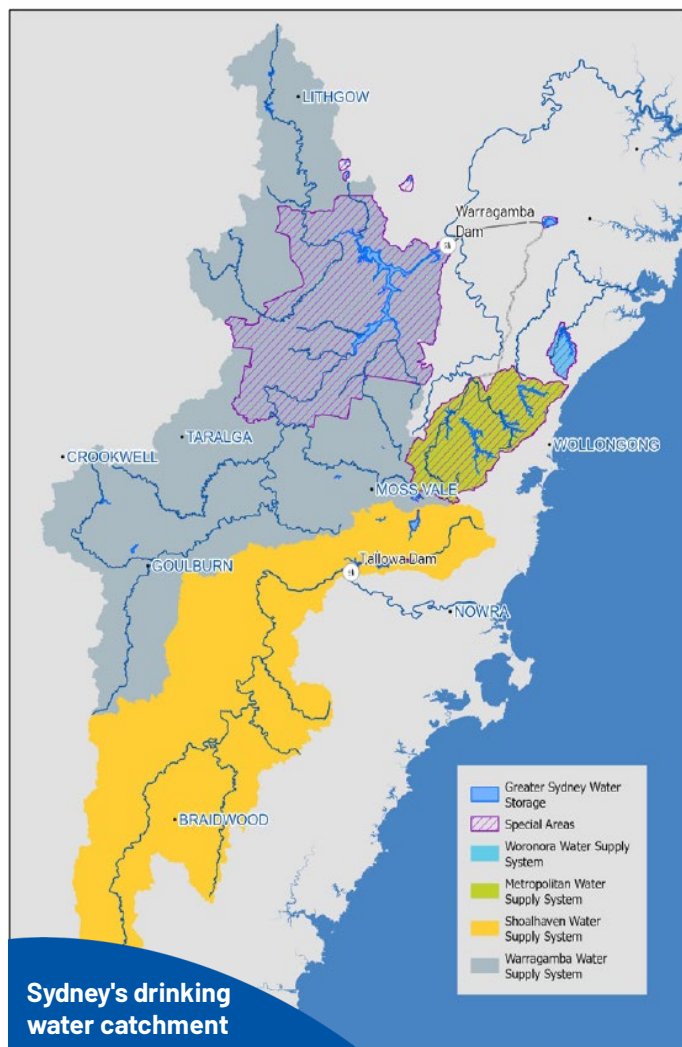


Sewage Treatment Plants in Sydney's Drinking Water Catchment

Background

Sewage Treatment Plants (STPs) are a significant point source of pollution. Where STPs are located within the Sydney Drinking Water Catchment, they need to be carefully managed to protect water quality, in accordance with requirements for a neutral or beneficial effect (NorBE) on water quality.



WaterNSW is a State-Owned Corporation and one of the main government agencies tasked with managing water in NSW. WaterNSW has a legislative responsibility "to protect and enhance the quality of water in the declared Sydney catchment areas" under the *Water NSW Act 2014*.

WaterNSW's Source Water Protection Strategy 2040 sets the vision, priorities, and goals for source water protection in Sydney's drinking water catchment (SDWC) over the next 20 years – [see WaterNSW's website](#) for more information.

Councils are the applicant (and often the determining authority) for new STPs and existing STP upgrades. STP projects can be considered as "development without consent" under the *State Environmental Planning Policy (Transport and Infrastructure) 2021*, "Integrated Development" under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act), or an activity requiring Part 5 approval under the EP&A Act.

Section 171A(3) of the Environmental Planning and Assessment Regulation 2021 outlines that when considering the likely environmental impact of an activity proposed to be carried out in the SDWC, the determining authority must consider whether the activity—

- i. will have a neutral or beneficial effect (NorBE) on water quality, and
- ii. is consistent with the NorBE Guideline within the meaning of *State Environmental Planning Policy (Biodiversity and Conservation) 2021*, Part 6.5.

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) are the approval authority for STP proposed works under section 60 of the *Local Government Act 1993*.

Demonstrating NorBE for STPs

WaterNSW understands and appreciates that Councils have the difficult task of demonstrating NorBE for new STPs and existing STP upgrades within the project constraints. Project constraints such as budget, treatment technology limitations, timeframes and increased wastewater loading due to population growth, limit the ability for Councils to meet NorBE requirements.

WaterNSW are working with DCCEEW to help local Councils in the SDWC to better understand what information is required at the different stages of STP projects to demonstrate the proposed works can achieve a NorBE on water quality.



Before you proceed, please confirm with WaterNSW and DCCEEW as to whether your STP project requires a detailed NorBE assessment. For example, the following may not require a NorBE assessment:

- STPs located outside of the Sydney drinking water catchment
- Changes to the STP where there is no increase in the volume of influent and discharges from the STP
- Minor changes/replacements to treatment technologies without affecting effluent discharge volumes and quality.

Councils are required to undertake the following for their STP projects within the SDWC:

- **Characterising existing STP effluent – for upgrades to existing STPs only**
- **Baseline monitoring of existing receiving water quality**
- **Characterising predicted STP effluent (including following upgrades for existing STPs)**
- **NorBE on water quality assessment – which should include outcomes from the above points (where relevant).**

Further details are provided in the following table.

The following should also be completed as part of the planning documentation prepared for the project (for example, the Review of Environmental Factors (REF) or Environmental Impact Statement (EIS)), which are also a consideration of the NorBE assessment:

- **Proposed monitoring program following completion of STP project** including location of proposed monitoring points upstream and downstream of the STP and discharge point(s) (where relevant), and pollutants to be monitored from predicted STP effluent quality
- **Management and/or transportation of biosolids** generated by the STP upgrade
- Details of how **construction soils and water** will be suitably managed, in accordance with Chapter 2 of NSW Landcom's *Soils and Construction: Managing Urban Stormwater(2004)*.

WaterNSW and DCCEEW are working to help local Councils in Sydney's Drinking Water Catchment better understand what information is required **to demonstrate** their new STP and existing STP upgrades can achieve **a NorBE on water quality**.

Visit our website for more information:



NorBE Requirement	Relevant projects	How will Council address this?	When should this be completed?
Characterisation of existing STP effluent	Upgrade to existing STP only	Characterisation of <u>existing</u> STP effluent from monitoring of treated effluent (including any licensed or overflow discharge point/s) over a 6–12 month¹ timeframe to understand the existing effluent quality for a range of pollutants Typically, pollutants should include those listed in any existing Environmental Protection Licence (EPL). This may include Biological Oxygen Demand (BOD), nitrogen, phosphorus, total suspended solids, oil and grease, faecal coliform and E.coli bacteria, and may also include metals and other pollutants depending on the type of treatment system and/or the wastewater quality being received by the STP (including any trade waste). Council should refer to the NSW Environment Protection Authority (EPA) Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au. Council may seek further advice from the EPA and/or WaterNSW to confirm pollutants and minimum time required for sampling prior to commencing this monitoring.	Council should refer to the EPA's Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au. Council may engage with the EPA and WaterNSW regarding the design of the monitoring plan (including pollutants to be monitored) to ensure a scientifically sound basis - prior to commencing this work (<i>prior to the options stage</i>). The characterisation should be completed <i>prior to any options study</i> to ensure NorBE requirements are considered at the options and design stages. Council should engage with their Regional Team within DCCEW for support <i>prior to the options stage</i>.
Adequate baseline monitoring of existing receiving water quality	Upgrades to existing STP New STP	Complete a water quality and flow monitoring program (with an expanded analyte range based on preliminary results from characterisation of the STP effluent) for: • upstream (background/reference) locations², unless a suitable WaterNSW monitoring site is identified • immediately upstream², unless a suitable WaterNSW monitoring site is identified • immediately downstream of discharge location(s)² • downstream receiving waterway (generally at the confluence). Council should refer to the EPA's Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au.	Confirmation of required pollutants to be monitored to be based on the EPA guidance and consultation with WaterNSW (and EPA if required) – <i>prior to monitoring commencing</i>. Council should undertake a minimum two (2) year sampling program, <i>commenced and completed prior to options stage</i> to

¹ Additional monitoring may be required depending on the weather/seasonal trends over the monitoring period.

² Where there is no existing STP, the upstream and downstream monitoring locations would be based on proposed STP outfall discharge location

NorBE Requirement	Relevant projects	How will Council address this?	When should this be completed?
		Council should undertake a minimum two (2) year sampling program, encompassing seasonal fluctuations. Flow monitoring should monitor base and storm flows to the receiving waterway, as well as any existing STP discharges.	inform Discharge Impact Assessment ³ , Review of Environmental Factors (REF) and design.
Characterisation of predicted STP effluent	Upgrades to existing STP New STP	Characterisation of proposed STP effluent (including following upgrades for existing STPs) to inform the sampling program for receiving waterways Predicted effluent quality should be provided for 50th, 90th and 100th percentile concentrations for BOD, nitrogen, phosphorus, total suspended solids, oil and grease, faecal coliform and E.coli bacteria, and may also include metals and other pollutants depending on the type of treatment system and/or the wastewater quality being received by the STP (including any trade waste).	Confirmation of required pollutants to be monitored based on the EPA guidance on conducting discharge impact assessments, and consultation with WaterNSW (and EPA if required) – <i>prior to monitoring commencing</i>. Treatment targets to be determined <i>at options stage</i>. Suitability of treatment process to be determined at <i>concept design or section 60 stage</i>.
Neutral or Beneficial Effect (NorBE) on water quality assessment	Upgrades to existing STP New STP	Undertake a NorBE water quality assessment for dry, average and wet weather conditions based on 50th and 90th percentile pollutant concentrations in effluent, including outcomes of the above Must include estimates and comparison of pollutant loads <u>and</u> concentrations for the following: <u>1.1. Pre-upgrade or baseline effluent quantity and quality estimated by:</u> a. For existing STP with licensed discharges:	As part of the REF process, and <i>prior to lodgement of a section 60 application</i> .

³ This may also be called a *Receiving water study, Pollution study, Environmental audit, Water quality investigation, Water pollution discharge assessment, Water pollution discharge impact assessment, or Water pollution impact assessment*.

NorBE Requirement	Relevant projects	How will Council address this?	When should this be completed?
		(i) Design Capacity: The design capacity of the pre-existing sewage treatment plant approved during the planning process - this should be known to council. For STPs that are operated above design capacity, this can be easily calculated using existing inflow data. (ii) Actual Mass Loads: The actual mass loads accurately measured at the STP when operating at and/or above design capacity flow rates. (iii) Water quality assessment of emergency/wet weather discharges including dates, locations, quality, frequency, volume and duration of discharges that have occurred from the existing STP (where applicable). b. For existing STP with no prior licensed discharges (i.e. effluent discharged to irrigation area/reuse): (i) Design Capacity: The design capacity of the pre-existing STP approved during the planning process - this should be known to council. For STPs that are operated above design capacity, this can be easily calculated using existing inflow data. (ii) Actual Mass Loads: The actual mass loads accurately measured at the STP when operating at and/or above design capacity flow rates. (iii) Water quality assessment of emergency/wet weather discharges including dates, location/s, quality, frequency, volume and duration of discharges that have occurred from the existing STP (where applicable). (iv) Accurate contour map of the effluent irrigation areas and soils data of the effluent irrigation area including: (1) adequate soil profiles over the irrigation areas, (2) current nutrient saturation levels, and (3) phosphorus absorption capacity of the soils. (v) Water balance for the existing effluent irrigation requirements. c. For new STP: Details of the number of unsewered dwellings, buildings, and areas (existing or future) anticipated to be connected to the new STP over the projected life of the STP – including effluent quality and quantity and performance of existing on-site systems. This can be based on council's on-site sewage management policy, approval to operate processes, and proposed new STP design type, and may combine qualitative and quantitative information. <u>1.2. Post-augmentation effluent quantity and quality</u> a. For proposed discharge to licensed discharge point within local waterway.	

NorBE Requirement	Relevant projects	How will Council address this?	When should this be completed?
		This refers to the <i>Characterisation of predicted STP effluent</i>(quality and quantity) above. <u>2. Detailed hydraulic and water quality modelling and assessment for dry, average and wet weather conditions including:</u> a. predictions for the potential risk of overflow of raw sewage from the failure of sewage treatment plant and emergency storage pond/s and sludge lagoons (if part of upgraded system design) during extended wet weather b. predictions for the risk of flood inundation of any elements of the STP and impacts on water quality, in particular inundation of any emergency storage pond c. predictions for volume and frequency of effluent (emergency and other) discharges, including untreated or partially treated wastewater releases at various locations d. predictions for changes to flows in the discharging water body e. impacts of effluent discharges on water quality during low, medium and high flows in the receiving water body, particularly of: (i) high effluent concentrations of pollutants (total suspended solids, BOD, TP, TN and pathogens) (ii) emergency discharges, and (iii) partially and primary treated effluent when wastewater flows exceed the capacity of the plant f. impacts on aquatic flora and fauna and geomorphology of the discharging water body. <u>3. How raw sewage and effluent will be managed when the volume exceeds the capacity of the plant</u> Examples include reviewing trade waste management to reduce trade waste impact, additional storages to divert flow, increased reuse, operational changes to the plant to reduce discharge etc. This should include potential water quality impacts for reuse/recycled water. Recycled water reuse is highly beneficial in reducing the discharge volume if managed appropriately. <u>4. Details of the management and/or transportation of biosolids generated by the STP project</u> Outline biosolids management and transport for the project in line with relevant guidelines such as:	

NorBE Requirement	Relevant projects	How will Council address this?	When should this be completed?
		- Environmental Guidelines: Use and Disposal of Biosolids Products (NSW EPA, 2000) - The Biosolids Order 2026 (NSW EPA, 2026) - The Biosolids Exemption 2026 (NSW EPA, 2026) - Applying compost and biosolids to land (NSW EPA, 2018) - NSW Biosolids Guideline Review (NSW Department of Planning and Environment, 2023) - Waste classification guidelines (NSW EPA, 2021). <u>5. For existing STPs, details of any decommissioning required for the existing treatment plant (if applicable)</u> This may include decommissioning of any existing treatment infrastructure and/or effluent irrigation areas including application of a 40 m buffer requirement for no additional effluent irrigation to be applied to existing saturated areas.	

Information Requirements

The requirements outlined in the table above should be undertaken by a suitably qualified and experienced professional, and may be addressed as follows:

Characterisation of existing STP effluent	Prior to commencing the characterisation study, a monitoring plan should be developed consistent with the project's initial planning documentation (such as REF or EIS) and should be in line with the EPA's Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au. The plan should demonstrate how the existing STP effluent quality and quantity will be determined. The plan should outline monitoring timeframes, list of analytes specific to the existing effluent quality (and may include analytes additional to those listed in an EPL), and sampling point locations. The results of the existing STP effluent monitoring program may be addressed in: • a section in the REF / EIS • a Discharge Impact Assessment⁴, and/or • a section in a NorBE Assessment Report. The report should also include monitoring data as an appendix.
Adequate baseline monitoring of existing receiving water quality	Prior to commencing baseline monitoring, a monitoring plan should be developed consistent with the project's initial planning documentation (such as REF or EIS) and should be in line with the EPA's Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au. The plan should outline how baseline monitoring will be undertaken, including monitoring timeframes, list of analytes specific to the existing (if relevant) and proposed effluent quality (and may include analytes additional to those listed in an EPL), and sampling point locations upstream and downstream of the existing and/or proposed STP discharge point. The results of the baseline monitoring program may be addressed in: • a section in the REF / EIS • a Discharge Impact Assessment⁴, and/or • a section in a NorBE Assessment Report. The report should also include monitoring data as an appendix.
Characterisation of predicted STP effluent	Characterisation of the predicted STP effluent quality and quantity may be addressed in one of the following reports and may be subject to verification from DCCEEW's Technical Assessment Team: • Concept Design Report or Options Study reflecting predicted targets • as a section in the REF / EIS • Discharge Impact Assessment⁴ • Effluent Irrigation Report, and/or • as a section in a NorBE Assessment Report.

⁴ This may also be called a *Receiving water study, Pollution study, Environmental audit, Water quality investigation, Water pollution discharge assessment, Water pollution discharge impact assessment, or Water pollution impact assessment*.

Neutral or Beneficial Effect (NorBE) on water quality assessment	Where there are gaps in the information required as outlined in the above table, Council should consult with WaterNSW regarding an appropriate way forward – prior to submission of their section 60 application. WaterNSW may advise Council and DCCEEW that the section 60 assessment can progress prior to the formal NorBE assessment being finalised, provided that Council has a good understanding of: - the water quality and volume of existing STP discharges (where relevant) - baseline water quality and flow data for the receiving waterway - the predicted STP effluent quality and volume after completion of the STP works, and - proposed measures to reduce impacts to receiving water quality. The NorBE Assessment may be incorporated in: - a section in the REF / EIS - a Discharge Impact Assessment⁴ - an Effluent Irrigation Report, and/or - a NorBE Assessment Report.
Proposed monitoring program following STP works	A monitoring program should be developed consistent with the project's initial planning documentation (such as REF or EIS) and should be in line with the EPA's Water Pollution Discharge Assessments guidance on their website at www.epa.nsw.gov.au. The program should include details of regular, ongoing monitoring for the life of the project and should include monitoring timeframes, list of analytes specific to the predicted STP effluent quality (and may include analytes additional to those listed in an EPL), and sampling point locations upstream and downstream of the proposed STP discharge point/s. The proposed monitoring program may be addressed in: - a section of the REF / EIS - an Environment Protection Licence (EPL) requirement - an Irrigation Monitoring Plan, and/or - an Operational Environmental Management Plan.
Management and/or transportation of biosolids	Details of the management and/or transportation of biosolids generated by the STP project should be addressed in: - a section of the REF / EIS - a Discharge Impact Assessment⁴ - an Effluent Irrigation Report - a NorBE Assessment Report - an Environment Protection Licence (EPL) requirement, and/or - an Operational Environmental Management Plan.
Construction soil and water management	Management of construction soils and water should be undertaken in accordance with Chapter 2 of NSW Landcom's <i>Soils and Construction: Managing Urban Stormwater</i>(2004) and may be addressed in: - a Soil and Water Management Plan - an Erosion and Sediment Control Plan - a Construction Management Plan - a section of the REF / EIS, and/or - a section of the NorBE Assessment.