

Proposed Twin 1800mm Diameter Potable Water Pipeline along Island Club Road, from Bukit Kalang Service Reservoir (BKSR) to Upper Thomson Road - Environmental Impact Assessment (EIA)

Frequently Asked Questions (FAQ)

No	Questions	Reply
A	BACKGROUND	
A1	What is the purpose of this water pipeline project?	PUB is laying a new set of potable water pipelines from Bukit Kalang Service Reservoir (BKSR) to Woodleigh Waterworks. The existing pipe network was constructed in the late 1970s and new pipelines are required to meet the increasing developments and water demand in the Bukit Kalang Supply Zone (primarily Sengkang, Hougang and Ang Mo Kio).
A2	What is the scale of this water pipeline project? How will the pipes be laid?	The project involves the laying of twin 1800mm (diameter) pipelines of approximately 4.6km(length) by open cut method inside Bukit Kalang Service Reservoir (BKSR) and pipe jacking method along Island Club Road.
A3	What is the construction timeline for the project?	The construction works are targeted to commence in 2Q 2022 and expected to complete by 1Q 2026.
A4	Are maintenance works required after the project completion? If so, how often?	Maintenance works are not required on a regular basis. Repair works will only be carried out in the event of incidences such as pipe leaks.
A5	Where can I find the latest updates on the project?	The project updates can be found under Tenders & Contracts on PUB's website (https://app.pub.gov.sg/constructionprojects/Pages/AllProjectListing.aspx) once the tender is awarded.

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B	CONSIDERATION AND ALIGNMENT OPTIONS	
B1	Has PUB explored other options instead of laying the pipelines along Island Club Road?	A feasibility study was done in 2016 to study the various pipeline routes and construction methods. As Bukit Kalang Service Reservoir is sited near the Central Catchment Nature Reserve the proposed pipe route has been designed to hug closer to the existing Island Club Road instead. The pipejacking method which creates lesser disturbance above ground, is also adopted for the construction.
B2	What is the depth of the pipe jacking works?	The depth of the pipe jacking works ranges about 7m to 38m from ground.
B3	How does PUB carry out its pipe jacking works smoothly?	Soil investigation is conducted to identify the type of soil before the most optimal pipe jacking machine for the soil profile is selected for the works. The pipe jacking operator will also ensure adherence to the parameters set out by a Professional Engineer (PE) for the pipe jacking machine before, during and at the end of the day.
B4	Will there be construction works every day? What are the construction hours?	Construction works will be carried out on weekdays only, between 9am to 5pm as there are no construction works during weekends and public holidays.
B5	What are the types of machinery used for the construction works?	The types of machineries include soil drilling rills, excavators, tipper/concrete trucks, cranes, silent pilers, generators, air compressor and pipe jacking machine. Noise silencer and localised noise barrier will also be installed around the generators to minimise the noise generated.
B6	How will the construction machinery/vehicles travel to the worksites?	The construction vehicles will travel along Island Club road to reach the worksites.

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B7	Are there any interfaces between PUB's pipeline project and LTA's Cross Island Line (CRL) project, considering both projects will have works in the proximity of Central Catchment Nature Reserve (CCNR)?	One of PUB's proposed worksites will be interfacing with LTA's CRL worksite along Island Club Road. PUB and LTA have been coordinating closely on work area, access and project timeline. PUB will complete the pipejacking works first before handing over the worksite to LTA.
B8	How does PUB minimise disruption to the people who visit the nature reserve?	The worksites within and adjacent to Central Catchment Nature Reserve and Windsor Nature Park will be hoarded up and all construction activities will be carried out within the respective areas. Noise barriers will also be placed to minimise disturbance. The Venus trail will be closed for a period of about 24 months but there will be directional signages to guide the public to access the Tree Top Walk via the Drongo Trail.
B9	Did PUB consult the relevant agencies and stakeholders like Nature Groups when carrying out the Environmental Impact Assessment (EIA) for the project?	PUB consulted NParks and the Nature Groups for the EIA scope during the preliminary and detailed design stages of the project, to minimise any potential impact to the environment
B10	What is the likelihood of a rescue shaft scenario?	<p>To minimise the likelihood of a rescue shaft scenario, soil investigation works were carried out to understand the soil profile that the jacking works will be cutting through. Suitable type of machines will be selected based on the soil profile that the machine will be jacking through and the Qualified Person (QP) will ensure that the correct face pressure is maintained during jacking.</p> <p>The proposed TBM shall have provisions for opening at the machine front to allow human access for maintenance/ changing of cutter head, removal of obstruction. In the event of failure of motors/ other electrical equipment within the TBM, the repair shall be carried out from the jacking shafts.</p>

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		An instrumentation monitoring plan will also be in place to monitor any abnormal ground movement during the works, coupled with daily visual site inspection.
C	ENVIRONMENTAL IMPACT AND MANAGEMENT MEASURES	
C1	How does PUB ensure silt and debris from the construction work do not flow into the streams, especially during a storm?	<p>Mitigation measures have been developed for each worksite to ensure no polluted water will be discharged into the natural streams within Windsor Nature Park.</p> <p>In general, there are two approaches.</p> <ol style="list-style-type: none"> 1. The surface runoff will be directed by the perimeter drains and treated onsite by Earth Control Measure (ECM) treatment plants. Each worksite's ECM plan will be designed, checked and verified by a Qualified Erosion Control Professional (QECP). The QECP will also ensure the proper operation and maintenance of the ECM treatment plants on site, before the onset of heavy rain. Treated water will be discharged through a silt fence to roadside drains. 2. For worksites near to existing streams, the surface runoff may potentially enter the drains that lead into the streams. Perimeter drains will be constructed to direct the runoff into an underground first flush storage tank within each of these worksites to collect the first 30 minutes of stormwater. This first flush (30 minutes of rain) of potential contaminated runoff will be collected in the tank and thereafter pumped out for treatment and discharge offsite. After the first flush of rain, an auto valve will direct the runoff within the site through a silt fence before discharging into roadside drains. <p>Regular site inspections will be conducted and precautionary measures will be implemented on site to prevent silt and debris from flowing into any stream.</p>

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C2	How does PUB ensure that there is no spillage of slurry during pipejacking works?	The slurry produced by the pipe jacking activities will be discharged to the slurry tank by a series of interconnecting pipes. The slurry will then be collected by licensed collectors to be disposed offsite. Offsite waste disposal will be fully documented prior to leaving the site.
C3	What are some of the Earth Control Measures (ECM) that will be taken?	<p>The following ECM measures will be taken: -</p> <ol style="list-style-type: none"> <li data-bbox="1043 507 2063 579">1. <u>Cut-Off Drain</u> Existing and temporary drains to capture and contain water within the site. <li data-bbox="1043 627 2186 850">2. <u>Cut-Off Kerb / Hump / Sandbags</u> Temporary water diversion kerbs will be installed at stretches along hoarding boundary where the ground slope guides water into the site. This prevents clean water from adjacent areas from entering the site and coming in contact with exposed earth if any. At the worksite accesses, a concrete hump will be used instead. Sandbags will be used where necessary to divert flow and control spillage of mudflow. <li data-bbox="1043 898 2186 1010">3. <u>Concretisation of sites</u> Each worksite will be covered with concrete slabs or washed aggregates to eliminate any exposed bare earth which may lead to silty runoff water. <li data-bbox="1043 1058 2186 1169">4. <u>Silt Fence</u> Silt fences will be installed along the perimeter hoarding and drains to retain mud water and silt. <li data-bbox="1043 1217 1816 1289">5. <u>Silt Trap</u> Silt traps will be constructed along drains to capture silt. <li data-bbox="1043 1337 1391 1362">6. <u>Erosion Control Blanket</u>

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		<p>Erosion blankets will be used to cover all temporary work areas during rain and at the end of the workday.</p> <p>7. <u>Treatment Plants</u> Treatment plants will be used for treatment of any silty runoff water at Worksites 1, 2 and 6, before discharge into nearby drains. At Worksites 3, 4 and 5, underground first flush storage tanks will be constructed to collect the first flush of stormwater, which will be pumped out, treated and discharged off site. Subsequent clean runoff will be passed through a silt fences before discharge into nearby drains.</p> <p>8. <u>Daily Site Monitoring</u> Daily monitoring will be undertaken to ensure no seepage/leaks of mud water to outside hoarding, especially rainy days.</p>
C4	What is the potential impact of the works on the flora?	<p>With most of the worksites (except Worksites 4 and 5) strategically placed on managed vegetation/ open spaces and shafts kept to the minimum, the reduced impact to the flora are:</p> <ol style="list-style-type: none"> 1. A total of 53 trees (4 to be transplanted; 49 to be felled) will be removed at Worksites 1 to 6, out of which there are 5 species of trees with conservation status. The trees with conservation status include <i>Nephelium lappaceum</i> (Rambutan) and <i>Peltophorum pterocarpum</i> (Yellow Flame) species which are abundant in Singapore as they are from former agricultural activities and commonly planted as roadside trees while the other species with conservation status (<i>Mangifera odorata</i>, <i>Scaphium macropodum</i> and <i>Sindora coriacea</i>) will be transplanted. 2. Minor secondary impact such as wind damage, edge effects and habitat fragmentation might cause potential reduced nutrients, water supply for vegetation and increase in soil compaction, as area affected is localised.

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C5	What are the mitigation measures that will be implemented for the flora?	<p>An Environmental Monitoring and Management Plan (EMMP) will be put in place to minimise impact on the flora. The key measures are:</p> <ol style="list-style-type: none"> 1. Vegetation with conservation status found within the worksites to be transplanted or salvaged; 2. Engage flora specialist and arborist to supervise the site clearance works, monitor the construction and health of the surrounding trees; 3. Tree protection zone (TPZ) to be set up prior to the start of the site clearance; 4. Trenching, excavation or boring within the TPZ to be limited to works approved by the arborist; 5. Groundwater levels will be monitored, and watering recommended if water levels decline by more than 0.3m and/or the plants look dehydrated.
C6	What is the potential impact of the works on the fauna?	<p>With most of the worksites (except Worksites 4 and 5) strategically placed on managed vegetation/ open spaces and shafts kept to the minimum, the reduced impact to the fauna are:</p> <ol style="list-style-type: none"> 1. Contaminated surface runoff may enter the streams in Windsor Nature Park and affect the sensitive aquatic fauna; 2. Increased traffic volume could result in an increased risk of roadkill;

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C7	What are the mitigation measures that will be implemented for fauna?	<p data-bbox="992 488 2190 560">An Environmental Monitoring and Management Plan (EMMP) will be put in place to minimise impact on the fauna. The key measures are:</p> <ol style="list-style-type: none"> <li data-bbox="1041 584 1890 616">1. Vegetation and trees will be inspected prior to site clearance; <li data-bbox="1041 655 2018 687">2. Worksites will be hoarded up with noise barriers of appropriate height; <li data-bbox="1041 727 2040 759">3. Workers and staff will be briefed on how to deal with animal encounters; <li data-bbox="1041 799 2190 887">4. Vehicle access at Upper Thomson Road will be restricted to 8am to 7pm, with speed limit capped at 40km/hr; <li data-bbox="1041 927 2114 1015">5. Fencing and silt fence will be installed 50m before and after Worksites 4 and 5, along both sides of Island Club Road, to reduce risks of road kills; <li data-bbox="1041 1046 2190 1126">6. Regular fauna and roadkill monitoring will be conducted via visual surveys and camera traps.

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C8	What measures are taken to ensure that no additional trees or habitat will be erroneously cut down?	<p>A tree felling plan and method statement are prepared by a certified arborist and submitted to NParks for approval.</p> <p>The areas to be cleared will be marked out clearly, and any tree felling and site clearance will be supervised by the arborist and site supervision team. Prior to site clearance, the flora specialist will identify any trees, saplings or seedlings of conservation concern. For trees or seedlings with conservation status, we will check with NParks on the possibility and location of transplanting or salvaging.</p>
C9	What measures are taken to minimise the impact to biodiversity while conducting the clearance for the worksites?	<p>Prior to tree felling, the flora specialist will confirm the trees to be felled have been approved in the tree felling plan. Tree-protection zones will be set-up wherever necessary. The vegetation will be inspected by the fauna specialist for any nesting or roosting animals before clearance. Vegetation clearance will be done slowly to allow any residing fauna to vacate the clearance area.</p> <p>After construction, suitable native trees will be replanted to reinstate the site and accelerate the recovery of vegetation within the worksites.</p>
C10	It is noticed that the proposed pipelines will be undercrossing the stream in Windsor Nature Park. Can they be shifted to be under Island Club Road?	A feasibility study was done in 2016 to study the pipeline routes and construction methods, with the consideration of minimising the impact to the environment and biodiversity. Due to site constraints such as the nature trails and Singapore Island Country Club, and technical limitations of the pipe jacking method, the final pipe route needs to be as close as possible to the road to minimise further encroachment into the nature.
C11	Will there be any disturbances to the stream during the pipe jacking works? What are the mitigation measures?	<p>As the pipeline will be constructed 7m below the stream by pipe jacking method, there will be no disturbances to the stream.</p> <p>Mitigation measures such as controlling the water quality and soil erosion will be in place to minimise any potential impact.</p>

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		<p>A suitable type of machine will also be used for the soil condition that it will be jacking through.</p> <p>The proposed Tunnel Boring Machine (TBM) will have provision for opening at the machine front to allow human access for maintenance/changing of cutter bits and removal of obstruction etc.</p> <p>The TBM face pressure calculations are done by the Qualified Person (QP) prior to works and to ensure the required pressure is maintained during pipejacking works to prevent any possible soil collapse.</p> <p>For the stretch of pipejacking undercrossing the stream, the vibration and ground condition monitoring will be conducted such as:</p> <ol style="list-style-type: none"> 1. Inclinometers will be installed to monitor lateral ground movement; 2. Settlement monitoring along the pipe alignment by markers; 3. Vibration monitoring; 4. Visual and physical checks by Contractor to detect any changes in ground or stream condition. If there is any impact detected, the site supervision and EMMP team will be informed for immediate action.
C12	If the critically endangered and vulnerable trees are affected by the works, will they be planted back?	NParks will be consulted, and the flora specialist will tag species that can be salvaged and transplanted before site clearance. Species that can be salvaged/ transplanted will be re-located to a suitable holding area before being planted back on-site during the reinstatement stage.

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C13	How does PUB mitigate possible mosquito breeding?	<p>Under NEA requirements, the Environmental Control Officer (ECO) will check the sites daily for stagnant water.</p> <p>The sites will be designed with proper drainage to avoid water ponding. Vector control measures will also be implemented.</p>
C14	When pipe jacking is carried out, will it cause any settlement to the surrounding areas, near the Singapore Island Country Club and the residential sites within the proximity of the site?	The pipe jacking works will be designed by Qualified Person (QP) with calculations to estimate the settlement if any. Thereafter, there will be daily settlement monitoring to monitor the ground settlement against the design threshold value. Immediate action will be taken to address any excessive settlement.
C15	What are the measures taken to prevent road kills?	<p>The following measures are/will be put in place:</p> <ol style="list-style-type: none"> 1. Existing road humps along Island Club Road 2. Implementation of speed limit of 40km/h along Island Club Road 3. Education of site staff and drivers 4. Erection of signs to remind the workers of the presence of wildlife at appropriate intervals 5. Fencing will be extended from existing perimeter fencing of Singapore Island Country Club
C16	What will the workers do if they encounter wildlife during the works?	Workers will respond accordingly to the protocol outlined in the fauna response plan (reinforced and reminded by the supervisor during the daily toolbox meeting). Prior to carrying out works near the Nature Reserve, workers would also have been briefed on the list of Dos and Don'ts to safeguard themselves.