

4.1 Water infrastructure – drinking water

Only provide a response to the questions in the following section if the applicant corporation is seeking a licence for the construction, maintenance and operation of water infrastructure for the supply of drinking water.

- 4.1.1 Describe the proposed drinking water infrastructure from the source of the drinking water through to the end use (i.e. catchment to tap). Please include in your description all of the infrastructure for which the applicant corporation is seeking a licence. This will include any infrastructure that is to be used for the production, treatment, filtration, storage, conveyance or reticulation of the drinking water. Please list all sources and end uses in the description. Identify the infrastructure for which the applicant corporation is seeking a licence. **Provide a detailed process flow diagram of the proposed infrastructure from source to end use in Appendix 4.1.1.**

You must attach a process flow diagram in response to this question. The process flow diagram should only include the drinking water infrastructure where the scheme includes more than one type of infrastructure and must cover the process from source to end use. You may also include a piping and instrumentation diagram for additional information.

The response to this question will be used to draft a proposed licence. The licence will specify the type of water industry infrastructure, if a licence is granted (Act s.6(1)(a)). The response will also be used to ensure you have applied for the correct licence(s) and as a context for our assessment of the applicant corporation's technical, organisational and financial capacity to undertake the activities for which you are seeking a licence (Act s.10(4)(a)).

Source

Drinking water will be sourced from Sydney Water's drinking water supply system for each stage of the Development.

FSO proposes to negotiate a commercial agreement with Sydney Water for the provision of drinking water. This agreement will be known as a Utility Services Agreement (USA) and will be substantially based on the agreements already in place between Sydney Water and Flow Systems for its other schemes in Sydney Water's area of operations at Central Park and Discovery Point and between Hunter Water and Flow Systems for its schemes at Huntlee and Cooranbong. Sydney Water offered the agreed form of USA to Flow Systems for the Shepherds Bay scheme on 4th May 2017. This is currently being populated with site-specific information is intended to be executed in June 2017 with a condition precedent being the granting of a WICA network operator's licence to FSO for the Shepherds Bay scheme.

Trunk Drinking Water infrastructure

FSO will work with Sydney Water and the Developer to determine the trunk drinking water infrastructure requirements that are required to service the drinking water system within the Development. Sydney Water has previously advised and has recently updated the Developer of infrastructure requirements through their Advice Letters and Notices of Requirements. This infrastructure does not form part of this licence application as it will become part of Sydney Water's network. The design and construction of any additional trunk drinking water infrastructure required will be performed by the Developer and dedicated to Sydney Water upon completion.

The Flow Systems-prepared drinking water reticulation masterplan and preliminary assessments by FSO indicate that drinking water will be sourced and serviced to the Scheme by development of a 200mm diameter trunk main east-west through the centre of the Development along Nancarrow Road.

Drinking Water reticulation

Each stage of the Development will be serviced by a private drinking water pipe connected via a Sydney Water bulk water meter from the Sydney Water drinking water main. Each of these drinking water pipes will be owned by the relevant Owners Corporation but operated and maintained by FSO and it will transport drinking water from the Sydney Water drinking water reticulation main in the street to the Customer Connection Point, which is the upstream face of

the flange at the domestic drinking water booster pumps, usually located in the relevant building's basement. Each private main will be owned, operated and maintained by that building's owners' corporation. FSO has developed a drinking water masterplan to determine the infrastructure requirements.

FSO seeks to licence all of the drinking water infrastructure which it proposes to be responsible to own, operate or maintain.

RELEVANT APPENDICES

- Appendix 4.1.1(a) Process Flow Diagram (Drinking Water)
- Appendix 4.1.1(b) Sydney Water Advice Letter and Notice of Requirements
- Appendix 4.1.1(c) Drinking Water Reticulation Masterplan
- Appendix 4.1.1(d) Drinking Water Infrastructure Responsibilities
- Appendix 4.1.10(a) Flow Systems Drinking Water Quality Plan

4.1.2 Describe whether the infrastructure is existing infrastructure or is to be constructed. If the infrastructure is existing, please describe its current condition and operability. If the infrastructure is a mixture of existing and to be constructed **identify the infrastructure as existing or to be constructed on the process flow diagram in Appendix 4.1.1.**

The response to this question will be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).

All drinking water infrastructure under this licence application is to be constructed.

4.1.3 Describe the location of the proposed infrastructure. For example include:

- the identification of specific lot descriptors (e.g. lot and DP numbers) for the production, treatment, filtration and/or storage infrastructure.
- the location of infrastructure for the conveyance and/or reticulation of drinking water by street name, local government area or other description as appropriate to the size of the scheme.

Provide a map showing the location of the proposed infrastructure from source to end use in Appendix 4.1.3.

The map may include all water industry infrastructure (ie, drinking water, non-potable water and/or sewerage) where the scheme includes more than one type of infrastructure.

The response to this question is a requirement for any network operator's licence (Reg cl.6(1)(a)). The response to this question will be used to specify the authorised area of operations (Act s.11(1)), if a licence is granted. The response will also be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).

All drinking water infrastructure described in section 4.1.1 above is contained within the Development area as shown in the Drinking Water Reticulation Masterplan.
The drinking water supply and distribution network will be located throughout the Development area.

The Development area may be described as follows:

Lot	DP	Lot	DP
1-7	19585	4	548406
9-17	19585	3	7130
1	122205	11-18	7130
2	792836	1	703858
102	1037638	1	322641
1-2	810552	1	1205357

1	713706	2	550006
1-2	930584	1-2	982743
1	104280		

RELEVANT APPENDICES

- Appendix 4.1.1(c) Drinking Water Reticulation Masterplan
- Appendix 4.1.3(a) Scheme Lot and DP references

4.1.4 Describe any interconnections between the proposed drinking water infrastructure and other infrastructure not part of this scheme (eg, interconnections with other licensed network operators or public utilities). Identify in your description who is responsible for the construction, operation and maintenance of which infrastructure. **Identify all interconnections with other infrastructure on the process flow diagram in Appendix 4.1.1 and the map in Appendix 4.1.3.**

The response to this question will be used to ensure the correct area of operation is specified in the licence, if a licence is granted (Act s.11(1)). The response will also be used as a context for the assessment of risks from the proposed scheme and to identify possible additional licence conditions relating to the inter-connected systems and responsibilities for risks.

All drinking water will be sourced from Sydney Water's drinking water system.

All of the Scheme's drinking water infrastructure will connect to Sydney Water infrastructure within the boundary of the Development area.

The drinking water infrastructure will supply the Initial Stages (as defined in 4.1.1) with temporary interconnection to the recycled water reticulation network until the LWC becomes fully operational.

The detailed design and construction of the drinking water infrastructure up to but not including the drinking water meter inside each customer's apartment will be undertaken by the Developer. FSO will establish the masterplan and design standards, and carry out detailed design review and inspection and testing of the constructed infrastructure prior to dedication to Sydney Water or the relevant owners corporation.

FSO will ~~not~~ be responsible for the operation and maintenance of the drinking water pipe owned by the Owners Corporation which transports drinking water from the Sydney Water drinking water reticulation main in the street to the Customer Connection Point, which is the upstream face of the flange at the domestic drinking water booster pumps, usually located in the building basement. FSO will also own, operate and maintain any drinking water infrastructure except for the drinking water meter inside each customer's tenement.

A commercial agreement (USA) between Sydney Water and FSO's parent company, Flow Systems Pty Ltd and substantially based on the agreements already in place between Sydney Water and Flow Systems for its other schemes in Sydney Water's area of operations at Central Park and Discovery Point and in ~~line with the USAs which are in final negotiation with Hunter Water's area of operations~~ for Flow's schemes at Huntlee and Cooranbong developments, will clearly outline the parties' respective responsibilities. Sydney Water offered the agreed form of USA to Flow Systems for the Shepherds Bay scheme on 4th May 2017. This is currently being populated with site-specific information is intended to be executed in June 2017 with a condition precedent being the granting of a WICA network operator's licence to FSO for the Shepherds Bay scheme.

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RELEVANT APPENDICES

- Appendix 4.1.1(a) Process Flow Diagram (Drinking Water)
- Appendix 4.1.1(b) Sydney Water Advice Letter and Notice of Requirements
- Appendix 4.1.1(c) Drinking Water Reticulation Masterplan
- Appendix 4.1.1(d) Drinking Water Infrastructure Responsibilities

4.1.5	Where applicable, describe the connection point to customers or end users (e.g. the customer connection point may be a water meter). Identify in your description who is responsible for the construction, operation and maintenance of which infrastructure. Identify all customer and/or end user connections on the process flow diagram in Appendix 4.1.1 and the map in Appendix 4.1.3.
<i>The response to this question will be used to ensure the correct area of operation is specified in the licence, if a licence is granted (Act s.11(1)). The response will also be used as a context for the assessment of risks from the proposed scheme.</i>	
<p>The detailed design and construction of the drinking water infrastructure up to but not including the drinking water meter inside each customer's property will be undertaken by the Developer.</p> <p>The Developer's builder will install the drinking water meters issued by Flow Systems.</p> <p><u>FSO will be responsible for the operation and maintenance of the drinking water pipe owned by the Owners Corporation which transports drinking water from the Sydney Water drinking water reticulation main in the street to the Customer Connection Point, which is the upstream face of the flange at the domestic drinking water booster pumps, usually located in the building basement. FSO will also own, operate and maintain the drinking water meter inside each customer's tenement.</u></p> <p>FSO will not be responsible for the operation and maintenance of any drinking water infrastructure.</p> <p>The Developer will install all drinking water infrastructure, downstream of the drinking water meter and the owner and/or owners corporation will be responsible for its operation and maintenance.</p> <p>NSW Fair Trading is responsible for inspection and review of the customer's drinking water infrastructure downstream of the Sydney Water connection point.</p> <p>RELEVANT APPENDICES</p> <ul style="list-style-type: none"> • Appendix 4.1.1(a) Process Flow Diagram (Drinking Water) • Appendix 4.1.1(c) Drinking Water Reticulation Masterplan • Appendix 4.1.5(a) Network Infrastructure Inspection Certification and Dedication Procedure • Appendix 4.1.5(b) High Rise Projects Documentation Compliance Checklist 	
4.1.6	What volume of water is available from the proposed source? Where applicable, please provide the capacity of the source and the (allowable) average daily extraction rate from the source. If there is more than one source, please provide the requested information for each of the sources. Where relevant, provide a copy of any agreements and/or licences to access the source water in Appendix 4.1.6.
<i>The response will also be used as a context for the assessment of the technical, organisational and financial capacity of the applicant corporation (Act s.10(4)(a)).</i>	
<p>Drinking Water will be sourced from Sydney Water.</p> <p>FSO and Sydney Water will work together to determine and implement the short and long term infrastructure requirements to service the Development area.</p> <p>Using the more conservative, WSAA Code demands, to service the ultimate drinking water needs of the Development, up to 1,045 kL/day will be drawn from Sydney Water's supply network (peak day).</p> <p>To service the recycled water needs of the Development before the water recycling facility is constructed and commissioned, an additional 697 kL/day will be drawn from Sydney Water's supply network (peak day).</p> <p>RELEVANT APPENDICES</p> <ul style="list-style-type: none"> • Appendix 4.1.1(b) Sydney Water Advice Letter and Notice of Requirements • Appendix 4.1.6(a) Shepherds Bay Servicing Strategy 	

4.2 Water infrastructure – non-potable water

Only provide a response to the questions in the following section if the applicant corporation is seeking a licence for the construction, maintenance and operation of water infrastructure for the supply of non-potable water.

4.2.1	Describe the proposed non-potable water infrastructure from the source of the water through to the end use (ie, catchment to tap). Please include in your description all of the infrastructure for which the applicant corporation is seeking a licence. This will include any infrastructure that is to be used for the production, treatment, filtration, storage, conveyance or reticulation of the non-potable water. Please list all sources and end uses in the description. Identify the infrastructure for which the applicant corporation is seeking a licence. Provide a detailed process flow diagram of the proposed infrastructure from source to end use in Appendix 4.2.1.
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You must attach a process flow diagram in response to this question. The process flow diagram should only include the non-potable water infrastructure where the scheme includes more than one type of infrastructure and must cover the process from source to end use. You may also include a piping and instrumentation diagram for additional information.

The response to this question will be used to draft a proposed licence. The licence will specify the type of water industry infrastructure, if a licence is granted (Act s.6(1)(a)). The response will also be used to ensure you have applied for the correct licence(s) and as a context for our assessment of the applicant corporation's technical, organisational and financial capacity to undertake the activities for which you are seeking a licence (Act s.10(4)(a)).

The recycled water catchment is the Development area. Wastewater collected from predominantly residential households will be delivered into the LWC via a flow balance tank which forms an integral part of the LWC itself. Further, note that the LWC is also designed for recycled water storage to be topped up with drinking water when recycled water demand exceeds the available supply (see section 4.2.6 below).

Infrastructure involved, and key steps, in the treatment process are as follows:

Flow balance tank – Used to buffer incoming supply vs. treatment capacity.

Inlet screening – Material greater than 2mm will be removed from the raw sewage to protect the downstream equipment. Dewatered screenings will be collected and disposed off-site via an approved waste management contractor.

Membrane bioreactor – A membrane bioreactor will form the core treatment process for the LWC. The biological reactor will be designed to achieve the required levels of BOD and nutrient reduction. Nitrogen will be removed biologically whereas phosphorus will be precipitated with alum and subsequently form part of the biomass. The membranes will separate the biomass from the treated water and provide the first disinfection barrier. The biomass is sent back to the start of the biological reactor and the treated water is sent onto further disinfection. Excess biomass is periodically wasted from the membrane zone. The bioreactor is configured into distinct zones via baffles to minimise short-circuiting.

UV Disinfection – UV disinfection provides the second disinfection barrier. Importantly, the low turbidity water (typically ~0.2NTU) produced from membrane filtration is well suited to UV disinfection.

Chlorination – A chlorine contact time provides the third disinfection barrier. Importantly, the low turbidity water (typically ~0.2NTU) produced from membrane filtration is well suited to chlorine disinfection.

Chemical storage and dosing – A variety of chemicals including sodium hypochlorite and citric acid will be used for treatment process purposes, disinfection and membrane cleaning.

Recycled water storage – Used to provide a buffer between production capacity and recycled water demand.

Reverse osmosis – Used to trim the concentration of total dissolved solids in the recycled water so that it is suitable for use in cooling towers.

Recycled water network reticulation infrastructure – Recycled water will be supplied to end use customers through a pressurised distribution network. A pressure pump set will boost recycled water from the recycled water storage tanks to the distribution network to achieve a minimum pressure of 15 metres static head at each property boundary measured for a continuous 30 minute period during normal system operation. The FSO recycled water infrastructure includes the recycled water meters on each lot.

WAS Dewatering – The Waste Activated Sludge (WAS) from the membrane zone will be dewatered from 0.6% w/w solids to ~12% w/w solids. The filter cake will be collected and disposed off-site via an approved waste management contractor.

Odour scrubbing – Foul air from the inlet screens and flow balance tank will be collected and processed via an odour scrubbing. The primary treatment process for odour will be biological followed by activated carbon

Control System – The control and operation of the overall scheme is based on a PLC/SCADA system which will be designed to ensure safe and correct functional operation of the LWC and associated ancillary components.

The PLC follows specific steps to automatically control valves, pumps, etc. during the operating states for the scheme and provides automated control of the equipment. All the programming for the control of the scheme is stored in the PLC.

The SCADA system software allows the full and complete interaction between the Scheme operators and the scheme. It supplies all the data from field transmitters and displays the values and statuses by the animation of graphic objects and colours in the required number of graphic pages.

Recycled water network reticulation infrastructure – Recycled water will be supplied to end use customers through a pressurised distribution network. A pressure pump set will boost recycled water from the recycled water storage tanks to the distribution network to achieve a minimum pressure of 15 metres static head at each property boundary measured for a continuous 30 minute period during normal system operation. The FSO recycled water infrastructure includes the recycled water meters. Following developer infrastructure works practical completion, FSO is responsible for the ownership, operation and maintenance of all recycled water estate reticulation in the street. Recycled water pipes owned by each Owners Corporation but operated and maintained by FSO, will transport recycled water from FSO's recycled water reticulation main in the street to the Customer Connection Point, which is the upstream face of the flange at the domestic recycled water booster pumps, usually located in the building basement. Each owners corporation will be responsible to own, operate and maintain its own recycled water infrastructure downstream of the connection point to the estate reticulation.

FSO seeks to licence all of the recycled water infrastructure which it proposes to be responsible to own, operate or maintain.

The end use for recycled water is described in section 4.2.9 below.

RELEVANT APPENDICES

- Appendix 4.2.1(a) Process Flow Diagram (Sewerage and Recycled Water)
- Appendix 4.2.1(b) Recycled Water Reticulation Masterplan
- Appendix 4.2.1(c) LWC concept layout
- Appendix 4.2.4(a) Recycled Water Infrastructure Responsibilities

4.2.2 Describe whether the infrastructure is existing infrastructure or is to be constructed. If the infrastructure is existing, please describe its current condition and operability. If the infrastructure is a mixture of existing and to be constructed **identify the infrastructure as existing or to be constructed on the process flow diagram in Appendix 4.2.1.**

The response to this question will be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).

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All scheme infrastructure under this licence application is to be constructed.																																									
4.2.3	<p>Describe the <u>location</u> of the proposed infrastructure. For example include:</p> <ul style="list-style-type: none"> ▼ The identification of specific lot descriptors (eg, lot and DP numbers) for the production, treatment, filtration and/or storage infrastructure. ▼ The location of infrastructure for the conveyance and/or reticulation of non-potable water by street name, local government area or other description as appropriate to the size of the scheme. <p>Provide a map showing the location of the proposed infrastructure from source to end use in Appendix 4.2.3.</p> <p>The map may include all water industry infrastructure (ie, drinking water, non-potable water and/or sewerage) where the scheme includes more than one type of infrastructure.</p> <p><i>The response to this question is a requirement for any network operator's licence for water infrastructure (Reg cl.6(1)(a)). The response to this question will be used to specify the authorised area of operations (Act s.11(1)), if a licence is granted. The response will also be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).</i></p> <p>The recycled water infrastructure described in section 4.2.1 above is contained within the Scheme area as shown in the Recycled Water Reticulation Masterplan.</p> <p>The LWC is proposed to be located in the basement of Stage 3 of the Development, spanning lots 12,13 and 14 of deposited plan 7130.</p> <p>Recycled water storage and distribution pumps will be located alongside the LWC.</p> <p>The recycled water supply and distribution network will be located throughout the Development area.</p> <p>The Development area may be described as follows:</p> <table border="1"> <thead> <tr> <th>Lot</th> <th>DP</th> </tr> </thead> <tbody> <tr><td>1-7</td><td>19585</td></tr> <tr><td>9-17</td><td>19585</td></tr> <tr><td>1</td><td>122205</td></tr> <tr><td>2</td><td>792836</td></tr> <tr><td>102</td><td>1037638</td></tr> <tr><td>1-2</td><td>810552</td></tr> <tr><td>1</td><td>713706</td></tr> <tr><td>1-2</td><td>930584</td></tr> <tr><td>1</td><td>104280</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Lot</th> <th>DP</th> </tr> </thead> <tbody> <tr><td>4</td><td>548406</td></tr> <tr><td>3</td><td>7130</td></tr> <tr><td>11-18</td><td>7130</td></tr> <tr><td>1</td><td>703858</td></tr> <tr><td>1</td><td>322641</td></tr> <tr><td>1</td><td>1205357</td></tr> <tr><td>2</td><td>550006</td></tr> <tr><td>1-2</td><td>982743</td></tr> <tr><td></td><td></td></tr> </tbody> </table> <p>RELEVANT APPENDICES</p> <ul style="list-style-type: none"> • Appendix 4.1.3(a) Scheme Lot and DP references • Appendix 4.2.1(b) Recycled Water Reticulation Masterplan • Appendix 4.2.1(c) LWC layout 	Lot	DP	1-7	19585	9-17	19585	1	122205	2	792836	102	1037638	1-2	810552	1	713706	1-2	930584	1	104280	Lot	DP	4	548406	3	7130	11-18	7130	1	703858	1	322641	1	1205357	2	550006	1-2	982743		
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4.2.4	<p>Describe any interconnections between the proposed non-potable water infrastructure and other infrastructure not part of this scheme (eg, interconnections with other licensed network operators or public utilities such as sewers or water mains). Identify in your description who is responsible for the construction, operation and maintenance of which infrastructure. Identify all interconnections with other infrastructure on the process flow diagram in Appendix 4.2.1 and the map in Appendix 4.2.3.</p>																																								

<p>Examples of interconnections may include potable water top up or trade waste disposal, as well as to other network operators.</p>	
<p><i>The response to this question will be used to ensure the correct area of operation is specified in the licence, if a licence is granted (Act s. 11(1)). The response will also be used as a context for the assessment of risks from the proposed scheme and to identify possible additional licence conditions relating to the inter-connected systems and responsibilities for risks.</i></p>	
<p>There are no permanent interconnections required between the proposed recycled water infrastructure and other infrastructure not part of this scheme.</p> <p>FSO will not be treating wastewater from outside the Scheme area under this licence application.</p> <p>Provision is made for the recycled water storage system to be topped up via an air-gap by FSO's own drinking water connection at the LWC.</p> <p>Before the LWC is built, commissioned and producing recycled water, the recycled water reticulation network will need to be charged with drinking water via temporary cross-connections to FSO's own drinking water reticulation network, complete with isolation valve, check valve and a removable spool piece. This spool piece will be removed once the recycled water storage tank top-up facility is commissioned and recycled water reticulation is connected to the LWC.</p> <p><u>The FSO recycled water infrastructure includes the recycled water meters on each lot. Following developer infrastructure works practical completion, FSO is responsible for the ownership, operation and maintenance of all recycled water estate reticulation in the street. Recycled water pipes owned by each Owners Corporation but operated and maintained by FSO, will transport recycled water from FSO's recycled water reticulation main in the street to the Customer Connection Point, which is the upstream face of the flange at the domestic recycled water booster pumps, usually located in the building basement. Each owners corporation will be responsible to own, operate and maintain its own recycled water infrastructure downstream of the connection point to the estate reticulation.</u></p>	
<p>RELEVANT APPENDICES</p> <ul style="list-style-type: none"> Appendix 4.2.4(a) Recycled Water Infrastructure Responsibilities 	
4.2.5	<p>Where applicable, describe the connection point to customers or end users (eg, the customer connection point may be a water meter). Identify in your description who is responsible for the construction, operation and maintenance of which infrastructure. Identify all customer and/or end user connections on the process flow diagram in Appendix 4.2.1 and the map in Appendix 4.2.3.</p>
<p><i>The response to this question will be used to ensure the correct area of operation is specified in the licence, if a licence is granted (Act s. 11(1)). The response will also be used as a context for the assessment of risks from the proposed scheme.</i></p>	
<p>FSO is responsible for the design, construction, operation and maintenance of all recycled water infrastructure within the LWC.</p> <p>The detailed design and construction of the recycled water infrastructure from the LWC up to but not including the recycled water meter inside each customer's allotment will be undertaken by the Developer. FSO will establish the masterplan and design standards and carry out detailed design review and inspection and testing of the constructed infrastructure prior to developer infrastructure works practical completion.</p> <p>The Developer will install the recycled water meters issued by Flow Systems inside each property. Flow Systems will retain ownership, operation and maintenance responsibility of these meters.</p>	

Following developer infrastructure works practical completion, FSO is responsible for the operation and maintenance of all recycled water estate reticulation in the street. Recycled water pipes owned by each Owners Corporation but operated and maintained by FSO, will transport recycled water from FSO's recycled water reticulation main in the street to the Customer Connection Point, which is the upstream face of the flange at the domestic recycled water booster pumps, usually located in the building basement. Each owners corporation will be responsible to own, operate and maintain its own horizontal and vertical recycled water infrastructure downstream of the connection point to the estate reticulation. NSW Fair Trading is responsible for inspection and review of the Developer's recycled water plumbing infrastructure.

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RELEVANT APPENDICES

- Appendix 4.1.1(a) Process Flow Diagram (Drinking Water)
- Appendix 4.2.1(a) Process Flow Diagram (Sewerage and Recycled Water)
- Appendix 4.2.1(b) Recycled Water Reticulation Masterplan

4.2.6 What volume of water is available from the proposed source? Where applicable, please provide the capacity of the source and the (allowable) average daily extraction rate from the source. If there is more than one source, please provide the requested information for each of the sources. **Where relevant, provide a copy of any agreements and/or licences to access the source water in Appendix 4.2.6.**

The response will also be used as a context for the assessment of the technical, organisational and financial capacity of the applicant corporation (Act s.10(4)(a)).

There are two likely sources for the recycled water, namely:

1) **Sewage** – This source can provide at ultimate development an average of 398 kL/day of raw sewage. The conversion of raw sewage to recycled water is approximately 75% when reverse osmosis is used.

3) **Drinking water** – As outlined above, the Initial Stages will be supplied by a drinking water connection into the recycled water reticulation network until recycled water becomes available. Once recycled water is being produced and supplied by the LWC, if recycled water demand exceeds the supply of raw sewage and prolonged use depletes the recycled water storages, then drinking water from FSO's own supply to the LWC will be used to supplement supply.

(NB: Recycled water will not be supplied until the infrastructure in Phase 3 is completed, existing lots are delivering sewage to the LWC and the LWC is commissioned and FSO has approval for commercial operation).

RELEVANT APPENDICES

- Appendix 4.1.1(b) Sydney Water Advice Letter and Notice of Requirements
- Appendix 4.1.6(a) Shepherds Bay Servicing Strategy
- Appendix 4.2.1(a) Process Flow Diagram (Sewerage and Recycled Water)

4.2.7 What volume of water will be treated by the scheme? Please provide the average and peak daily flow rates treated by the scheme.

This information will be used to determine the fee category for the scheme, if a licence is granted. The response to this question may be used to draft a proposed licence, if a licence is granted.

The Scheme will have the hydraulic capacity to treat average daily flows of up to 600kL/day but is expected to treat 449 kL/day of sewage on average at full development.

The catchment is expected to produce up to 950 kL/day on a peak day at full development. In relation to peak daily flow, however:

- The LWC flow balance tank will buffer flows

4.3 Sewerage infrastructure

Only provide a response to the questions in the following section if the applicant corporation is seeking a licence for the construction, maintenance and operation of sewerage infrastructure.

4.3.1	Describe the proposed sewerage infrastructure from the collection to disposal or reuse. Include in your description all of the sewerage infrastructure for which the applicant corporation is seeking a licence. This will include any infrastructure that is to be used for the collection, treatment, filtration, storage, conveyance or disposal of the sewerage or treated effluent. Provide a detailed process flow diagram of the proposed infrastructure from collection to disposal or reuse in Appendix 4.3.1.
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You must attach a process flow diagram in response to this question. The process flow diagram should only include the sewerage infrastructure where the scheme includes more than one type of infrastructure and must cover the process from source to end use. You may also include a piping and instrumentation diagram for additional information.

The response to this question will be used to draft a proposed licence. The response to this question is a requirement for any network operator's licence for sewerage infrastructure (Reg cl.6(2)(d)(iii)). The licence will specify the type of water industry infrastructure, if a licence is granted (Act s.6(1)(a)). The response will also be used to ensure you have applied for the correct licence(s) and as a context for our assessment of the applicant corporation's technical, organisational and financial capacity to undertake the activities for which you are seeking a licence (Act s.10(4)(a)).

The total Development sewerage infrastructure consists of:

- domestic pressure sewer pumping systems at each building in the Development
- pressure sewage reticulation system connecting each building to the LWC

Phase 1 – Until the LWC flow balance tank is constructed in Stage 2-3, the first buildings in the Development (Stage 2-3 and 4-5) will initially discharge their sewage into the Sydney Water sewerage system at their closest discharge point.

Phase 2 – There are two possible scenarios: Either the entire Development area will deliver sewage to the LWC's flow balance tank where peaks will be buffered and odour scrubbed before discharging into a single point of Sydney Water's sewerage system on Rothesay Avenue or flows will discharge to their closest discharge point into the Sydney Water sewerage system.

Phase 3 – Sewage collected from the Development will pass through the membrane bioreactor, disinfection and reverse osmosis treatment process units to be redistributed as recycled water for reuse within the Development area. The biological treatment capacity will ultimately be 600 kL/day. Any sewage not required to be treated to maintain the recycled water demand will bypass the LWC and be discharged to Sydney Water's sewerage system at a single discharge point on Rothesay Avenue.

FSO will own, operate and maintain the estate sewage collection reticulation infrastructure in the street. Pipes owned by the Owners Corporation but operated and maintained by FSO will transport sewage from the Customer Connection Points to FSO's sewage reticulation main inside the Development area and/or Sydney Water's sewage reticulation main outside the Development area as applicable under the relevant phase above.

The Developer will construct all sewerage pipework in the Development area as well as the tanks and plantroom that would house the proposed water recycling facility, all to FSO's specification and QA procedures. FSO will install and commission the mechanical and electrical equipment that forms the water recycling facility. FSO will own, operate and maintain the water recycling facility.

FSO seeks to licence all of the sewerage infrastructure which it proposes to own, operate or maintain.

RELEVANT SCHEDULES

- Appendix 4.2.1(a) Process Flow Diagram (Sewerage and Recycled Water)

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- Appendix 4.2.1(c) LWC Concept Layout
- Appendix 4.3.1(a) Process Flow Diagram (Interim Sewer)
- Appendix 4.3.1(b) Sewerage Reticulation Masterplan
- Appendix 4.3.4(a) Sewerage Infrastructure Responsibilities

4.3.2 Describe whether the infrastructure is existing infrastructure or is to be constructed. If the infrastructure is existing, please describe its current condition and operability. If the infrastructure is a mixture of existing and to be constructed **identify the infrastructure as existing or to be constructed on the process flow diagram in Appendix 4.3.1.**

The response to this question will be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).

All sewerage infrastructure under this licence application is to be constructed.

4.3.3 Describe the location of the proposed infrastructure. For example include:

- ▼ the identification of specific lot descriptors (eg, lot and DP numbers) for the collection, treatment, filtration and/or storage infrastructure
- ▼ the location of infrastructure for the conveyance and/or reticulation of sewage by street name, local government area or other description as appropriate to the size of the scheme.

Provide a map showing the location of the proposed infrastructure from source to end use in Appendix 4.3.3.

The map may include all water industry infrastructure (ie, drinking water, non-potable water and/or sewerage) where the scheme includes more than one type of infrastructure.

The response to this question is a requirement for any network operator's licence for sewerage infrastructure (Reg cl.6(2)(a)). The response to this question will be used to specify the authorised area of operations (Act s.11(1)), if a licence is granted. The response will also be used as a context for the assessment of environmental risks from the proposed scheme (Act s.10(4)(e), Reg cl.7).

The sewerage infrastructure described in 4.3.1 above is contained within the Development area as shown in the Sewerage Reticulation Masterplan.

The LWC is proposed to be located in the basement of Stage 3 of the Development, spanning lots 12,13 and 14 of deposited plan 7130.

The pressure sewer reticulation network will be located throughout the Development area.

The Development area may be described as follows:

Lot	DP	Lot	DP
1-7	19585	4	548406
9-17	19585	3	7130
1	122205	11-18	7130
2	792836	1	703858
102	1037638	1	322641
1-2	810552	1	1205357
1	713706	2	550006
1-2	930584	1-2	982743
1	104280		

RELEVANT APPENDICES	
<ul style="list-style-type: none"> Appendix 4.1.3(a) Scheme Lot and DP references Appendix 4.2.1(c) LWC Concept Layout Appendix 4.3.1(b) Sewerage Reticulation Masterplan 	
4.3.4	<p>Describe any interconnections between the proposed sewerage infrastructure and other infrastructure not part of this scheme (eg, interconnections with other licensed network operators or public utilities such as sewers). Identify in your description who is responsible for the construction, operation and maintenance of which infrastructure. Identify all interconnections with other infrastructure on the process flow diagram in Appendix 4.3.1 and the map in Appendix 4.3.3.</p> <p><i>The response to this question will be used to ensure the correct area of operation is specified in the licence, if a licence is granted (Act s.11(1)). The response will also be used as a context for the assessment of risks from the proposed scheme and to identify possible additional licence conditions relating to the inter-connected systems and responsibilities for risks.</i></p> <p>Phase 1 – Until the LWC flow balance tank is constructed in Stage 2-3, the first buildings in the Development (Stage 2-3 and 4-5) will initially discharge their sewage into the Sydney Water sewerage system at their closest discharge point.</p> <p>Phase 2 - There are two possible scenarios: Either the entire Development area will deliver sewage to the LWC's flow balance tank where peaks will be buffered and odour scrubbed before discharging into a single point of Sydney Water's sewerage system on Rothesay Avenue or flows will discharge to their closest discharge point into the Sydney Water sewerage system.</p> <p>Phase 3 – Sewage collected from the Development will pass through the membrane bioreactor, disinfection and reverse osmosis treatment process units to be redistributed as recycled water for reuse within the Development area. The biological treatment capacity will ultimately be 600 kL/day. Any sewage not required to be treated to maintain the recycled water demand will bypass the LWC and be discharged to Sydney Water's sewerage system at a single discharge point on Rothesay Avenue.</p> <p><u>FSO will own, operate and maintain the estate sewage collection reticulation infrastructure in the street. Pipes owned by the Owners Corporation but operated and maintained by FSO will transport sewage from the Customer Connection Points to FSO's sewage reticulation main inside the Development area and/or Sydney Water's sewage reticulation main outside the Development area as applicable under the relevant phase above.</u></p> <p><u>The Developer will construct all sewerage pipework in the Development area as well as the tanks and plantroom that would house the proposed water recycling facility, all to FSO's specification and QA procedures. FSO will install and commission the mechanical and electrical equipment that forms the water recycling facility. FSO will own, operate and maintain the water recycling facility.</u></p> <p>RELEVANT APPENDICES</p> <ul style="list-style-type: none"> Appendix 4.3.1(b) Sewerage Reticulation Masterplan Appendix 4.3.4(a) Sewerage Infrastructure Responsibilities
4.3.5	<p>What volume of sewage will be treated by the scheme? Please provide the average and peak daily (hydraulic and biological, where relevant) flow rates <u>treated by</u> the scheme.</p> <p><i>This information will be used to determine the fee category for the scheme, if a licence is granted. The response to this question may be used to draft a proposed licence, if a licence is granted.</i></p> <p>The maximum biological capacity treated by the scheme will be 600 kL/day at ultimate capacity.</p> <p>In relation to peak daily sewage flow rates:</p> <ul style="list-style-type: none"> The LWC flow balance tank will buffer flows

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