

11 Jul 2023

President
The Singapore Contractors Association Ltd (SCAL)

Dear Sir/Mdm

REQUIREMENT FOR CONSTRUCTION SITES WITHIN PUBLIC SEWER CORRIDOR OF DTSS AND LARGE-DIAMETER SEWERS TO UPLOAD GROUND INSTRUMENTATION READINGS AND LINK ON-SITE SURVEILLANCE CAMERAS TO PUB'S ACTIVITY MONITORING AND ALERT (AMANDA) SYSTEM

1. PUB operates an extensive network of public sewers that include the **Deep Tunnel Sewerage System (DTSS) tunnel** and more than 340km of **large sewers (i.e. sewers of diameter \geq 900mm)**. These critical pipelines serve a significant proportion of our population, and if damaged, are costly to repair and could cause widespread public health risks, service disruption and prolonged inconvenience to the public. Hence, PUB hopes to work with the built industry to implement the necessary sewer protection requirements and reduce the likelihood of damage to the DTSS/sewers.

2. Currently, the built industry is required to seek approval from PUB via the Protection of Water Pipes and Sewers (POWS) portal (<https://bpu.pub.gov.sg/pows>), and implement sewer protection measures before carrying out any specified activity¹ within the corridor of any public sewer² (See **Annex 1**). Notwithstanding, there have been near-misses and damages to our critical pipelines and with the recovery in construction activities, we expect increasingly deeper and more complex underground works that will continue to pose significant risks to our sewers.

3. In line with the prevailing Code of Practice on Sewerage and Sanitary Works, Contractors/QPs are currently required to implement various surveillance and sewer protection measures such as, but not limited to, furnishing PUB with a weekly report of daily ground instrumentation readings, installing web-based IP surveillance cameras onsite, and fitting GPS-enabled devices on SI and boring/piling rigs. As part of PUB's digitalisation efforts, we have developed a centralised monitoring platform, i.e. **Activity Monitoring AND Alert (AMANDA) System**, that would be able to aggregate data from the various surveillance devices into a "one-stop" portal. PUB and

¹Specified activity refers to any subsurface/underground works which could potentially affect the public sewers and water pipes. This includes activities such as but not limited to earthwork for site formation, excavation more than 0.5m deep, soil investigation, boring/piling, soil improvement, tunnelling/pipejacking, and erection of temporary/permanent structures.

²The sewer corridor is the land/space bounded by 2 vertical planes through which the sewer runs – 40m on either side from centreline of the DTSS; 20m on either side from centreline of a sewer of diameter \geq 900mm; 10m on either side from centerline of a sewer of diameter $<$ 900 mm.

Contractors/QPs can then monitor the data in an integrated manner and detect breaches in readings or non-compliances timely.

4. With the introduction of AMANDA System, ground instrumentation readings and CCTV feeds (if there are any web-based IP surveillance cameras installed at the sewer setback zone) shall be uploaded/transmitted to AMANDA System. Construction sites with new POWS approval granted **on 12 July 2023 and thereafter** will be required to comply with the above mentioned. PUB hopes to work closely with your construction site project teams to ensure a smooth transition.

5. The key changes to the way data/info are furnished to PUB going forward is summarised in **Table 1** below.

Table 1: Summary of key changes to the way data/info are provided to PUB

POWS Requirement	Current Practice	Changes with AMANDA
Submission of ground instrumentation readings if the project involves carrying out any specified activities within the corridor of DTSS or trunk sewers	<ul style="list-style-type: none"> • Instrumentation reports are sent to PUB via email on a weekly basis. • PUB officers review the instrumentation reports manually and seek further clarifications with Contractors/QPs via email. 	<ul style="list-style-type: none"> • Contractors/QPs (or the appointed instrumentation contractor) will be required to upload excel template containing instrumentation readings onto AMANDA System (https://instrumentshub.com) on a **daily basis. • PUB will prompt Contractors/QPs via AMANDA System & email/SMS to submit QP's assessment report via AMANDA System whenever any submitted instrumentation readings has breached its WSL. • PUB will also prompt Contractors/QPs via AMANDA System & email/SMS to submit a QP cover letter monthly via AMANDA System, as endorsement of the instrumentation readings <p><i>**This can vary on a case-by-case basis depending on the instrumentation monitoring frequency stipulated by the QPs.</i></p>
Installation of web-based IP surveillance camera if the project involves carrying out any specified activities within the setback of DTSS or trunk sewers	These CCTV feeds are usually viewable via the CCTV vendors' respective OEM mobile apps.	<ul style="list-style-type: none"> • Contractors/QPs are required to link the CCTV feeds to AMANDA System. • Contractors/QPs are required to ensure the CCTV system include: <ul style="list-style-type: none"> ○ Broadband router or ○ 4G LTE router that is equipped with <u>VPN client to support OpenVPN or L2TP tunnelling protocol</u>

POWS Requirement	Current Practice	Changes with AMANDA
Installation of GPS-enabled devices on SI and boring/piling rig(s) carrying out works within the corridor of DTSS, trunk sewers, or transmission water pipes	<p>For SI/Piling/Boring activity, Contractor shall:</p> <p>(a) Install a GPS-enabled device on the piling/boring & SI rigs. The accuracy of the device shall be in accordance with PUB's advice.</p> <p>(b) Submit the details of the machineries and GPS-enabled devices via Google Form: https://tinyurl.com/rigdetails</p> <p>(c) Email PUB's geofencing system vendor at geofencing@spaceagelabs.com.sg (copy PUB_geofencing@pub.gov.sg) to make an appointment for the GPS device to be inspected that it is well-connected to PUB's geofencing system.</p>	There are no changes to the current practice for QPs/Contractors. Geofencing alerts will be viewable on AMANDA System.

6. PUB will contact the affected construction site project teams to onboard them on the use of AMANDA System after issuance of POWS approval. Details on the key actions required from contractors at each stage (before, during, and after commencement of works) are summarised in **Annex 2**.

7. Should you require any clarification on the changes, please contact my colleagues at [KHONG Hui Shan@pub.gov.sg](mailto:KHONG_Hui_Shan@pub.gov.sg) and [Kelvin TAN@pub.gov.sg](mailto:Kelvin_TAN@pub.gov.sg).

Yours faithfully,



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Annex 1 – Corridor and Setback Zones for DTSS tunnel and Large Sewers

Type of Pipe	Setback Zone	Corridor Zone
	Distance from pipe center	Distance from pipe center
Large sewer of diameter \geq 0.9m to 1.5m	$0.5D + 2.5m$	10m
Large sewer of diameter $>$ 1.5m to 2.5m	$0.5D + 3m$	20m
Large sewer of diameter $>$ 2.5m	$0.5D + 4m$	
DTSS tunnel	$0.5D + 6m$	40m

Note: D stands for pipe diameter.

Annex 2 – Summary of Key Actions Required of Contractors

A. After receiving POWS approval and before commencing works

- The following registered project team members* of the approved POWS submissions will receive an invitation link via email sent by AMANDA vendor (ATT Systems Pte Ltd) to create AMANDA login accounts for:
 - QP
 - Contractor
 - Point of contact of Instrumentation & Monitoring Contractor (IMC)

**If the instrumentation readings are submitted by a separate contractor other than the contractor who is carrying out the approved works (e.g. if approved works are carried out by main contractor but submission of instrumentation readings is by IMC), then the separate contractor shall be registered & included as a project team member during the POWS application. This is for the purpose of creating user accounts for AMANDA System.*

- Once the login accounts have been activated by the Contractor/QP/IMC, an email notification will be sent to PUB officers.
- After the account has been successfully activated, QP/Contractor/IMC will receive an email notification to enter the AMANDA System. The QP/Contractor/IMC is to download PUB's excel template, key in the instrument details (instrument ID, AL and WSL values, initial/baseline reading) into PUB's excel template, and upload to AMANDA System. Subsequently, QP/Contractor/IMC may proceed to upload the daily readings into AMANDA System
- Online training session on how to upload/view instrumentation reading will be scheduled by ATT within 2 weeks. Detailed User Manual/Training Video with step-by-step guide on the submission of instrumentation readings onto AMANDA System will be provided during the online training session.

- If project site involves carrying out specified activities within the setback of DTSS or trunk sewers, Contractor is to email ATT at admin@amandasystem.com at least 3 days in advance of the intended works commencement date to set up/configure VPN settings to link the CCTV streaming to AMANDA System.

B. During works

- QP/Contractor, or the appointed IMC Contractor, shall submit the instrumentation readings (where applicable as per approved submission) records ****daily** via AMANDA System through <https://instrumentshub.com>.
- QP/Contractor will receive instrumentation alerts and queries via SMS/email from PUB (through AMANDA) for assessment arising from any instrumentation reading breaching its WSL.
- QP/Contractor shall respond to the queries via AMANDA System. Details to be included in QP's assessment include:
 - What works were carried out during the period where instrumentation readings were found to breach WSLs;
 - QP's assessment on the cause of instrumentation reading breach;
 - Any impact/damage on affected sewers due to the instrumentation reading breach its WSL, and proposed mitigation measures if any;
 - Additional protection measures on the affected sewers if there is expected impact to the affected sewer.

***This can vary on a case-by-case basis depending on the instrumentation monitoring frequency stipulated by the QPs*

C. After completion of works

- Contractors shall indicate in AMANDA System whenever the specified activity has been completed so that the auto-alerts could be disabled.