

APPENDIX 4 TO CONDITIONS OF TENDER

TECHNICAL CONDITIONS OF TENDER

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(Unless the context otherwise requires, terms and references used in this Appendix have the same meaning and construction as defined or construed in the Conditions of Tender for the aforesaid Tender.)

AUTHORITIES'/ GOVERNMENT AGENCIES' REQUIREMENTS

Whilst every care and attention has been taken in the compilation and preparation of all information and to ensure its accuracy at the point of publishing this Tender, the contents herein may be subject to changes by JTC and/or the Authorities or agencies without prior notice.

Tenderers shall note that all proposed Works to the Premises shall comply with the relevant codes of practices, standards and regulations stipulated by the relevant authorities of Singapore.

1. SP Group (SPPG)

- 1.1 The Successful Tenderer shall liaise with a gas retailer on the requirements for gas supply to the Premises. 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.
- 1.2 Where necessary, 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 Parcel and in the vicinity of the Land Parcel 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.
- 1.3 Where necessary, 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.
- 1.4 Where necessary, the Successful Tenderer will need to purchase the gas plan from PowerGrid's Mapping & Earthworks Administration section at tel. no. 69165022 or email mea@spgroup.com.sg. If the gas pipelines are affected by the Successful Tenderer's proposal, please submit a request together with the diversion corridor and length to <https://ebiz.spgroup.com.sg/index.html> for consultation on gas pipeline diversion. Alternatively, the Successful Tenderer may email to ebiz@spgroup.com.sg for further enquiries.
- 1.5 Where necessary, the Successful Tenderer is to submit written notice to SP PowerGrid Ltd (Earthworks Surveillance & Patrolling Section) if the intent is to carry out earthworks in the vicinity of gas pipelines at least 7 days prior to commencing the earthworks. All necessary precautionary measures must be taken to prevent damage to our gas pipelines at the work site.

- 1.6 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 in **Annex 4A** for the Successful Tenderer’s information.
- 1.7 A copy of “Requirements for Distribution Gas Pipe Diversion Works” is enclosed in **Annex 4B** for the Successful Tenderer’s information.
- 1.8 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.
- 1.9 The latest gas plan(s) can be purchased on request from:
Mapping & Earthworks Administration Section
2 Kallang Sector
Singapore 349277
Tel: 69165022
Email: mea@spgroup.com.sg

2. Energy Market Authority (EMA)

- 2.1 This Premises may affect existing and proposed electricity and gas infrastructures (including electrical substation, electricity cables and gas offtake station, gas pipelines etc.) in the vicinity of the Property. Electricity and Gas Divisions from SP PowerGrid Ltd shall be consulted prior to any commencement of works. Please reach out to the following officers for comments:
 - Ms Bernice Chan, Electricity Network Management: bernicechan@spgroup.com.sg;
 - Ms Veenita Kumari d/o Tarachand, Electricity Asset Management: veenita@spgroup.com.sg; and
 - Gas Network Planning: gasplanning@spgroup.com.sg.

3. National Environment Agency (NEA)

- 3.1 The Premises 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 Premises shall not cause pollution directly or indirectly to the water resources. Any activity that could cause contamination to the water resources shall not be carried out. Please also ensure that the attached requirements for developments in water catchment areas are duly complied with (see **Annex 4C**).
- 3.2 Sewage and used water from the Premises shall be discharged into the public sewer. The Successful Tenderer 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.
- 3.3 The Successful Tenderer must avoid any features that may result in water stagnation and become potential breeding habitats for mosquitoes.

- 3.4 Abatement measures shall be provided for all proposed M&E equipment installed in the Premises 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 shall ensure that the noise emitted from the operations of M&E equipment installed in the Premises does not cause nuisance to surrounding residential and noise sensitive premises. The Successful Tenderer 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>.
- 3.5 The Successful Tenderer shall ensure that the kitchen exhaust systems meet the design requirements stipulated in the Code of Practice on Environmental Health. Greasy/oily wastewater generated shall be discharged into the public sewer via an approved grease trap, which has to be sited outside food handling/preparation area. Refuse and food wastes should be collected and kept in a proper holding area/bin centre pending disposal by a licensed general waste collector. No manhole, inspection chamber, waste sump, screen chamber, grease trap or overhead sanitary/ waste/ drainpipes shall be sited within the kitchen/ dining areas where food is prepared, cooked, stored, or served. This is to prevent causing public health and hygiene problems during maintenance.
- 3.6 Provision of sanitary facilities at the Premises shall comply with Code of Practice on Environmental Health.
- 3.7 The Successful Tenderer shall exercise management control on the stallholders at the Premises to ensure that their respective use and activities will not cause disamenities to surrounding area, and among the operators/ users at the Premises. In addition, the Successful Tenderer shall front any feedback or complaints of any disamenities and implement appropriate mitigation measures to minimise adverse impacts.
- 3.8 The Premises shall be designed such that the operation and any activities of the proposed commercial/ retail offerings shall not cause nuisance to the nearby residential premises.
- 3.9 In line with the Singapore Standard on Code of Practice for Pollution Control (i.e. SS593:2013), when a site that was used for past polluting activities which could pose potential public health risks is to be redeveloped, rezoned or reused for a non-polluting activity, a site assessment study should be conducted. If there are indicators that point to the presence of land contamination (e.g. visual signs of soil discolouration and/or odour) found at the Premises, a site assessment study should also be conducted. The purpose of the site assessment study is to determine the presence and extent of land contamination, along with the potential risks to public health. If the site assessment identifies any potentially unacceptable public health risks, appropriate remediation or mitigation measures shall be taken before the site is redeveloped for residential or any non-industrial use to ensure that it is suitable for its intended uses. The Successful Tenderer shall comply with the site assessment requirement if the Premises meets the abovementioned conditions.

- 3.10 In accordance to the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline published in 2010: <https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.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 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.
- 3.11 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, and their Regulations shall be complied with.

4. Housing Development Board (HDB)

- 4.1 The Successful Tenderer shall be responsible for addressing all public concerns and feedback arising from the Premises and shall attend promptly to all public enquiries/complaints pertaining to such issues, including traffic consideration.
- 4.2 The Successful Tenderer shall take appropriate measures to abate or minimise any noise, dust and other disturbances/inconvenience during the period of A&A works at the Premises. The Successful Tenderer is to take all necessary measures to ensure public safety at all times.

5. Singapore Civil Defence Force (SCDF)

- 5.1 The Successful Tenderer shall comply with the Fire Safety Act 1993 and its Regulations (see **Annex 4D** for details). If the Successful Tenderer needs any clarification on Fire Safety requirements, he may consult the Fire Safety Department (FSD) at <http://www.scdf.gov.sg/home/feedback>.

6. Public Utilities Board (PUB)

Comments/requirements on Catchment and Waterways are given below. Please contact TANG WEI GUANG (Tang_wei_quang@pub.gov.sg), YEO WANG PING (YEO_Wang_Ping@pub.gov.sg), LEE TECK MENG (LEE_TECK_MENG@PUB.GOV.SG), from PUB(FRP), if you need any clarifications.

- 6.1 The Premises is not affected by Drainage Reserve.

- 6.2 For tenderer's information, the minimum platform level (MPL) for the Premises shall not be lower than 4m 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. 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 in Corenet or Design Gateway/ Construction Gateway (where applicable) in Corenet X. 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 subject site shall be submitted to PUB(C&W) for comments and approval.
- 6.3 The Successful Tenderer shall locate and identify all existing drains within and in the vicinity of the Premises. The existing drainage system within and in the vicinity of the Premises shall not be interfered with, in any manner, without written approval from PUB(C&W). All works shall not cause damage or affect the structural integrity of the roadside/outlet drains.
- 6.4 The Successful Tenderer shall ensure that the design and Works carried out at the Premises will not cause damage and affect the structural integrity of the existing drains. The Successful Tenderer shall ensure that the runoff within, upstream of and adjacent to the site shall be effectively drained away without causing flooding within the Premises and in the vicinity of the Premises. The Successful Tenderer shall take due care and precautionary measures to ensure that no damage, settlement or any adverse impacts occurs to any existing drain/drainage facilities in the course of the Works. Free flow of water in the drains shall be maintained at all times. Any damages caused to the drainage structures shall be reinstated at the Successful Tenderer's own cost to the satisfaction of PUB(C&W).
- 6.5 The Successful Tenderer shall carry out an impact assessment to establish the influence zone of the proposed Works which affect the existing drains and drainage facilities. The impact assessment to be submitted to PUB shall be endorsed by a qualified person (QP). Pre-work and post-work surveys shall be submitted to PUB and shall cover drains/drainage facilities in the area affected by the Works (and shall extend to at least the area within the second reserve of the MRT lines - if applicable). All drains/drainage facilities shall be located and identified. The survey shall show the levels of the drains/drainage facilities and shall be accompanied by a set of photographs showing the conditions of the drains/drainage facilities. All survey work shall be carried out by a Registered Surveyor.

- 6.6 Where necessary, the Successful Tenderer may need to carry out soil instrumentation for monitoring the soil/geo-technical/structural movements or changes at and around the worksite in particularly existing drains/drainage facilities throughout the contract period. The Successful Tenderer shall set the critical alert levels and put in place a contingency plan to rectify any damages to the drains/drainage facilities. The soil instrumentation shall be monitored daily and weekly summary reports of the results of the soil instrumentation shall be submitted to PUB. Any breach of the alert levels and/or anomaly found in the reports shall be immediately reported to PUB and rectify immediately to the full satisfaction of PUB. Details of the contingency plan including the schedule of works and organisation chart of the Successful Tenderer and consultant/contractor shall be submitted to PUB before commencement of works. In the event of breach of alert levels and/or anomaly in the soil instrumentation results, the Successful Tenderer alert PUB immediately and activate the contingency plan to mitigate and rectify the situation. The analysis and rectification reports of the affected drains and drainage facilities shall be submitted to PUB for comments/approval.
- 6.7 Where necessary, the Successful Tenderer may need to conduct a joint visual inspection and any defects identified shall be made good to the full satisfaction of PUB and shall follow up with an incident report for the affected drains and drainage facilities within 3 days including remedial/repair works. If necessary, briefing/meeting shall be conducted by the Successful Tenderer to address the damage and follow up actions to rectify the situation. The method of construction of temporary drains and/or drains affected by the works shall be submitted to PUB for comments and approval before commencement of the works. Upon completion of the works, postcondition survey and topography survey of the affected drains shall be submitted and PUB may request for joint site inspection of the rectification works.
- 6.8 The Successful Tenderer shall inform PUB in writing at least one week before the commencement of any work at the site which affects drains. PUB may require the affected drain to be upgraded in conjunction with the proposal. Please further consult PUB(C&W) with the detailed proposal for further comments.
- 6.9 The planning, design, construction activities and procedures for plan submission shall comply fully with the requirements as stipulated in the latest edition of the Code of Practice on Surface Water Drainage and The Sewerage and Drainage (Surface Water Drainage) Regulations 2007. You may download the latest version of the COP from the PUB website <https://www.pub.gov.sg/Professionals/Resources/Code-of-Practices>.
- 6.10 The topography of the site shall not be changed without the approval of PUB.
- 6.11 Where relevant, all affected drains and Drainage Reserves (location and alignment) and their respective sizes shall be indicated in the detailed plan drawings. Details such as inverts/copes of affected drains, adjacent ground levels and amount of soil cover shall also be indicated in the detailed submission to PUB. All drain crossings within road reserves (e.g. culverts and roadside drains) shall be clearly highlighted in the plans. Detailed proposal plans shall be submitted at the detailed planning stage for our comments and clearance before the commencement of works.

- 6.12 Where necessary, the existing drainage system within and in the vicinity of the proposed site (if any) may be upgraded/improved to cater for increased runoff from the proposed development. In addition, new drains, depending on the type and nature of the proposed development, may be built within the development site. Appropriate Drainage Reserves shall be set aside for drains in accordance with the prevailing Code of Practice on Surface Water Drainage.
- 6.13 The Successful Tenderer shall pre-consult PUB(C&W) on the required size of the proposed drains affected by the proposed development before making DC/BP submission in Corenet or Design Gateway/ Construction Gateway (where applicable) in Corenet X. Detailed drainage plans for the proposed crossing-over/reconstruction of roadside drain / outlet drain including hydraulic calculations, backwater analysis, longitudinal and cross sections etc shall be submitted to PUB for approval before the commencement of works.
- 6.14 The proposed site is within Pandan Water Catchment. The proposal shall not result in any loss of yield from the catchment area. Stringent pollution control measures shall be incorporated in the design and during the construction of the proposed development. All sewage and sullage water shall be discharged into a public sewer. Bulk storage of toxic and hazardous materials shall not be allowed. If there is any earth filling work at the development 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. Please reach out to PUB(C&W) for more information.
- 6.15 If the existing roadside drain is within the Premises, the Successful Tenderer shall realign the existing roadside drain to within/about the road reserve and reconstruct the roadside drain into covered drain. The Successful Tenderer shall construct the proposed drain to the required size as determined by PUB. The developer/owner shall ensure that the design and construction of the proposed development within the site will not cause or affect the structural integrity of the existing roadside drains. The detailed drainage plan shall be submitted to PUB(C&W) for approval prior to the commencement of work on site. Appropriate Drainage Reserves shall be set aside and secured for in accordance to the latest edition of the 'Code of Practice on Surface Water Drainage'.
- 6.16 The development schedule of the site shall be properly considered to avoid a situation where site and/or the lands in the vicinity of the site become 'land locked' without proper drainage outlets. The runoff within, upstream of and adjacent to the sites 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(C&W)'s comments and clearance.
- 6.17 All 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:
- i) Detention tanks;
 - ii) Retention/Sedimentation ponds;

- iii) Wetlands;
- iv) Bioretention swales;
- v) Porous pavements;
- vi) Bioretention basins or rain gardens, etc.

- 6.18 Where necessary, the 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, the Successful Tenderer can refer to the ABC Waters Guidelines and relevant chapters in the Engineering Procedures, available on the PUB website.
- 6.19 PUB launched the Active, Beautiful and Clean Waters (ABC Waters) Programme in 2006. 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/Resources/Guides-and-Handbooks>. 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>. 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. You could contact the team at PUB-ABCWaters@pub.gov.sg for issues related to ABC Waters design features.

Comments/requirements on Water Reclamation are given below. Please contact Noorhuda Binte Ridawi (NOORHUDA RIDAWI@PUB.GOV.SG), Andrew Julius Tionardy (Andrew TIONARDY@pub.gov.sg), Muhammad Sufiyan Bin Shafari (MUHD SUFIYAN SHAFARI@PUB.GOV.SG), Tan Ke Han, Regina (REGINA TAN@PUB.GOV.SG), from PUB(WRN), if you need any clarifications.

- 6.20 The planning of this project shall comply with the prevailing Code of Practice on Sewerage and Sanitary Works [thereafter referred to as the "COPSSW"].
- 6.21 There are existing 150mm, 229mm, 305mm and 375mm diameter sewers and existing drain-lines within/ in the vicinity of the proposed site. The attachment, "PUB_26_0747_Site 01SIP_Landscape_A3.pdf" (**Annex 4E**) shows the approximate location of our existing sewerage infrastructure within/in the vicinity of the proposed site. This plan is for your internal reference only. Thorough site investigation shall be carried out to determine the exact positions and levels of the existing sewerage infrastructure.
- 6.22 There are abandoned 229mm diameter sewers within/ in the vicinity of the proposed site. Please see Annex 4E for more information.

- 6.23 The Successful Tenderer shall ensure that the premises is served by an adequate, effective and functional internal sanitary drainage and plumbing system and be connected to public sewers. The reuse of existing sanitary drain-lines/drain-line connection to the public sewer is subjected to PUB(WRN)'s approval. If PUB agrees to the reuse of the drain lines/ drain-line connection to the public sewer, the Successful Tenderer shall carry out CCTV inspection and water tightness test to satisfy PUB(WRN) that the existing sanitary drain lines/drain line connection to the public sewer is in a serviceable condition. Otherwise, they shall be replaced/repared by the Successful Tenderer to the satisfaction of PUB.
- 6.24 No structure/object/building/piling/retaining structure, etc. (whether temporary or permanent), except lightweight and demountable elements (such as decking, awnings, 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 / Pumping Main Depth (m)	Minimum Setback 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/pumping main pipe or DTSS.		

- 6.25 Proposed drains with a maximum width of 2m may over-cross sewers with a minimum vertical clearance of 1m (measured from the bottom of the drain structure to the crown of the sewer pipe) but they shall not be laid parallel to and over the sewer. More details can be found in COPSSW Section 1.2.4.
- 6.26 The Successful Tenderer shall take all necessary measures to protect all existing sewers, particularly large (≥900mm diameter) sewers, affected by, or in close proximity to the proposed works.
- 6.27 All food shops and food processing establishments shall be provided with grease trap(s) of adequate capacity to prevent discharge of oils, fats and grease directly into the public sewerage/retention tank/holding tank system in strict compliance with the COPSSW, in particular Sections 4.2.2 and 4.6.1. The grease traps shall be adequately sized based on COPSSW, Section 4.2.2.d. The grease traps shall also be properly and regularly maintained based on PUB's recommended cleaning procedures (refer to COPSSW Annex J & K). The effluent discharged from the grease traps shall comply with the standards required for discharge into the public sewerage/retention tank/holding tank system. The Successful Tenderer shall apply to PUB for a Written Approval (WA) before discharging trade effluent into the public

sewerage system. The application for WA for discharge of trade effluent into the sewer can be made online at <https://www.gobusiness.gov.sg/licences>. For further information on matters relating to trade effluent discharge, please email to PUB_WA@pub.gov.sg.

- 6.28 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. The Successful Tenderer shall note that the upstream (inlet) and downstream (outlet) ends of the abandoned drain line connections to the public sewers, drain-lines, ADCs or sewers/pumping mains of all sizes shall be sealed watertight with 225mm thick brick plugs rendered with cement mortar. 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. 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 Section 1.2.8 and "Standard Requirements for Abandoning of Disused Sewerage System" for compliance.
- 6.29 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:
- a. whether the abandoned sewers/pumping mains/drain-lines/ADCs are removed, grouted or sealed;
 - b. For manholes/chambers that are only partially demolished with approval from PUB(WRN), the extent of demolition shall be shown;
 - c. the exact extent/length of the abandoned sewers/pumping mains/drain-lines/ADCs that is removed, grouted or sealed;
 - d. the exact locations of the watertight seals; and
 - e. the type of watertight seals.
- 6.30 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).
- 6.31 Where diversion/removal of any sewer/pumping main is required, it shall be carried out by the Successful Tenderer at his own cost & expense. Details of the diversion (pipe size, gradient, invert level, etc.) shall be submitted to PUB(WRN) for approval before the commencement of works.
- 6.32 The Successful Tenderer shall be responsible for seeking approval from all relevant authorities/landowners of affected land for any proposed sewerage works to be carried out beyond the development site. Such approval or consent from the authorities/landowners 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.
- 6.33 All sewers and manholes shall be readily accessible at all times to PUB for inspection and maintenance.

- 6.34 Where there are any Specified Activities (including excavation/tunnelling/pipe jacking/through soil boreholes/installation of earth retaining and stabilising structure (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. 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](https://www.pub.gov.sg/-/media/Images/Feature/Content-Pages/Professionals/Compliance/Applications/Revised_PUB_WRN_AdvisoryNotes_Mar_2023.pdf).
- 6.35 The Successful Tenderer 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.
- 6.36 The Successful Tenderer 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/pumping mains.
- 6.37 For development control clearance of the proposed development/ building/ infrastructure/ utility works, and to obtain the clearance certificate for the proposed sewerage/sanitary works, the Successful Tenderer shall prepare the necessary plans and submit the relevant applications via Corenet X or Corenet 2.0 to PUB's Building Plan Division (BPD).

Comments/requirements on Water Supply are given below. Please contact Tay Zi Hui, Julia (Julia_TAY@pub.gov.sg), Ang Liew Kwee (ANG_LIEW_KWEE@PUB.GOV.SG), from PUB(WSN), if you need any clarifications.

- 6.38 If water supply is required, the Successful Tenderer shall engage a Professional Engineer/Licensed Plumber to submit the Notification of WSI Works to PUB. 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.
- 6.39 The "Water Supply Plan" (WSP) shows the approximate positions of our proposed/under construction/ existing water pipes of 100 mm diameter and above in the vicinity of the proposed site (see **Annex 4F**). Smaller water pipes to customers' premises / properties may not be indicated. The presence of water meters near the work zone is an indication of the presence of water pipes. The latest WSP is available on SLA's INLIS portal at <https://app.sla.gov.sg/inlis>. Notwithstanding, during the planning/design stage, please determine by means of trial holes within your worksite to ascertain the exact alignment and levels of all the

proposed/under-construction/existing water pipes and consult PUB(WSN) at the contact information provided below. No structures are allowed above water pipes at all times as they may pose damage risks and/or impede future maintenance access.

- 6.40 If there are water pipes affected by the proposed development, PUB(WSN) will advise that the water pipes be diverted. Consultation for water pipes diversion must be made at least 6 months ahead of your proposed development and the cost of diversion of any water pipes shall be fully borne by the Successful Tenderer. Please be advised to engage a qualified water pipe laying contractor with CR07 work head with at least 5 years of experience to carry out the diversion works.
- 6.41 If there are works within the water pipe corridor, please comply with the protection and submission requirements stated in the Advisory-Prevention of Damage to Water pipes <https://www.pub.gov.sg/Professionals/Requirements/Application>. Submissions to seek approval for the works shall be made via our online portal, Protection Of Water and Sewer pipes (POWS) at <https://www.eservices.pub.gov.sg/bpp/account>.
- 6.42 For queries on matters relating to water pipes please contact PUB(WSN) officer at 68852542 or Email: PUB_WSN_CENTRALBU@pub.gov.sg. For diversion of water mains, please contact PUB(WSN) officer Jovin Choong at Email: Jovin_CHOONG@pub.gov.sg.
- 6.43 Water conservation measures as stipulated in the Public Utilities (Water Supply) Regulations and SS 636 – Code of Practice for Water Services shall be adopted.
- 6.44 Water fittings (e.g. pipes, pipe fittings, valves, water storage tanks, taps and mixers (basin, sink/bib, shower), dual-flush low capacity flushing cisterns (LCFCs), flush valves, materials in contact with water, etc.) to be used in the proposed development shall be tested for compliance with the standards and requirements as stipulated in PUB's Stipulation of Standards & Requirements for Water Fittings (PUB S&R) which is available for downloading from PUB's website at <https://www.pub.gov.sg/Professionals/Requirements/Water-Supply-Services/Water-Fittings>. Additionally, water fittings such as taps and mixers, LCFCs and flush valves shall be registered under the PUB's Mandatory Water Efficiency Labelling Scheme (MWELS).
- 6.45 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 proposed development should obtain the Water Efficient Building (Basic) Certification by PUB.
- 6.46 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.
- 6.47 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.

- 6.48 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 proposed development.
- 6.49 Wherever possible, water recycling systems 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.
- 6.50 PUB provides financial support to organisations seeking efficient ways to reduce their water consumption. More details of funding can be found at <https://www.pub.gov.sg/Public/WaterLoop/Water-Conservation/Incentives-and-Grants>.
- 6.51 Use non-water cooled systems (such as air-cooled, refrigerant-cooled, etc) for cooling purposes wherever possible.
- 6.52 Cooling towers should achieve minimum 7 and 10 Cycles of Concentration (COC) using potable water and NEWater respectively.
- 6.53 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:
 - i) Minimum 50% RR for wafer fabrication plants involved in front-end semiconductor manufacturing; and
 - ii) Recycling of specified waste streams for electronics plants and biomedical plants.
- 6.54 More details can be found at <https://www.pub.gov.sg/Public/WaterLoop/Water-Conservation/Mandatory-Water-Efficiency-Requirements>

7. Defence, Science and Technology Agency (DSTA)

- 7.1 The Successful Tenderer shall ensure that all developments, structures and fixtures on the said Land shall not exceed the maximum height of 160m Singapore Height Datum (SHD). Such developments, structures and fixtures include those on the roof tops, whether permanent, temporary, transient or stationary (including but not limited to the building superstructure, TV antennae, water tanks, lift motor rooms, cranes, maintenance equipment, lightning conductors, solar panels, moving objects, vegetation etc.).
- 7.2 Republic of Singapore Air Force's (RSAF) clearance shall be sought for the use of construction equipment and temporary structures above 160m SHD (Email: Height_Control@defence.gov.sg). If the Successful Tenderer wishes 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 this letter. For civil aviation height requirements, please consult the Civil Aviation Authority of Singapore ("CAAS"). The more stringent height restriction(s) from the respective agencies shall apply.

- 7.3 If the proposal entails solar panels installation, 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 expenses 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.
- 7.4 The development should not tap on or affect any MINDEF sub-stations at all times.
- 7.5 All capital and operating costs or expenses incurred by the Successful Tenderer to meet all the above conditions and requirements will be borne by the Successful Tenderer.
- 7.6 The Successful Tenderer shall consult MINDEF through URA - Development Control Group or JTC under the Plan Lodgement Scheme when the detailed development plans are available.