water tanks, lift motor rooms, TV antennae, cranes, maintenance equipment, lightning conductors, solar panels, moving objects, vegetation, etc.) and all construction equipment and temporary structures (including but not limited to cranes, piling rigs, etc.) are subject to the same height limit. The Republic of Singapore Air Force's (RSAF) clearances shall be sought for the use of crane or tall construction machineries above 30m Singapore Height Datum (Email height_control@defence.gov.sg). If the Successful Tenderer wish to pre-consult RSAF on the maximum allowable height for the use of construction equipment and temporary structures, the Successful Tenderer can consult RSAF with a copy of the awarded letter and a copy of this conditions of tender. For civil aviation height and requirements, please consult the Civil Aviation Authority of Singapore ("CAAS"). The more stringent height restriction(s) from the respective agencies shall apply.

All capital and operating costs or expenses incurred to meet all the above conditions and requirements will be borne by the Successful Tenderer.

The Successful Tenderer shall submit to the Civil Aviation Authority of Singapore (CAAS) a certified surveyor as-built plan prior to applying to the Building Control Authority (BCA) for the Temporary Occupation Permit or Certificate of Statutory Completion for the development on the Land.

The Successful Tenderer shall obtain CAAS' and RSAF's prior written approval before mobilising and/or installing any construction machineries on the Land. An application to CAAS is to be submitted by the Successful Tenderer using the Crane Application Form available at URL: http://www.caas.gov.sg/e-services-forms/e-services/application-for-obstacle-clearance.

The Successful Tenderer is to consult MINDEF through URA's Development Control Group when the detailed development plans are available.

In the event where there are any communication installations on the Land, the Successful Tenderer is advised to seek clearance from relevant agencies such as Info-communications Media Development Authority of Singapore (IMDA).

3.5 DEVELOPMENT CONTROL

The Successful Tenderer shall comply with the Development Control (DC) Guidelines issued or may be issued by the Competent Authority under the Planning Act 1998, unless otherwise stated in the Additional Conditions of Tender (Technical).

The building massing and design treatment of the development must be sensitive to the surrounding environment. The layout of the building blocks shall be subject to evaluation at the Development Application stage. The Successful Tenderer can refer to URA's circular dated 4 March 2010 titled "*Sensitive Design and Development: An Industry Guide of Good Practices to Minimise Wall-like Developments*" on possible design treatment options for the development.

In addition, regardless of when the development application is submitted to URA, the Successful Tenderer shall comply with the revised Gross Floor Area (GFA) and strata area definitions as set out in the circular "Harmonisation of floor area definitions by URA, SLA, BCA and SCDF" issued on 1 September 2022.

Where applicable, the Successful Tenderer's Qualified Person shall submit a Development Statement of Intent (DSI) together with their development proposal to the Competent Authority under the Planning Act 1998 at the formal submission stage in compliance with prevailing guidelines and circulars issued by the Competent Authority.

<u>Existing Underground Structures</u>

The Successful Tenderer shall be responsible, at his own cost and expense, to carry out his own site investigation to verify whether there is any sub-structure or other obstructions e.g. footings, piles, tree roots etc. in the ground of the Land, and ascertain their effect on the proposed development, including the removal of such sub-structure or obstructions, if necessary. The Successful Tenderer shall be deemed to have notice of any sub-structure or other obstructions in the ground of the Land and shall not raise any objection or requisition whatsoever in respect of any such sub-structure or other obstructions.

3.6 URBAN DESIGN AND ENVIRONMENT CONSIDERATIONS

Given that the development is in close proximity to the landed housing area (i.e. north of the site), the Successful Tenderer is to ensure that the development is sensitively designed along this edge e.g. stepping down of building, gable-end facing blocks, to minimise overlooking and to reduce wall-like effect facing the landed housing.

The architectural solution must respect the context/built environment of the Land in its setting and shall blend in with the surrounding developments and be conducive to the overall surrounding character/ambience.

As there is an existing Sungei Simpang Kanan Park Connector (PC) along the southern edge, the Successful Tenderer is to ensure that there is seamless connection from the subject development to the PC and surrounding amenities/facilities, for ease of the residents.

The Successful Tenderer shall ensure that the development and its activities will not cause any undue nuisance to the surrounding/adjacent developments in terms of noise, glare, smell and any other form of pollution. Please refer to the plan referenced in Appendix C(I) for the requirements listed above.

Sembawang Town Design Guide

The Successful Tenderer is encouraged to refer to HDB's Sembawang Town Design Guide (TDG) for the vision and design guidelines for Sembawang. The full TDG will be issued upon the successful appointment of the Successful Tenderer. The Successful Tenderer shall contribute to the distinctiveness of Sembawang and take reference from the neighbourhood sub-theme of 'Nautical Living' in which the development lies. These include guidelines on public spaces, streetscape and urban edge, colour palette and landscape approach for the neighbourhood scale which can help to enhance placemaking of the estate.

3.7 VISUAL CONTROL CONSIDERATIONS

There is a need for visual controls at the Land to shield the facilities at Sembawang Air Base from external view. This can only be determined when design details such as number of storeys of the development, location of openings (e.g. windows) etc. are available. The Successful Tenderer shall comply with MINDEF's requirements for visual controls as set out in Appendix D Clause 11.0.

3.8 PLATFORM LEVEL

The existing levels of the Land are as shown in the Topographical Survey Plan No. 3509-CSS-TP-SB-12401-01. Public Utilities Board (PUB) has specified that the minimum platform level (MPL) for the Land shall not be lower than 4.5m above Singapore Height Datum, or 600mm above the adjacent road/ground levels for multi-residential and commercial developments, 1m for special facilities and developments with direct or indirect linkages to underground special facilities, or any other level as determined by PUB as stated in the latest edition of the 'Code of Practice on Surface Water Drainage', whichever is the highest. For basements of industrial, institutional, commercial or multi-unit residential developments, the minimum crest level shall be at least 300mm above the MPL as stated above. The final platform level is subject to the relevant Competent Authorities' approval. The Successful Tenderer shall be required to seek approvals from the relevant Competent Authorities on the platform levels before commencement of its building layout design.

All the cost and expense incurred in carrying out earth cutting and filling of the existing ground, if necessary, to the proposed platform level shall be borne by the Successful Tenderer.

In changing the platform levels, the Successful Tenderer shall ensure that the revised platform levels of the Land shall satisfy the drainage requirements in compliance with PUB's current Codes of Practice on the Surface Water Drainage and the Sewerage & Drainage (Surface Water Drainage) Regulations. The Successful Tenderer shall also check and ensure that the revised platform level will still meet all the requirements of the relevant Competent Authorities.

The Successful Tenderer shall conduct thorough investigations of the Land and ensure that the runoff within, upstream of and adjacent to the Land can be effectively drained away without causing flooding within the Land and in the vicinity of the Land, all in compliance with the PUB's relevant Codes of Practice.

All earthworks, slope and embankments shall be contained within the boundaries of the Land.

3.9 VEHICULAR INGRESS / EGRESS

The Land Transport Authority (LTA) requires the Successful Tenderer to comply with the following requirements:

i) The vehicular access to the Land shall be taken from Sembawang Road. The approximate position of the access is as shown on the Site Plan, with the egress-only located 15m away from the upstream side road, and the ingress-only located 30m away from the start of the left turn slip road taper. The exact location and detailed proposal for the access point and the traffic layout arrangement are subject to the requirements and approval of the LTA and other relevant Competent Authorities at the formal submission stage.

ii) To prevent potential queue-back onto Sembawang Road:

a) Security Clearances with gantry shall be set back further into the development with at least 3 car-length queue space for the visitor lane.

b) The internal layout should cater sufficient space for food/parcel delivery vehicles, etc, to conduct their activities without impeding traffic flow.

c) The internal layout should be designed to ensure sufficient pick up/drop off facilities within the development to provide good traffic circulation and avoid conflicting movements among vehicles/pedestrians/cyclists.

iii) The pedestrian side gate should be located where it can encourage pedestrian connectivity and reduce walking distance to the nearby transport nodes such as bus stops near Jalan Hikayat, Canberra MRT and other nearby pedestrian crossings so as to encourage first-mile and last-mile connectivity.

iv) The Successful Tenderer shall design the boundary walls at the exit point/pedestrian side gates such that the line of sight amongst motorists/pedestrians/cyclists crossing the access is clear. The design shall be subject to the requirements and approval of the LTA and other relevant Competent Authorities at the formal submission stage.

v) Any drop barrier to car park or internal driveway shall be located within the development site and designed for sufficient queuing space within the development to ensure smooth flow of vehicles along the main road. All drop off/pick up points shall be adequately designed for and not affect ingress/egress movement and should be located further inland.

vi) Access to service areas (e.g. bin centre, electrical substation, loading/unloading bays) shall be taken from within the development. Access to these service areas, if required, shall be taken via the ingress/egress point of the development as shown in the Site Plan, subject to the requirements and approval of the LTA and other relevant Competent Authorities. No separate service access will be allowed to be directly taken from the public roads.

vii) The Successful Tenderer shall at his own cost and expense construct the vehicular culverts for the access and external works, and hand it over to the relevant Competent Authority for management and maintenance.

3.10 LOCATION OF BIN CENTRE

The bin centre shall be sensitively located within the Land such that it does not become a nuisance to residents in the surrounding developments. The entrance of the bin centre shall face inwards within the development. The design of the refuse management system shall comply from the Code of Practice on Environmental Health.

The Successful Tenderer shall ensure that the bin centre and its entrance area, including any parking space for refuse trucks, are located away from any adjacent residential developments (if any).

The service driveway for the bin centre is to be integrated within the Land and the length of the service driveway must be able to accommodate all service vehicles.

Lush planting and / or screening shall be provided to screen the bin centre and service areas from view of the residents in the adjacent residential developments (if any), and users of the surrounding public roads and walkways.

3.11 CAR PARKING REQUIREMENTS

LTA requires the Successful Tenderer to comply with the following requirements:

i) The Successful Tenderer is to ensure that the proposal and plans of the parking place and parking lots within the development comply fully with the prevailing Parking Places (Provision of Parking Places and Parking Lots) Rules and other relevant guidelines of the Authority.

ii) All critical dimensions of the parking layout such as size of parking lots, width of driveways/ramps, parking aisles, headroom clearance, etc. shall be clearly indicated on plan and sections.

iii) The design of the parking place shall include adequate spaces for vehicles to carry out furniture delivery or house-moving activities.

iv) The design and layout of the car park will be subject to the requirements and approval of the Authority and the relevant Competent Authorities and Public Utility Licenses under the LTA's requirements for the Land.

Electric Vehicles (EV) Charging Provision

v) The Successful Tenderer shall provide for the required EV charging provisions under the Electric Vehicles Charging Act (EVCA) 2022, if applicable. Please refer to the guidelines published on LTA's website at

https://www.lta.gov.sg/content/ltagov/en/industry_innovations/technologies/electric_vehicles/transitioning_to_evs.html under 'Widening Coverage of Accessible EV Charging Points' for more information.

Bicycle Parking Provision

vi) The Successful Tenderer shall comply with LTA's requirements for bicycle parking provisions as set out in Appendix D Clause 3.0 and shall be subject to the evaluation and approval of the Authority and other relevant Competent Authorities.

PART IV

4.0 OTHER REQUIRED WORKS

4.1 ROAD WORKS REQUIREMENTS

LTA, PUB, and NParks requires the Successful Tenderer to comply with the following requirements:

i) The Successful Tenderer is to reconstruct the existing roadside table along Sembawang Road in accordance to LTA's prevailing standards, i.e. converting into 1.8m wide footpath-cum-drain and tie back to existing footpath-cum-drain along Sembawang Road as shown in the Site Plan. The design shall be subjected to the requirements and approval of the LTA and other relevant Competent Authorities at the formal submission stage. The Successful Tenderer is to consult NParks for concurrence should the trees along Sembawang Road be affected.

   a. The existing roadside drain is to be reconstructed to minimally 1.4m (w) x 1.5m (d) with a gradient of 1:250 or equivalent. The reconstructed drain will be taken over by PUB for maintenance, subject to meeting PUB's requirements.

   b. The Successful Tenderer is to ensure that the connection between the existing footpath and the proposed footpath abutting the site to be constructed by the Successful Tenderer is tied back properly for proper connectivity, at downstream design stage.

ii) The Successful Tenderer is to also implement a yellow box on Sembawang Road, at the egress of the development. The indicative location is as indicated on the Site Plan.

iii) The Successful Tenderer is also to lengthen the existing U-turn storage lane along north-bound Sembawang Road as much as possible, utilizing space from the center median, in consideration of the existing U-turn storage lane in the other direction.

iv) The detailed design and the proposed works are to comply with the requirements of the relevant Competent Authorities. The Successful Tenderer shall submit a detailed proposal of the proposed works to the relevant Authorities for approval.

4.2 DRAINAGE AND SEWER WORKS REQUIREMENTS

PUB requires the Successful Tenderer to comply with the following requirements:

i) The Successful Tenderer is to realign and divert the existing public drain cutting across the site to the edge of the development. The indicative location where the drain is to be reconstructed at is as shown on the Site Plan.

a. The existing drain shall be realigned and reconstructed to minimally 1.2m (w) x 1.2m (d) at gradient of 1:200 or equivalent. There is existing runoff from the upstream catchment area that is discharging into the existing drain that are cutting across the development. 45% of the development's discharge shall discharge into this drain. The remaining 55% is to be discharged along the existing roadside drain along Jalan Cherpen.

b. The Successful Tenderer is to engage a registered surveyor to do a site verification on the size of existing drain before realignment and reconstruction.

c. The proposed drain diversion must be assessed to be technically and physically feasible and acceptable by PUB. It must also tie in with the existing drains smoothly. PUB will assume ownership and maintenance of the 1.2m wide open drain, subject to the drain's design meeting PUB's Code of Practice (COP) on Surface Water Drainage requirements.

d. Should there be any counter proposal for the discharge points and allocated catchment area discharging, please pre-consult PUB early and obtain approval prior to the formal submission and commencement of works.

ii) The Successful Tenderer is to divert the existing 150mm/375mm diameter sewers out of the proposed site, and construct 300mm diameter sewers of approx. 495m length including all manholes from MH A to MH K at his own cost and connect to the unsurveyed 2100mm diameter sewer at MH L, as shown indicatively in Appendix C(II). As the 2100mm diameter sewer is around 20m deep, the Successful Tenderer will most likely have to construct a vortex drop before connecting to the said sewer. The Successful Tenderer shall also divert the existing flow of the 150mm diameter sewer serving the existing housing estates from MH M to MH H as shown in Appendix C(II). The Successful Tenderer shall carry out further detailed study to determine the feasibility of the proposed sewer alignment and consult PUB early before the details are firmed up.

a. Sewer connection for the site shall be made to the new sewers to be laid by the Successful Tenderer. The details on the proposed sewer including the required sewer diversion to be implemented by the Successful Tenderer shall be submitted to PUB(WRN) early for comment/approval before the commencement of works on site.

b. The existing drain-lines/sewers serving the premises on the proposed sites and adjacent lots shall not be disrupted or abandoned unless CCTV inspection and site investigation have confirmed that no lateral connections are still connected to the sewers/drain-lines. The Successful Tenderer is to liaise directly with the private owners

for all works affecting these sanitary drain-lines. All lateral connections shall not be disrupted/affected by any proposed diversion. PUB's prior approval shall be obtained before any sewer/manhole/drain-line is abandoned/sealed/grouted.

PART V

5.0 OTHER REQUIREMENTS

5.1 PEDESTRIAN SIDE GATES

LTA requires the Successful Tenderer to comply with the following requirements:

i) The Successful Tenderer is to pay additional attention on the pedestrian connectivity aspect in terms of where the pedestrian side gate locations should be located, i.e. to the nearby bus stops and pedestrian crossing as well as towards the nearby Canberra MRT station, etc, to encourage first-mile/last-mile accessibility. For example, the Successful Tenderer should design the pedestrian gate along Sembawang Road to be as close as possible to the upstream bus stops (near Jalan Hikayat) so that the walking distance between the bus stops and pedestrian gate will be shorter.

5.2 REMOVAL OF EXISTING RETAINING WALL

PUB requires the Successful Tenderer to comply with the following requirements:

i) There is an existing retaining wall surrounding the sewer manhole within the development. This retaining wall may be removed by the Successful Tenderer, if necessary, subject to approval by PUB(WRN), by raising the lower ground level to match the upper slope level. The top level of the affected manhole would also have to be raised to match the upper slope level by the Successful Tenderer as part of the proposed work.

ii) Manholes shall not be buried under any circumstances. Where there is a need to raise or lower any existing manholes, the Successful Tenderer shall liaise with the Network Management Branch (Tel No. 6517 2230) of Water Reclamation (Network) Department, PUB and carry out the necessary works at his own cost and expense. In Detailed Plan submissions, the QP shall provide details of the proposal including the surveyed existing manhole top and invert levels, proposed new manhole top level and manhole details. Upon completion of the manhole raising/lowering work, as-built drawings showing the surveyed final manhole top and invert levels and updated details of manhole details of the affected manholes shall be submitted to PUB.

5.3 PRODUCTIVITY IMPROVEMENT

The Successful Tenderer is required to comply with the productivity improvement as stipulated under the Building Control (Buildability and Productivity) Regulations for the proposed development on the Land as set out in Appendix D Clause 10.0.

5.4 STORAGE AREA FOR PREFABRICATED PREFINISHED VOLUMETRIC CONSTRUCTION (PPVC) MODULES

If PPVC method of construction is adopted, the Successful Tenderer is required to set aside some space within the Land for storage and/or holding area for PPVC modules. No additional space outside the Land will be granted on TOL basis for this purpose.

5.5 CONDITIONS AND REQUIREMENTS FOR ENGINEERING WORKS AFFECTING HDB PROPERTIES

i) For engineering works that affect HDB properties, the Successful Tenderer/Qualified Person (QP) in charge of the engineering works shall submit to HDB an engineering works plan before the commencement of work. The engineering works plan shall be prepared, signed and supervised by the Successful Tenderer/QP. The following shall be included in the engineering works plan:

Layout plan including site boundaries and cross-sectional details of works;

a. Layout plan and cross-sectional details of retaining structure and temporary support;

b. Method Statement of Construction;

c. Design calculations for the works that affect HDB property;

d. Soil investigation report of the site;

e. Proposal for monitoring the effect of the works on HDB property.

ii) The Successful Tenderer/QP shall be fully responsible for the construction of all the works as shown in the works plan. The Successful Tenderer/QP shall also be responsible for carrying out the works in the manner as stated in the method statements.

iii) The Successful Tenderer/Contractor shall submit a Pre-Construction Survey Report to the relevant Town Council and the nearest HDB Branch before the installation of instrument on HDB property or the commencement of works.

The Successful Tenderer/Contractor shall highlight to Town Council on defect(s) that may have structural or public safety concerns and/or require close monitoring.

iv) The Successful Tenderer/QP shall submit a Building Impact Assessment Report to HDB (Building & Infrastructure Group) before the commencement of the works.

5.6 INSTRUMENTATION MONITORING

HDB requires the Successful Tenderer to comply with the following requirements:

i) For geotechnical building works that affect HDB properties, the Successful Tenderer/QP shall ensure that the proposed works do not affect the integrity or stability of the foundation and structure of HDB property. During the progress of the engineering works, the Successful Tenderer/QP must provide adequate means of instrumentation to monitor the effect of the engineering works on HDB property. The Successful Tenderer/QP shall submit the type and location of such monitoring instruments and frequency of reading to HDB for clearance. The physical movement to be monitored shall include but not be limited to the following:

a. Lateral deflection of retaining structure;

b. Vertical deflection of column of HDB property;

c. Settlement of apron slab and beam of HDB property;

d. Levels of road or carpark or sewer manhole adjacent to HDB property;

e. Ground water level below/adjacent to HDB property;

f. Vibration movement in HDB property.

The Successful Tenderer/QP shall submit an instrumentation report to HDB every month until the completion of works.

ii) Instrumentation on Fiber Reinforced Polymer (FRP) columns (if any)

For the purpose of instrument installation, the diameter of holes drilled must not exceed 10mm on the fibre reinforced polymer wrapped column. The minimum spacing between these drilled holes is 300mm, centre-to-centre. No ram setting is allowed on the columns.

iii) Alert (Trigger) and Work Suspension (Allowable) Instrumentation Level

The Successful Tenderer/QP shall establish Alert and Work Suspension levels for the instrumentation reading of the physical movement mentioned in Clause 5.6(i) above. These Alert and Work Suspension instrumentation level readings shall be made known to HDB before the commencement of works. On breaching of Alert level at any location on site, the Successful Tenderer/QP is required to inform HDB and follow up with a report to HDB reviewing the movement and predicting further movement up to completion of the works. Where necessary, the Successful Tenderer/QP shall submit to HDB a proposal to mitigate further movement or install additional monitoring. On breaching a Work Suspension level at any location, the Successful Tenderer/QP shall stop the works immediately. The Successful Tenderer/QP shall immediately inform HDB and implement measures to mitigate further movement. The Successful Tenderer/QP shall allow the work to continue only if the measures implemented are proven to be effective by the relevant Authorities. The monitoring of movements shall be inclusive of another 6 months of monitoring after end of backfilling, shall be submitted to HDB.

iv) Vibration

The Successful Tenderer/QP shall ensure that the proposed works or method of working does not cause undue vibration or unease and discomfort to HDB residents and damage to HDB property. The Successful Tenderer/QP shall take steps to minimise the magnitude and frequency of any such vibrations. If vibration is expected from the proposed works, the Successful Tenderer/QP shall submit to HDB detailed calculations showing the magnitude, frequency and the resultant load imposed on HDB property. The condition on instrumentation and monitoring contained in Clauses 5.6(i) to 5.6(iii) above shall apply.

v) Cessation of Instrumentation Monitoring

When the Successful Tenderer/QP intends to cease the instrumentation monitoring, the Successful Tenderer/QP shall notify HDB and submit a PE endorsed closing report to cease instrumentation monitoring on HDB property.

Upon removal of the building monitoring instruments, the surface shall be reinstated to its original condition and Town Council shall be notified for inspection and take over after painting completed.

vi) Piling and Pipe Jacking Works

The Successful Tenderer/QP shall ensure that the method of piling, piling operation and pipe jacking do not affect the structural integrity or stability of the existing HDB buildings or any building under construction. Piling shall generally be constructed by non-displacement techniques such as augering. The stability of the ground shall be ensured by the use of appropriate measures designed by the Successful Tenderer/QP. Notwithstanding the method used in the piling work, the Successful Tenderer/QP shall review and closely monitor the technical parameters and Instrumentation level as stated in Clauses 5.6(i) to 5.6(iii) above. The Successful Tenderer/QP shall ensure that the noise generated as a result of the piling work is also kept to a minimum and within the limit set by the Relevant Authorities.

The Successful Tenderer/QP shall check the as-built plans on piling, footing, pile-cap and all related plans of the affected structures to ensure that their works do not encroach into existing piles, footings, pile-caps and other structures. A confirmation that such checks has

been carried out shall be submitted to HDB (Building & Infrastructure Group) before work commences.

The structural drawings can be purchased at:

HDB Hub
480 Lorong 6 Toa Payoh Singapore 310480
Atrium 3rd Storey
Tel: 6490 3203
Email: hdb_sop@hdb.gov.sg

Attn: Officer-in-charge of Structural Drawings Plan

vii) Earth Retaining or Stabilising System, Excavation Work and Tunnelling Work

The Successful Tenderer/QP shall ensure that the construction of earth retaining or stabilising system (ERSS), the excavation work or the tunnelling work does not cause the lowering of ground water table or any soil movement underneath the HDB property. If the lowering of ground water table or soil movement is expected, the Successful Tenderer/QP shall ensure that the construction of ERSS, excavation work or tunnelling work does not cause the movement of HDB property to exceed the allowable building settlement or tilt movement as specified in the relevant building codes, conditions or requirements imposed by the relevant Authorities. The Successful Tenderer/QP shall also install recharge wells if required and submit to HDB detailed calculations showing the resultant load imposed and the corresponding maximum movement on HDB property. The conditions of instrumentation and monitoring set out in Clauses 5.6(i) to 5.6(iii) above shall also apply to ERSS, excavation work and tunnelling work.

5.7 SERVICES AND SOIL REPORT

The information on existing services and soil report is indicative only. The HDB shall not be liable for any damages suffered or expenses incurred as a result of the information given and shall not be held responsible for their accuracy. There may also be departures from the courses and there may also be other findings of which no record is held. The Successful Tenderer is advised to carry out his own site verification at his own cost.

For underground services lines, the Successful Tenderer shall also carry out his own site verification and arrange and obtain approval from the relevant Competent Authorities to carry out any diversion or provision of the services including sewer lines etc. The cost of such verification and diversion of services which may affect the Land to meet the specifications and requirements of the relevant Competent Authorities shall be fully borne by the Successful Tenderer.

All new services lines serving the development shall be contained within the Land boundaries. The approval of the relevant Competent Authorities must first be sought before any connection can be made. All costs incurred shall be borne by the Successful Tenderer.

There may be services within or near the Land. Prospective tenderers are required to carry out due diligence by purchasing the services plans from the respective service providers. Please contact the respective Services Providers for the services plans. For plans on electrical cables and gas, please approach the following Competent Authority and Public Utility Licensee for details, as they would like to keep a record of the parties who view the plans:

Electricity and Gas

SP PowerGrid Ltd
Mapping & Earthworks Administration Section
2 Kallang Sector
Singapore 349277
Tel: 6916 5022
Email: mea@spgroup.com.sg

All applications and requests for consultation, cable testing and diversion shall be submitted through the portal. Please visit https://ebiz.spgroup.com.sg/index.html to access the SP eBusiness Portal.

Singapore Telecommunications Limited (Singtel)

Singapore Telecommunications Limited
Outside Plant Engineering
375 Tanjong Katong Rd, #03-00
Blk 1 Tanjong Telecommunication Complex
Singapore 437132
Tel: 6342 5900 / Fax: 6440 6305
E-mail: g-plansale@singtel.com

More information on purchase of Singtel plant route plans are available at http://info.singtel.com/earthwork.

5.8 EXISTING FOOTINGS, OBSTRUCTIONS AND OTHER MATERIALS

There may be footings and other obstructions left in the ground. The Successful Tenderer shall at his own cost and expense, carry out his own site verification of the possible positions of the footings, obstructions and other materials and ascertain the effect of these on the development.

The costs of such verification, tests, removal of the possible footings, obstructions and other materials etc. which may affect the development shall be fully borne by the Successful Tenderer.

5.9 SLOPES AND EARTH RETAINING STRUCTURES

The Successful Tenderer shall ensure that all slopes and earth retaining structures where required shall be designed to comply with the requirements of the relevant Competent Authorities. All slopes and earth retaining structures shall be kept within the boundary of the Land.

The Successful Tenderer shall submit the details and design calculations prepared by a Professional Engineer for any proposed slopes or earth retaining structures to HDB and to the relevant Competent Authorities for approval before commencement of works.

5.10 WORKING AREA

The Successful Tenderer shall confine the construction work within the boundary of the Land. The Successful Tenderer shall not cause obstruction to other parties who may be working around the Land at the same time.

Hoarding shall be put up by the Successful Tenderer to ensure the safety and well-being of pedestrians. These hoarding shall be maintained in good condition throughout the project completion period of the development.

5.11 WORK BY OTHERS / AUTHORITIES' / AGENCIES' CONTRACTORS NEAR / WITHIN VICINITY OF CONTRACT BOUNDARIES

The Successful Tenderer shall coordinate with adjacent landowners, contractors and sub-contractors regarding the shared maintenance of the existing facilities and other construction systems including road furniture and public or work accesses.

There will be other contractors working near / within the vicinity of contract boundaries of the development. The Successful Tenderer shall be deemed to have knowledge of to know that other contractors will be working near the contract boundaries and shall liaise / work with the Contractors on site to ensure any interfacing works with other contractors are carried out in a smooth and cordial manner. All interfacing works with other contractors' works are deemed to be included in the contract. No claim for additional costs and extension of contract/phases period time would be entertained on these grounds.

The Successful Tenderer shall be responsible for all necessary coordination, liaison, provision of attendance, accesses, etc. with all relevant Authorities' / Agencies' contractors and their subcontractors for the satisfactory completion of works.

5.12 CLEANING AND MAINTENANCE OF ROADS AND DRAINS

The Successful Tenderer shall maintain the cleanliness of public roads and drains used by his vehicles throughout the project completion period. He shall construct a washing bay for the cleaning of earth-laden lorries before they leave the work site and shall be responsible for cleaning up all deposits left by his vehicles on the road. Adequate Earth Control Measures should be implemented at the Successful Tenderer's own cost to prevent any cloggage or silty discharges into the public drains.

The Successful Tenderer shall be responsible for paying any fines imposed by the relevant Competent Authorities e.g. Environmental Health Department, Traffic Police etc.

5.13 PLANS OF PROPOSED DEVELOPMENT

The Successful Tenderer shall submit DC plans and Building Plans to HDB for its endorsement on behalf of the Government as landowner before these plans are submitted to the Competent Authority for approval. The Successful Tenderer shall submit 2 extra sets of plans for HDB's retention.

The HDB shall have the right to require the Successful Tenderer to amend and modify the above-mentioned plans submitted by him.

5.14 DEVIATIONS FROM PLANNING REQUIREMENTS

The requirements set out in this Part relating to location, height, size, area or extent of uses, etc., are specified with a view to achieving the relevant planning objectives as outlined or indicated in the provisions in this Part. The Successful Tenderer may submit for the HDB's consideration alternative proposal to any such requirements. Where HDB is satisfied that the alternative proposal will also serve to achieve the planning objective relevant to the requirement, the Successful Tenderer may be allowed to adopt such an alternative proposal instead; in which event, the relevant provisions in this Part shall be deemed to be complied with. HDB however reserves the absolute discretion to decide whether or not to allow any alternative proposal to be adopted.

5.15 PUBLIC COMMUNICATIONS PLAN

The Successful Tenderer is required to carry out a public communications plan as part of the efforts to keep the local community informed of the development plans for the Land.

The local community is defined as:

a) all residents of HDB flats, private condominiums / flats and landed houses;
b) Management Corporation Strata Title (MCST) Committee of private residential developments and Neighbourhood Committees; and
c) administration of schools and other institutions

that fall within a 100m (approximate) radius of the Land.

In addition, it shall include the local Member of Parliament (MP), Advisor, Constituency Director of the Constituency and General Manager of Town Council.

The Successful Tenderer is required to meet up with the local community (when required) to explain the internal development layout of the project and the mitigating measures.

The Successful Tenderer is required to handle any feedback from public arising from the proposed development and the associated works.

Stage 1: Prior to the first submission of plans to HDB for Endorsement

Prior to the erection of any hoarding or commencement of any clearance and / or tree-felling on the Land, the Successful Tenderer shall distribute flyers to the local community containing the following information and ensure this information are accurately presented:

a) Project information (e.g. type of development, number of units, storey height, vehicular access);
b) Location map showing hoarding, construction access etc;
c) Infrastructure works to be carried out and removal of existing facilities;
d) Key milestones in the construction programme [e.g. site clearance, hoarding works, commencement and duration of piling works, expected date of issuance of Temporary Occupation Permit (TOP)];
e) Details of proposed measures to mitigate the impact of development to the surrounding environment and users;
f) Contact details of the Successful Tenderer for the community to highlight issues such as noise and dust arising from the construction activities, and to provide feedback on the proposal; and
g) The hotline numbers of the relevant departments in BCA, HDB, MOM and URA.

Prior to the distribution of the flyer, the Successful Tenderer shall ensure that information as outlined above (a – g) are included in the flyer and inform the HDB on the distribution date with a copy of Form A as shown in **Appendix C (III)** and flyer.

After the distribution of the flyers, the Successful Tenderer shall submit to the HDB a duly completed Form B as shown in **Appendix C (IV)**. This Form B is to be submitted together with the first submission of plans to HDB for endorsement.

Upon submission of Form B to the HDB, the Successful Tenderer may proceed with the erection of hoarding, on which the contact details of the Successful Tenderer and the hotline numbers of relevant departments in BCA, HDB and MOM shall be prominently displayed.

Stage 2: Prior to the submission of plans to HDB for endorsement for WP application

After the grant of Provisional Permission by the Competent Authority under the Planning Act (Cap. 232) for the proposed development, the Successful Tenderer shall distribute additional flyers to the local community containing detailed information on the proposed development. The information to be provided shall include those in the Stage 1 flyer as well as (but not limited to) the following:

a. Schematic site layout showing the location of building blocks and facilities such as the bin centre, electrical substation, BBQ pits, etc.; and

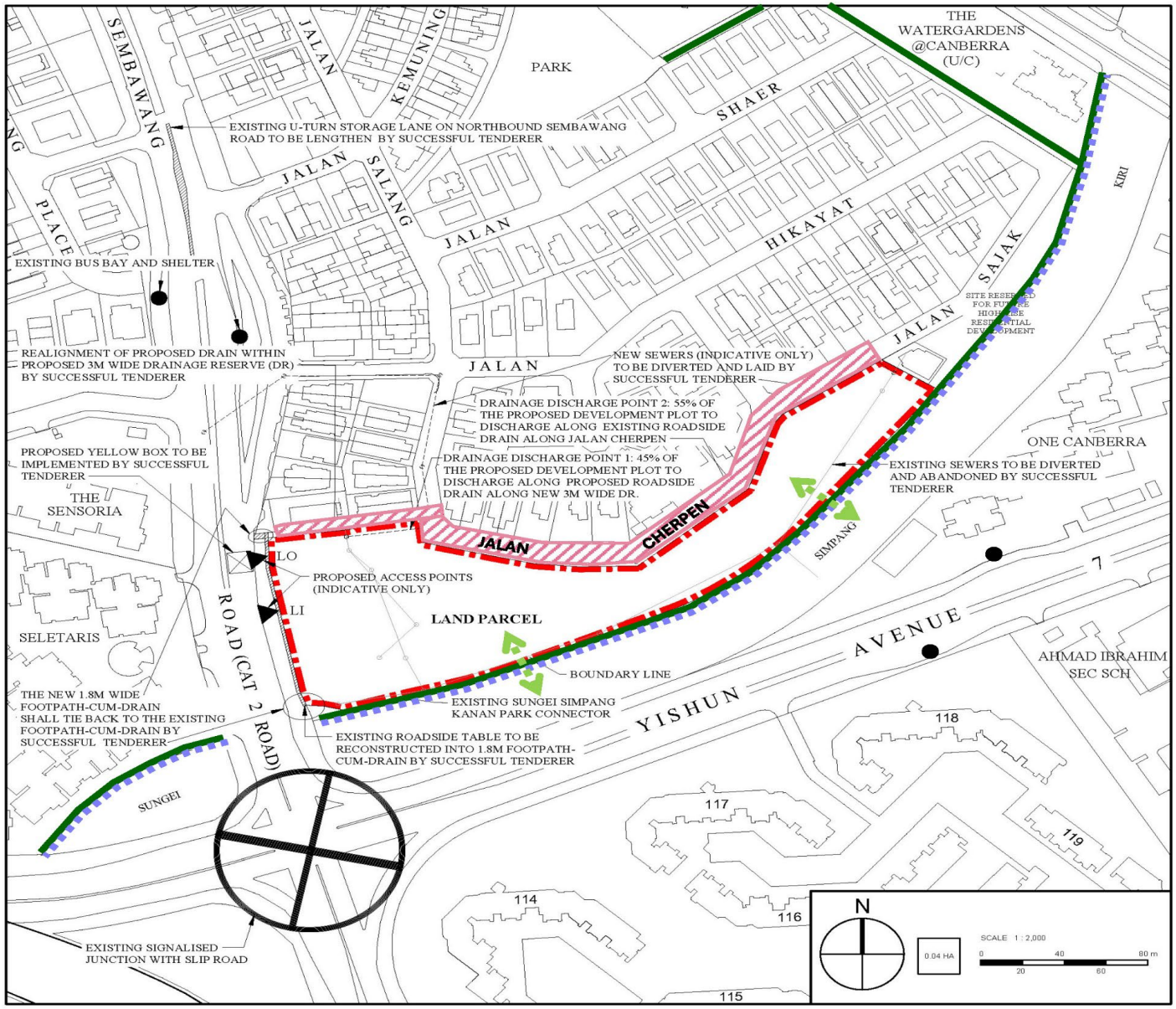
b. Indicative timeframe for the community to respond to the proposal, which shall be at least 2 weeks from the date the flyers are distributed.

The Successful Tenderer is required to submit a copy of the flyer for the HDB's approval before the distribution to the local community.

At least 2 weeks after the date of distribution of flyers, the Successful Tenderer shall submit to the HDB a duly completed Form C as shown in **Appendix C (V)** and a duly completed Form D as shown in **Appendix C (VI)**, which is a final collation of the feedback received on the proposed development, if any, together with an explanation of how the development proposal seeks to sensitively address the concerns raised by the local community. Both Forms C & D are to be submitted together with the submission of plan, which shall be made no earlier than 3 weeks from the date the flyers are distributed, to the HDB for endorsement.

After the endorsement of the submission of plans by the HDB, the Successful Tenderer is required to submit to the Competent Authority a copy of Form C & D as part of the application for planning approval.

The Successful Tenderer shall not commence structural works until the Competent Authority has given written consent for the Successful Tenderer to proceed to apply to BCA for the permit to commence structural works, or has granted Written Permission under the Planning Act 1998.



URBAN DESIGN GUIDELINES FOR LAND PARCEL AT SEMBAWANG ROAD

LEGEND

The locations of the RRF and green links are indicative. Not all the RRF shown in the legend are used in this plan.

- SUBJECT SITE
- CONNECTIVITY TO EXISTING PARK CONNECTOR AND CYCLING PATHS (INDICATIVE ONLY)
- SETBACKS TO ADJACENT LOW-RISE PRIVATE LANDED HOUSING AREA
- EXISTING PARK CONNECTOR
- EXISTING CYCLING PATH

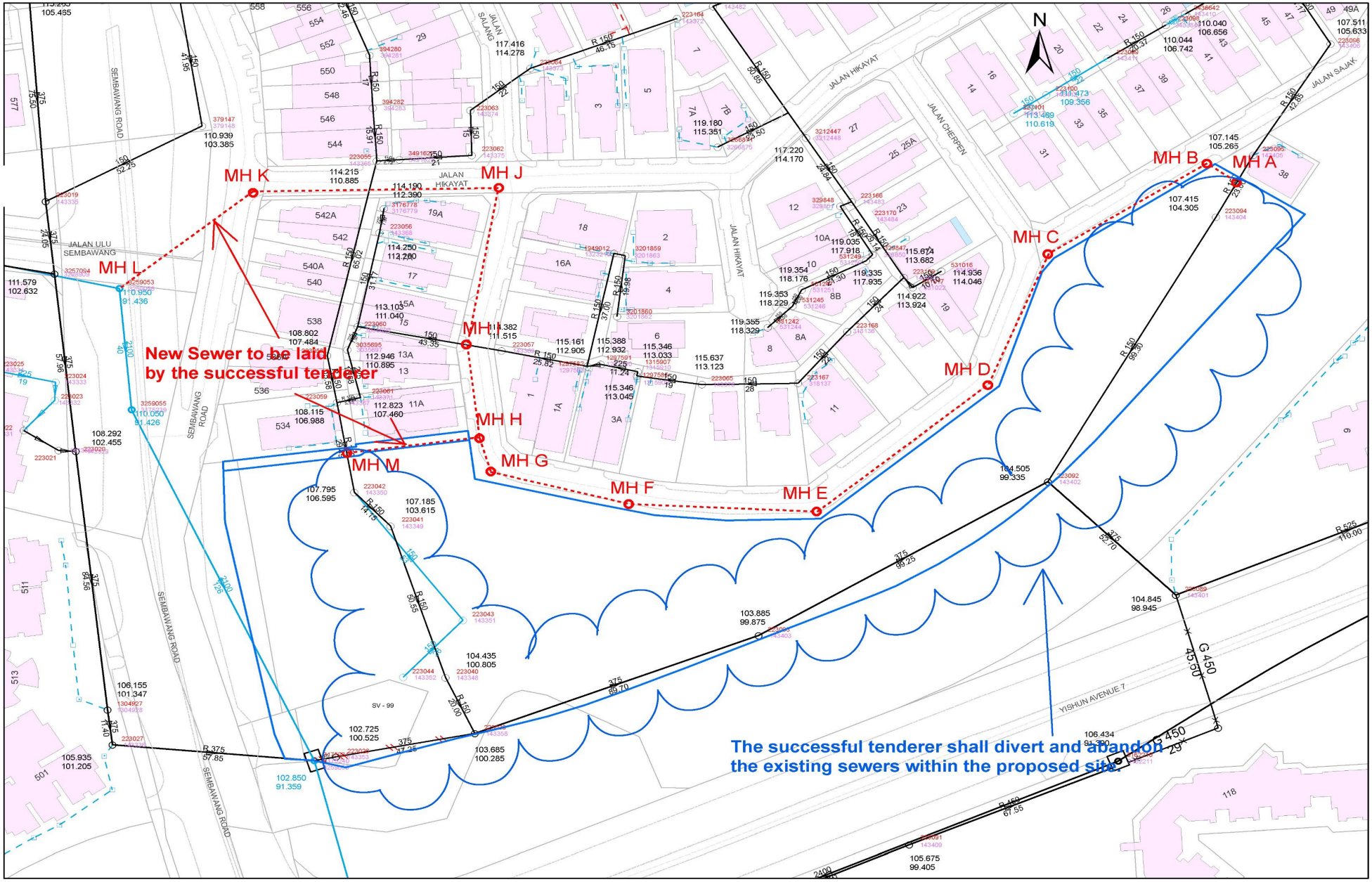
ROAD RELATED FACILITIES (RRF)

- SIGNALISED JUNCTION WITH SLIP ROAD
- SIGNALISED PEDESTRIAN CROSSING
- BUS STOP AND SHELTER
- BUS BAY AND SHELTER
- VEHICULAR ACCESS

PLAN A

N

APPENDIX C(II)



APPENDIX C (III)

FORM A
PUBLIC COMMUNICATIONS PLAN

Details of Developer Company Name: Address: Tel no: Email:	**To:** Land Sales & Lease Administration Housing & Development Board HDB Hub 480 Lorong 6 Toa Payoh Singapore 310480	**INSTRUCTION:** This form is to be duly completed and submitted to the HDB prior to the distribution of the Stage 1 flyer.

Proposed Development:

_____

Lot no.: _____ TS/MK: _____

Key milestone		**Proposed date of commencement* (MM/YYYY)**
1.	Send Stage 1 flyer to local Member of Parliament (MP) and Advisor	
2.	Distribution of Stage 1 flyer containing brief project information and contact details of parties specified	
3.	Submission of Form B	
4.	First submission of development proposal	
5.	Erection of hoarding / site clearance	
6.	Obtain grant of Provisional Permission	
7.	Send Stage 2 flyer to local Member of Parliament (MP) and Advisor	
8.	Distribution of Stage 2 flyer containing detailed project information	
9.	Submission of Form C	
10.	Submission of Form D	
11.	Construction schedule a) Piling b) Sub-structure c) Superstructure d) M&E works e) Finishes	

Name, Designation & Signature of Developer's representative

** Subject to changes. The HDB shall be kept informed of any changes to the public communications plan.*

APPENDIX C (IV)

FORM B
DECLARATION BY THE DEVELOPER (FOR FIRST SUBMISSION OF PLANS TO HDB)

INSTRUCTION: This form is to be duly completed and submitted to the HDB together with the first submission of plans for HDB's endorsement, which shall be made no earlier than 1 week from the date the flyers are distributed	
Details of Developer Company Name: Address: Tel no: Email:	**To:** Land Sales & Lease Administration Housing & Development Board HDB Hub 480 Lorong 6 Toa Payoh Singapore 310480
Proposed Development: _____ _____ Lot no.: _____ TS/MK: _____	
I, _____ (Name), _____ (Designation), hereby declare on behalf of the developer that in accordance with Condition 5.15 of the Additional Conditions of Tender, flyers containing brief information on the project and the contact details of the parties specified in the said Condition have been distributed to the local community* on _____ (Date).	
Signature:	Date:

** Local community is defined and includes the parties specified in Condition 5.15 of the Additional Conditions of Tender*

APPENDIX C (V)

FORM C
DECLARATION BY THE DEVELOPER

(FOR SUBMISSION OF PLANS SUBSEQUENT TO THE GRANT OF PROVISIONAL PERMISSION)

INSTRUCTION:

This form is to be duly completed and submitted to the HDB together with the submission of plans to HDB subsequent to the grant of Provisional Permission, which shall be made no earlier than 3 weeks from the date the flyers are distributed.

Details of Developer	**To:**
Company Name: Address: Tel no: Email:	Land Sales & Lease Administration Housing & Development Board HDB Hub 480 Lorong 6 Toa Payoh Singapore 310480

Proposed Development: _____

_____

Lot no.: _____ TS/MK: _____

I, _____ (Name), _____ (Designation), hereby declare on behalf of the developer that in accordance with Condition 5.15 of the Additional Conditions of Tender, flyers containing detailed information on the development project and the contact details of the parties specified in the said Condition have been distributed to the local community* on _____ (Date).

Details of preliminary feedback received from the local community (if any):
Signature: Date:

Local community is defined and includes the parties specified under Condition 5.15 of the Additional Conditions of Tender

APPENDIX C (VI)

FORM D
CONSOLIDATED FEEDBACK ON PROPOSED DEVELOPMENT

(FOR SUBMISSION OF PLANS SUBSEQUENT TO THE PROVISIONAL PERMISSION)

INSTRUCTION:

This form is to be duly completed and submitted to the HDB as part of the submission of the plans subsequent to the grant of the Provisional Permission, which shall be made no earlier than 3 weeks from the date the flyers are distributed.

Details of Developer	**To:**
Company Name: Address: Tel no: Email:	Land Sales & Lease Administration Housing & Development Board HDB Hub 480 Lorong 6 Toa Payoh Singapore 310480

DC Reference:
_____

Proposed Development:
_____

Lot no.: _____ TS/MK: _____

I, _____ (Name), _____ (Designation), hereby declare on behalf of the developer that in accordance with Condition 5.15 of the Additional Conditions of Tender, the table below has included all feedback that has been received from the local community, up to the date of the submission of this development application.

Feedback received from the local community and how the development proposal has sensitively addressed the feedback raised*:

Feedback Received from Local Community	**Proposed Measures**

Signature: Date:

** This must include all feedback received up to the point of the submission of the plans to HDB.*

APPENDIX D

PROPOSED EXECUTIVE CONDOMINIUM HOUSING DEVELOPMENT

LAND PARCEL AT SEMBAWANG ROAD

CONDITIONS AND REQUIREMENTS OF RELEVANT COMPETENT AUTHORITIES AND PUBLIC UTILITY LICENSEES

(FOR INFORMATION OF TENDERERS)

CONTENTS **PAGE**

1.0 DEFINITION

The lease of the Land Parcel at Sembawang Road ("the Land") is subject to the Additional Conditions of Tender and the Conditions of Tender for the Land contained in the eDeveloper's Packet.

2.0 GENERAL CONDITIONS AND REQUIREMENTS

2.1 The Successful Tenderer is required to consult and comply with all technical conditions imposed by the relevant authorities such as Urban Redevelopment Authority, Land Transport Authority, National Environment Agency, Public Utilities Board, SP Power Grid and the Singapore Civil Defence Force etc.

2.2 The Successful Tenderer for the Land is required under the said Conditions of Tender to ascertain the exact and detailed conditions and requirements of all relevant Competent Authorities and Public Utility Licensees in respect of the development thereon and shall at his own cost and expense observe and comply with the same.

2.3 Without affecting the generality of paragraph 2.1 above and without prejudice to the obligations of the Successful Tenderer as set out therein, the contents herein are provided for the information of the tenderers only. Whilst every care and attention has been taken in the compilation and preparation hereof, it does not warrant that the contents herein represent all the conditions and requirements of the relevant Competent Authorities and Public Utility Licensees in respect of the development on the Land or that they are free from errors or omissions whatsoever. The contents herein are subject to changes by the relevant Competent Authorities and Public Utility Licensees concerned and the onus lies on the Successful Tenderer to verify these conditions and requirements directly with HDB, the relevant Competent Authorities and Public Utility Licensees and comply with their prevailing conditions and requirements.

2.4 A summary of the initial services requirements of the relevant Competent Authorities and Public Utility Licensees is set out herein. It serves only as an indication of the possible work involved with regards to services and is by no means exhaustive or final.

2.5 The Successful Tenderer shall ensure that the following requirements are complied with:

2.5.1 To consult and liaise directly with the relevant Competent Authorities and Public Utility Licensees regarding the actual locations of all service mains within the Land and on the requirements and conditions for services diversion, if any, and provision prior to the commencement of site work. All necessary precautions shall be taken by the Successful Tenderer to safeguard the service mains before they are diverted.

2.5.2 To engage his own licensed Cable Detection Worker and licensed Telecommunication Cable Detection Worker to carry out cable detection and if necessary to carry out trial trenches to locate any manholes and cable routes prior to the commencement of site work. The Successful Tenderer shall bear the cost of any diversion work.

2.5.3 To ensure that all service mains that do not need to be diverted are identified and provided with protection, if necessary, during the construction stage of the development. The cost of repairs to any damaged service main as a result of work carried out by the Successful Tenderer shall be borne by the Successful Tenderer.

2.5.4 To ensure that the relevant Competent Authorities and Public Utility Licensees are allowed free and unconditional access at all times to services that remain within the Land for the purpose of installation, maintenance, repair and improvement works and all other work and activities incidental thereto.

2.5.5 To make his own arrangements with the relevant Competent Authorities and Public Utility Licensees and pay for the fees and costs of any diversion and/ or "capping off" of existing

services, provision of service mains and service connection, if any, in relation with the development.

2.5.6 To provide for all the internal distribution for water, electricity, drainage and sanitary discharge for the development.

2.5.7 To liaise with all the relevant Competent Authorities and Public Utility Licensees on upgrading the road reserves abutting the Land to ensure that the necessary roadside drains, sidetable, kerb, etc., are carried out in accordance with the prevailing Road Reserve requirements.

2.5.8 To ensure that all proposed infrastructure is to be implemented in accordance to the requirements of the relevant Competent Authorities, and to initiate and complete the handover of the relevant infrastructure to the respective Competent Authorities upon completion.

2.6 The Successful Tenderer shall be responsible to carry out at his own cost and expense his own site investigation to verify whether there is any sub-structure or other obstructions e.g. footings, piles, tree roots, etc., in the ground of the Land, and ascertain their effect on the development.

2.7 There may be some other existing services affected by the development. The Successful Tenderer shall inform the relevant Competent Authorities and Public Utility Licensees immediately and bear the necessary cost of diversion and/or "capping off" of these existing services, if any.

2.8 In general, no structure shall be sited close to or over existing and proposed services. The Successful Tenderer shall comply with all requirements as stipulated by the relevant Competent Authorities and Public Utility Licensees.

3.0 REQUIREMENTS OF LAND TRANSPORT AUTHORITY (LTA)

LTA requires the Successful Tenderer to comply with the following requirements:

i) All proposed Street Works, as well as proposed engineering/construction works within the Road Reserve shall be prepared/designed, submitted, supervised and constructed in accordance with Street Works (Street Works by Private Persons) Regulations, Street Works (Public Street Works) Regulations and the following prevailing standards and Code of Practice:

a. Code of Practice (COP) on Street Work Proposals Relating to Development Works;

b. LTA Standard Details of Road Elements;

c. Materials & Workmanship Specifications for Civil & Structural Works;

d. Code of Practice for Road Opening Works;

e. Code of Practice for Traffic Control at Work Zone;

f. Infrastructure Design Criteria; and

g. Civil Design Criteria.

ii) The technical details, extent and completion date of such works shall comply with the requirements of the LTA and other relevant Competent Authorities.

iii) The Successful Tenderer shall at his own cost and expense, carry out all the proposed works as detailed in the Additional Conditions of Tender (Technical).

iv) Detailed plan submission, including the traffic plans for the development showing the details of the accesses, circulation, traffic measures, etc., shall be made to LTA Plan Compliance Division (PCD) for review and clearance during the formal plan submission stages.

Bicycle Parking facilities

v) The Successful Tenderer is required to comply in full with the LTA bicycle parking requirement under the Parking Places (Provision of Parking Places and Parking Lots) Rules 2018. A guide for Bicycle Parking and related facilities can be found in the Code of Practice for Street Works Proposals relating to Development Works and Code of Practice for Vehicle Parking Provision in Development Proposals.

vi) The Successful Tenderer is required to construct and provide a minimum number of bicycle parking lots within the Land at the rate of 1 bicycle parking lot for every 6 dwelling units or prevailing requirements set out by the relevant Competent Authority at the formal submission stage.

vii) As good practice, the Successful Tenderer should set aside 20% of the total bicycle parking lots on the ground floor where it is freely accessible and visible to visitors visiting the development.

viii) The bicycle parking lots shall be securely anchored and non-removable. The Successful Tenderer may, however, propose alternative layouts and designs for LTA's consideration and approval.

ix) The Successful Tenderer should consider existing vehicular and pedestrian movement when locating bicycle parking lots within the development. Bicycle parking lots shall be segregated from pedestrian walkways, driveways and car park access to ensure safety of motorists, pedestrians and cyclists. It is advantageous to provide separate pathways for cyclists and motorised vehicles to avoid conflict between cyclists and other road users.

x) The Successful Tenderer is strongly encouraged to provide higher capacity lifts to cater to higher cycling demand. The recommended dimensions for such lifts can be found in Code of Practice for Street Works Proposals relating to Development Works.

xi) The Successful Tenderer shall obtain clearance from the Competent Authority on all matters related to the bicycle parking facilities before commencing the construction of the bicycle parking lots.

Wayfinding Signage

xii) The Successful Tenderer is to provide a comprehensive wayfinding system to guide residents and visitors of the development to transportation nodes in the vicinity and towards the pedestrian and cyclist related facilities (e.g. bicycle parking) within the development. A guide for wayfinding signage and related facilities can be found in the Code of Practice for Street Work Proposals relating to Development Works or at https://www.lta.gov.sg/content/ltagov/en/industry_innovations/industry_matters/development_construction_resources/street_works/requirements_for_street_work_proposals.html

xiii) The Successful Tenderer shall obtain clearance from the Competent Authority on all matters related to the wayfinding system before commencing construction of the development.

xiv) The Successful Tenderer shall be responsible for the maintenance of the wayfinding system at all times and shall bear all the costs related to the proper functioning of the wayfinding system.

Construction Access

xv) The construction access shall be taken from Sembawang Road at the location of the permanent access, as shown indicatively in the Site Plan.

xvi) The Successful Tenderer shall ensure that any existing pedestrian and/ or cyclist connectivity along Sembawang Road is maintained during the construction period. Where necessary, traffic marshals shall be deployed to guide vehicular and pedestrian traffic.

xvii) Construction vehicles can only access the site during off-peak hours (9.30am to 5.00pm). The Successful Tenderer shall include the proposed construction access location and route in its Public Communication Plans (PCP).

xviii) The details of the proposed construction access are to be submitted to LTA PROMPT and the relevant Competent Authorities for approval before commencement of work on site.

xix) The Successful Tenderer shall at his own cost and expense, fully reinstate any modifications to the road features and/or rectify any damages to the road kerb / centre median / sidetable at Sembawang Road to the standards and satisfaction of the Competent Authorities.

Prefabricated Prefinished Volumetric Construction (PPVC)

xx) Feedback related to PPVC transportation activities

a. Feedback related to PPVC transportation activities shall be handled by the Successful Tenderer.

xxi) Delivery of PPVC Modules

a. The Successful Tenderer is to obtain a permit from LTA if the vehicle (with or without load) meets any of the following criteria:

i. Having an overall width exceeding 3 metres (or 2.6 metres when travelling on controlled roads). Please visit https://prompt.lta.gov.sg/WebUIPWAS/Home/Faq and see Q.2 under the “Permit for Vehicle Movement” tab; or

ii. Having a rear projection of 1.8 metres or 40% of the length of the load bearing vehicle (whichever is lesser); or

iii. Having an overall weight exceeding the vehicle type’s weight limit (please visit https://prompt.lta.gov.sg/WebUIPWAS/Home/Faq and see Q.1 under the “Permit for Vehicle Movement” tab)

b. In addition to a permit, Auxiliary Police Escort (escorted vehicle movement from 7 p.m. to 5 a.m. on arterial roads; or from 11 p.m. to 5 a.m. on expressways) is required if the vehicle (with or without load) also meets any of the following criteria:

i. Having an overall width of 3.4 metres or more; or

ii. Having an overall weight of 80,000 kilograms or more; or

iii. Having an overall height exceeding 4.5 metres

c. The Successful Tenderer shall comply with LTA guidelines “Special Vehicles that require Submission of Notice to LTA”.

xxii) Oversized Vehicle Delivery Operation / Access Point

a. Ingress/ Egress shall be taken off from off from the same location as the development's main access point.

b. All construction related activities (including but not limited to loading/unloading, reversing of vehicles) must be carried out within the site.

c. Deliveries are to be carried out outside of AM and PM peak hours (6.30am – 9.30am, 5.00pm – 7.30pm).

d. Parking or waiting of construction vehicles/staff vehicles by the roadside is strictly prohibited.

e. Due to existing public buses plying through this area, please ensure that there is no road closure at all times and construction operations do not obstruct public buses. PPVC deliveries must be carried out after the last bus ceases operation, if necessary.

f. Marshalls must be deployed to help guide/regulate traffic and ensure smooth traffic flow.

g. The Successful Tenderer/Contractors are to plan the traffic routes properly.

xxiii) First-time applicants must register through LTA.PROMPT via https://prompt.lta.gov.sg/WebUIPWAS/Login.aspx for access. Applications are to be made at least 3 working days in advance.

4.0 REQUIREMENTS OF CATCHMENT AND WATERWAYS DEPARTMENT (C&W), PUBLIC UTILITIES BOARD (PUB)

PUB(C&W) requires the Successful Tenderer to comply with the following requirements:

i) The site is within/near a 36.15m (width) drainage reserve (DR) shown in the Drainage Interpretation Plan in Appendix D(I). No structures / services shall be constructed/ laid within the DR. The DR shall be excluded from the site, secured, safeguarded and free from encumbrances.

ii) In the course of construction, access into the drainage reserve shall not be obstructed. The drainage reserve shall not be used for parking of vehicles/machinery/storage of construction materials/dumping of excavated earth etc. The drainage reserve (including the markers along the boundary of the drainage reserve) shall be reinstated upon completion of works.

iii) The existing drainage system within and in the vicinity of the site shall be upgraded/ improved to cater for increased runoff from the development. In addition, new drains, contingent to the type and nature of the development, may be built within the Land in conjunction with the development proposal. The Successful Tenderer shall reconstruct the existing drains to the minimum drainage requirement as indicated on the Site Plan. Appropriate Drainage Reserves shall be set aside and secured for drains free from encumbrances in accordance to the latest edition of the 'Code of Practice on Surface Water Drainage'. The Successful Tenderer shall preconsult PUB(C&W) on the proposed discharge point for the site. The new drains shall be constructed and functional prior to the development.

iv) Comprehensive drainage plan including proposed platform levels, road levels, catchment plans and hydraulic calculations, details of the proposed drains including the cross sections, longitudinal sections, etc. shall be endorsed by a Professional Engineer (PE) and submitted to PUB(C&W) for comments and approval.

v) The Inter-Ministerial Committee on Climate Change endorsed the proposal for drainage design to protect catchments for the projected 75th percentile increase in rainfall intensity

due to climate change. Based on the asset life of the drain of 50 years, this corresponds to a 25% increase in rainfall intensity and the revised rainfall intensity incorporating the additional 25% increase shall be used in the design of the drainage infrastructure.

vi) The Land may be affected by common drains and other smaller drains which serve the Land and areas outside the Land. Surface runoff from the Land and all neighbouring lands must be allowed to discharge through the drains within the Land. Any proposal to alter, disturb, fill, block, interfere or divert these drains shall be submitted to the PUB for approval.

vii) If there is any works carried out within the site, the Successful Tenderer shall ensure that the works shall not cause damage or affect the structural integrity of the roadside/outlet drains. The development schedule of the Land shall be properly considered to avoid a situation where the Land and / or lands in the vicinity become 'land locked' without proper drainage outlets. Proper drainage system shall be provided at all stages of works. All proposals of drainage work including temporary works affecting drains shall be submitted to PUB(C&W) for comments and clearance.

viii) The existing drainage system including earth drains within and in the vicinity of the site shall not be altered, disturbed, filled, diverted, blocked or interfered with without prior approval from PUB(C&W). Any surface runoff from the site and all neighbouring lots shall continue to be allowed to discharge through these existing drains (if applicable) within the site.

ix) The Successful Tenderer shall ensure the runoff within, upstream of and adjacent to the site shall be effectively drained away without causing flooding within the site and in the vicinity of the site. Any proposal to level/backfill the site shall be submitted for PUB's comments and clearance.

x) The Successful Tenderer shall provide effective erosion and sediment control measures and the QP shall advise the Successful Tenderer to provide such effective measures and facilities with inputs from Qualified Erosion Control Professional (including site management system and perimeter cut-off drain, silt traps, storage ponds, treatment plants, etc) to ensure clean discharge that complies with the statutory requirement. The proposed erosion and sediment control measures shall be submitted by a Qualified Erosion Control Professional (QECP) to Public Utilities Board before commencement of works. All affected watercourses shall be desilted and cleared until completion of work.

xi) Industrial, commercial, institutional and residential developments greater than or equal to 0.2 hectares in size are required to control the peak runoff discharged from the development sites. The maximum allowable peak runoff to be discharged to the public drains will be calculated based on a runoff coefficient of 0.55, and for design storms with a return period of 10 years and for various storm durations of up to 4 hours (inclusive). Peak runoff reduction can be achieved through the implementation of ABC Waters design features and structural detention and retention features, such as:

a. Detention tanks;
b. Retention/Sedimentation ponds;
c. Wetlands;
d. Bioretention swales;
e. Porous pavements;
f. Bioretension basins or rain gardens, etc.

xii) The Successful Tenderer/Qualified Person (QP) shall be required to submit details (calculations and/or hydraulic model results) showing how the proposed system meets the required peak runoff rates. Due consideration shall be given to meeting ABC Waters stormwater quality objectives, which will often require treatment of stormwater runoff using ABC Waters design features. For design guidance on the ABC Waters design features, Successful Tenderer/QPs can refer to the ABC Waters Guidelines and relevant chapters in the Engineering Procedures, available on the PUB website.

xiii) PUB has in 2006 launched the Active, Beautiful and Clean Waters (ABC Waters) Programme. As part of the Programme, PUB has launched ABC Waters design guidelines which provide ideas on how natural runoff treatment systems termed ABC Waters design features such as rain gardens, vegetated swales and bioretention swales can be integrated within a development. These features detain/ slow down stormwater runoff and improve water quality by using plants and soil. They also enhance landscape and biodiversity of the development. Specific information on the design of these features can be found at the website: https://www.pub.gov.sg/Professionals/Working-on-ABC-Waterways/ABC-Waters-Design-Guidelines.

xiv) PUB encourages the implementation of ABC Waters design features in the development as well as the achievement of ABC Waters certification. Information regarding ABC Waters Certification can be found via the link: https://www.pub.gov.sg/Professionals/Awards-and-Certification/ABC-Waters-Certification.

xv) If applicable, the design and construction supervision of ABC Waters design features as well as drawing up the maintenance plan for these features shall be carried out by an ABC Waters Professional. The Successful Tenderer/QP may wish to contact Miss Kelly Sng (Kelly_SNG@pub.gov.sg) for issues related to ABC Waters design features.

xvi) The planning, design, construction activities and procedures for plan submission shall be subject to the requirements stipulated in the prevailing Code of Practice on Surface Water Drainage and the Sewerage and Drainage (Surface Water Drainage) Regulations 2007 and any subsequent addendum to the Code of Practice. The Code of Practice can be downloaded from the PUB website at https://www.pub.gov.sg/Professionals/Resources/Code-of-Practices.

xvii) The minimum platform level (MPL) for the subject site shall not be lower than 4.5m above Singapore Height Datum, or 300mm above the adjacent road/ground level for general developments, 600mm for multi-residential and commercial developments, 1m for special facilities and developments with direct or indirect linkages to underground special facilities, or any other level as determined by PUB as in stated in the latest edition of the 'Code of Practice on Surface Water Drainage', whichever is the highest.

xviii) The minimum crest levels for basements of general developments shall be at least 150mm above the MPL as stated above. For basements of industrial, institutional, commercial or multi-unit residential developments, the minimum crest level shall be at least 300mm above the MPL as stated above. The minimum crest level for entrances to the underground pedestrian network having direct or indirect underground linkage to MRT Stations, or other underground special facilities shall be 300mm above the MPL as stated above. Please pre-consult PUB(C&W) on the required MPL before making DC/BP submission.

xix) In complying with the MPL requirement, thorough investigations of the site shall be conducted to determine suitable platform profiles to ensure that the runoff within, upstream of and adjacent to the subject site can be effectively drained away without causing flooding within the site and in the vicinity of the site. Any proposal to level/backfill the site shall be submitted to PUB(C&W) for comments and approval.

xx) The development site is within proposed Woodland Water Catchment.

a. The proposal shall not result in any loss of yield from the catchment area.

b. Stringent pollution control measures shall be incorporated in the design and during the construction of the development.

c. All sewage and sullage water shall be discharged into a public sewer.

d. Bulk storage of toxic and hazardous materials shall not be allowed.

e. If there is any earth filling work at the site, use good earth free of any debris or construction waste materials. If sand is used for backfilling, do not use marine sand. Only washed sand with chloride content not exceeding 0.01% (by Weight) shall be allowed. Test reports on the chloride content of the washed sand shall be submitted to PUB(C&W) for records before commencement of work.

xxi) Please contact ROSIMA BINTE ABBAS (email: Rosima_ABBAS@pub.gov.sg), POH LI PING (email: Poh_Li_Ping@PUB.GOV.SG), from PUB(C&W), if you need any clarifications.

5.0 REQUIREMENTS OF WATER RECLAMATION (NETWORK) DEPARTMENT (WRN), PUBLIC UTILITIES BOARD (PUB)

PUB (WRN) requires the Successful Tenderer to comply with the following requirements:

i) The planning of this project shall comply with the prevailing Code of Practice on Sewerage and Sanitary Works [thereafter referred to as the "COPSSW"].

ii) There are existing sewerage infrastructure in the vicinity of the site:

- Existing 150mm/375mm diameter sewers
- To be abandoned 375mm diameter sewers
- Unsurveyed 150mm/2100mm diameter sewers

iii) Thorough site investigation shall be carried out to determine the exact positions and levels of the existing sewerage infrastructure.

iv) No building/ structure/piling/retaining structure, etc. (whether temporary or permanent), except lightweight and demountable elements (such as awnings, surface drains, compound boundary wall & fencing, planting troughs and link-way shelters), shall be sited over or across any sewers/pumping mains without the approval of PUB. All proposed structures shall be kept as far away from the existing sewers/pumping mains as possible and no nearer than the following minimum lateral clearances (also known as sewer/ pumping main setback):

Sewer/ Pumping Main Nominal Diameter (mm) D	Sewer Depth (m)	Minimum Distance (m)*
≤600	≤3	1.0
	>3 and ≤5	1.5
	>5	2.0
>600 to 1500	All	0.5D + 2.5
>1500 to 2500		0.5D + 3
>2500		0.5D + 4
Deep Tunnel Sewerage System (DTSS)		0.5D + 6
*Measured from the outer most edge of the structure, including footings and overhangs, to the centreline of the sewer pipe or DTSS.		

More details can be found in **COPSSW Sections 1.2.4 and 1.2.5**.

v) PUB's approval shall be obtained for any proposed abandonment of sewers/pumping mains/manholes/chambers/drain-lines/ADCs as well as the manner in which they will be abandoned.

a. The Successful Tenderer/Qualified Person (QP) shall note that the upstream (inlet) and downstream (outlet) ends of the abandoned sewer connections, drain-lines, ADCs or sewers/pumping mains of all sizes shall be sealed watertight with 225mm thick brick plugs rendered with cement mortar.

b. All abandoned sewers/pumping mains of diameter 300mm or larger and abandoned sewers/pumping mains/ADCs of all sizes within the road reserve shall be grouted with cement grout or other approved materials.

c. All abandoned manholes/chambers are to be demolished, filled up with well compacted approved material, and the manhole frames and covers removed. Details of the requirements can be found in the **COPSSW** and "Standard Requirements for Abandoning of Disused Sewerage System" for compliance [https://www.pub.gov.sg/-/media/PUB/PDF/Code-of-Practices-and-Submission-Guidelines/Sewerageand-Sanitary-Works/STD_REQ_SEALING_SEWERCONN_ABANDONEDSEWERS_MANHOLES_PUMPINGMAINS_Apr2023_.pdf].

d. The abandoned sewers/pumping mains/manholes/chambers/drain-lines/ADCs, including the manner of abandonment (remove, seal, grout, partial demolition, etc.), shall be indicated on the as-built drawings submitted to PUB(WRN). The following details shall also be included:

    i. whether the abandoned sewers/pumping mains/drain-lines/ADCs are removed, grouted or sealed;

    ii. For manholes/chambers that are only partially demolished with approval from PUB(WRN), the extent of demolition shall be shown;

    iii. the exact extent/length of the abandoned sewers/pumping mains/drain-lines/ADCs that is removed, grouted or sealed;

    iv. the exact locations of the watertight seals; and

    v. the type of watertight seals.

vi) No sewerage systems (including abandoned sewers/ pumping mains, any sensors, meters, equipment, instruments, etc. within manholes) shall be altered/interfered with without the approval from PUB(WRN). Where diversion/removal of any sewer/pumping main is required, it shall be carried out by the Successful Tenderer at his own cost and expense. Details of the diversion (pipe size, gradient, invert level, etc.) shall be submitted to PUB(WRN) for approval before the commencement of works.

vii) The Successful Tenderer shall be responsible for seeking approval from all relevant authorities/land owners for the proposed sewerage works to be carried out beyond the development site. Such approval or consent from the land owner/authorities shall not include any conditions that require PUB to provide a letter of undertaking to divert the sewerage infrastructure in future. The Successful Tenderer is to ensure that all sewerage and sanitary designs comply with PUB's COPSSW.

viii) All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.

ix) Air-tight manhole covers shall be provided for new vortex structures as follows:

a. Vortex structures with two stand-alone chambers design (vortex drop chamber and manhole chamber) – only the covers of manhole chambers shall be air-tight.

b. Vortex structures with single combined chamber design – the covers of chambers with incoming sewers ≥900mm diameter shall be air-tight.

For enquiries or clarifications, pls contact Mr Wong Kin Wee at WONG_Kin_Wee@pub.gov.sg or Mr Lim Li Fu at LIM_Li_Fu@pub.gov.sg from PUB(WRN).

x) As there are existing large diameter sewers (≥900mm) within/ in the vicinity of the proposed site, the Successful Tenderer shall take every measure to protect all existing sewers, particularly large diameter (≥900mm) sewers, affected by or in close proximity of the proposed works. Large diameter sewers are critical pipelines that serve very large catchments. Any damage to these sewers could lead to used water overflow/leaks affecting a sizable area where the consequential pollution/environment impact could be catastrophic. In this respect, the Successful Tenderer is advised to keep the proposed works away from these critical large diameter sewers at the earliest planning stage where possible.

xi) For the protection of large (≥900mm diameter) sewers and DTSS tunnels & structures, the following shall be strictly complied with:

a. The Successful Tenderer shall comply with PUB's requirements for protection of large (≥900mm diameter) sewers and DTSS tunnels & structures given in **COPSSW Section 2.2.**

b. A registered surveyor shall be engaged to ascertain the exact locations of all existing sewers and the DTSS tunnels in the vicinity of the proposed works. The layout plan, cross-sectional and longitudinal details indicating the vertical and horizontal distances between the proposed works/specified activities (including tunnelling, pipe/cable laying, piles, earth retaining or any other structures, etc.) and the edges of all existing sewers/DTSS tunnels endorsed by the registered surveyor shall be submitted.

c. The detailed plans for the proposed works or specified activities must be submitted early to allow PUB(WRN) sufficient time to evaluate.

xii) Where there are any Specified Activities (including excavation/tunnelling/jacking/boreholes/installation of ERSS for services diversions) within the public sewer corridor [i.e. 10m for sewer/main of diameter <900mm, 20m for sewer/main of diameter ≥ 900mm and 40m for DTSS tunnel] as stipulated in **COPSSW Section 2.1.2**, a written approval from the Director, Water Reclamation Network (WRN) Department of PUB should first be obtained before carrying out the specified activities at the site.

a. The Successful Tenderer/QP shall make a Protection of Water and Sewer Pipes (POWS) submission via PUB's Business & Professional (B&P) Portal at https://eservices.pub.gov.sg/bpp prior to any commencement of the specified activities. The Applicant shall refer to **COPSSW Section 2** for the technical requirements on sewer protection. The guideline on 'Prevention of Damage to Public Sewerage System' can be found in PUB website at https://www.pub.gov.sg/-/media/Images/Feature/Content-Pages/Professionals/Compliance/Applications/Revised_PUB_WRN_AdvisoryNotes_Mar_2023.pdf.

b. The Successful Tenderer/QP/contractor is required to submit a notification to PUB's Network Management Branch (NMB) at least 7 days before the commencement of any works or specified activities within the public sewer corridor.

xiii) The Successful Tenderer/QP must check for the presence of public sewerage pipelines by referring to the Sewerage Information Plan (SIP) and through site investigation. The SIP is available on SLA's INLIS at https://app.sla.gov.sg/inlis/#/PUB/UP/Search. Please note that the sewerage information in SIPs is indicative and for reference only. A thorough site investigation, including trial trenches, shall be carried out to determine the exact position and levels of the existing sewers.

xiv) Please contact KOH KING SIANG (email: KOH_King_Siang@pub.gov.sg), ANDREW TIONARDY (email: Andrew_TIONARDY@pub.gov.sg), ZHANG XIN (email: ZHANG_XIN@PUB.GOV.SG), from PUB(WRN), if you need any clarifications.

6.0 REQUIREMENTS OF WATER SUPPLY (NETWORK) DEPARTMENT (WSN), PUBLIC UTILITIES BOARD (PUB)

PUB(WSN) requires the Successful Tenderer to comply with the following requirements:

WATER SUPPLY INFRASTRUCTURE/LAND USE

i) Provision shall be made by the Successful Tenderer for PUB to lay new watermains, if required, along public road reserves / sidetables to the site. The cost for the laying of new watermains, if any, and connecting pipe to serve the above site shall be borne by the Successful Tenderer.

SUBMISSION OF PLANS

ii) The design of the internal water reticulation system shall comply with the Public Utilities (Water Supply) Regulations, Singapore Standard 636 – Code of Practice for Water Services and all other relevant statutory requirements. The modes of water supply to be adopted are as follows:

Height of Highest Fittings (Above Mean Sea Level)	**Method of Supply**
i) Up to 25 m	Direct.
ii) Higher than 25 m but up to *37 m	Indirect supply through high level storage tanks.
iii) Higher than 37 m	Indirect supply through low level tank with pumping to high level storage tanks.
(* Refers to height of inlet pipe to high level storage tanks.)	

iii) Where pumping system or storage tanks are required for the water services, a Professional Engineer must submit the Notification of WSI Works together with a set of drawings to PUB. If all the fittings in the water service installation are receiving direct water supply from PUB watermain, then a Licensed Plumber shall be engaged to submit the Notification of WSI Works together with a set of drawings to PUB prior to commencement of the WSI works.

iv) For water mains diversion (100mm and above), please contact Wang Ningxiang at WANG_Ningxiang@pub.gov.sg

PROTECTION OF WATERMAINS

v) The Water Supply Plan shows the approximate positions of PUB(WSN)'s existing and proposed water main of 100mm diameter and above in the vicinity of the site. Smaller submain to customers' premises/ properties are not indicated. Please determine by means of trial holes the exact alignment and levels of all existing water pipe during the design stage and let PUB(WSN) know whether they are affected by the proposed works so that PUB(WSN) can advise whether diversion is required. If diversion is required for water pipes of 300 mm dia and below, consultation must be made at least 6 months ahead and the cost of diversion of any water pipes shall be borne by the Successful Tenderer. Diversion of PUB(WSN)'s existing water pipes of 500 mm and above, being PUB(WSN)'s vital water pipes should be avoided unless absolutely necessary. If diversion is unavoidable, please be advised to engage a qualified pipe laying contractor with CR07 work head to carry out the diversion of the affected existing watermains.

vi) The PUB WSN Advisory-Prevention of Damage to Watermains found in Appendix D(II) provides the details on the protection and submission requirements for applications to seek PUB's approval for proposed works carried out in the vicinity of PUB(WSN)'s water mains. This submission shall be made via PUB(WSN)'s online submission portal, Protection of Water and Sewer pipes (POWS) at PUB Business Professional Portal.

vii) The latest Water Supply Plan is available on SLA's INLIS portal at https://www.sla.gov.sg/INLIS.

viii) Please contact PUB officer Mr Mohd Faruq at 63809832. Email to: Mohd_Faruq_Mohd_Feroz@pub.gov.sg

WATER CONSERVATION

xi) Water conservation measures as stipulated in the Public Utilities (Water Supply) Regulations and SS 636 – Code of Practice for Water Services shall be adopted.

xii) Only water fittings (i.e. taps and mixers, LCFCs, WC flush valves and urinal flush valves/waterless urinals) that are of at least 2-tick rating under PUB's MWELS shall be installed. The development should obtain the Water Efficient Building (Basic) Certification by PUB.

xiii) Unless with written permission by PUB, fixed or movable sprinklers are not allowed to be used to deliver any form of water supplied by PUB, including potable water, NEWater, raw water, effluent water, industrial water for watering any garden, lawn or other land including commercial market gardens, commercial nurseries, sports grounds, golf courses, race courses, public and club tennis courts. Where possible, the Successful Tenderer is encouraged to use drought tolerant plants.

xiv) For non-domestic developments with estimated water requirements of at least 5,000 m3/month, and government developments with estimated water requirements at least 3,000 m3/month, private water meters in accordance to PUB's requirements to monitor water usage in the key areas as stipulated in the Fourth Schedule of the Public Utilities (Water Supply) Regulations shall be installed.

xv) Wherever possible, alternate sources of water (such as industrial water, high grade industrial water, sea water, recycled water, rainwater and AHU condensate etc) should be used to meet the non-potable water requirements of the development.

xvi) Wherever possible, water recycling system should be set up to reclaim water for reuse for non-potable purposes such as production process, toilet flushing, irrigation and as cooling tower make up water, etc.

xvii) Use non-water cooled systems (such as air-cooled, refrigerant-cooled, etc) for cooling purposes wherever possible.

xviii) Cooling towers should achieve minimum 7 and 10 Cycles of Concentration (COC) using potable water and NEWater respectively.

xix) From 1 January 2024, the following requirements apply to new projects (including expansion of existing plants) that will consume at least 60,000m3 of water annually:

a. Minimum 50% RR for wafer fabrication plants involved in front-end semiconductor manufacturing; and

b. Recycling of specified waste streams for electronics plants and biomedical plants. More details can be found at https://www.pub.gov.sg/Public/WaterLoop/Water-Conservation/Mandatory-Water-Efficiency-Requirements

xx) Please contact Julia Tay (email: Julia_Tay@PUB.GOV.SG), ANG LIEW KWEE (email: ANG_LIEW_KWEE@PUB.GOV.SG), from PUB(WSN), if you need any clarifications.

7.0 REQUIREMENTS OF NATIONAL PARKS BOARD (NPARKS)

NParks requires the Successful Tenderer to comply with the following requirements:

General Requirements

i) If the Successful Tenderer intends to carry out any regulated activities under the Parks and Trees Act and its Regulations that arise out of or pursuant to the use of the site, it must seek the Commissioner of Parks and Recreation's ("Commissioner") approval before doing so.

a. Before seeking the Commissioner's approval, the Successful Tenderer is required to consult the Commissioner, through the Greenery and Development Planning Branch at NPARKS_GDP@nparks.gov.sg at the planning and design stage of the development works concerning the site.

b. The Successful Tenderer is required to present the following at the consultation:

i. A survey plan (survey done less than 2 years at the point of application and endorsed by the qualified surveyor) of the site and its peripheral roads, at a scale of at least 1:500. The plan must also clearly indicate the location, species, height and girth of trees at the site; and

ii. All other relevant additional information such as plans on construction hoardings.

ii) The Successful Tenderer shall note and adhere to the following requirements in respect of the green verge(s) / roadside table(s) / green buffer(s) surrounding the site. Further details of these requirements can be found in NParks' "Guidelines on Greenery Provision and Tree Conservation for Developments". It is available at https://www.nparks.gov.sg/publications-resources/guidelines-greenery-provision-tree-conservation-developments.

a. The development on the site shall not encroach on the green verge(s) surrounding the site, nor shall it affect any roadside table surrounding the site.

b. The Successful Tenderer shall ensure that the green verge(s) abutting the site are not to be affected by the development and use of the site, including without limitation:

i. Ensuring that the construction or provision of any vehicular ingress / egress, acceleration / deceleration / storage / vehicular lanes, services access, bus stops, and any structure required under statute to be erected to divert or reconstruct services or road features/elements, shall not affect the trees and plants located in the green verge(s);

ii. Ensuring that the green verge is kept clear and shall be free from obstructions and encumbrances at all times, including without limitation bicycles parked on the green verge or items left on the green verge;

iii. Ensuring that vehicular and service access points, pick-up / drop-off points, taxi laybys, loading / unloading bays and fire engine hard-standing areas are to be located within the site and not within the green verge(s); and

iv. Ensuring that there is no change of soil level to the green verge(s) without prior approval from the Commissioner.

c. The Successful Tenderer must also ensure that the development on the site complies with the requirements for green buffers, including without limitation the following:

i. The green buffers must be free from any encroachment above ground, and / or any structures or services are to be recessed to at least 2-metre below ground level and are not to slope with gradients steeper than 1:2.5; and

ii. The width of the green verge shall be in accordance to LTA's standard road code for that category of road or aligned with the existing green verge along the road, whichever is wider.

iii) If there is any indication that the works at the site will affect the green verge(s) / roadside table(s) / green buffer(s) in any way whatsoever, the Successful Tenderer must seek the Commissioner's approval as set out in Clause 7.0 (i), as well as the approval of the other applicable authorities under the relevant legislation, for the conduct of the works that will affect the green verge(s)/ road sidetable(s).

iv) Development works are to be confined within the site and working boundaries. There must not be any illegal dumping or storing of construction materials beyond the approved boundaries. The development shall not encroach on the road reserve line and affect any roadside table.

v) The Successful Tenderer shall comply with all applicable planting provision and aeration requirements for open air parking at street level. Further details of these requirements can be found in NParks' "Guidelines on Greenery Provision and Tree Conservation for Developments". It is available at https://www.nparks.gov.sg/publications-resources/guidelines-greenery-provision-tree-conservation-developments.

Section B – Specific Site Requirements

vi) There is a Park Connector (PC) at the southern boundary of the site along Sungei Simpang Kiri.

vii) There shall be no encroachment and no obstruction/interruption to the connectivity of the PC.

viii) The development works shall not affect the PC including the track, park furniture and plantings. If there is any indication that the development or use of the site will affect the PC, including any disruption to the continuity of the PC or pathways, or the affecting of any trees or plants located in the PC, the Successful Tenderer must apply for the Commissioner's approval under the Parks and Trees Act and its regulations to carry out the activities affecting the PC.

ix) No protruding structures shall encroach on the PC during and after the development. Worksites must be cordoned off with barricades and cautionary signage to prevent any possible overflow of construction activity onto the adjacent PC.

x) The PC should always be kept clear of obstruction and open to public use.

xi) Necessary measures are to be taken to ensure that there will not be any detrimental effect on the stability of the ground. There shall be proper drainage and cut-off drains to ensure that storm run-off is directly discharged into the canal/drains and not to cause ponding/flooding to the PC. Please consult NParks/Parks North-West team, Ms Eslindah at Ismailat Eslindah_Ismail@nparks.gov.sg on earthworks involving the cutting of slopes, retaining walls, and other soil stability and/or drainage measures.

xii) A risk assessment on the project shall be submitted for reference by the NParks/Parks North-West team. All specifications of works including construction plans, machineries involved, duration of the project shall be submitted to Ms Eslindah Ismail at Eslindah_Ismail@nparks.gov.sg for approval before commencement of work.

xiii) The Successful Tenderer shall be liable and responsible for any accidents resulting in injuries to PC users, damages to the PC as well as all public feedback arising from, during and after completion of the works (not limited to work site boundaries).

xiv) The works and the use of the site must not affect any trees within the PC. Working zone(s) should be set at least 2 metres away from the base of a tree trunk. No works should be carried out within this 2 metre buffer zone. Suitable barricades should be placed around the buffer zone to prevent people from crossing over. The Successful Tenderer's attention is brought to Clause 7.0 (viii).

xv) In the event whereby the Successful Tenderer or the Successful Tenderer's contractor encounters tree roots of above 0.2 metre in girth during excavation works on the site which originate from the PC, the Successful Tenderer or the Successful Tenderer's contractor is to cease work and inform NParks immediately.

xvi) All manholes and drain gratings should be kept flushed to the PC surface. NParks reserves the right to conduct site inspections as and when required to ensure that necessary measures against hazards such as mosquito breeding and tripping are taken. Any maintenance or operational issues shall be resolved between the involved parties amiably.

xvii) In order to preserve the health of the tree(s) on the green verge(s) surrounding the development, the Successful Tenderer shall consult NParks/Streetscape, Mr Ang Wenyang at Ang_Wenyang@nparks.gov.sg on the tree protection criteria for roadside trees before any commencement of works.

xviii) The Successful Tenderer may prune encroaching branches of trees abutting the development. The Successful Tenderer is to consult NParks/Streetscape, Mr Ang Wenyang at Ang_Wenyang@nparks.gov.sg and NParks/Parks North-West, Ms Eslindah Ismail at Eslindah_Ismail@nparks.gov.sg to confirm the extent of tree pruning on site before development.

xix) The Successful Tenderer may expect certain amount of branch and tree crown encroachment as the trees continue to mature. The Successful Tenderer may alert future MSCT/MA appointed.

8.0 REQUIREMENTS OF NATIONAL ENVIRONMENT AGENCY (NEA)

NEA requires the Successful Tenderer to comply with the following requirements:

i) The site is affected by a building height constraint (BHC) of 120m AMSL/SHD arising from flue gas emission in the area. The development shall comply with the BHC requirement.

ii) The Land is located within a water catchment area, where rainwater and surface runoff are collected in the downstream reservoir for treatment to produce drinking water by PUB. The development shall not cause pollution directly or indirectly to our water resources. Any activity that could cause contamination problem to our water resources shall not be carried out. Please also ensure that the requirements for developments in water catchment areas in Appendix D(III) are duly complied with.

iii) Sewage and used water from the development shall be discharged into the public sewer. The Successful Tenderer/QP of the development shall check with PUB (Water Reclamation Network Department) on the point of sewer= connection and the allowable discharge rate. Holding tanks shall not be used at locations served by the sewer network.

iv) Refuse and other solid wastes generated from the development shall be collected by a licensed waste collector for disposal at an approved waste disposal facility. Please ensure that the proposed refuse storage and collection system (e.g. bin centre) is in compliance with the public health requirements stated in the Code of Practice on Environmental Health.

v) Abatement measures shall be provided for all proposed M&E equipment installed in the development to mitigate the impact of noise, smell, fume, vapour or heat flux from operations and maintenance of these equipment on residential and noise sensitive

premises. The Successful Tenderer/QP shall ensure that the noise emitted from the operations of M&E equipment installed in the development does not cause nuisance to surrounding residential and noise sensitive premises. The Successful Tenderer/QP may take reference to the NEA's Technical Guideline on Boundary Noise Limits for Air-Conditioning and Mechanical Ventilation Systems in Non-Industrial Buildings for the noise limits. A copy of the said Guideline may be viewed at the following website: https://www.nea.gov.sg/docs/default-source/default-document-library/technical-guideline-on-boundary-noise-limit-for-air-conditioning-and-mechanical-ventilation-systems-in-non-industrial-buildings---feb-2018.pdf.

vi) The development is located in the vicinity of major roads (i.e. Sembawang Road, Yishun Avenue 7), Sembawang Airbase and residential developments. Hence, the site has high ambient noise level attributed to road traffic, air traffic, M&E equipment operations and community events/activities carried out in the vicinity. The Successful Tenderer/QP shall factor the high ambient noise level and other nuisance impacts in the planning layout and design of the development, such as siting the proposed residential buildings as far away as possible from the nuisances sources, and incorporate mitigation measures in the development to mitigate noise and other nuisances impact. The Successful Tenderer/QP shall carry out a land traffic noise impact assessment (NIA) to demonstrate that the noise level at residential buildings façade does not exceed 67 dBA (Leq 1 hour) and the indoor noise level does not exceed 57 dBA (Leq 1 hour) under natural ventilated condition with windows/sliding doors fully opened. The Successful Tenderer shall obtain NEA's clearance of the NIA and submit it as part of the development application to URA before the development application can be considered for Provisional Permission (PP), subject to compliance with relevant planning requirements. The Successful Tenderer/QP shall also inform or socialise the prospective buyers of the apartment units of the potential dis-amenities posed by the activities carried out in the vicinity of the subject site. Abatement measures shall be provided to further mitigate the impact if nuisance sensitive uses are included in the proposed development.

vii) In line with the Singapore Standard on Code of Practice for Pollution Control (i.e. SS593:2013), when a site that had undergone past polluting activities which could pose any risks to public health, is to be redeveloped, rezoned or reused for a non-polluting activity, a study should be conducted on the site to assess the presence and extent of land contamination. If there are indicators that point to the presence of land contamination (e.g. visual signs of soil discoloration and/or odour) found at the site, a site assessment study should also be conducted on the proposed site to assess the presence and extent of land contamination. If the site assessment study shows that the site is contaminated, the site shall be remediated or mitigation measures to be taken before it is redeveloped for residential or any non-industrial use, to ensure that the land is suitable for its intended uses. The Successful Tenderer/QP shall comply with the site contamination study requirement if the site meets the abovementioned conditions.

viii) In accordance with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline published in 1998: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf, the electromagnetic field emission from all the electrical installations and underground electrical cables should not result in the general public being exposed to extremely low frequency (ELF) magnetic field strength above or anywhere close to the guideline values. Similarly, the World Health Organisation (WHO) has recommended that (i) "Provided that the health, social and economic benefits of electric power are not compromised, implementing very low-cost precautionary procedures to reduce exposure is reasonable and warranted" and (ii) "Policy-makers, community planners and manufacturers should implement very low-cost measures when constructing new facilities and designing new equipment including appliances". Taking guidance from WHO, NEA encourages the Successful Tenderer to explore the implementation of cost-effective measures as a precaution to further lower exposure to ELF radiation when building new facilities or modifying existing facilities.

ix) The development shall comply with all the applicable requirements and provisions of the Singapore Standard on Code of Practice for Pollution Control (i.e. SS593:2013), the Code of Practice on Environmental Health, the Environmental Protection and Management Act 1999, the Environmental Public Health Act 1987, the Energy Conservation Act 2012, the Radiation Protection Act 2007 and their Regulations.

x) Under the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations, construction sites within 150m of hospitals, schools, institutions of higher learning, homes for the aged sick or residential buildings have to comply with more stringent construction noise limits, especially during the evening and night-time hours. Hence the Successful Tenderer/QP shall implement noise control measures during the construction period to ensure that the noise levels from the construction activities are within the noise limits and to minimise dis-amenity. In addition, construction sites within 150m of any hospital, home for the aged sick or residential building are not allowed to carry out construction activities from 10pm on Saturdays or eves of public holidays to 7am on the following Mondays or days after public holidays respectively.

xi) From 1 Apr 2025, a new project* that meets the following two criteria is required to have noise barriers installed along the perimeter of the worksite:

a) Construction project value of **$50 million and above** (per project location), and

b) Worksite located within **75 meters** of nearby sensitive premises (e.g. hospital, school, institution of higher learning, home for the aged sick or residential building).

** Refers to tenders for construction projects that are published on and after 1 Apr 2025*

The noise barriers to be installed shall meet the specifications stated in the following circular: https://www.corenet.gov.sg/media/2392015/mandating-of-noise-barriers-at-selected-construction-sites.pdf. If you have any enquiries on the requirement for noise barriers at worksites, please contact NEA at NEA_Noisebarrier@nea.gov.sg.

9.0 REQUIREMENTS OF FIRE SAFETY DEPARTMENT (FSD), SINGAPORE CIVIL DEFENCE FORCE (SCDF)

SCDF requires the Successful Tenderer to comply with the Fire Safety Act 1993 and its Regulations, the prevailing "Code of Practice for Fire Safety Precautions in Buildings" (Fire Code), the relevant Codes of Practices & Guidelines, and SCDF Circulars. These general fire safety requirements are also applicable to any proposed temporary usage or installation. In addition, the following conditions will apply where applicable:

i) To consult SCDF on the specific design requirements if the premises is to store, handle, use, transport or import of hazardous materials, including petrol station or CNG station which may have impact within the premises or on the surrounding existing or new developments. SCDF may impose the Quantitative Risk Assessment study (QRA) and/or additional Fire Safety requirements, or disapprove such proposals if there is possible impact within the premises or on the surrounding developments.

ii) To consult SCDF on any specific developments or structures having impact on SCDF operations e.g. deep basement works (which are more than 4 storey or more than 24 metres in depth), tunnel or any other special developments, etc. SCDF may impose additional Fire Safety requirements.

iii) The Successful Tenderer shall ensure that their proposal will not affect existing other surrounding developments (neighbouring) such as their exit provision, sidelane/backlane, window openings [the unprotected openings requirements, i.e. the Successful Tenderer and their Qualified Person (QP) shall strictly observe these existing conditions and provide more setback if necessary to prevent fire spread] and fire engine accessway etc. The Successful Tenderer and their QP shall consult SCDF directly for those new proposed building

structures to be sited near to common boundary line, as additional Fire Safety requirements may be imposed.

iv) The Successful Tenderer shall ensure that the boundary line of petrol service stations, either be an existing[1] or going-to-build petrol service station, shall be at least 50m from any residential building, or 90m from any place of public assembly.

v) For existing premises, the Successful Tenderer may wish to note that the SCDF's Plan Approval and Fire Safety Certificate (FSC) will have to be obtained if there is any change in use or involving any alteration/addition works. The Successful Tenderer shall ensure that the existing premises, including existing layouts and usages, have obtained the necessary Approvals from SCDF.

vi) For lease extension, the Successful Tenderer is urged to engage their own QP in assisting them to obtain the SCDF's Plan Approval and Fire Safety Certificate (basing on the prevailing Fire Code) if it is not done so for the entire buildings/premises. The fire safety provisions and mitigation measures are essential for all buildings; it is particularly true for religious premises where congregation of general public is possible, and for premises with similar usage as Nursing Home & Early Childhood Development Centre (ECDC) where the occupants are vulnerable to emergency situations.

vii) For applications of non-exclusive and limited religious use, the Successful Tenderer shall liaise directly with the building owner/management to ensure their proposed usage and number of occupants for that particular room/floor does not exceed the limit as originally designed & approved for. The Successful Tenderer shall also provide the full details to the building owner/management so that the Emergency Response Plan (ERP) can be updated accordingly.

viii) For new road development (including road widening, realignment, road expunction and interim measures etc.), it shall not affect or encroach upon any part of existing development compounds. For public fire hydrant, the Successful Tenderer is to liaise with PUB directly for any proposed relocation or erection of new fire hydrant.

ix) For drainage system development (including widening, realignment, extension and interim measures etc.), it shall not affect or encroach upon any part of existing development compounds.

x) Before making any commitment (purchase/occupation or rental/lease etc.) or commencement of any proposal, the Successful Tenderer shall engage a Qualified Person (QP) to carry out a feasibility study to ensure the entire premises and new proposals are able to comply with all the Fire Safety requirements (the current Fire Code and other relevant standards/guidelines/circulars). The feasibility study shall also ensure those existing fire safety provisions of surrounding developments are not affected. The QP will then assist them to obtain the SCDF's Plan Approval and the Fire Safety Certificate (FSC). If the Successful Tenderer has any doubts or queries regarding the fire safety requirements or plan approval procedures, he may enquire the Fire Safety Department via SCDF_QP_Consultant@scdf.gov.sg.

xi) For projects involving petroleum and flammable materials (P&FM) such as Chemical Plants, Petroleum Refineries and Buildings/Structures used for handling & storage of bulk P&FM, the Successful Tenderer and their QP shall provide the overall layout details to SCDF at SCDF Headquarters at 91 Ubi Ave 4, for further comments, as additional fire safety provisions and mitigation measures will be imposed. The Successful Tenderer and their QP can consult Hazmat Department at (Email: Bryan_NG@scdf.gov.sg or Glen_Chua@scdf.gov.sg).

[1] For existing petrol service stations undergoing A&A works, the 50/90m separation distance stipulated in the Fire Code is not applicable if the fire safety work does not involve deviation from existing approved plan (1) tanker parking position; (2) tanker refilling point or position; (3) position or capacity of the underground tanks.

10.0 REQUIREMENTS OF BUILDING AND CONSTRUCTION AUTHORITY (BCA)

BCA requires the Successful Tenderer to comply with the following requirements:

Environmental Sustainability

i) The BCA Green Mark Scheme is a green building rating system to evaluate a building for its environmental impact and performance. Under this scheme, a building will be assessed based on the level of environmental performance that can be achieved in its design and construction. More details are available at https://go.gov.sg/gm2021.

ii) The Successful Tenderer is required to incorporate energy-efficient, water-efficient and environmentally friendly design, technologies and practices to achieve a minimum BCA Green Mark Rating of Green Mark Platinum Super Low Energy (SLE) with exemplary performance under the Maintainability (Mt) section (i.e. obtain Maintainability Badge) for each development on the Land.

iii) The Successful Tenderer is required to apply to BCA for assessment of the environmental features and performance of each development under the BCA Green Mark Scheme and achieve the rating of Green Mark Platinum SLE with Maintainability Badge. In the application under the BCA Green Mark Scheme, the Successful Tenderer is to submit all relevant building plans and documents to BCA and to comply with all requirements, procedures, directions and requests, and pay all fees, charges and other amounts payable to BCA for, and in relation to, the assessment of each development under the BCA Green Mark Scheme. The Successful Tenderer is advised to render full co-operation to BCA, its officers, employees and agents in relation to the assessment.

Digitalisation

iv) The Successful Tenderer is required to carry out building works for the development on the Land in accordance with the requirements of integrated digital delivery (IDD) as set out in the Code of Practice on Buildability Addendum No. 1 in relation to IDD.

v) The Successful Tenderer is required to submit the preliminary IDD implementation plan to BCA for BCA's review within three months from the Successful Tenderer obtaining URA's Provisional Permission.

vi) When submitting the plans of building works for the development on the Land to the Commissioner of Building Control for approval, the Successful Tenderer is also required to include the final IDD implementation plan as stipulated under the Building Control (Buildability and Productivity Regulations) 2011 and such IDD implementation plan must include the following:

a. the details of the five (5) IDD essential use cases that are adopted in respect of the building works; and

b. such other documents or information as may be required by the Commissioner of Building Control.

Productivity

vii) The Successful Tenderer is required to adopt suitable productive technologies for the development to achieve a minimum level of 30% productivity improvement*.

viii) The Successful Tenderer is also required to adopt the minimum level of use of prefabricated systems for the development on the Land as stipulated in the Building Control (Buildability and Productivity) Regulations 2011 as shown below:

a)	Prefabricated structural systems of minimally advanced precast concrete system in respect of total structural floor area of the building works	65%
b)	Prefabricated architectural systems in respect of total wall length of the building works	80%
c)	Prefabricated mechanical, electrical and plumbing systems in respect of the total qualifying areas in the development as specified in the Code of Practice. The mechanical, electrical, and plumbing components or equipment are required to be manufactured and assembled in an accredited fabrication facility, in accordance with any accredited fabrication method.	65%
d)	System formwork in respect of the total cast-in-place areas of super structural works	70%

ix) A Productivity Concept Implementation Plan (PCIP), which demonstrates a minimum level of 30% productivity improvement*, is to be submitted to the Building and Construction Authority in the following manner:

*compared to the base figure for 2010 as set out in BCA's website (at https://go.gov.sg/measuringprojectproductivity)

a) Within three months from obtaining URA's Provisional Permission (PP), the Successful Tenderer is required to submit the Productivity Concept Implementation Plan (PCIP) to BCA. The Successful Tenderer must attach BCA's acknowledgement letter on the submission of PCIP as part of the application for Structural Plans (ST) Approval. If the Building Plan (BP) Approval is obtained before the Successful Tenderer applies for the ST Plans Approval, the acknowledgement letter on submission for PCIP will not be required.

b) As part of the application for BP Approval, the Successful Tenderer is required to submit the final PCIP, by incorporating and highlighting any design changes, to BCA together with the application for BP Approval, and obtain the Commissioner of Building Control's approval for the final PCIP before BP Approval is obtained. Once the PCIP has been approved by BCA, the Successful Tenderer is required to design and carry out the building works in accordance with the approved PCIP under the Building Control (Buildability and Productivity) Regulations 2011.

x) If the Successful Tenderer adopts Prefabricated Prefinished Volumetric Construction (PPVC) for the development, he shall:

a. include in all options and agreements for the sale, sublease or disposition of the residential units within the development such information as to highlight to the purchasers, sublessees or parties agreeing or intending to agree to accept from the Successful Tenderer the disposition of the residential units within the development that the PPVC method is used for the development and any resulting conditions of use of the residential units (arising from the use of the PPVC method), including but not limited to:

i. restrictions on hacking/alteration of load-bearing structures within the residential units;

ii. for localised chasing and drilling works on load-bearing structures within the residential units, the following shall apply:

1. appointing a Professional Engineer (PE) to issue a formal letter affixed with PE stamp and signed prior to carrying out such works to confirm that strengthening of the structures will not be required and that the

structural integrity of the building will not be affected by the proposed works. The PE shall supervise the works being carried out, and provide a further formal letter affixed with PE stamp and signed after the completion of such works stating that such works are satisfactory;

2. obtaining clearance from the Management Corporation (MCST) of the development prior to carrying out such works, and in the case where there is no MCST constituted in respect of the development, obtaining clearance from the owner developer of the development prior to carrying out such works

iii. keeping access panels (if any) within the residential units unobstructed to facilitate periodic inspections

b. Ensure that the PPVC which is used must conform to the requirements set out in the Code of Practice in relation to PPVC.

c. The PPVC system adopted is to be of a concrete system and must allow for flexibility for removal of internal walls in the event the homeowners want to make any modifications to their units.

Buildability and Constructability Requirements

xi) The Successful Tenderer is required to adopt labour-efficient designs and construction technologies to achieve the Buildability and Constructability requirements as set out in the Code of Practice on Buildability for the development on the Land.

xii) Buildability considers the extent of standardisation, simplicity and integrated elements applied to buildings at the design stage and the potential impact of a building's design on labour usage. Constructability considers the level of adoption of labour-efficient construction methods and construction processes such as system formwork and climbable scaffolding which would result in savings in manpower and shorter construction time. More details are available at https://go.gov.sg/bpregulations.

xiii) The Successful Tenderer is required to consult BCA at the planning stage, before the first application for ST or BP plan submission approval to BCA, whichever is earlier, on the designs and productive technologies of the development to meet the Buildability and Constructability requirements as set out in the Code of Practice on Buildability.

xiv) The Successful Tenderer shall comply with the requirements, procedures, directions and requests of BCA and shall also render his full co-operation to BCA, its officers, employees and agents in relation to meeting the Buildability and Constructability Requirements.

Prefabricated Bathroom Units (PBU)

xv) The Successful Tenderer is required to adopt Prefabricated Bathroom Units (PBUs) for 65% or more of the bathroom units in the non-landed residential component of the development on the Land as stipulated under the Building Control (Buildability and Productivity) Regulations 2011.

xvi) The PBUs which are used must conform to the requirements set out in the Code of Practice on Buildability in relation to PBUs.

xvii) In situations where PPVC is adopted and the PPVC modules for the residential component of the development also contain bathroom units which conform to the latest Code of Practice on Buildability stipulated for both the PPVC and PBU units, the adoption of these modules can be counted towards meeting the required minimum levels of use for both the PPVC method and PBUs. The adoption of these PBU modules may also contribute towards meeting the minimum level of productivity improvement as stated in Clause 10.0 (vii).

Construction Quality Assessment System (CONQUAS)

xviii) The Successful Tenderer shall be required to refer and submit the development to BCA to be assessed for the construction quality of the building works under the Construction Quality Assessment System (CONQUAS).

xix) The Successful Tenderer is to comply with all requirements, procedures, directions and requests of BCA and pay all fees, charges and other amounts payable to BCA for and in relation to the assessment of the construction quality of the Development under CONQUAS. The Successful Tenderer is to render full co-operation to BCA, its officers, employees and agents in relation to such assessment under CONQUAS.

Quality Mark (QM) for Good Workmanship

xx) The Successful Tenderer is required to apply for and comply with all the requirements under the BCA Quality Mark for Good Workmanship scheme in the non-landed residential component of the development on the Land.

Barrier-Free Accessibility (BFA) & Universal Design (UD)

xxi) The Successful Tenderer shall comply with the mandatory requirements specified under the prevailing Code on Accessibility in the Built Environment (Code).

a. All areas intended for access by residents, visitor or the public shall be made accessible for persons with disabilities in accordance with the provisions specified under the prevailing Code.

xxii) Where there are direct pedestrian connections to adjacent developments, parks, walkways/linkways and commuter facilities like MRT station, public bus stops and taxi stands; whether underground, on grade or elevated, all such connecting routes must be made accessible for persons with disabilities.

xxiii) The development on the Land should be designed and constructed to be accessible and inclusive for diverse users, including persons with disabilities, the elderly and families with young children. The BCA Universal Design index self-assessment framework (UDi) evaluates the building's level of user-friendliness through its provision of user-friendly features. The Successful Tenderer is required to use the BCA Universal Design index (UDi) Checklist at the onset of design and strive to achieve higher UDi rating for the development. More details are available at http://go.gov.sg/bcaudi.

11.0 MINISTRY OF DEFENCE (MINDEF)

MINDEF requires the Successful Tenderer to comply with the following requirements:

i) There is a need for visual controls at the subject site to shield the facilities at Sembawang Air Base from external view. The Successful Tenderer shall comply with the details of the visual controls as follows:

a. The views from windows, corridors, staircases, or any openings, or any surveillance cameras, devices or equipment (e.g. CCTVs) on the Land exceeding the height of 25m to 30m SHD (indicative) onwards, as shown on the Control Plan (Visual), must be directed away from Sembawang Air Base.

b. If the above is impracticable to implement, the Successful Tenderer can propose visual screening measures in the form of permanent fixtures which are impossible or difficult to remove. They can include but are not limited to the following:

i. Window openings are to be recessed or have fixed frosted glass panels;

ii. Corridors, staircases, fixtures and other openings are to be provided with louvres;

iii. Parapet wall on the rooftop should have a height of 2m for personnel and 3m for vehicles.

c. The Successful Tenderer is advised to liaise with MINDEF early on the requirements for these visual controls and submit the proposal to DSTA for MINDEF's comments and clearance (at least 1 month in advance) at the detailed design stage and arrange for mock up screening measures on site before implementation. Such inspection may include the use of alternative means such as virtual meetings or multi-media to facilitate MINDEF's assessment. If the screening measures implemented on site are found by MINDEF at its sole discretion to be inadequate or ineffective, the Successful Tenderer shall undertake to carry out any and all necessary rectification works at its own cost and expenses, to comply with the visual control requirements stated above and to the satisfaction of MINDEF.

ii) As the Land is located in proximity to Sembawang Airbase, and under the flight take-off/approach funnel of a runway, aircraft noise and vibrations should be expected, especially for noise- or vibration-sensitive operations. These effects should be taken into account in the development, and in particular, in the design of the facilities and operating equipment. If necessary, the Successful Tenderer should assess if a noise study should be carried out. The development must not impose any constraint on MINDEF or curtail its existing and future developments, operations and activities in any way.

iii) The Successful Tenderer shall ensure that the lighting system and solar reflectance from materials (e.g. facade cladding, solar panels etc) for the proposed development must not affect aircraft in flight. The Successful Tenderer shall ensure that any working/outdoor lightings and solar reflectance must be directed downwards and/or shielded to prevent causing glare and confusion to pilots. The Successful Tenderer shall undertake all necessary rectifications at its own cost and expense to the satisfaction of the RSAF if the lightings are assessed by the RSAF to be a hazard to air navigation. The Successful Tenderer shall submit detailed plans on any glare-inducing installation to RSAF (Email: Height_Control@defence.gov.sg with the Subject Title: "Glare Proposal for AOD"), for comments prior to implementation.

iv) The development should not tap on or affect any MINDEF sub-stations at all times.

v) All capital and operating costs or expenses incurred to meet all the above conditions and requirements will be borne by the Successful Tenderer.

12.0 ELECTRICITY

i) The Successful Tenderer shall liaise with the Transmission Licensee authorised under the Electricity Act for the electricity supply and any other electrical provisions required for the purpose of and in connection with the development.

ii) The Successful Tenderer shall apply to the SP PowerGrid Ltd directly for the electrification scheme and any electrical substation, which need to be constructed within the Land to serve the development. The Successful Tenderer shall be deemed to have included in his tender price for the construction of the electrical substation(s).

13.0 TELECOMMUNICATIONS

i) The Successful Tenderer shall liaise with the Telecommunication System Licensee authorised under the Telecommunication Act, for the telecommunication supply to the development.

ii) The Successful Tenderer shall provide all facilities for telecommunication services, such as MDF room, Telecom riser ducts, lead-in pipes and manholes etc., within the Land. All Telecom facilities shall be provided according to the prevailing Info-communications Media Development Authority of Singapore (IMDA) Code of Practice for Info-communications Facilities in Buildings.

iii) The Successful Tenderer is advised to consult the relevant Telecommunication System Licensees (e.g. Singapore Telecommunications Ltd, StarHub Ltd, StarHub Cable Vision Ltd, NetLink Trust, SP Telecommunications Pte Ltd, etc.) early during the planning stage of the development, on the location and diversion of existing Telecoms services.

iv) The detailed Telecoms facilities plans for the development shall be submitted to and duly verified by Telecommunication Facility Co-ordination Committee (TFCC) through the CORENET esubmission system, and approved by the IMDA prior to the commencement of works.

14.0 GAS

General

i) The Successful Tenderer shall liaise with a gas retailer on the requirements for gas supply to the Land. For reference, the information on gas pipeline network in Singapore and the list of gas retailers in the market can be found at https://www.ema.gov.sg/our-energy-story/energy-market-landscape/gas and https://www.ema.gov.sg/Licensees_Gas_Retailer.aspx.

ii) The Successful Tenderer shall at his own cost and expense, carry out trial trench / holes to determine the exact alignment and levels of any existing gas main within the Land and in the vicinity of the Land during the design stage and ascertain whether they will be affected by the development works. If affected, the Successful Tenderer shall liaise with the Gas Transporter to request for diversion.

iii) The Successful Tenderer shall provide a suitable diversion corridor and the proposed corridor for the gas mains diversion works must be made available without any obstructions. The Successful Tenderer shall contact gasenquiry@spgroup.com.sg for diversion consultation if the gas mains are affected and bear the necessary diversion cost.

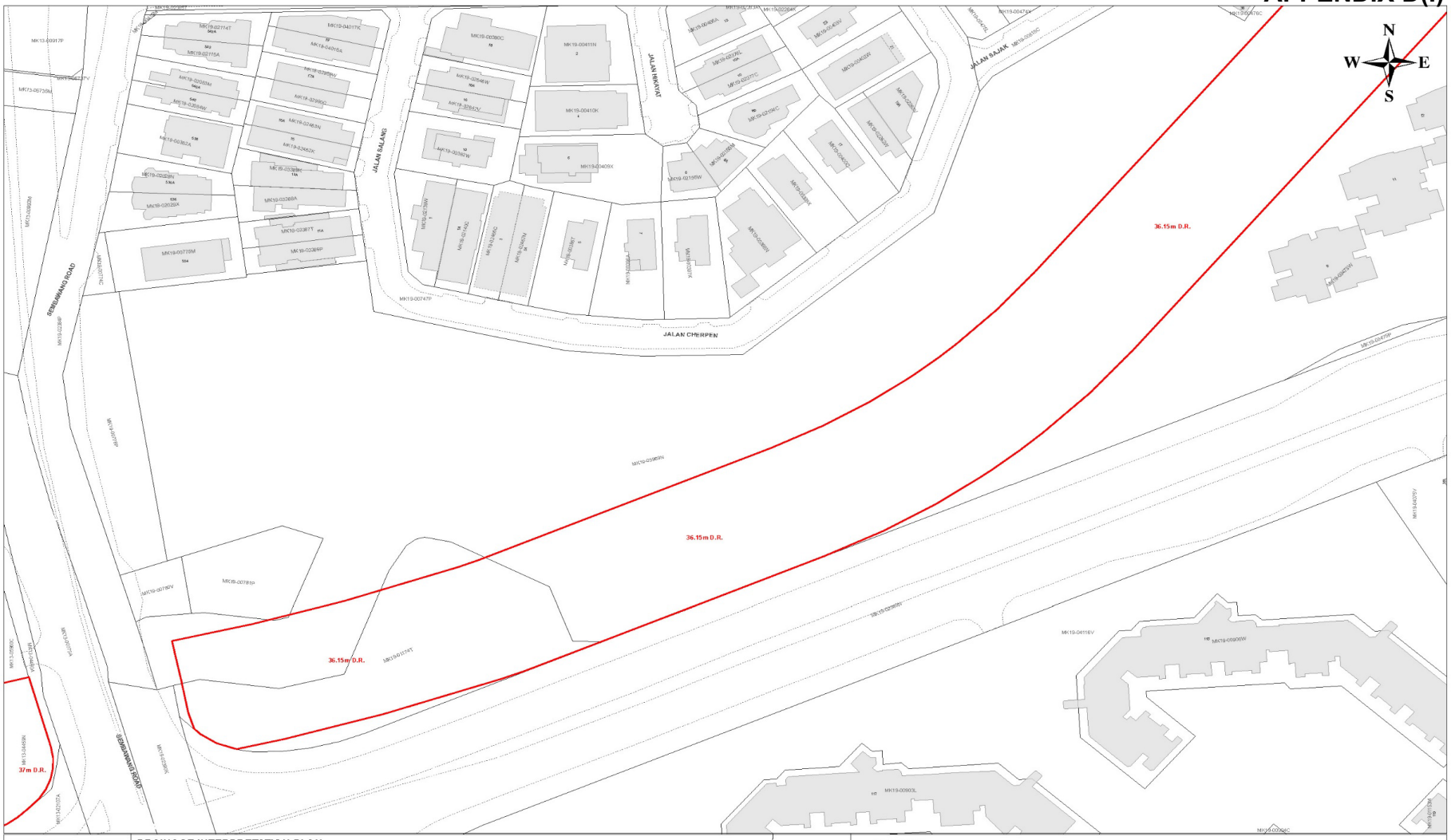
Particular Requirements

ix) For further enquiries pertaining to the existing gas transmission pipelines, please email gastrans@spgroup.com.sg. A copy of “Notes for Working near Power Gas Transmission Pipeline” is appended for the Successful Tenderer’s information in Appendix D(IV).

x) A copy of “Distribution Requirements for Distribution Gas Pipe Diversion Works” is enclosed for the Successful Tenderer’s information in Appendix D(V).

xi) For advice on gas pipe damage prevention, the Successful Tenderer may contact Earthworks Surveillance & Patrolling section during office hours at Tel No. 69165119 or email espsection@spgroup.com.sg.

APPENDIX D(I)



PUB
Water for All:Conserve,Value,Enjoy

DRAINAGE INTERPRETATION PLAN

THE INFORMATION GIVEN ON THIS DRAINAGE INTERPRETATION PLAN FORMS THE BEST INFORMATION AVAILABLE ON THE DATE PRINTED AND IS LIABLE TO CHANGE WITHOUT NOTICE WHILST EVERY ENDEAVOR IS MADE TO ENSURE THAT THE INFORMATION PROVIDED IS CORRECT, THE PUBLIC UTILITIES BOARD DISCLAIMS ANY LIABILITY FOR ANY DAMAGE OR LOSS **THAT MAY BE CAUSED TO ANY PERSON DIRECTLY OR INDIRECTLY AS A RESULT OF ANY ERROR OR OMISSION.**

Caution:
The information given is indicative only. The Applicant is advised to verify the information at the site.

SCALE
(in A1 Size)
1:500

LEGEND :
Drainage Reserve

APPENDIX D(II)

To: Agencies/ Developers/ Qualified Persons/ Contractors

PUB (WSN)/ PUB (CWD) ADVISORY NOTE- PREVENTION OF DAMAGE TO WATER PIPES (REVISED EDITION – OCT 2024)

Our records show that there are existing and/or proposed water pipes within and in the vicinity of your development lot/worksite. The Qualified Person (QP) / contractor is required to notify/obtain a written clearance from PUB before carrying out any earth work/ piling work/ building work at the site, satisfying all the Conditions and Requirements set hereunder.

i) For work activities within the protection corridor of water pipes < 300mm diameter, a notification to PUB will suffice. If the work activities satisfy the setback clearance requirement for water pipes < 300mm diameter, there is no necessity to await PUB's response upon notification with the required declaration and supporting documents (1.A to 1.E) before commencement of work within the protection corridor of water pipes < 300mm diameter.

ii) For work activities within the protection corridor of water pipes ≥ 300mm diameter, the QP/contractor shall make a submission and obtain PUB's approval prior to the commencement of the work activities. PUB will review the submission within 14 working days, and if the submission is in order, grant a written clearance for the work activities. **No work activities are to commence until clearance has been granted by PUB(WSN) for Potable, NEWater and Industrial water pipes and PUB (CWD) for Raw water pipes.**

Penalties under the Public Utilities Act (PUA)/ Regulations

We would like to draw your attention to Section 57 of the Public Utilities Act which stipulates a duty to enquire on water mains if any person wishes to carry out any work in the vicinity of any water pipes. We wish to highlight that under Section 47A of the Public Utilities Act, any person who, whether wilfully or otherwise, removes, destroys or damages or causes or permits to be removed, destroyed or damaged, any water pipes belonging to or under the management or control of the Board, shall be guilty of an offence and shall be liable on conviction to a fine not exceeding $40,000 or to imprisonment for a term not exceeding 3 months or to both; or if the water pipes is 300 mm or more in diameter, to a fine not exceeding $200,000 or to imprisonment for a term not exceeding 3 years or to both.

Under the Public Utilities (Protection of Water Pipes Infrastructure) Regulations 2017, which stipulates that for any water pipes smaller than 300mm (proposed or existing), the QP/PE/contractor shall notify PUB before commencement of the works. No approval by PUB is needed. For any water pipes equal to or larger than 300mm (proposed or existing), the QP, PE or contractor shall submit an application to PUB and obtain PUB's approval before commencement of works. Any person who is guilty of an offence under the Regulation shall be liable on conviction to a fine not exceeding $10,000 and, in the case of a continuing offence, to a further fine not exceeding $250 for every day or part of the day during which the offence continues after conviction.

For more information of the Public Utilities Act and Regulations, please refer to http://sso.agc.gov.sg/Act/PUA2001. QR code to the Public Utilities Act below.

Mandatory requirement before commencement of work activities

The QP/contractor shall purchase a copy of the **Water Services Plan (WSP)** to check for any water pipes that would be affected by the work activities. The latest copy of the **WSP** is available on SLA's INLIS portal: https://www.sla.gov.sg/INLIS. QR code to the INLIS portal below.

Where the work activities are to be carried out within a water pipe corridor, the QP/contractor shall make a submission to PUB before the carrying out of any work activities.

The below documents are to be submitted to PUB(WSN)/PUB (CWD) for carrying out work activities within the water pipe corridor:

1.A	Clear Layout and Section Plan indicating the lateral and vertical clearances from the affected water pipes based on the trial trenches results.
1.B	Detailed method statement and drawings for the construction works, details of the machinery/equipment used with analyses / assessment to demonstrate that the construction method proposed will not cause any impact or damage to the water pipe. Include PE endorsed design for the support of water pipe and joints in case of the necessity to exposure the water pipes (see para 6. G).
1.C	Construction Impact Assessment Report (CIAR) – The QP is to carry out a construction impact assessment of the construction effects of the works on the water pipes in the vicinity of the works and submit the report to PUB. Refer to para 6. B for detail.
1.D	Instrumentation and monitoring plan of all the water pipes that in the QP's view are likely to be affected by the works. Refer to para 8. A to H for detail.
1.E	PUB would require the owner/developer/contractor to install surveillance cameras for works within water pipe setback distance (see para 3. B) for water pipes ≥900mm diameter (see para 9. A and B).

Who to make the submissions for the proposed works to PUB

Before commencement of works, the owner/developer shall engage a QP to undertake the design, make and endorse all submissions to PUB.

For activities requiring BCA approval

- the QP is the Professional Engineer (PE) appointed by the contractor/person carrying out activity

For activities not requiring BCA approval

- the QP is the PE appointed by the contractor/person carrying out activity, or
- contractor/person carrying out activity where PUB has dispensed the need for PE

The PE shall be registered with the PE Board, Singapore and possess a valid practicing certificate.

How to make the submissions for the proposed works to PUB(WSN)/PUB(CWD)

Submissions shall be made via PUB's Online Submission Portal, Protection of Water Pipes and Sewers (POWS). POWS serves as a centralised portal for processing of submissions by Qualified Persons/Professional Engineers/Contractors prior to carrying out specified activities near water pipes and public sewers.

- The link to the POWS portal is as follows: https://www.eservices.pub.gov.sg/bpp/account. QR code to the POWS portal below.
- Singpass or Corppass login is required to access the portal.

Contact for Enquires on the submission to PUB(WSN)/PUB(CWD)

5.A For submissions/enquiries on protection of water pipes, you may send an email or call the following officers:

- Potable Water/NEWater/Industrial Water pipelines at Northern & Eastern areas
  - Mr Aman Fikri (North) at aman_fikri_anuar@pub.gov.sg or 91114963
  - Mr Low Zhan Hong (East) at low_zhan_hong@pub.gov.sg or 84751572
- Potable Water/NEWater/Industrial Water pipelines at Central & Western areas
  - Mr Firdaus Azmi at firdaus_azmi@pub.gov.sg or 92222064
- Raw Water pipelines – Mr Fattah Danial/Foo Zhen Lin at fattah_danial_amin@pub.gov.sg / foo_zhen_lin@pub.gov.sg or 92229625/97562935

Appendix 1

Duty and Responsibility to locate and positively identify PUB water pipes

2.A The information of the water pipes on the WSP is valid as at date plotted and is given without any liability for any error, mis-statement or omission therein. Positions of water pipes as shown in the plan are **approximate** only. Smaller submains and connections to customers' premises /properties are not indicated in the WSP.

2.B The exact locations and depths of all water pipes (including the smaller submains and connections), must be positively identified by the contractor on site by means of trial holes conducted using manual excavation. Water pipes could also be embedded within reinforced concrete (e.g. thrust block, pavement slab, box drain slab etc). When the contractor encounters and requires to remove the reinforced concrete in the trial holes, additional mitigating measures shall be proposed and subjected to PUB's approval prior to commencement of the work. The presence of water meters near the work zone is an indication of the presence of water pipes, and these water pipes shall be positively identified on site by trial holes. The alignment of the water pipes must be pegged on site, so that the alignment is clearly visible and appropriate protection measures can be adopted. The below table shows the requirements for the marking of water pipes and appurtenances within construction sites.

Type of Water pipes /Appurtenances	Pegging Requirements	Remarks
Water pipes < 1200mm dia	To mark out the centre alignment of the water pipe	See standard drawings to mark out the centre alignment of water pipes in **Appendix 4**
Water pipes ≥1200mm dia	To mark out the centre alignment and the 2 edges of the water pipe	See standard drawings to mark out the centre alignment and the 2 edges of water pipes in **Appendix 4**
Water Appurtenances like valve chambers	To mark out the location of the appurtenances	See standard drawings to mark out water appurtenances in **Appendix 4**

***Where it is not feasible to put in the markers as set out in Appendix 4 (i.e on carriageway), the contractor may consult PUB(WSN)/PUB (CWD) and propose the use of alternatives for the marking of water pipes and appurtenances .**

2.C If a contractor identifies an abandoned PUB's water pipe within the worksite, they must promptly inform PUB. Upon confirmation from PUB that the pipe is abandoned, the contractor shall remove it. They must provide before and after photographs as evidence of the removal. Should technical constraints hinder the removal, the contractor shall submit technical justifications, endorsed by a Professional Engineer (PE) or Qualified Person (QP), and seek approval for a waiver.

2.D Do have proper protection for our existing and/or proposed water pipes during excavation. PUB's water pipes are not to be exposed, suspended or otherwise interfered with without prior approval from PUB. All exposed water pipes should have a PE's certification on the design for supporting the existing and/or proposed water pipes. Any exposed water pipe joint shall be rigidly restrained (i.e via joint restrainers or encapsulation clamp etc) to prevent the water pipe joint from being dislodged.

2.E Our water pipes and appurtenances must be accessible for maintenance and repairs at all times. All chambers and appurtenances within the construction site should be clearly demarcated, suitably protected and hoarded up. Under no circumstances, shall any earth spoil or debris or any construction activities cover our chambers and appurtenances. All other necessary precautions must be taken by the contractor to safeguard and to avoid the damage to the water pipes.

2.F The alignment of the water pipes must be pegged on site, so that the alignment is clearly visible and appropriate protection measures can be adopted. You shall reconfirm the alignment of the water pipes before reapplying missing or faded pegs and surface markers on the ground or inside trench.

2.G You shall update the peggings / markings at the worksite after the carrying out of any water pipe diversion, decommissioning of water pipes or commissioning of new water pipes. You shall brief all worksite personnel of the new positions of the water pipes.

2.H Trial trenches conducted may not locate the water pipes, as shown on the plan. This does not mean that the water pipe is not there. The water pipe may be the deeper than the depth of the trail holes. The Developer/ Contractor shall then undertake geophysical or other methods to positively identify and locate all the water pipes, shown on the plan.

2.I Please contact PUB officer in-charge for assistance if you are unable to detect the exact locations of the water pipes on site.

General Requirements

3.A No structure, including rigid pavement either permanent or temporary shall be erected over our water pipes. Our buried water pipes require a minimum cover of one metre, and you must not at any time increase, reduce or remove this, without our approval. The Developer/ Contractor is required to provide adequate protection for our water pipes.

3.B No structure either permanent or temporary shall be erected over or within the below minimum setback distance from the water pipe.

WATER PIPE SETBACK DISTANCE CLEARANCE REQUIRED

Water pipe Diameter (mm)	**Nett Clearance Required**
100 to 600 (depth ≤3m)	1.0m from outer edge of any structure to centreline of water pipe
100 to 600 (depth > 3m to 5m)	1.5m from outer edge of any structure to centreline of water pipe
150 to 600 (depth > 5m)	2.0m from outer edge of any structure to centreline of water pipe
> 600 to 1500	2.5m from outer edge of any structure to outer edge of water pipe
> 1500 to 2200	3.0m from outer edge of any structure to outer edge of water pipe
> 2200, Tunnels or Tunnelled pipes	4.0m from outer edge of any structure to outer edge of water pipe

3.C All services must undercross our water pipes. Services undercrossing our water pipes shall be protected throughout the entire width of the undercrossing section and a minimum clearance of 1 metre all-round the pipe must be provided.

3.D No heavy machinery or vehicles shall be driven over PUB water pipes. Where vehicles need to cross any existing and/or proposed water pipes, adequate protection would have to be installed e.g. use of steel plates over the ground with sufficient earth cover of 1m minimum, above the pipes for load distribution during construction access. There shall be no stacking and storage of materials or parking of vehicles directly above the water pipes.

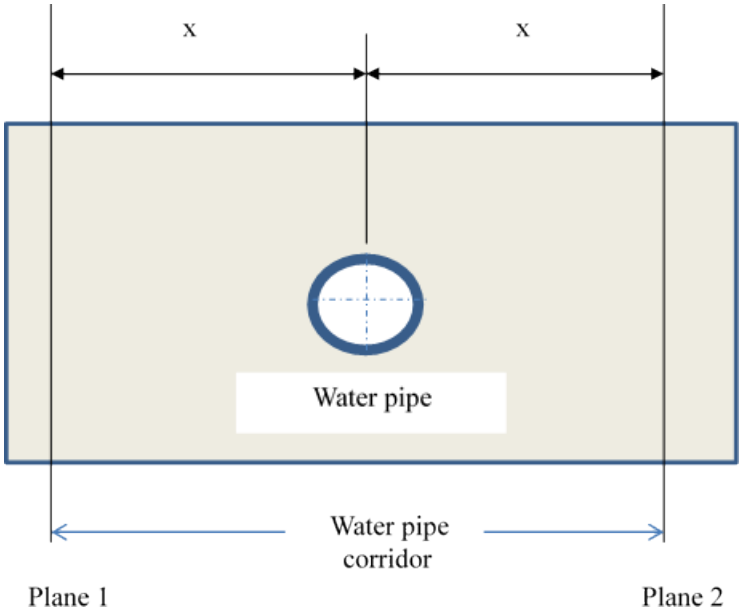
3.E PUB will not be held responsible for any damage or injury caused to any persons, property, road, etc as a result of water pipe leakage due to the Developer/Contractor's works. The Developer/Contractor shall be fully liable for any damage caused to adjacent property whether public or private as a result of any leakage from the water pipe due to his works. The Developer/Contractor shall undertake all repairs to the adjacent property at his own costs and reimburse the owners directly for any consequential claims or expenses claimed by them. The Developer/Contractor will also be required to indemnify PUB against all losses and claims arising from damage to water pipes.

Verification of Proposed Works within Water pipe Corridor

4.A After positively identifying existing and/or proposed water pipes on site (including its depth and alignment), the Developer/ Contractor shall assess whether if the proposed works lie within the water main corridor, as indicated in the Table below.

4.B The water main corridor as set by PUB, is the distance between two vertical planes, on either side of the centreline of any water pipe, as specified in the table below.

Water Pipe	Distance X on either side from the centreline
<900 mm Diameter	10 metres
≥ 900mm Diameter	20 metres
Tunnels and Tunnelled pipes	40 metres



Water pipes Diversion for Proposed Works within Water pipe Corridor

5. A The Developer / Contractor shall consult PUB at the earliest opportunity during the design stage on the handling of the affected water pipe. The Developer / Contractor shall arrange for site meetings with PUB to seek PUB's comments on whether the affected water pipe should be diverted or remain in its original position with adequate protection measures implemented. If deemed necessary by PUB, the affected water pipe shall be diverted out of the water pipe corridor and the Developer / Contractor shall be responsible for engaging a Licensed Plumber / Contractor to carry out the diversion works according to PUB's pipe-laying specifications. If PUB deems that diversion of the affected water pipe is not feasible, the Developer / Contractor shall make necessary modifications or design changes to his works such that the water pipe is either no longer affected or adequately protected by appropriate measures.

5. B If PUB deems that that the proposed works (whether within or outside of the water pipe corridor) impose risks or constraints on the future operation, maintenance or repair of the water pipe, PUB may direct the Developer/ Contractor to divert the water pipe or make necessary modifications or designs changes to his works.

5. C The cost of all abovementioned diversions, modifications and design changes to proposed works, as PUB may direct, shall be borne by the Developer / Contractor.

Responsibilities Required from Qualified Persons

6. A The developer/contractor's QP shall submit for the information of PUB the procedures and methods for all excavation and other construction works within the entire corridor of the water pipes to prevent damage to the water pipes during the work. See para 1. A to 1. E.

6. B Construction Impact Assessment Report (CIAR) - The QP is to carry out a construction impact assessment of the construction effects of the works on the water pipes in the vicinity of the works and submit the report to PUB. The report shall include the following details:

(i) The ground conditions, geotechnical profiles and relevant borehole logs.
(ii) The proposed construction equipment and methods, and sequencing of construction.

(iii) Assessments on the use of the proposed construction equipment /methodology on the existing and/or proposed water pipe, vibrations, ground displacements and groundwater draw downs and how the impacts would be mitigated to meet requirements. (See para 6. C to F)

(iv) The damage potential and risks to the water pipes.

(v) Preventative and precautionary measures to protect the water pipes from damage and remedial measures to be taken in the event of damage/incidents.

6.C Equipment Vibrations - Construction activities such as piling, excavation, soil improvement, diaphragm wall and retaining wall construction etc and the use of construction equipment such as piling/boring machine etc shall not subject the water pipe to a peak particle velocity (PPV) exceeding 15 mm/s at any frequency. The QP shall provide a detailed impact assessment that clearly demonstrates the vibration attenuation for each of the equipment proposed to be used at the development site and in similar ground conditions to show that this vibration limit would not be exceeded on the existing and/or proposed water pipes.

6.D Groundwater Drawdown – The developer/contractor's QP shall confirm that there will not be any groundwater drawdown in the vicinity of the PUB water pipe. If there is drawdown of groundwater, the developer/contractor's QP shall propose mitigation measures.

6.E For Cement-lined Steel and Cement-lined Ductile Iron pipes: In general, the allowable limits are as follows:

1. longitudinal deflection – not exceeding L / 250 or 20mm whichever is lesser, where L is defined as the calculated length of sagging pipe section, at ends of which there will be no expected horizontal nor vertical movement.
2. diametrical deformation – not exceeding 2% of the pipe diameter
3. The total stress on the pipe at any point (including existing stress and additional stress due to the proposed works) shall not exceed 133 N/mm^2.

6.F For Cement-lined Cast Iron Pipes (with lead-caulked pipe-joints):
All cast iron pipes are assumed to take zero longitudinal deflection and zero diametrical deformation. This is because existing cast iron pipeline are old and due for replacement. They cannot be subject to any additional loading/ stresses. Development near a cast iron pipeline must be designed to prevent any increase in stress / strain to the pipeline.

6.G If water pipes are required to be exposed and supported to facilitate construction works, QP needs to provide PE endorsed design for the utility support. The water pipe should be supported by box-in structural design that can fix the pipe rigidly on all 4 sides to prevent movement/deflection of the water main, especially at the spigot & socket or welded joint positions. Please provide wooden wedges or rubber shins in between the supports and pipe to further prevent any movement and damages to the pipes once the metal supports are in place. Extra precaution should be taken at the pipe bends due to additional thrust force at pipe bends.

6.H You shall not dig any trial holes in the vicinity of water pipes without the written consent from PUB. You shall comply with any additional requirements that may be imposed by PUB.

6.I The QP shall advise PUB on the likely risk to the water pipe and his proposed mitigating measures for preventing the water mains from damage to the satisfaction of PUB.

6.J If there are changes to the schedule for the carrying out of the work or changes in the work method, the QP shall study the implications, review the earlier impact assessment that had been carried out and promptly notify PUB if there are any changes to such earlier assessment.

Good Practices at Worksite

7. A You should provide full-time site supervisor to monitor the worksite operations for the entire duration of any work. You shall ensure that the site supervisor is familiar with these requirements.

7. B You shall ensure that daily site briefings with all worksite workers are conducted (in languages that are understood by all workers) to remind them about the location of the water pipes and the measures to be taken to prevent damage to the water pipes. You

shall keep records of such daily briefings (which shall include but are not limited to date and time, venue and person conducting the briefings, contents of briefings and the list of worksite workers who have attended such briefings). You shall also disallow any worksite worker who has not attended such briefings from being involved with any part of the intended work. New staff must be briefed before they start work.

7.C You shall inform PUB officers of the identity of the Worksite management/ QP(S)/ Provisional Registered Excavator Operator (PREO)/ Registered Excavator Operator (REO), the proposed methods of carrying out of the work and/ or location of the proposed work. You shall also inform PUB officers if there are any changes to the above.

7.D You shall ensure that information on the presence of water pipes in the vicinity of the worksite and all mitigation measures to be taken to prevent damage to such water pipes have been communicated and adhered to by all personnel of all working levels in the project team, including sub-contractors and any third party who are in any way involved with any part if the intended work.

7.E You shall contact PUB if you find any live or abandoned water pipes in the course of carrying out any work at the worksite which have not been shown in the Water Service Plan.

7.F You shall provide adequate lighting if the work are to be carried out at night.

7.G You shall engage only a REO or PREO to operate a powered mechanical excavator.

7.H You shall ensure that powered mechanical excavation is only used, under the close standing supervision of a full time site supervisor, when working near or above any water pipe.

7.I You should implement a PTW system to monitor and ensure that all Earthworks are properly tracked and controlled if such Earthworks are to be carried out in the vicinity of water pipes. Under the PTW system, such Earthwork shall be approved by the manager of the project or his authorised deputy. You shall periodically audit the PTW system for its effectiveness.

Instrumentation and Monitoring

8. A The QP shall include in the monitoring plan of all the water pipes that in his view are likely to be affected by the works.

8. B The QP's method statement shall include the proposed monitoring intervals and all requirements imposed by PUB.

8.C The QP shall be responsible for ascertaining and setting the safe limits (including alert level and work suspension level) of ground movements, vibration levels or other changes for ensuring the structural integrity and proper functioning of all water pipes. He shall provide comprehensive basis for the proposed safe limits. See para 6. C to F.

8.D The QP shall verify and certify by monitoring that the permissible limits set for deformation and vibration are not exceeded.

8.E It shall be clearly understood that the submissions of the instrumentation monitoring results and reports to PUB are only for PUB's information. The QP shall be fully responsible for the analysis and interpretation of all the readings and measurements and for taking all remedial measures where necessary. When abnormal readings or measurements are obtained, QP shall immediately investigate the causes of the abnormalities and take all necessary remedial measures. QP shall promptly inform PUB should such abnormalities be likely to affect the structural integrity of the water pipe.

8.F Instrumentation monitoring regime consists of inclinometers, ground settlement markers, vibration meters, piezometers, strain gauges, rod extensometers, etc. shall be carried out by QP to check whether ground movements & vibration impacts are within allowable limits during the construction works. Records of the instrumentation monitoring regime shall be endorsed by the QP and properly maintained at the site, submitted to PUB or made available for inspection by PUB upon request. See para 6. C to F.

8.G The QP shall monitor and review the instrumentation monitoring results daily, looking out

particularly for excessive ground movements that may cause damage to the water pipes. The QP shall submit the instrumentation monitoring records to PUB weekly or at a frequency otherwise stipulated by PUB. QP shall highlight in his submission if there are any excessive ground movements monitored or any other abnormalities.

8.H The QP shall stop the works immediately if the instrumentation monitoring results exceed the allowable limits and inform PUB immediately. The QP shall assess the impact on the water pipe and submit a report and proposed mitigation measures to PUB.

Appendix 2

Additional Requirements for submission prior to Commencement of Works

9. A PUB would require the owner/developer to install surveillance cameras for works within water pipe setback distance (see para 3. B) for water pipes ≥900mm diameter:

(i) Owner/developer shall provide web-based IP surveillance cameras to continuously monitor construction activities in the vicinity of the large diameter (≥900mm) water pipe. The number of cameras to be provided shall be approved by PUB and shall be sufficient to **cover the entire corridor of** the water pipes.
(ii) The surveillance cameras must be able to capture still pictures and perform continuous video recording.
(iii) The owner/developer shall provide PUB with the Internet website address for centralized viewing of the still picture and video recordings of the construction activities above PUB water pipes captured by the surveillance cameras.

9. B The owner/developer is required to submit their proposed designs and notify / obtain an approval from PUB before commencement of the works.

Protection of Water pipes from Damages

10. A Please inform PUB 24 hours Call Centre at Tel No. 1800-CALL PUB (1800- 2255 782) immediately in the event of damage to a water pipes.

10. B You and/ or your workers shall not attempt to repair or modify any damaged water pipe.

10. C Please take all necessary measures to prevent damage to our water pipes and appurtenances in the course of your work. I have attached a copy of the **"DOs and DON'Ts"** (see Appendix 3), which provides the details on the protection requirements for proposed works carried out in the vicinity of our water mains, for your compliance.

10. D PUB shall be entitled to ask you to stop work with immediate effect in the event of non-compliance to this Advisory. PUB shall not be liable to you in any way for any losses, claims or damages arising from or in connection with such stop work requests.

10. E You shall comply with any requirements as reasonably prescribed by PUB in PUB's review and endorsement of the relevant method statement and any other documents submitted by you in relation thereto for the work.

10. F The cost to repair any water pipes damaged as a result of work carried out is to be borne by the party which causes the damage. The party will also be billed for repair of the mains and the estimated quantities of water lost from the damaged main. The party will also be required to indemnify PUB against all losses and claims arising from damage to water pipes.

Other Administrative Notes

11. A These requirements are applicable to all persons who carry out any work and strict compliance is required, unless otherwise permitted in writing to PUB. Please consult PUB, if necessary.

11. B The requirement stated above are not exhaustive. Additional requirements may be issued from

time to time by PUB. These additional requirements, together with the requirements in this Advisory, shall form the full list of requirements that must be complied with at all times. You are advised to carry out all necessary assessment and take all necessary precautions to prevent damage to any existing and/or proposed water pipes.

Appendix 3

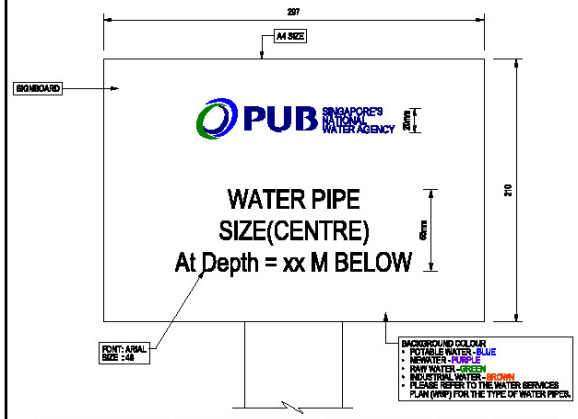
DOs AND DON'Ts WHILST WORKING IN THE VICINITY OF WATER PIPES

DOs

1. Do purchase the latest Water Services Plan (WSP) on SLA's website INLIS.
2. Do trial holes to identify the exact location of existing and/or proposed water pipes.
3. Do use manual excavation especially near water pipes.
4. Do propose mitigating measures and obtain PUB's prior approval for the removal of reinforced concrete encountered in the trial holes to locate the water pipes. This is because water pipes could be encased in the reinforced concrete (e.g. thrust block, pavement slab, box drain slab etc).
5. Do use pipe locators with the assistance of valve chambers and hydrants to identify the location of existing and/or proposed water pipes.
6. Do consult PUB on the location of the existing and/or proposed water pipes when you are unable to locate them.
7. Do lay services such as cables, pipes with a separation distance of one meter from PUB existing and/or proposed water pipes.
8. Do have proper protection for our existing and/or proposed water pipes during excavation (PE certification on design of supporting existing and/or proposed water pipes is required).
9. Do peg the alignment of the water pipes within the worksite clearly with signages/visible markers.
10. Do install instrumentation (eg. ground settlement markers, vibration meters to be placed at site to monitor the impact of soil movement/ vibration to PUB water mains) for monitoring at the site.

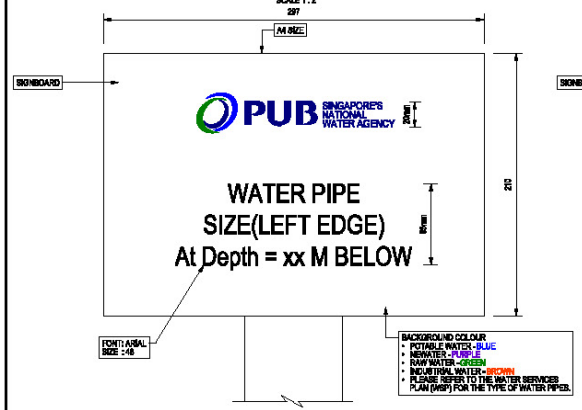
DON'Ts

1. Don't allow heavy machinery to move over PUB water pipes without adequate protection (eg steel plate).
2. Don't use excavator for trial holes to locate the existing and/or proposed water mains when near them. The last 0.5m must be checked by use of probes and manual excavation.
3. Don't lay sewer pipes on top of our existing and/or proposed water pipes.
4. Don't construct any structures on top of our existing and/or proposed water pipes.
5. Don't allow our valve chambers to be covered over with construction debris especially at worksites. Contact PUB (WSN) for PUB valve chambers at worksites to be raised to prevent them from accidentally being covered over. Our water pipes and connections must be accessible for maintenance and repair works at all times;
6. Don't expose our water pipes without prior approval from us.
7. Don't erect any structure either permanent or temporary over or within one metre from our water pipes. Our buried water pipe requires a minimum cover of one metre, and you must provide adequate protection for our main should the cover be removed or reduced by your works.



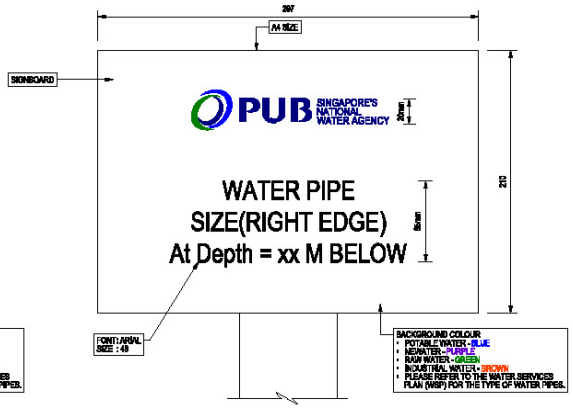
STANDARD DESIGN TO MARK OUT CENTRE ALIGNMENT OF WATER PIPES

SCALE 1 : 2



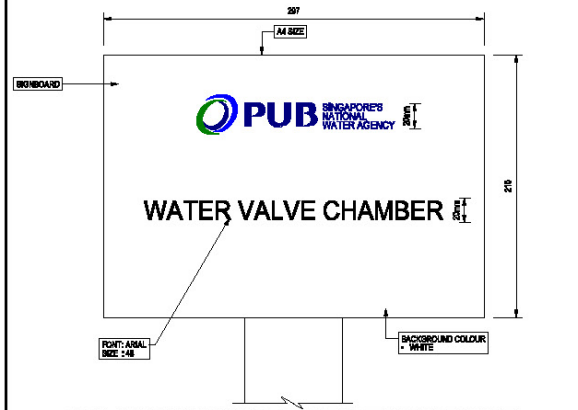
STANDARD DESIGN TO MARK OUT THE LEFT EDGE OF WATER PIPES ≥ 1200MM DIA.

SCALE 1 : 2



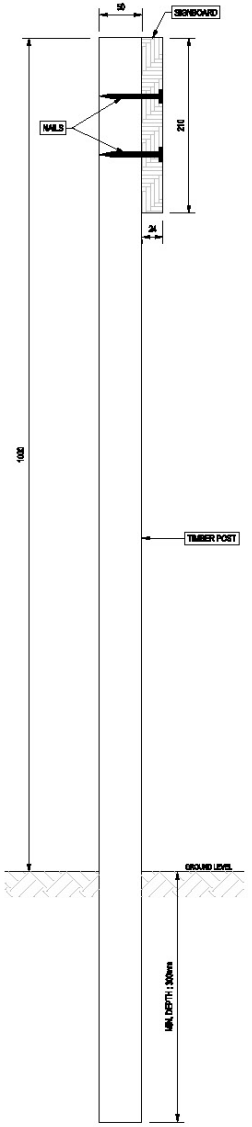
STANDARD DESIGN TO MARK OUT THE RIGHT EDGE OF WATER PIPES ≥ 1200MM DIA.

SCALE 1 : 2



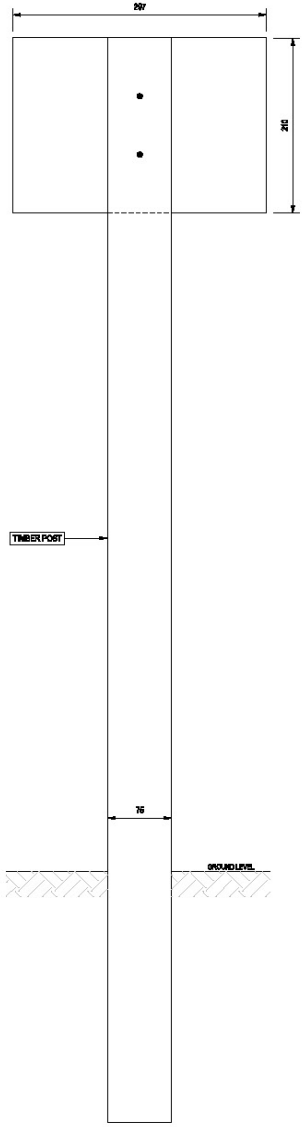
STANDARD DESIGN TO MARK OUT THE WATER APPURTENANCES

SCALE 1 : 2



SIDE ELEVATION

SCALE 1 : 5



BACK ELEVATION

SCALE 1 : 5

NOTES:

1. SIGNBOARD : PLYWOOD (24mm THICKNESS).
2. TIMBER POST : 75mm x 50mm SECTION.
3. TIMBER POST SHALL BE DRIVEN TO AN ADEQUATE DEPTH TO ENSURE THE STABILITY OF THE SIGNBOARD.
4. THE ALIGNMENT OF ALL WATER PIPES WITHIN CONSTRUCTION SITES SHALL BE CLEARLY MARKED OUT AT ALL TIMES.
5. THE SIZE(mm) AND DEPTH(m) OF THE WATER PIPES SHALL BE CLEARLY INDICATED ON THE MARKERS. PLEASE REFER TO THE STANDARD DESIGN FOR SUCH MARKERS.
6. THE INTERVAL OF THESE MARKERS SHALL BE AT MOST 5m APART.
7. FOR WATER PIPES <1200mm DIA., MARKERS INDICATING THE CENTRE ALIGNMENT OF THE WATER PIPES WILL SUFFICE.
8. FOR WATER PIPES ≥ 1200mm DIA., THE WATER PIPES SHALL BE MARKED AT EITHER LEFT EDGE OR RIGHT EDGE OF THE PIPE, REFER TO THE STANDARD DESIGN OF THESE MARKERS.

REV	DATE	AMENDMENTS	DRAWN	CHECKED

PUB SINGAPORE'S NATIONAL WATER AGENCY

WATER SUPPLY(NETWORK) DEPARTMENT
NS DIVISION

PROJECT TITLE

STANDARD DRAWINGS

DRAWING TITLE

APPENDIX 4: DETAILS OF MARKERS FOR WATERMAINS AND WATER APPURTENANCES

DATE: 28 JUN 2020	SCALE: AS SHOWN
DRAWING NO.	REV.: -
THIS DRAWING IS COPYRIGHT	A1

APPENDIX D(III)

POLLUTION CONTROL MEASURES
FOR PROPOSED DEVELOPMENT
WITHIN WATER CATCHMENT AREA

1 Storage of Toxic Chemicals

(a) No toxic or hazardous chemicals shall be used, stored or handled in the premises.

(b) Storage of fuel may be allowed subject to provision of pollution control measures as stipulated in the Singapore Standard on Code of Practice for Pollution Control (i.e. SS593:2013).

2 Public Sewerage System

(a) Public sewerage system shall be extended to serve the proposed developments.

(b) All sewage used water and trade effluent (e.g. wastewater) shall be collected and discharged into the public sewers in compliance with the Sewerage & Drainage Act and its Regulations.

3 Refuse Management System

The proposed bin centre or refuse holding area shall be designed in the manner such that refuse storage, handling and transfer activities (e.g. transfer of refuse from a collection cart to a compactor, etc.) are carried within a building equipped with pollution and nuisance control measures. In addition, all sullage water, including liquid from refuse compaction and wastewater from washing of refuse collection carts, bins, floors, etc. is to be discharged into the public sewer in accordance to the requirements imposed by PUB. The design of the refuse management system shall comply from the Code of Practice on Environmental Health.

4 Pollution Control Measures

The proposed developments shall be designed to ensure that all activities that generate trade effluent are carried out within buildings. All trade effluent generated shall be discharged into the public sewer in compliance with the conditions and requirements imposed by PUB, and not into any land or watercourse for storm water. In this respect, any proposed wash area in residential development, washing bay for vehicles in workshop, wash area for food preparation in eating establishment, etc. should comply with the above requirements.

5 Pollution Control Measures at Construction Stage

(a) During construction stage, sewage, used water and/or trade effluent from the construction sites shall be discharged into the public sewer, and not into any watercourse for storm water or onto any land.

(b) All washings activities shall be carried out within sheltered areas and used water and trade effluent generated shall be collected and discharged into the public sewer, and not into any watercourse for storm water or onto any land. For construction site where public sewer is not available, sewage, used water and trade effluent shall be collected in holdings tanks and subsequently, transported using a tanker or other means to a Water Reclamation Plant (WRP) approved by PUB for treatment and disposal.

(c) No servicing and repairing of mechanical plants and equipment are allowed in the construction sites. The said servicing and repair activities should be carried at authorised workshops equipped with pollution control facilities.

(d) Fuel storage tanks, if provided, shall be equipped with containment facilities as stipulated in the Singapore Standard on Code of Practice for Pollution Control (i.e. SS593:2013).

(e) Construction site shall also comply with the earth control measures requirements as imposed by PUB.

Reviewed in Jun 2018

To all concerned parties

We act for PowerGas Ltd.

NOTES FOR WORKING NEAR POWERGAS GAS TRANSMISSION PIPELINE

1. Introduction

1.1 The Gas Transmission Pipeline (GTP) is designed to carry gas at high pressures. It is buried underground with granite dust and earth backfill cover as required under LTA's regulations. Warning markers are planted near the gas pipeline or pasted on nearby lamppost to indicate its existence and warn third parties working in the area.

1.2 SPPG patrols the pipeline regularly to monitor works in the vicinity by third parties. Such works if done without knowing the existence and/or exact location of the pipeline can potentially damage the gas pipeline and/or it's coating. SPPG pays special attention to drilling, piling, blasting or any high impact works such as, excavation, tunneling works and construction of structures near or over the gas pipeline and gas plant.

1.3 Any party who intend to carry out any construction activities in the vicinity of the GTP shall notify and cooperate with SPPG to implement measures to protect the gas pipeline and gas plant from all possible damages.

2. Statutory Requirement

2.1 Section 32 Carrying out earthworks within vicinity of gas plant or gas pipe of the Gas Act (Chapter 116A) requires anyone who wants to carry out earthworks in the vicinity of the gas plant or gas pipe to;

(a) give the Gas Transporter (PowerGas) not less than 7 days' notice in writing of the date on which it is proposed to commence the earthworks;

(b) obtain from the Gas Transporter the necessary information on the location of the gas plant or gas pipe; and

(c) consult the Gas Transporter on the steps to be taken to prevent the gas plant or gas pipe from being damaged while the earthworks are being carried out.

2.2 Section 32 also requires the person carrying out the earthwork to comply with the requirements of the transporter, ensure precautionary measures are taken to prevent damage to the gas pipe or gas plant and provide access to the transporter for inspection or taking necessary protective measures.

2.3 Any person that contravenes this Section 32 is guilty of an offence and shall be liable to a fine not exceeding $100,000 or to imprisonment for a term not exceeding 5 years or both.

3. Requirements on Third Parties working near the Gas Transmission Pipeline

3.1 Pre-work Consultation with SPPG

a) The works owner and contractor shall inform SPPG in advance of their intention to work in the vicinity of the GTP and submit NCE accordingly. Such works include excavation, piling, earthwork leveling, bore logging, trial holes, blasting, tunneling or any earth works. The proposed work with construction drawings and method of statements shall be given to SPPG to evaluate the impact of the works on the pipeline. This enables SPPG to advise on appropriate precautionary measures to be taken.

b) The works owner and contractor shall obtain the as-built drawings of GTP from SPPG. They are required to incorporate the pipeline alignment co-ordinates into their construction drawings. Please note that the information in the as-built drawings should be treated as confidential and should not be shared.

c) No works in the vicinity of GTP shall be carried out without prior consultation with SPPG. An impact assessment for the works and implementation of precautionary measures to prevent damage to the gas pipe or gas plant shall be submitted to SPPG

d) SPPG shall be kept informed of any changes to the proposed works.

e) No permanent structures shall be designed and constructed above the GTP. However, surface road over the pipeline without reducing the pipeline cover may be acceptable, subject to SPPG's concurrence.

3.2 Precautionary Measures during Works

a) The works owner and contractor shall take all necessary precautions to prevent any damages to the GTP during the construction stage. They shall inform SPPG before carrying out any excavation works near the gas pipeline and **report all damages** to the gas pipeline and its coating to SPPG. Repair shall be done immediately to prevent corrosion aggravation to the gas pipeline at the damage location and thus becoming a potential hazard.

b) All propose works shall be accompanied with Risk Assessment, Impact Assessment and Safe Works Methodology endorsed by QP.

c) If any **earthwork is within 5m of the pipeline (or more when required)**, a registered surveyor shall be engaged to peg the pipeline alignment (generally every 2m) and interpret the pipeline depth from the pipeline drawings. Pegging and marking shall be clear and prominent and remain as such for the duration of works. Trial holes to prove the location of the GTP shall be carried out and all trial holes shall only be done in the presence of SPPG officer. A SPPG RES(Registered Earthwork Supervisor) shall supervise the earthwork and monitor the pipeline depth closely based on the surveyor's interpretation.

d) Only manual excavation is allowed within 1m of the gas pipeline and only hand excavation is allowed within 0.5m of the gas pipeline.

e) Under no circumstance shall the GTP be exposed without written consent of SPPG. GTP shall only be exposed in the presence of SPPG Officer. If a GTP is exposed, the owner/contractor shall take the necessary measures to protect the pipe from any physical impact that may cause damage to the pipe and/or its coatings to the satisfaction of SPPG.

f) Do not shift or remove warning markers indicating the existence of the GTP at site without SPPG's approval. The contractor shall protect them from being damaged or tempered. In the event the warning markers are damaged, they shall be reported to SPPG and replaced immediately. Where necessary, additional temporary warning markers shall be installed to warn others of the presence of gas pipeline.

g) For **blasting works**, piling or any works that cause ground vibration, the peak particle velocity (PPV) of ground shock generated by the blast shall be limited to 15mm/s measured at the pipeline and 5mm/s measured at gas plant. The PPV shall be monitored in real time. SPPG shall be notified once the PPV reaches 10mm/s for the gas pipeline or 3mm/s for the gas plant.

h) For **tunneling, shaft excavation** and piling works, ground consolidation could occur due to ground water losses resulting in surface settlement. This settlement can potentially induce excessive stress on the pipeline. The contractor shall engage a Qualified Personnel conduct a risk assessment to assess the impact of tunneling on the surrounding area and to the GTP. To monitor the surface settlement, surface monitoring points shall be installed along the pipeline alignment at every 10m intervals for at least 100m pipe length from the tunnel or shaft. The settlement shall be regularly monitored while excavation or tunneling works are being carried out. A differential settlement attained less than 1:1000 will require all parties involved to assess the ground consolidation and evaluate the need to implement measure to arrest the consolidation. Contractors are advised to stop works when the differential settlement attained less than 1:714 and a thorough stress analysis of the pipeline shall be done by competent persons recognised by SPPG. Depending on the findings of the analysis, measures shall be taken to relieve the pipeline from stress induced. Final reinstatement of the differential settlement to relieve the stress on GTP shall be included (i.e. to settlement of 1:1000 or better). Detailed assessments are also required for any pipelines that have gross structural discontinuities (i.e: bends, tees, valves, etc)

i) For **crossing and parallel laying** of services to GTP, Table 1 shows the required separation distance between the GTP and other services or structures. It should be noted that other authorities may have stricter or additional requirements on minimum separation distance between proposed building / structure and the pipeline than what is stated here. Services crossing the pipeline shall not be at the previous boring pit locations of the pipeline, the locations are to be advised by SPPG. The services crossing over the GTP shall not be an obstruction for SPPG to access the GTP. (Generally, the services should not be wider than 1m and self-suspended without a support).

j) For movement of heavy haulage over the gas pipeline, the transporter shall submit the proposed route to SPPG. The load per axal shall be limited to 10tonne and sufficient load distribution shall be placed for crossing over the pipeline and if the pipeline is not buried under a proper road.

k) For any new development surrounding the GTP, the developer shall inform the property owner on the location of the pipeline within their premises and draw up measures to prevent any possible damage to it. Pipeline within a fenced compound shall be accessible to SPPG for patrolling and any maintenance works as and when required.

l) For laying of new pipeline or construction of new structure with cathodic protection, a proper study and survey needs to be implemented by the contractor to ensure no cathodic protection system are compromise or interfered with.

m) For major works that span over a long period of time, the owner and contractor shall hold monthly meetings to update SPPG on the progress and any changes to their works.

3.3 Repair of Damage Pipe/Coating

In the event the pipe and/or its coating are damaged by the third party works or found damaged, **immediate report** shall be made to SPPG. SPPG will undertake the necessary repair works. All costs of such repairs shall be borne by the third party responsible for the damage.

3.4 Emergency Works

When emergency works have to be done near the pipeline in the interest of public or private safety, the owner and contractor shall **call SPPG** at the 24-hour hotline at **1800 752 1800 or 69167400**. SPPG officers will respond to site to advise on the approximate location of the gas pipeline. The contractor shall ensure safe works are executed for emergency works near the gas pipeline or gas plant. The Principal shall submit a written notice to ESP within 24 hours after the work has commenced.

4. Enquiries

The above requirements are only stated in general. The concerned party shall consult SPPG on all works near the GTP. SPPG reserves the right to alter any stated requirements or impose additional requirements that are necessary depending on site conditions and type of work. Refer all enquiries and correspondences on works near the GTP to:

Postal address

Transmission Pipelines Operations and Maintenance (TPOM) Section
SP PowerGrid Ltd (Gas Operation)
National Gas Control Centre
24A Senoko Ave
Singapore 758314

Email: gasenquiry@spgroup.com.sg

Telephone numbers

Transmission Pipelines Operations and Maintenance (TPOM) Section :
6916 6136 / 6916 6112

24-hour System Control Centre: **6916 7400**

24-hour Customer Service Centre: **1800 752 1800**

HEAD OF SECTION
TRANSMISSION PIPELINES OPERATIONS AND MAINTENANCE (TPOM)
GAS OPERATIONS
SP POWERGRID LTD
As agent for and on behalf of PowerGas Ltd

(This is a computer-generated document. No signature is required.)

Table 1: Minimum Separation Distance Between GTP And Other Services / Structures

S/N	Service / Structure	Minimum separation distance / Requirements
1.	Bore / sheet piling	5.0m. May require real time monitoring of soil movement and settlement and additional Risk/Impact Assessment.
2.	200x200 Concrete Piles	3.0m
3.	Tunneling	Clearance distance 2.0m or more. Depending on size and depth, it may require real time monitoring of soil movement and settlement and additional Risk/Impact Assessment.
4.	Directional Drilling	2.0m plus radius of final tunnel size
5.	Formed Drain / Earth Drain	1.2m / 1.5m
6.	Minor Drain	0.5m
7.	Water/Sewer Pipe: less than 700mm dia.	1.0m
8.	Water/Sewer Pipe: 700mm dia. or larger	2.5m or more depending on size of pipe and construction method.
9.	Electric Cables: less than 22 KV	0.5m
10.	Electric Cables: 22KV and above	1.2m
11.	Telecom cables	0.5m
12.	Low pressure gas pipe	0.5m
13.	Shrubs	1.2m
14.	Trees	2.0m
15.	Soil Investigation	10.0m (If lesser, with positive identification of GTP)
16.	Posts / foundations for light, signs etc	1.5m
17.	Road Pavement	1.5m
18.	Off-Road Crossing for heavy vehicles	1.5m or more with 25mm steel plating on surface.
19.	Earthing Rods	5.0m

To all concerned parties

We act for PowerGas Ltd.

Requirements for Distribution Gas Pipe Diversion Works

Planning Phase

1. Prior to any excavation works, the project owner / contractor shall request for gas services returns and acquire the gas plans.

2. Where any gas pipe is affected, the project owner / contractor shall liaise with Gas Distribution Planning section for diversion of pipes. As far as possible, no gas pipes shall be within the hoarding area of the work site.

3. The project owner / contractor shall provide a feasible corridor free from other underground services and away from semi-rigid / rigid pavements to facilitate the diversion work. If there are other underground services along the proposed corridor, the project owner / contractor shall consult and obtain the necessary clearances from the relevant agencies for the new gas pipe to be laid.

4. Depending on the extent and complexity of the diversion, a long lead time may be required. Hence, the project owner is advised to consult the planning team early.

Construction Phase

1. The project owner / contractor shall coordinate all diversion activities with Gas Distribution Projects section.

2. The consultant / contractor shall arrange a site walk with the SPPG Officer-in-Charge prior to the commencement of pipe laying works.

3. The project owner / contractor shall peg the confirmed pipe corridor.

4. A minimum clearance of 300mm shall be maintained between our gas pipes and all other services or structure.

5. Wherever possible, valves shall be installed to enable quick isolation of pipeline within the work site (e.g., crossing of bored tunnels, cut-and-cover tunnels). These isolation valves should not be located inside the work site.

6. Where the cut-and-cover tunnel runs parallel to the gas pipes, there shall be a minimum clearance of 5 metres from the diaphragm wall.

7. Once laying of gas pipeline is completed, pipe cleaning and pressure test will be conducted.

8. For works within third party worksites, a site inspection with the SPPG Officer-in-Charge shall be conducted prior to commissioning of the gas pipe to check that the site is in order.

Gas Pipeline Safety and Integrity

1. All vent shafts to the tunnels shall be at least 20 metres away from the gas pipes.

2. All piles shall be at least 5 metres away from the gas pipes, which shall be determined by trial holes.

3. All crossings over cut-and-cover tunnels shall be replaced temporarily with steel pipes for suspension and subsequently replaced with polyethylene pipes upon the completion of the construction work. The steel pipe supports shall be endorsed by a Professional Engineer (Civil) and submitted to SPPG Gas Operations. The support system shall allow access to the pipe for inspection and for fire-fighting purposes in the event of an emergency.

4. No air intake / outlet shall be located near the gas pipes.

5. Valve chambers which are still located within the work site due to site constraints, shall be raised 0.5 metres above ground level and kept visible and accessible at all times for emergency.

6. The project owner / contractor shall be aware of all gas pipes within the work site and shall ensure that all parties working within the site are also aware of the locations of the gas pipes. Where possible, prominent markers indicating the pipe route shall be displayed.

7. The project owner / contractor shall be responsible to maintain the integrity of the gas pipes, protection slabs, warning markers and gas chambers within the work site, and to comply with the following:

   a) No permanent structure is to be constructed over any gas pipe,
   b) No Electronic Parking System (EPS) is to be constructed over any gas pipe,
   c) No heavy machinery / equipment is allowed to be placed over any gas pipe,
   d) All gas chambers or standpipes must be barricaded prominently with “Danger” sign,
   e) Access shall be provided for gas inspection and maintenance to be conducted regularly along the pipe route within the work site.

8. Wherever possible, no hot work is allowed in the vicinity of the gas pipes. If hot work is unavoidable, the project owner / contractor shall take all necessary measures, including but not limited to the following:

   a) The site shall be certified gas-free by a qualified Safety Officer,
   b) Gas-free checks shall be conducted regularly before and throughout the work,
   c) All necessary precautions to prevent damage to the gas pipes shall be taken,
   d) All possible occurrence of fire hazards shall be eliminated and, if necessary, consult SPPG on other precautionary actions to be taken.

9. The project owner / contractor shall notify SPPG Gas Operations of any works directly or indirectly affecting the gas pipes.

10. The project owner / contractor shall monitor possible ground movements / soil subsidence in the vicinity of their work sites and inform SPPG Gas Operations immediately if any such movements / subsidence is observed / detected and where gas pipes are present.

11. In the event that any gas leak is detected, all works shall cease immediately and SPPG Gas Operations 24 hrs Gas Service Operation Centre shall be contacted at Tel: 1800-752-1800 for assistance.

Acknowledged by:
Project Name: _____

_____	_____
Signature & Stamp of Principal / Consultant	Signature & Stamp of Main Contractor
Name : _____	Name : _____
Designation : _____	Designation : _____