Notice of Meeting

Water and Sewer Advisory Committee Meeting

A Water and Sewer Advisory Committee Meeting of Byron Shire Council will be held as follows:

Venue	Conference Room, Station Street, Mullumbimby
Date	Thursday, 16 November 2023
Time	9.00am

Phil Holloway Director Infrastructure Services

I2023/1776 Distributed 09/11/23



CONFLICT OF INTERESTS

What is a "Conflict of Interests" - A conflict of interests can be of two types:

Pecuniary - an interest that a person has in a matter because of a reasonable likelihood or expectation of appreciable financial gain or loss to the person or another person with whom the person is associated.

Non-pecuniary – a private or personal interest that a Council official has that does not amount to a pecuniary interest as defined in the Code of Conduct for Councillors (eg. A friendship, membership of an association, society or trade union or involvement or interest in an activity and may include an interest of a financial nature).

Remoteness – a person does not have a pecuniary interest in a matter if the interest is so remote or insignificant that it could not reasonably be regarded as likely to influence any decision the person might make in relation to a matter or if the interest is of a kind specified in the Code of Conduct for Councillors.

Who has a Pecuniary Interest? - a person has a pecuniary interest in a matter if the pecuniary interest is the interest of the person, or another person with whom the person is associated (see below).

Relatives, Partners - a person is taken to have a pecuniary interest in a matter if:

- The person's spouse or de facto partner or a relative of the person has a pecuniary interest in the matter, or
- The person, or a nominee, partners or employer of the person, is a member of a company or other body that has a pecuniary interest in the matter.

N.B. "Relative", in relation to a person means any of the following:

- (a) the parent, grandparent, brother, sister, uncle, aunt, nephew, niece, lineal descends or adopted child of the person or of the person's spouse;
- (b) the spouse or de facto partners of the person or of a person referred to in paragraph (a)

No Interest in the Matter - however, a person is not taken to have a pecuniary interest in a matter:

- If the person is unaware of the relevant pecuniary interest of the spouse, de facto partner, relative or company or other body, or
- Just because the person is a member of, or is employed by, the Council.
- Just because the person is a member of, or a delegate of the Council to, a company or other body that has a pecuniary interest in the matter provided that the person has no beneficial interest in any shares of the company or body.

Disclosure and participation in meetings

- A Councillor or a member of a Council Committee who has a pecuniary interest in any matter with which the Council is concerned and who is present at a meeting of the Council or Committee at which the matter is being considered must disclose the nature of the interest to the meeting as soon as practicable.
- The Councillor or member must not be present at, or in sight of, the meeting of the Council or Committee:
 - (a) at any time during which the matter is being considered or discussed by the Council or Committee, or

(b) at any time during which the Council or Committee is voting on any question in relation to the matter.

No Knowledge - a person does not breach this Clause if the person did not know and could not reasonably be expected to have known that the matter under consideration at the meeting was a matter in which he or she had a pecuniary interest.

Non-pecuniary Interests - Must be disclosed in meetings.

There are a broad range of options available for managing conflicts & the option chosen will depend on an assessment of the circumstances of the matter, the nature of the interest and the significance of the issue being dealt with. Non-pecuniary conflicts of interests must be dealt with in at least one of the following ways:

- It may be appropriate that no action be taken where the potential for conflict is minimal. However, Councillors should consider providing an explanation of why they consider a conflict does not exist.
- Limit involvement if practical (eg. Participate in discussion but not in decision making or viceversa). Care needs to be taken when exercising this option.
- Remove the source of the conflict (eg. Relinquishing or divesting the personal interest that creates the conflict)
- Have no involvement by absenting yourself from and not taking part in any debate or voting on the issue as of the provisions in the Code of Conduct (particularly if you have a significant non-pecuniary interest)

Committee members are reminded that they should declare and manage all conflicts of interest in respect of any matter on this Agenda, in accordance with the <u>Code of Conduct</u>.

RECORDING OF VOTING ON PLANNING MATTERS

Clause 375A of the Local Government Act 1993 – Recording of voting on planning matters

- (1) In this section, **planning decision** means a decision made in the exercise of a function of a council under the Environmental Planning and Assessment Act 1979:
 - (a) including a decision relating to a development application, an environmental planning instrument, a development control plan or a development contribution plan under that Act, but
 - (b) not including the making of an order under that Act.
- (2) The general manager is required to keep a register containing, for each planning decision made at a meeting of the council or a council committee, the names of the councillors who supported the decision and the names of any councillors who opposed (or are taken to have opposed) the decision.
- (3) For the purpose of maintaining the register, a division is required to be called whenever a motion for a planning decision is put at a meeting of the council or a council committee.
- (4) Each decision recorded in the register is to be described in the register or identified in a manner that enables the description to be obtained from another publicly available document and is to include the information required by the regulations.
- (5) This section extends to a meeting that is closed to the public.

OATH AND AFFIRMATION FOR COUNCILLORS

Councillors are reminded of the oath of office or affirmation of office made at or before their first meeting of the council in accordance with Clause 233A of the Local Government Act 1993. This includes undertaking the duties of the office of councillor in the best interests of the people of Byron Shire and the Byron Shire Council and faithfully and impartially carrying out the functions, powers, authorities and discretions vested under the Act or any other Act to the best of one's ability and judgment.

BUSINESS OF MEETING

1. APOLOGIES

2. DECLARATIONS OF INTEREST - PECUNIARY AND NON-PECUNIARY

3. ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

4. STAFF REPORTS

Infrastructure Services

4.1	Utilities Operational Plan Report	. 13
4.2	Ocean Shores STP Transfer to Bruns Valley Workshop Presentation	. 45

5. LATE REPORTS

6. FOR INFORMATION ONLY

6.1	Byron STP Condition 9 Additional Load - Quarterly Report	133
6.2	Mullumbimby Inflow and Infiltration	137

ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

Report No. 3.1	Adoption of Minutes from Previous Meeting
Directorate:	Infrastructure Services
File No:	12023/1717

RECOMMENDATION:

10 That the minutes of the Water and Sewer Advisory Committee Meeting held on 17 August 2023 be confirmed.

Attachments:

15

5

1 Minutes 17/08/2023 Water and Sewer Advisory Committee, I2023/1205 , page 8 $\frac{1}{2}$

ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

Report

The attachment to this report provides the minutes of the Water and Sewer Advisory Committee Meeting of 17 August 2023 .

5

Report to Council

The minutes were reported to Council on 28 September 2023.

<u>Comments</u>

10

In accordance with the Committee Recommendations, Council resolved the following:

23-420 Resolved

That Council notes the minutes of the Water and Sewer Advisory Committee Meeting held on 17 August 2023.

Minutes of Meeting Water and Sewer Advisory Committee Meeting

Venue	Conference Room, Station Street, Mullumbimby
Date	Thursday, 17 August 2023
Time	4.30pm



3.1 - ATTACHMENT 1

BYRON SHIRE COUNCIL

WATER AND SEWER ADVISORY COMMITTEE MEETING MINUTES 17 AUGUST 2023

Minutes of the Water and Sewer Advisory Committee Meeting held on Thursday, 17 August 2023

File No: 12023/1205

PRESENT: Cr M Lyon, Cr S Ndiaye, Cr D Dey, Cr C Coorey

Staff: Phil Holloway (Director Infrastructure Services)

Cameron Clark (Manager Utilities)

Kimberley van Soest (Minute Taker)

Community: Ben Fawcett, David Fligelman, Elia Hauge, Bruce Clarke

Guest member: Robyn Campbell (Hydrosphere Consulting)

Cr Lyon (Chair) opened the meeting at 4:38pm and acknowledged that the meeting was being held on Bundjalung Country.

ATTENDANCE VIA AUDIO-VISUAL LINK:

Cr C Coorey

APOLOGIES:

There were no apologies.

DECLARATIONS OF INTEREST – PECUNIARY AND NON-PECUNIARY

Committee member Ben Fawcett declared a possible non-pecuniary interest in Report 4.1. The nature of the interest being that his residence is in close proximity to Laverty's Gap and the WTP.

Committee member David Fligelman declared a possible non-pecuniary interest in Report 4.1. The nature of the interest being that his consulting company, TYR Group is currently engaged in development of a potable reuse investigation study for Rous County Council

WSAC Water and Sewer Advisory Committee Meeting

page 3

3.1 - ATTACHMENT 1

BYRON SHIRE COUNCIL

WATER AND SEWER ADVISORY COMMITTEE MEETING MINUTES 17 AUGUST 2023

ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

Report No. 3.1Adoption of Minutes from Previous MeetingFile No:I2023/1168

Committee Recommendation:

That the minutes of the Water and Sewer Advisory Committee Meeting held on 15 June 2023 be confirmed. (Clarke/Dey)

The recommendation was put to the vote and declared carried unanimously

BUSINESS ARISING FROM PREVIOUS MINUTES

There was no business arising from previous minutes.

STAFF REPORTS - INFRASTRUCTURE SERVICES

 Report No. 4.1
 Integrated Water Cycle Management and Strategic Business Plan

 File No:
 12023/1179

Committee Recommendation:

That Council:

- 1. Notes that updating its Integrated Water Cycle Management Strategy is no longer required by DPE;
- 2. Notes that it can opt-in now or later, to the newly adopted (2022) DPE *regulatory and assurance framework* in order to seek state funding (of which there is none currently available); and
- 3. Notes the work in progress in assessment of the gaps between Council's current strategic planning status and the requirements of the new framework, and receive an update on the outcomes when they become available.

(Hauge/Fligelman)

Cr Ndiaye entered meeting at 4:52pm and regained Chair.

The recommendation was put to the vote and declared carried unanimously

Guest Robyn Campbell left meeting at 5:58pm.

WSAC Water and Sewer Advisory Committee Meeting

page 4

ADOPTION OF MINUTES FROM PREVIOUS MEETINGS

3.1 - ATTACHMENT 1

BYRON SHIRE COUNCIL

WATER AND SEWER ADVISORY COMMITTEE MEETING MINUTES 17 AUGUST 2023

Report No. 4.2Utilities Operational Plan ReportFile No:I2023/1189

Committee Recommendation:

That the Committee notes the Utilities Operational Plan Report. (Lyon/Fawcett)

The recommendation was put to the vote and declared carried.

There being no further business the meeting concluded at 6:28pm.

WSAC Water and Sewer Advisory Committee Meeting

page 5

STAFF REPORTS - INFRASTRUCTURE SERVICES

STAFF REPORTS - INFRASTRUCTURE SERVICES

Report No. 4.1	Utilities Operational Plan Report
Directorate:	Infrastructure Services
Report Author:	Cameron Clark, Manager Works
File No:	12023/1588

Summary:

This report summaries the performance of Utilities Department delivery for August – October 2023

10

5

RECOMMENDATION:

That the committee notes the report.

15

Report

DRINKING WATER QUALITY

In August 2023 there were zero (0) critical limit exceedances at Mullumbimby WTP.

20 In September 2023 there was one (1) critical limit exceedances at Mullumbimby WTP, as detailed in the table below

In October 2023 there were zero (0) critical limit exceedances at Mullumbimby WTP.

STAFF REPORTS - INFRASTRUCTURE SERVICES

				Mullumbimby Drinking Water - Critical Control Point - Quality Compliance						
	//	Shire Council						12 M	onths to Oct 2023	
	• • 6	Mor.		CCP 1 Raw Water Intake	CCP 2 WT	P Filtration	CCP 3 WTP Disinfection	CCP 4 Re	eservoirs	
				Turbidity	Filter1 - Turbidity	Filter2- Turbidity	Free Chlorine	Free C Left Bank Reservoir - Free Chlorine	hlorine Azalea Street Reservoir - Free Chlorine	
		Number	Exceedances	0	3	3	2	1	0	
	Num	ber of San	ples in Period	365	365	365	365	49	50	
E	F Exce	Percentage edance of	of Samples in Licence Limits	0.0%	0.8%	0.8%	0.5%	2.0%	0.0%	
Sec	5			Exc	eedances of Drinki	ng Water MS Critic	al Limits			
of Exceedanc	3 - 2 -									
Number	1 - 0 -				, , , , , , , , , , , , , , , , , , , ,					
		Nov 22	Dec 22	Jan 23 Feb 23	Mar23 Apr23	3 May 23 Ju	n 23 Jul 23	Aug 23 Sep 23	Oct 23	
		CCP 1 Raw	Water Intake Tu	urbidity	Filter1 - Turbidit	y	Filter2	Filter2- Turbidity		
	■ CCP 3 WTP Disinfection Free Chlorine			Left Bank Reserv	oir - Free Chlorine	Azalea	Street Reservoir - Free	e Chlorine		

From: WaterOutlook > Reports > Special > MONTHLY UTILITIES REPORTS > UTILITIES REPORT - Mullumbimby Drinking Water Quality

CRITICAL LIMIT EXCEEDANCES Mullumbimby Drinking Water Supply Critical Control Points (CCPs) 12 Months to April 2023									
Date Occurred	Description Description and Cause of Issue Action Taken to Remedy Action Take ed Situation Reoco								
5/1/23 to 6/1/23	Turbidity Exceedance ' Filter 1 & 2 (3 exceedance s)	Rainfall event on the 5 Jan 2023 raised the Turbidity in plant process between 6 and 7 Jan 2023 (Filter 1 exceeded on one day and Filter 2 exceeded on both days, see plots below). The finished water on both days had Turbidity of < 0.75 NTU which is within acceptable limits, therefore no impact on supply.	Jar testing and Chemical dosing corrections undertaken throughout. Treated water returned to < 0.23 NTU by 8 Jan 2023.	Continued monitoring of raw water turbidity and filter turbidity.					
11/1/23 – 15/1/23	Chlorine Residual at Left Bank Reservoir = 0.19mg/L	Free Chlorine Residual result during weekly sample collection and testing on 11 Jan 2023 was found to be 0.19mg/L at Left Bank Reservoir outlet. The cause of this issue was	The other Reservoir in Mullumbimby had filled then Left Bank Reservoir inlet valve was returned to normal operations. This happened on 15 Jan 2023. During this fill 44% of the volume was filled	When Reservoirs are isolated. Check Chlorine trends and if trending downwards dose with sodium hypo to keep level within our set					

STAFF REPORTS - INFRASTRUCTURE SERVICES

		the Reservoir filling had been isolated since 6th Jan 2023. During this time of no fresh water entering the Reservoir and the high ambient temperatures the chlorine residual slowly trended lower.	with fresh filtered chlorinated water from the water treatment plant. After this Left Bank Reservoir Free Chlorine Residual was sampled as 0.75mg/L on 18 Jan 2023	parameters.
14/6/23 & 15/6/23	Turbidity Exceedance ' Filter 1 = 0.54 MTU & 0.94 NTU	Inline turbidity Instrument on Filter 1 found to be reading incorrectly on the 14/6/23.	The instrument was calibrated on 15/6/23 and readings returned to within operational limits.	Maintain regular calibration schedule of instruments and continue daily reads.
29/6/23	Chlorine Residual at CCP3 = 0.83mg/L	Issue with dosing system	SCADA alarm alerted operator who was able to rectify in a timely manner.	
12/7/23	Chlorine Residual at CCP3 = 0.93mg/L	Low Chlorine reading was due to inline instrument problem. As a safeguard the plant was stopped automatically when the low value was recorded. When the plant was attended, onsite test showed Chlorine reading was 1.55 mg/L free and 1.82 mg/L Total, well within guideline values.	Inline instrument maintenance undertaken to rectify underread.	Continued Maintenance on Inline Instruments and continual monitoring of SCADA alarms. Fail safe Plant stop trigger points in place for Chlorine and Turbidity.
14/9/23	Turbidity Exceedance ' Filter 2 = 0.83 NTU	Inline Turbidity Instrument on Filter No 2 found to be reading incorrectly (0.83 NTU) on the 14/9/23. Calibrated on the 15/9/23 and found to be reading correctly again. Finished water on this day 14/9/23 0.08 NTU Turbidity on combined Filters Out.	Continual Monitoring	Continual monitoring & planned maintenance

Public Health Reportable Events

There were no water quality reportable events in August, September or October 2023.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Shire Water Consumption



From: WaterOutlook > Reports > Special > MONTHLY UTILITIES REPORTS > UTILITIES REPORT - Water Usage and STP Inflows Summary

STP INFLOWS

5



From: WaterOutlook > Reports > Special > MONTHLY UTILITIES REPORTS > UTILITIES REPORT - Water Usage and STP Inflows Summary

10 STP Performance

There were zero (0) STP licence 100 percentile limit exceedances in August, September or October 2023.

4.1

STAFF REPORTS - INFRASTRUCTURE SERVICES

			ST	STP Licence Limit Exceedances (Treated Water Quality) - Last 12 Months								
	Byon strine Cal			yron Ba	y STP	Brunswick STP	Valley	Bangalow	STP	Ocean Shores STP	ALL S	ct 2023 TPs
1	00% Percen	tile Exceedance	es		0		1		0	4	1	5
	90% Percen	tile Exceedan	es		0		0		0		1	1
		Το	al		0		1		0	:	5	6
N	lumber of S	amples in Peri	bd		208		187		178	18	7	760
E	Percenta xceedance	ige of Samples of Licence Lin	in its	0.0%			0.5%		0.0%	2.1%	6	0.7%
2 Number of Exceedances 0	Nov 22	Exce	23	Feb 23	P Licent Mar 2	Apr 23	, May 2	ers - 100th F	Jul 23	Aug 23 Sep	23 Oct 23	
	Byron Bay STP Brunswick Valley STP Bangalow STP Ocean Shores STP											

STP 100 th PERCENTILE LICENCE LIMIT EXCEEDENCES								
(TREATED WATER QUALITY)								
		12 Months to	May 2023					
Date Occurred	Description	Description and Cause of Issue	Action Taken to Remedy Situation	Action Taken to Prevent Reoccurrence				
Byron Bay STP								
		No Exceedances						
		Bangalow	STP					
		No Exceedances						
Brunswick Valley STP								
15/02/23	Faecal Coliform Exceedance 'EPA 1' of	Exceedance was caused by a high rainfall event over 14th and 15 th February. Hi inflows resulted in bypass of the UV	Outflow was retested until FC had dropped to an acceptable level meeting License). This was	Monitor FC testing results and reduce inflow and infiltration into the				

STAFF REPORTS - INFRASTRUCTURE SERVICES

	3750 cfu /100 ml	system.	achieved by 20/02/2023.	system.						
	Ocean Shores STP									
4/1/23	Faecal Coliform Exceedance 'EPA 3' of 950 cfu /100 ml	Cleaning of wetlands combined with heavy rainfall caused flow of debris to hinder effectiveness of UV.	Operators cleaned UV and tested FC levels continuously until license compliance achieved.	Ensure regular cleaning of Wetlands channel and cleaning of UV Tubes to prevent recurrence.						
15/2/23	Faecal Coliform Exceedance 'EPA 3' of 1120 cfu /100 ml	15 February 2023 a high FC count was tested at EPA 3. This was due to a High rainfall event on 14th and 15th February.	Retesting was done until FC count met License. This was achieved by 20/02/23.	Monitor FC results. Reduce Inflow Infiltration into system.						
1/3/23	Faecal Coliform Exceedance 'EPA 3' of 4700 cfu /100 ml	Investigation determined that organic material from the wetland cell is washing through the UV during high flow periods.	A resample was conducted on 17/3/2023 and the result came back at 130cfu which is within normal operating range.	UV to be cleaned regularly to limit the organic material building up in the unit also monitoring of the water quality going through the wetland.						
15/3/23	Faecal Coliform Exceedance 'EPA 3' of 730 cfu /100 ml	Investigation determined that organic material from the wetland cell is washing through the UV during high flow periods.	A resample was conducted on 17/3/2023 and the result came back at 130cfu which is within normal operating range.	UV to be cleaned regularly to limit the organic material building up in the unit also monitoring of the water quality going through the wetland.						

EPA Reportable Events

There were zero (0) EPA reportable incidents during August, September or October 2023.

STAFF REPORTS - INFRASTRUCTURE SERVICES

TREATED EFFLUENT & REUSE WATER MANAGEMENT SYSTEMS

Byron Bay treated effluent water balance

Below is a basic water-balance model of Byron Bay effluent management systems, which
include the Byron Bay STP, the Byron Bay Urban Recycled Water Scheme (BBURWS),
and the Byron Bay Integrated Water Management Reserve (BBIWMR).



A numerical model has been developed to better understand the water-balance dynamics of the site. It is fed with monitoring data (EPA points, STP site reuse, rainfall). It estimates

10 the evapotranspiration output (i.e. environmental effluent reuse) at the BBIWMR. Remaining knowledge gaps in the model include groundwater infiltration in the BBIWMR. EPA 6 flows will be included in the model once the Additional Flow Path system is commissioned.

Total effluent reuse includes urban reuse (EPA 5 flows), STP site reuse and evapotranspiration at the BBIWMR site.

Updated results from the abovementioned model are shown below:

15

STAFF REPORTS - INFRASTRUCTURE SERVICES







<u>4.1</u>

STAFF REPORTS - INFRASTRUCTURE SERVICES



August / September Key observations:

5

- Rain appears to be a substantial driver for water flows into and out of the effluent management systems. Rainfall over the winter period (June-August) has reduced compared to previous months.
- During winter, monitored flow data shows a decrease in STP inflows (EPA 2) and effluent discharge to the Union Drain (EPA 4). Urban recycled water demand has increased (EPA 5). Modelled environmental reuse (evapotranspiration) decreased (possibly in response to shorter light periods).
- On average, approx. 22% of STP inflows are reused per day. However, variability is high, with reuse ranging from approx. 5% to 73% per day. This variability is attributed to rainfall, variable climate and seasonal patterns.
 - It is estimated that effluent reuse represents 26% (approx. 1ML/day) of ADWF inflows to the STP.
- 15 There is untapped reuse potential at the 24 ha site (approx. 500 kL/day). This system is in the process of being reactivated.
 - If 24 ha reuse site is reactivated, it is estimated that reuse could be increased to an average of 39% (approx. 1.5 ML/day) if ADWF inflows to the STP.

October Key observations:

- 20 Tyagarah bushfire impacts:
 - Supply to the 24ha irrigation site (EPA3) was activated in October 17th to reduce impact of bushfire (and subsequent peat fires). A daily average of 1.8 ML has been supplied.

STAFF REPORTS - INFRASTRUCTURE SERVICES

- The increase in reuse at the 24ha has seen a sharp decline in effluent discharge into the drain system (EPA4).
- Rain appears to be a substantial driver for water flows into and out of the effluent management systems.
- 5 2023, particularly the second half of the year, has seen a decrease in rainfall, triggering an increase in urban reuse demand, and a more stable dry-weather discharge trend into the drainage network (EPA4).
 - Since October 2022, an average of 23% of STP inflows are reused per day.
 However, variability is high, with reuse ranging from approx. 5% to 64% per day.
 This variability is attributed to rainfall, variable climate and seasonal patterns, which in turn affect demand from urban and environmental uses.
 - It is estimated that effluent reuse represents 29% (approx. 1.15 ML/day) of ADWF inflows to the STP.
 - There is untapped reuse potential at the 24 ha site (approx. 500 kL/day). This system is in the process of being reactivated.
 - If 24 ha reuse site is reactivated, it is estimated that reuse could be increased to an average of 42% (approx. 1.68 ML/day) of ADWF inflows to the STP.

Byron Wetlands Water Quality

10

15

The data below shows the assimilative and polishing capacity of Byron Wetlands for August to October 2023.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Byron Wetlands Nutrient Removal - August 2023 to October 2023										
		To	tal Nitrogen (mg	g/L)			Tota	l Phosphorus (m	ng/L)	
	EPA P1 Inlet	EPA P3 Mid	EPA P4 Outlet	Reduction	Total Nitrogen	EPA P1 Inlet	EPA P3 Mid	EPA P4 Outlet	Reduction	Total
		point		Target	Reduction		point		Target	Phosphorus
Statistics										Reduction
Average	4.11	2.11	0.78		81%	0.13	0.18	0.15		-16%
Geomean	1.93	1.53	0.75	40-55%	61%	0.12	0.17	0.11	40-60%	9%
Median	1.21	1.04	0.68		44%	0.10	0.19	0.10		0%

Note: Average nutrients removals figures from:

https://www.researchgate.net/publication/6717563_Removal_of_Nutrients_in_Various_Types_of_Constructed_Wetlands 1-"Removal of total nitrogen in studied types of constructed wetlands varied between 40 and 55%"





The assimilative and polishing capacity is demonstrated by the nutrient reduction trend between EPA1 and EPA 4 for nitrogen and phosphorus concentrations as follows:

• **Total Nitrogen** - an average reduction of between 44-81% is seen between EPA1

5 and EPA4. This is significantly better than that seen in the literature of around 40-55%

• **Total Phosphorus** - an average decrease of -16% and 9% is seen between EPA1 and EPA4. The increased phosphorus levels at EPA 4 (Wetland Outlet) occur at the end of October 2023. This reduction in the effectiveness of the wetland in phosphorus removal is undoubtedly the impact of the recent bushfire and associated activity at the Wetlands site.

10 Wetlands Operation

Water levels in the wetlands have remained lower throughout the BBIWMR due to the sustained low rainfall.

The outlets of Cell F and G have remained closed and minimum flows directed to Cells F and G to sustain the water levels for the DPI Salvinia trial. Further sampling as part of the Salvinia management trial has been conducted. Results of laboratory analysis of Salvinia samples show higher levels of Nitrogen at the top of the Cell. Indicating that the Salvinia is supporting nutrient removal function in the Cells F and G.

Periodically additional tope of flows are released into Cells F and G to support the Jacanas present at the top of Cell H.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Cells D and E have been opened and higher water levels are now evident this has resulted in reestablishment of water lilies in Cell D and high levels of bird activity.

Monthly inspections were not conducted due to fire activity commencing on the weekend of 14/15 October.

5 Fire has impacted on the Frog and Grass Owl habitat to the west and north of the STP and extensively through the Melaleuca regeneration area (see photos below). There has been significant impact to the effluent irrigation system.

The recycled water was used to assist in fire suppression. Additional recycled water lines were installed to support fire fighting activities in conjunction with NPWS and RFS.



10

24ha Melaleuca regeneration area

There was not significant impact of the fire on the treatment wetland cells with fire just entering the western side of Cell H (see photo below).



15 Northern End of Cell H

STAFF REPORTS - INFRASTRUCTURE SERVICES

Further release of weevils in the southern drain was undertaken with Shane Austin and DPI (See photos below).



Shane Austin and the weevil release site adjacent to EPA 4

5 The assessment of the function and condition of the southern drain has been commenced See photos below. Clearing of access to critical infrastructure has been completed by Martin Tolley and Shane Austin. Further clearing of vegetation along the southern drain alignment is required.

Water quality performance of the wetlands has been good buy higher nitrogen levels have been recorded at EPA 1 this results in higher loading of the treatment system.

Works have been undertaken to enhance the flow of water into Cells I and J. Excavation of accumulated materials and installation of crushed rock.

Biosolids Management

Volumes Distributed

15 The table below shows the total biosolids removed from the STP sites and applied to land for the last 12 months to October 2023. There have been no recent movements due to the current dry weather.

	Nov 22	Dec 22	Jan 23	Feb 23	Mar 23	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Total
Byron Bay STP	519	239	376	-	360	323	452	-	-	-	131	-	2,400
Brunswick Valley STP	376	-	-	-	295	-	-	-	-	117	45	-	833
Bangalow STP	60	30	-	-	60	-	-	71	24	-	-	-	245
Ocean Shores STP	233	131	-	120	71	104	-	117	-	45	30	-	851
Total Biosolids (cu. metres)	1,188	400	376	120	786	427	452	188	24	162	206		4,328

From: WaterOutlook > Reports > Special > MONTHLY UTILITIES REPORTS > UTILITIES REPORT - Biosolids Movements

STAFF REPORTS - INFRASTRUCTURE SERVICES

Biosolids Contamination Grading

The allowable uses for Biosolids are detailed in the following extract from the NSW EPA Guidelines: Use and Disposal of Biosolids Products (2020).

Classification of Biosolids Products						
		Minimum Qual	ity Grades			
Biosolids Classification	Allowable Land Application Use	Contaminant	Stabilisation			
		Grade	Grade			
	i) Home lawns and gardens.					
	ii) Public contact sites.					
	iii) Urban landscaping.					
Uprostricted Use	iv) Agriculture.	٨				
omesticieu ose	v) Forestry.	~	~			
	vi) Soil and site rehabilitation.					
	vii) Landfill disposal.					
	viii)Surface land disposal (2).					
	i) Public contact sites.					
	ii) Urban landscaping.					
	iii) Agriculture.					
Restricted Use 1	iv) Forestry.	В	A			
	v) Soil and site rehabilitation.					
	vi) Landfill disposal.					
	vii) Surface land disposal(2).					
	i) Agriculture.					
	ii) Forestry.					
Restricted Use 2	Soil and site rehabilitation.	С	В			
	iv) Landfill disposal.					
	v) Surface land disposal2.					
	i) Forestry.					
Restricted Use 3	Soil and site rehabilitation.	D	в			
hebinded obe o	iv) Landfill disposal.	5	5			
	iv) Surface land disposal2					
Not Suitable For Lise	i) Landfill disposal.	F (1)	C(1)			
Not Suitable FOI Use	ii) Surface land disposal2.	L (1)	0(1)			

(1) Biosolids products which are not contaminant or stabilisation graded are automatically classified Not Suitable For Use.
 (2) To be applied within the boundaries of sewage treatment plant site.

5

STAFF REPORTS - INFRASTRUCTURE SERVICES

The contamination grading results for each STP for the last 3 months are detailed below:

Bang	alow S	STP Bi	osolid	s			Byron	Bay S	TP Bios	olids			
EPA	EPA	EPA	EPA				EPA	EPA	EPA	EPA			
Guideline	Guideline	Guideline	Guideline				Guideline s Grade	s Grade	s Grade	Guideline s Grade			
s Grade	s Grade R	s Grade	s Grade	Enter First Batch Numbe	25	26	A	B	C	D	Enter First Batch Numb	36	37
(ma/ka)	(ma/ka)	(ma/ka)	(ma/ka)	Date	6/06/2023	11/09/2023	(ma/ka)	(ma/ka)	(ma/ka)	(ma/ka)	Date	6/06/2023	11/09/2023
20	20	20	30	Arsenic	3.831	3.292	20	20	20	30	Arsenic	10.970	8.796
3	5	20	32	Cadmium	2.360	2.474	3	5	20	32	Cadmium	2.490	2.912
100	250	500	600	Chromium	19.097	17.329	100	250	500	600	Chromium	40.564	37.133
100	375	2000	2000	Copper	441.879	422.134	100	375	2000	2000	Copper	381.115	390.127
150	150	420	500	Lead	17.770	15.202	150	150	420	500	Lead	12.180	12.266
1	4	15	19	Mercury	1.258	0.855	1	4	15	19	Mercury	0.535	0.404
60	125	270	300	Nickel	18.501	15.975	60	125	270	300	Nickel	25.396	22.965
5	8	50	90	Selenium	4,463	4,738	5	8	50	90	Selenium	4.288	5.577
200	700	2500	3500	Zinc	764.899	680,905	200	700	2500	3500	Zinc	716.389	737.581
0.5	0.5	1	1	pp-DDE	0.010	0.010	0.5	0.5	1	1	pp-DDE	0.010	0.010
0.5	0.5	1	1	pp-DDD	0.010	0.010	0.5	0.5	1	1	pp-DDD	0.010	0.010
0.5	0.5	1	1	pp-DDT	0.010	0.010	0.5	0.5	1	1	pp-DDT	0.010	0.010
0.02	0.2	0.5	1	Aldrin	0.010	0.010	0.02	0.2	0.5	1	Aldrin	0.010	0.010
0.02	0.2	0.5	1	Dieldrin	0.024	0.028	0.02	0.2	0.5	1	Dieldrin	0.070	0.084
0.02	0.2	0.5	1	trans-Chlordane	0.010	0.010	0.02	0.2	0.5	1	trans-Chlordane	0.010	0.010
0.02	0.2	0.5	1	cis-Chlordane	0.010	0.010	0.02	0.2	0.5	1	cis-Chlordane	0.010	0.010
0.02	0.2	0.5	1	Heptachlor	0.010	0.010	0.02	0.2	0.5	1	Heptachlor	0.010	0.010
0.02	0.2	0.5	1	нсв	0.010	0.010	0.02	0.2	0.5	1	НСВ	0.010	0.010
0.02	0.2	0.5	1	gamma_BHC (Lindane)	0.010	0.010	0.02	0.2	0.5	1	gamma-BHC (Lindane)	0.010	0.010
0.02	0.2	0.5	1	alnha_BHC	0.010	0.010	0.02	0.2	0.5	1	alpha-BHC	0.010	0.010
0.02	0.2	0.5	1	heta-BHC	0.010	0.010	0.02	0.2	0.5	1	beta-BHC	0.010	0.010
0.02	0.2	0.5	1	delta-BHC	0.010	0.010	0.02	0.2	0.5	1	delta-BHC	0.010	0.010
0.1	0.3	1	1	Total PCB's	0.010	0.010	0.1	0.3	1	1	Total PCB's	0.187	0.185
		C	Overall C	ontamination Grade	C	C			0	verall Co	ntamination Grade	С	С

Druns	SWICK	valley	SIPE	siosolius			Ocea	n Shoi	res ST	P Bios	olids		
EPA Guideline s Grade A	EPA Guideline s Grade B	EPA Guideline s Grade C	EPA Guideline s Grade D	Enter First Batch Num	23	24	EPA Guideline s Grade A	EPA Guideline s Grade B	EPA Guideline s Grade C	EPA Guideline s Grade D	NOTE: There is an issu	20	2'
(ma/ka)	(ma/ka)	(ma/ka)	(ma/ka)	Date	6/06/2023	11/09/2023	(ma/ka)	(ma/ka)	(ma/ka)	(ma/ka)	Date	6/06/2023	11/09/2023
20	20	20	30	Arsenic	11.389	6.675	20	20	20	30	Arsenic	7.787	7.690
3	5	20	32	Cadmium	2.890	2.274	3	5	20	32	Cadmium	1.532	1.407
100	250	500	600	Chromium	43.205	35.411	100	250	500	600	Chromium	17.848	19.773
100	375	2000	2000	Copper	278.045	226.274	100	375	2000	2000	Copper	279.789	321.297
150	150	420	500	Lead	31.664	18.817	150	150	420	500	Lead	11.115	12.94
1	4	15	19	Mercury	1.827	1.156	1	4	15	19	Mercury	0.539	0.539
60	125	270	300	Nickel	32.754	23.629	60	125	270	300	Nickel	17.417	16.995
5	8	50	90	Selenium	5.247	5.159	5	8	50	90	Selenium	5.092	5.931
200	700	2500	3500	Zinc	897.804	693.402	200	700	2500	3500	Zinc	797.483	808.167
0.5	0.5	1	1	pp-DDE	0.010	0.010	0.5	0.5	1	1	pp-DDE	0.010	0.010
0.5	0.5	1	1	pp-DDD	0.010	0.010	0.5	0.5	1	1	pp-DDD	0.010	0.010
0.5	0.5	1	1	pp-DDT	0.010	0.010	0.5	0.5	1	1	pp-DDT	0.010	0.010
0.02	0.2	0.5	1	Aldrin	0.010	0.010	0.02	0.2	0.5	1	Aldrin	0.010	0.010
0.02	0.2	0.5	1	Dieldrin	0.207	0.193	0.02	0.2	0.5	1	Dieldrin	0.050	0.068
0.02	0.2	0.5	1	trans-Chlordane	0.013	0.013	0.02	0.2	0.5	1	trans-Chlordane	0.016	0.032
0.02	0.2	0.5	1	cis-Chlordane	0.010	0.010	0.02	0.2	0.5	1	cis-Chlordane	0.013	0.013
0.02	0.2	0.5	1	Heptachlor	0.010	0.010	0.02	0.2	0.5	1	Heptachlor	0.010	0.010
0.02	0.2	0.5	1	HCB	0.010	0.010	0.02	0.2	0.5	1	НСВ	0.010	0.010
0.02	0.2	0.5	1	gamma-BHC (Lindane)	0.010	0.010	0.02	0.2	0.5	1	gamma-BHC (Lindane)	0.010	0.010
0.02	0.2	0.5	1	alpha-BHC	0.010	0.010	0.02	0.2	0.5	1	alpha-BHC	0.010	0.010
0.02	0.2	0.5	1	beta-BHC	0.010	0.010	0.02	0.2	0.5	1	beta-BHC	0.010	0.010
0.02	0.2	0.5	1	delta-BHC	0.010	0.010	0.02	0.2	0.5	1	delta-BHC	0.010	0.010
0.1	0.3	1	1	Total PCB's	0.100	0.100	0.1	0.3	1	1	Total PCB's	0.100	0.100
		0	erall Co	ntamination Grade	С	В			Ove	erall Con	tamination Grade	С	С

Brunswick Vallev STP Biosolids

STAFF REPORTS - INFRASTRUCTURE SERVICES

Recycled Water Management Strategy

Update on project progress:

Cost-benefit assessment of future options for effluent reused is being undertaken.

DEVELOPMENT APPLICATIONS

5 ET Assessments

Category	Overdue	Due in 7 days 📕	Due in 7+ days 🗖
Development Application	26	2	8

The graph below illustrates the ET assessment profile from October 2022 to October 2023. In October 2023, the systems planning team required an average of 55.4 days to complete ET assessments.



10

Overview

Assessments are being completed based on a priority list sent by planning staff each week.

- 13 ET assessments were finalised this month (October 2023).
- 14 referrals are currently on hold due to requested additional information from planners/applicants.

15

STAFF REPORTS - INFRASTRUCTURE SERVICES

ASSET MAINTENANCE SYSTEM ROLLOUT

Project Status – Assetic Rollout

- 1. Utilities are a significant way through the rollout of the new maintenance management software Assetic.
- 5 a. Four teams (Water Reticulation, Electrical Maintenance, Operational Treatment and Mechanical Treatment) are now live in this system and using it to manage all planned and reactive maintenance tasks.
 - b. The Rates team are now using the Assetic maintenance system to manage property meter changes (installs and removals) as well as special meter reads.
- 10 c. The next and final team to be brought onto Assetic is the Sewer Operations. This team's planned maintenance tasks and schedule are currently being reviewed and updated, in conjunction with being developed in Assetic. Training and rollout of final team is planned to be end of November to December 2023.
 - d. Based on feedback from the Mechanical Treatment team, their Planned Maintenance checklists have been reviewed and amended to capture maintenance data that reflects the Assets more accurately.
 - 2. Monthly reporting is now being developed in two streams:
 - a. For team leaders, who are managing workloads, personalised dashboards have been created within Assetic to manage their team's work for example:



15

<u>4.1</u>

III Work Orders for Treatment Systems with Status before COMP						
Work Order ID	T	Work Order Status	T	Work Order Brief Description	Work Order Creation Tir	
W0133		TCOMP		PM W-TREA-WTP-Instrument Service- 12M	27/01/2023 8:02 PM	
W0134		INPRG		PM W-TREA-WTP-Chemical Dosing Plant Inspection-6M	27/01/2023 8:02 PM	
W0135		INPRG		PM W-TREA-WTP-Control Room Inspection-6M	03/02/2023 8:03 PM	
W0136		INPRG		PM W-TREA-WTP-Sand Filter Inspection-6M	04/02/2023 8:02 PM	
W04202		INPRG		PM W-TREA-WTP-Sand Filter #2 Media Inspect/Replace-3Y	18/02/2023 8:03 PM	
				DMANA TOPA MITO ON A PINAS AI		

STAFF REPORTS - INFRASTRUCTURE SERVICES

 b. For Asset Management purposes high level reports have been developed in Power BI. Currently these reports are in a Power BI desktop report however, these will be published to the IS Utilities Workspace for access via the web. Currently BSC IT team and Assetic are developing the integration to allow a live link to Assetic. The following status reports are a sample of these reports.

Assetic Improvements

5

The Assetic team are working on improvements to streamline the system for field users from feedback requests. Recent improvements include:

10 1. Simplification of the meter installation/replacement assessment form for bulk installations. There is now an additional Assessment form and simplified process for these cases.

2. In the field App users had to open an allocated work order to identify which sewer pump station the WO was associated with.

15 3. Improvements in Search Profiles for dashboards to help team leaders monitor work. This work is ongoing, the team can continue to set up dashboard searches as requested.

4. Overview report of Planned Maintenance report (similar to Water Outlook report). A link to this Power BI report has been sent to team leaders.

Addition of Resource Recovery assets. Hence maintenance hours spent by Utilities
 team on these assets can now be captured.

6. Addition of a virtual asset (ID: 22222222). Hence maintenance hours spent by Utilities team on non-utilities assets not in Assetic can now be captured.

25 Improvements in the pipeline

STAFF REPORTS - INFRASTRUCTURE SERVICES

1. Plant Diary

There is no facility in Assetic to do a daily diary – we are looking at options to facilitate this.

- 2. Toolbox meeting records
- 5

We currently have this in WaterOutlook – we are looking at options to get this in a more user-friendly format.

Maintenance Reporting in Power BI

Higher level reporting for management purposes is currently being developed in Power BI. This is for the following reasons:

- Power BI has reporting and data analytics capabilities far in advance of Assetic.
- Integration with Power BI is part of a wider project to develop integrations with a variety of software to develop a single 'portal' where the team can access data from a wide variety of platforms. At this stage the plan is to include the Utilities Digital Asset Management Plan (DAMP), summary water quality data and energy efficient reporting.
- Currently BSC IT team is developing the infrastructure to have a live integration between Assetic and Power BI. Live reporting should be in place by January 2024.

Examples of the Asset Maintenance reporting being developed in Power BI are included in the following section.

PLANNED & REACTIVE ASSET MAINTENANCE

- From this point forward we are going to report on maintenance status from the Assetic system via Reporting in Power BI. Reports such as these will be available online via the IS Utilities Workspace, in the near future.
 - 2. As we collect more data and the final team comes onboard, we will be able to develop more detailed performance indicators and identify insights. At this stage we are just including some interesting summaries, in future trends will be able to be identified and performance monitored against KPIs.

Maintenance Hours

3. **Figure 1** shows the manhours by team for the last 6 months and the breakdown between planned and reactive maintenance as well as time worked on non-Utilities assets. Ultimately, we will be able to show the trend between planned and reactive maintenance over time.

10

15

20

4.1

STAFF REPORTS - INFRASTRUCTURE SERVICES

Figure 1 – Planned and Reactive Maintenance Breakdown

Planned v Reactive Tasks - Last 3 Months 17.9% 81.9% Water Reticulation BYRO 99.2% SHIRF COUNCIL nical Mainte 40.3% 57.7% Electrical Maintenan 55.4% 44.6% 20% 40% 60% 80% 1009 Manhours (%) Non-Utilities Asset Planned Reactive Maintenance Manhours - Last 3 Months Water Reticulation 229.3 1047.0 1,278.3 314.8 317.2 reatment Syste Mechanical Maintenanc 122.1 175.0 303.1 76.5 61.5 138.0 Electrical Maintenance 200 400 600 800 1,000 1,200 Select Data Period 8/1/2023 10/31/2023 О

Figures 2 & 3 shows the breakdown of manhours by asset class by team since March 2023. However, a data drill-down can be performed to undertake this analysis by individual asset when more data is available (for example Figure 3 shows the reactive manhours for reservoirs ranked highest to lowest.

5 Figure 2 – Maintenance Manhours by Asset Class



Maintenance Manhours by Asset Type

STAFF REPORTS - INFRASTRUCTURE SERVICES

Figure 3 – Ranked Reactive Maintenance Manhours for Reservoirs since March 2023



Maintenance Manhours by Asset Type

From a maintenance management perspective, we have reports set up which show overdue Planned Maintenance tasks by team. (Note: Water Reticulation team has been hit with the mains flushing tasks coming around again).

Figure 4 – Current Status Planned Maintenance

Total	218	100.00%				
Overdue	29	13.30%				
On Schedule	189	86.70%				
WorkOrder Status	Total Number	Percent of Total Number				
Electrical Maintenance						

Treatment Systems

WorkOrder Status	Total Number	Percent of Total Number
On Schedule	178	75.42%
Overdue	58	24.58%
Total	236	100.00%

Mechanical Maintenance (Treatment)

WorkOrder Status	Total Number	Percent of Total Number
On Schedule	49	72.06%
Overdue	19	27.94%
Total	68	100.00%

Water Reticulation

WorkOrder Status	Total Number	Percent of Total Number
Overdue	214	38.35%
On Schedule	344	61.65%
Total	558	100.00%

5

STAFF REPORTS - INFRASTRUCTURE SERVICES

General Asset Management Improvements

Utilities Digital Asset Management Plan (DAMP):

- Presentation for internal Utilities staff occurred on 04/10/2023.
- Presentation at Managers meeting occurred on 25/10/2023.
- Presentation for E.T meeting to be held on 01/11/2023.

Sewer Vacuum Pods:

• Assessment data has been loaded into Authority[™], GIS and Predictor[™]. Sustainability Workbank Backlog model has been adjusted accordingly.

Water Reservoirs:

- Full assessment scope has been developed for the 4-yearly internal water reservoir inspections.
- Quote should be received shortly from specialised contractors.

Sewer Pump Stations:

- New Stainless-Steel labels have been fitted to all Sewer Pump Stations.
- Meeting with Xylem to discuss Concertor pump audit set for 02/11/2023.

Sewer Manholes:

• All treatments ever applied to manhole assets currently being updated by Willow and Sparrow. This data will then be loaded into the Authority™ register.

Flood Damage:

- Wilsons Creek Weir Slip Repair Concept designs provided to BSC for comment. REF progressing. Proposed access costs exceed budget allocation for project. Repair options and access options to be further developed and reviewed.PW to make contact with private land holders regarding possible modifications to access track. Current access track was tested in a 4WD successfully.
- Ocean Shores STP Options Report Resilience project to be confirmed. Limited funds might restrict to design only. Proposal requested from WRM for the design and documentation for the inlet works upgrades. Currently awaiting response from BSC
- Mullum Water Mains Extension Proposed realignment of mainline due to upcoming roadworks in Fern St. If the realignment is approved it would trigger additional landowner consent, additional surveying and service locating. Council to provide confirmation in September.
- Water Mains Replacement (Kolora Way) Concept design and REF engaged. Route realignment occurring to avoid Coastal Wetlands. Additional investigations ongoing. Issue to market as D&C by October
- Villages Pressure Sewer Systems Post site inspections and working on the project technical spec for inclusion in the tender documents indicated an external flood switch may not be the most effective solution. Seeking advice and clarification from Aquatec that the existing run time alarm can be configured to do the flood switching.
- SPS Switchboards and Access Survey of boards has occurred. Review of eligible boards underway. 1% AEP plus 0.5m RLs being identified and confirmed. Endorsement scheduled for October.
- **Standby Power/Generators –** Analysis of eligible SPS boards and critical Assets will allow for final scoping.
- River/Flood level warning systems Council has elected to deliver this project. Costs to be confirmed.

STAFF REPORTS - INFRASTRUCTURE SERVICES

- SCADA/Remote Access Review Confirm current level of Council's Assets. Perform gap analysis to define scope against minimum flood resilience requirements for levels of Asset criticality. Scoping report commenced. Audit into Councils previously received microwave backbone system is underway.
- I & I Issues/Sew Modelling Claim form and Council managed project documentation has been sent to Council for review and input.
- Review Critical Equipment and Major Spares Inventory Scope defined. Endorsement received in June 2023.
- Electrical Grid Review (OSSTP) Outcome feeds into Standby Power/Generators Flood project. Final report received and endorsed. Report recommends permanent Genset to be installed at STP.

CAPITAL WORKS

TOUCHSTONE ENEGINEERING - Byron Shire Bioenergy Facility Project

Council Utilities staff and HWL Ebsworth have completed the Public Private Partnership (PPP) "Initial Assessment" submission to the NSW Office of Local Government (OLG). It was presented to the GM, DIS, Executive Officer, Manager Finance and Manager Utilities on August 10, 2023. The draft application is still presently under review by the Council Executive Officer and is expected to be completed hopefully during the first week of November.

An OLG Initial Assessment (approval) is intended to allow Council to pursue the option to seek private equity financing for the D&C and O&M of the facility. Council expected to submit in August 2023 its NSW OLG PPP Initial Assessment.

The Council Grants Coordinator and the Bioenergy Facility Project Manager completed the Stage 1 EOI application for grant funding from the Commonwealth "Growing Regions Program Round 1", which replaces the now-cancelled BBRF Round 6 Grant Fund. The Commonwealth is expected to announce the Stage 1 EOI results in October 2023.

One additional Commonwealth grant stream is expected in 2023 and might be potential funding sources for the BEF project. The Department of Infrastructure, Transport, Regional Development, Communications and the Arts new "Regional Precincts and Partnerships Program," which has not yet been announced; that funding stream shall be reviewed and considered when more detailed information is available.

Either of these two grant funding streams, should they be successful, could be put to offsetting the debt borrowing and private equity needs of a PPP delivery model.

5

STAFF REPORTS - INFRASTRUCTURE SERVICES

WILLOW AND SPARROW

SPS Renewals for Byron, Mullum, Ocean Shores & Bangalow

SPS	% COMPLETE	PUMPS DELIVERED	SWITCH- BOARD DELIVERED	COMPLETED SCOPE SUMMARY
SPS 1002	10	N/A	Quoted	Cast new switchboard pad (1830x1600x200), install new 3x 63mm electrical conduits and new 16mm mains onto pumps, replace switchboard install 2x gateway for pump mounted VSD. Make good old switchboard plinth and penetrations into well and valve chamber.
SPS 1005	100	N/A	N/A	Remove existing broken sealed surface and re-asphalt access road
SPS 1007	10	N/A	Quoted	Install bypass connection and MH. Remove pumps, Guide rails and lifting chains in preparation for coating, allow for EPOXY time. Remove ladder. Add spindle (SS316) on inlet valve. Replace risers in PE 125 and replace lifting chains in SS. Remove existing switchboard and concrete plinths including combined odour vent pole and plinth. Install new switchboard on new concrete pad (1960x1600x200). 3x63mm conduit 16mm electric main. Penos with 2 parts mega poxy (5-10mm). Replace odour with ground mount McBerns filter, try use same vent pipe. Relocate water service. Fix padlock cover on lid.
STAFF REPORTS - INFRASTRUCTURE SERVICES

SPS 2002	0	N/A	N/A	Replace risers PE125 through to the valve chamber, no need for valves. New Spindle on SS316
SPS 2004	100	N/A	N/A	Replace existing DN150 gate valve in the 2002 rising main on outside of well
SPS 2010	10	N/A	Quoted	Replace risers PE180, DN150 outlet gate valves, check valves, Gibault and flanged spigot. Install new Switchboard pad (1600x1600x200) including 3 x 63mm electrical conduits and penos, install new board facing south. Install new 16mm electric mains to green boy approx. 120m away. Water Service Relocation.
SPS 3004	25	N/A	N/A	Install bypass connection and MH. Remove and reinstate pumps, Guide rails and lifting chains as required for coating. Epoxy coat wet well and cover slab.
SPS 3010	10	N/A	N/A	Replace risers PE125 from elbow on wet well to valve pit, DN150 outlet gate valves, check valves. DN150 inlet gate valve and Spindle to be checked when doing service, relocate water service.
SPS 3017	100	N/A	N/A	Replace inlet gate valve, refurbish inlet pipe penetration
SPS 3021	10	N/A	Quoted	Replace DN125 risers, DN100 outlet gate valves, check valves, DN150 inlet gate valve, replace guide rails and brackets, relocate water service, remove vent pole and replace with McBerns odour filter, remove switchboard plinth and replace

STAFF REPORTS - INFRASTRUCTURE SERVICES

				switchboard.		
SPS 4007	N/A	N/A	N/A	Removed from scope		
SPS 5003	N/A	N/A	N/A	Removed from scope		
SPS 5014	10	N/A	Quoted	Cast new 600x600x200 switchboard plinth, install new 3x63mm conduits to pump well, removing existing conduits and grout. Possibly remove and make good part of the fence. Install new electrical mains from green boy to board, install new switchboard and commission with electricians.		
SPS 5017	10	N/A	Quoted	Replace DN125 risers, DN100 outlet gate valves, check valves and dismantling joints, DN150 inlet gate valve and spindle, remove switchboard plinth and replace switchboard on new elevated hardstand approximately 1m above wet well height. Replace vent pole with odour filter on new slab and run new conduits to suite. Relocate water service.		
SPS 5020	10	N/A	N/A	Supply and install 2 x new DN125 PE riser pipes through to the valve chamber, new gate valves and check valves, Gibault and flanged spigots. New gate valve DN150 on incoming gravity sewer. New slab for switchboard (3120x1000x200). Apply bitumen coat on spigot. Remove Ladder.		
SPS 5022	10	N/A	Quoted	Supply and install new switchboard conduits 3 x 63mm to new concrete platform. Remove existing switchboard and concrete plinths and install new		

STAFF REPORTS - INFRASTRUCTURE SERVICES

		switchboard on new platforms. Design of
		new platform to be per previous flood
		platforms, length 2600 by 1200mm wide.
		Relocate water service. New Covers, grill
		and frames sealed for odour control.
		Modify existing plinth to suit new ground
		mount odour filter.

Willow and Sparrow - Condition Assessments – FY22/23

The condition assessment of gravity sewer mains and maintenance holes was awarded to Willow and Sparrow (Maintenance holes) and Subsurface Mapping Solutions (Mains). The Maintenance hole condition assessments are underway. The CCTV mains contract was awarded to Subsurface Mapping Solutions and work was completed by June 30. The

5 awarded to Subsurface Mapping Solutions and work was completed by June 30. The sewer catchments that fall within this scope are across Bangalow, Byron Bay, Mullumbimby, and Ocean Shores. The indicative budgetary limit of \$300,000 has covered the costs for both CCTV assessments and MH visual assessments. Condition assessment reports for mains are complete and reports for MH's are now being finalised.



10

15

Willow and Sparrow - Condition Assessments – FY23/24

The condition assessment of gravity sewer mains and maintenance holes was awarded to Willow and Sparrow (Maintenance holes) and Subsurface Mapping Solutions (Mains). The Maintenance hole condition assessments are underway. The CCTV mains contract was awarded to Subsurface Mapping Solutions and work has commenced. The sewer catchments that fall within this scope are across Brunswick Heads, Suffolk Park, Byron Bay, Mullumbimby, and Ocean Shores. The indicative budgetary limit of \$350,000 will cover the costs for both CCTV assessments, MH visual assessments and condition assessment reporting.

STAFF REPORTS - INFRASTRUCTURE SERVICES



Gravity Sewer Mains Capital Works Inventory – FY23/24

Willow and Sparrow has been engaged to collect and collate data for all previously renewed/rectified sewer gravity mains in the Byron Shire. This will update council's asset management systems and streamline the planning process for future capital works programs. The projected budget is \$11,000. This work is nearing completion.

PLANIT CONSULTING

Water Main Replacements – Supply and Installation: Fletcher St, Carlyle St and Bangalow Rd Byron Bay; and Azalea St Mullumbimby

10 Work accomplished in the period:

- Works along Carlye Street commenced on the 18th of September 2023;
- HDD of Cowper St was completed last week;
- Approximately 220m of pipe has been laid to date;
- Unknown services picked up by contractor onsite (i.e., Redundant 100mm AC main) – The IFC design alignment is currently being investigated to avoid clash;
- The remaining water reticulation line (i.e., Carlyle Street, Cowper Street intersection and Massinger Street roundabout) are planned to be completed November; and
- Planit are acting as Superintendent and working closely with CivilCS (Contractor) to finalise the project for BSC.

15

20

STAFF REPORTS - INFRASTRUCTURE SERVICES





Reservoir Roof Replacement Works

Work accomplished in the period:

- No works were undertaken in this period.
- The project is currently in the post completion period.
- Planit are working with the Contractor to close out the remaining minor items.
 - Planit are working with Council staff to monitor the works and ensure any defects are rectified by the contractor as required.

Water Reservoir Slope Stability Works – Byron Bay and Ocean Shores

Work accomplished in the period:

- Warner Company commenced retaining wall works in September.
 - Remaining retaining wall and perimeter fence replacement works planned for early October.
 - Contract close-out and defects liability period to follow.

STAFF REPORTS - INFRASTRUCTURE SERVICES



Warrambool Reservoir - Completed Shotcrete Slope (view from Northern end)



Warrambool Reservoir – Retaining wall works underway along southern boundary.

5 Byron STP inlet works remediation.

Work accomplished in the period:

- The project is currently in the defect's liability period.
- Planit are working with Council staff to monitor the works and ensure any defects are rectified by the contractor as required.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Mullumbimby Trunk Water Main (Detailed Design)

Work accomplished in the period:

 Minor design changes have been made at the Azalea Street Reservoir site to have the proposed booster pump station located at the outlet of the Azalea Street
 Reservoir. This change allows for easier delineation of assets and metering if Rous County Council are to take over ownership of the DN400 trunk main (between the Pacific Motorway & Azalea Street Reservoir) in the future. We note that this was requested by RCC.

o Elite Aqua (booster pump specialist) has been consulted for the provision of
 booster pump sizing and design at the Azalea Street Reservoir site. They will be assisting the detailed design by providing a peer review and pump selection advice.

Liaison with Byron Shire Council & NSW Public Works determined that the pipeline crossing of Mullumbimby Creek, which was agreed to be strapped to the existing Azalea Street Bridge structure on the downstream side of the bridge. Planit
 Consulting and SSE (Salu Structural Engineering) met on site to discuss the available fixture options prior to SSE undertaking their design. The final structural engineering design drawings will form part of the detailed design package.

 Following additional input from Byron Bay Surveying, NSW Public Works, Byron Shire Council and APA Group, minor changes to the proposed trunk main alignment
 was determined to be necessary to avoid clashes and conflicts. Consequently, additional potholing has been requested from Byron Bay Surveying to further confirm the location and depth of existing services.

 Additional to the above, to avoid the root systems of significant trees on Jubilee Avenue, Planit Consulting amended the design alignment to sit beneath the existing road box and within a school drop off zone at Mullumbimby High. Proposed pipe installation methods for these sections will consist primarily of under boring to avoid major disturbances to traffic and reinstatement activities caused as a result of trenching.

The ASSMP Report is currently being finalised by ENV Solutions and has a new expected delivery date of Friday the 3rd of November. The ASSMP will show the results of soil sampling at five (5) locations along the proposed trunk main alignment and recommend the treatment of Acid Sulfate Soils in areas of the proposed alignment.

 Whilst undertaking the detailed design, Planit Consulting is marking and quantifying the trees and vegetation that will be affected for use in the basis of the updated Review of Environmental Factors and Biodiversity Assessment.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Additional Flow Path

Work accomplished in the period:

• Project finalised and closed; no updates to provide.

Byron STP Aerator platform upgrade

5 Work accomplished in the period:

• Project finalised and closed; no updates to provide.

10

<<Type text here>>

15

<u>4.1</u>

STAFF REPORTS - INFRASTRUCTURE SERVICES

Report No. 4.2	Ocean Shores STP Transfer to Bruns Valley Workshop Presentation				
Directorate:	Infrastructure Services				
Report Author:	Cameron Clark, Manager Works				
File No:	12023/1753				

Summary:

5

20

The purpose of this presentation is to discuss the following in relation to strategic infrastructure planning options for Ocean Shores and Brunswick Valley STP's.

- Study options
- 10 Discuss decision (MCA) criteria
 - Gain committee insights
 - Discuss preferred option and;
 - Way forward

15 **Background:**

At its Ordinary Meeting on 28 October 2021, Byron Sire Council resolved [21-451] to:

- Proceed to detailed design for infrastructure to transfer sewage flows from Ocean Shores STP to Brunswick Valley STP for:
 - a. All current and projected flows to Ocean Shores STP (for the purpose of temporary closure for repairs and flows more than wet weather capacity), and
 - b. With facility to continue to discharge an adjustable proportion of the flows to Ocean Shores STP (up to ~100% of current sewage flows) on an ongoing basis.
- Investigate options for upgrades to Ocean Shores STP to rectify its prevailing condition, configuration, and redundancy issues, and to improve its efficiency and reliability. The capacity of the upgraded plant would not be required to be increased through the upgrades and may be marginally reduced where cost effective to do so.
- Investigate options (including options with no Balancing Pond) for upgrades to Brunswick STP to rectify any prevailing issues (particularly in UV disinfection), and

4.2

STAFF REPORTS - INFRASTRUCTURE SERVICES

as required to accommodate the fraction of loads which cannot be reliably treated at the upgraded Ocean Shores STP.

5

Report

The OSSTP currently has a number of issues that impact on its safe and reliable operation with a view to protecting the environment and Council staff responsible for running and maintaining the plant.

10 It is a relatively old plant (~27 years old) and operates under an older environmental licence, which the NSW EPA has flagged is due for updating (most likely before 2029 and with tighter limits on effluent quality).

In particular, the ability of the plant to treat peak wet weather flows of more than three times average dry weather flow (ADWF) (and actually up to ~11 times design ADWF) is

- 15 severely limited by the process configuration and existing equipment. Components of the plant (including aerator supports, decant mechanism, UV disinfection system, chemical storage and dosing systems, electrical switchgear, control systems, biosolids handling/ dewatering system, sludge lagoons) urgently need attention to avoid the plant potentially failing, either in terms of process treatment capacity or OHS&E requirements (including safety of staff and protection of the environment).
 - The inability of the plant to adequately treat dry weather flows and loads during peak seasonal periods (e.g., around Christmas/ New Year or Easter holidays) has been demonstrated in recent years (e.g., by effluent ammonia exceeding license requirements for river discharge).
- 25 The BVSTP is a newer plant (~12 years old) that still has 'spare' dry weather capacity, when comparing theoretical (design) capacity to current dry weather flows. However, it does not have significant spare wet weather capacity. For example, during the recent severe wet weather events in Feb-Mar 2022 when widespread regional flooding occurred, BVSTP reached peak instantaneous flow rates that reached 97% of its design hydraulic capacity (7.1 times ADWF).
 - The existing clarifiers at the plant are relatively aggressively designed; therefore, their ability to fully treat (process capacity) flows of more than approximately five times ADWF is in doubt, particularly if actual sludge settleability is at the lower end of the likely range (i.e., worse than design values).
- 35 Due to intractable constraints around hydraulic design of the existing plant, it is not feasible to only add more clarifiers to increase plant wet weather capacity.

Other components of the plant that need attention to correct existing issues are UV disinfection (failure of equipment with limited spares availability and no longer

STAFF REPORTS - INFRASTRUCTURE SERVICES

commercially supported), sludge handling (e.g., lack of redundancy in sludge dewatering and supernatant withdrawal from the aerobic digester), as well as buildings to meet Council's insurance requirements for safe equipment storage.

5

Transfer and upgrade options investigated.

Transferring wastewater from Ocean Shores to BVSTP will enable 'load shedding' from OSSTP.

10 Transferring indicatively 21% of ADWF from OSSTP (to BVSTP) will help relieve the dry weather loading at OSSTP, particularly during peak holiday seasons, and reduce the risk of environmental non-compliance.

Given the lack of up-to-date wastewater characterisation and associated modelling of OSSTP, as well as uncertainty over future (new) licence requirements for this plant, further

15 work will be required during concept development to accurately define its ability to treat reduced dry weather flows (after load shedding to BVSTP) and consistently meet environmental requirements.

Based on available information, for this study, that capacity is provisionally estimated to be approximately 1.5 ML/d ADWF or 79% of its nominal capacity based on the most recent capacity assessment and assumed wastewater composition (no data for peak holiday

20 capacity assessment and assumed wastewater composition (no data for peak holiday loads).

This aligns with 21% dry weather load shedding estimated to be possible by diverting all flows from sewage pump station (SPS) 5004 to BVSTP, via a modification/ extension of its rising main.

- 25 It is estimated that full diversion of SPS5004 will divert up to approximately 30% of peak wet weather flows. In this 'transitional' scenario (until the ultimate fate of OSSTP is decided), OSSTP will then typically only treat flows from SPS5009 i.e., peak wet weather flows up to approximately 175 L/s (instead of 236 L/s currently), or approximately eight times its original nominal ADWF (instead of nearly 11 times ADWF currently).
- 30 To some extent, this will ease the hydraulic bottlenecks in the plant (e.g., the frequency and duration of periods when the intermittent aeration and decanting process stops functioning, thereby interrupting full treatment).

Diverting approximately 21% of OSSTP dry weather flows to BVSTP (i.e., approximately 0.4 ML/d) will increase ADWF at BVSTP from around 1.76 ML/d (based on flow projections that underpinned this study1) to around 2.2 ML/d, or just under 60% of its original design ADWF.

STAFF REPORTS - INFRASTRUCTURE SERVICES

However, diversion of up to approximately 61 L/s of peak wet weather flow from OSSTP to BVSTP will push the combined peak wet weather flow at BVSTP to more than its current hydraulic capacity for incoming raw wastewater (limited to 314 L/s, and currently operating very close to that during major wet weather events).

5 Given the hydraulic and design constraints at BVSTP, to make the diversion of flows from OSSTP possible whilst deferring a major plant upgrade that would increase capacity, a wet weather storage facility (or 'balancing pond') for raw wastewater is required at BVSTP.

Whilst there is some level of risk associated with building and operating an open wet weather storage facility (e.g., increased odour; increased traffic movements or dust during

10 construction; increased maintenance), those risks are considered manageable at this site. When it is not in use, the design operational objective will be to maintain the storage facility empty and nominally dry. The design will enable it to be emptied to mitigate odour.

The facility will be used primarily for storing dilute raw wastewater during wet weather, followed by its contents being pumped back for mainstream treatment within approximately ten days or less, after influent flow rates have subsided.

Only on rare occasions (or emergencies e.g., to carry out essential plant maintenance for which process treatment shutdowns are necessary) will the wet weather storage facility be used to store raw wastewater under dry weather conditions. Raw wastewater diverted to the facility will in any case be screened, to mitigate debris littering and accumulating within

20 it (e.g., posing associated risks to wildlife).

15

Having the wastewater transfer and storage facilities will give Council significant operational benefits ('future proofing') in being able to manage dry and wet weather flows more effectively across the two sites, particularly in the face of increased inflow-infiltration and flood risks associated with climate change. The storage facility design will need to

25 consider projections of future flood levels associated with a rise in sea-level (river levels) and peak wet weather events.

The proposed approach for partial diversion of wastewater from Ocean Shores to BVSTP postpones for Council the decision around the ultimate fate of OSSTP and its possible closure, whilst making full use of the remaining life of the existing assets at that plant.

- 30 The timing of OSSTP potential closure and ultimate full transfer to BVSTP, or the alternative (i.e., full upgrade of OSSTP, whilst retaining the capacity for partial transfer of flows/ load shedding to BVSTP) can be decided later. Given the age of the plant, the timing will depend heavily on the ability of the existing OSSTP to continue to operate reliably and achieve required environmental standards (anticipated new license) to the
- satisfaction of the EPA. 35

Ultimately, if Council decides in future to close OSSTP, then full transfer of flows to BVSTP will require completion of the transfer facility (i.e., a new transfer pump station at or near OSSTP, pumping via an additional pipeline of larger diameter, via the same easement that proposed for SPS 5004 diversion in the transitional scenario - see above).

40 It will also require completion of the full upgrade of BVSTP, with the wet weather storage facility (already built and operated for the transitional period) then serving as a useful back-

STAFF REPORTS - INFRASTRUCTURE SERVICES

up to full treatment capacity (process and hydraulic), for emergency use and mitigation of potentially deteriorated wet weather flow incursion to the ageing sewer catchments.

Alternatively, if Council decides to retain and fully upgrade OSSTP in future, then the transfer pipeline constructed for the transitional scenario could either be retained for

5 operational flexibility to manage raw wastewater flows and loads between the two plants into the future or be repurposed as a treated effluent/ recycled water main linking the two sites.

The options outlined above have been built into alternative pathways within adaptive plans developed as part of this study (refer table below). The option recommended for

implementation was designated 'Option 4-R' and aligns with a very similar option (Option
 originally recommended in the preceding Feasibility Study (GHD, 2016) for this project.

The nuances between Option 4-R and the original Option 4 relate to assumptions made in respect of BVSTP hydraulic and process configuration for partial vs. full process upgrades (i.e., plant capacity duplication), to accommodate the transfer from Ocean Shores.

- 15 Implementing Option 4-R in the short to medium term does not preclude future pathway options (e.g., ultimate full transfer and full upgrade of BVSTP vs. ultimate full upgrade of OSSTP), if required. However, Option 4-R has the advantage of the lowest capital cost and lowest NPV of all the options considered.
- The minor upgrade of OSSTP potentially offers a long-term pathway to retain both STPs (with load shedding from Oceans Shores to BVSTP), and remain within the capacity envelope of both plants, subject to OSSTP performance in future being satisfactory and sufficient to achieve future EPA license requirements.

In the Multi-Criteria assessment, Option 4-R ranked the highest of all options considered in this study, and was not sensitive to criteria weightings, in the range tested. Hybrid options around Option 4-R were considered.

These involved reduced scope for the minimum upgrade of OSSTP (i.e., confining the scope to only those items most critical in the short to medium term, to keep OSSTP operational, in an effort to reduce capital costs). However, these options pose increased risks (around technical operation/ maintenance and resilience) associated with running an old plant and meeting regulations including new FDA license regulations.

30 old plant and meeting regulations, including new EPA license requirements.

Those risks will most likely bring forward the date at which OSSTP must be either fully upgraded or closed (i.e., necessitating full transfer and upgrade at BVSTP).

The risks were factored in the scoring for cost criteria (adding capital and hence increasing NPV) and non-cost criteria in the MCA and led to these options ranking lower than Option
4-R, the preferred option. Some of the Option 4-R 'hybrid' options also scored very close to the Base Case (i.e., immediate, full upgrade of OSSTP, with no wastewater transfer and no upgrade of BVSTP, and were sensitive to criteria weightings.

This suggests that careful, more detailed assessment would be necessary before recommending any of these options as alternatives to the preferred option.

STAFF REPORTS - INFRASTRUCTURE SERVICES

Cost summary for options considered in this study, based on median capital costs estimates

Descriptor/ Option Name/ No.:	Base Case (Option 0)	Option 1- R	Option 8	Option 4-R	Option 4-R, hybrid with OSSTP minimum upgrade, then Option 1-R deferred to 2035	Option 4-R, hybrid with OSSTP minimum upgrade, then Option 1-R deferred to 2055	Option 4-R, hybrid with OSSTP minimum upgrade, then deferred full OSSTP upgrade in 2035	Option 4-R, hybrid with OSSTP minimum upgrade, then deferred full OSSTP upgrade in 2055
Adaptive Plan #	#1 & #2	#1	#1	#1	#2	#2	#2	#2
Adaptive Plan Key Decision Areas	1, 2 & 3	1, 2, 4 & 6	1, 2, 4 & 7	1, 2 & 5	1, 2, 4 & 5	1, 2, 4 & 5-alt	1, 2, 4 & 6	1, 2, 4 & 6-alt
Brief Description	No transfer; OSSTP Full Upgrade (MBR)	Option 1- R, full transfer and major upgrade at BVSTP (with WWS)	Partial transfer (long-term load shedding); minor upgrades of both OSSTP & BVSTP (without WWS)	Partial transfer (long-term load shedding); minor upgrades of both OSSTP & BVSTP (with WWS)	Partial transfer (short-medium- term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by Option 1-R (full transfer & completion of major upgrade of BVSTP, deferred to 2035)	Partial transfer (long-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by Option 1-R (full transfer & completion of major upgrade of BVSTP, long deferral to 2055)	Partial transfer (short-medium- tern load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by (deferred) full upgrade of OSSTP	Partial transfer (long-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by (deferred) full upgrade of OSSTP
Total Capex	\$37.59 M	\$66.68 M	\$55.04 M	\$29.47 M	\$74.10 M	\$74.10 M	\$61.42 M	\$61.42 M
Total Opex (30 years)	\$60.17 M	\$52.67 M	\$51.59 M	\$44.25 M	\$52.88 M	\$67.43 M	\$74.65 M	\$66.66 M
NPV of Total Capex	\$37.59 M	\$66.68 M	\$55.04 M	\$29.47 M	\$59.98 M	\$40.41 M	\$50.26 M	\$34.79 M
NPV of replacement Capex (Mech/ Elec/ I&C)	\$5.35 M	\$6.86 M	\$4.27 M	\$3.40 M	\$5.17 M	\$2.56 M	\$6.33 M	\$2.56 M
NPV of Total Opex	\$33.82 M	\$29.59 M	\$28.97 M	\$26.75 M	\$29.50 M	\$36.40 M	\$39.48 M	\$35.67 M
Discounted Residual Value of initial Capex	\$1.53 M	\$3.42 M	\$3.13 M	\$1.41 M	\$4.55 M	\$8.65 M	\$3.29 M	\$7.34 M
Discounted Residual Value of replacement Capex (Mech/ Elec/ I&C)	\$1.20 M	\$1.63 M	\$1.01 M	\$0.78 M	\$2.11 M	\$0.59 M	\$2.67 M	\$0.59 M

TOTAL NPV	\$74.03 M	\$98.08 M	\$84.15 M	\$57.43 M	\$87.99 M	\$70.14 M	\$90.11 M	\$65.08 M
Score 1 (worst) = Highest NPV 8 (best) = Lowest NPV	5	1	4	8	3	6	2	7
Capex: Capital expenditure								

10 Opex: Operating expenditure

<u>4.2</u>

STAFF REPORTS - INFRASTRUCTURE SERVICES

Scoring and Ranking Results from Multi-Criteria Assessment

STAFF REPORTS - INFRASTRUCTURE SERVICES

INUmbleBase Case (Dploto (d)Oplion (A)Oplion	Optio	Option D	nancial (Cost) 45% 1	23% Resilience and longevity (flexibility of option to adapt to changing	Complexity, reliability, regularity of maintenance and potential degree of difficulty (includes recruitment, number of sites)	21% Vivionmental and Community/Social Impact	Community Approval including new transfer pipeline	 cuimate change impact (including electricity/energy demaind, biosolids management, GHG emissions, prone to sea level rise) 	3 Compliance & Regulations (river discharge, biosolids disposalireuse, risk of environment incident - extent of planning approvals and risk of approval success including new transfer approval	popelines 1. Customers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearby,noise,odour)	tchnical Risk 11%	 Technical Risk in construction (including commissioning) Technical Risk in Service (proven technology/track record 	L WEIGHTED SCORE	erall Ranking
Base Case (option 0) Option 1.R. Option 6 Control 4.R. min COSSTP1 Option 4.R. min COSSTP2 Op	on Number	Description	k 45.0%	k 12.2%	10.7%	3	84.C-1	9K.9.7	9.2%	3.1%	2	4.6% 6.1%	9% 100%	
$ \ $	Base Case (Option (No transfer. No Upgrade of BVS7 Full Upgrade of OSS7	0 0.00	0010	0 0.00	000	0	0	00.0	0		0010 0010 0	0.00	3
oot 1.8 Option 6.8 Option 4.8 Option 4.8 Option 4.8 Option 4.8 min cosserty and)) Opti	Full transf type upgrade at W	4.0	4	3		7	2	7	7		2		
Option 8 Option 4R, min OSSTP1 Option 4	on 1-R	er and major BVSTP (with WS)	-180	0.49	0.32		i i		60 P	ε P		-0.05	1.91	9
	Option 8	Full transfer and upgrade at BVS WWS)	7.7	t	2		-1.5	-	2	5		0.0	-0.66	
Option 4.R. Option 4.R. min OSSTP1 Additional transfer (short: Min OSSTP1 Additional transfer (short: Partial transfer (shor	~	TTP (no 00	-0.76	0.12	120	ę		0	9119	90.0-		900- 900-		5
A poten 4.R, min OSSTPi Option 4.R, min OSSTPi Option 4.R, min OSSTPi Option 4.R, min OSSTPi Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load Partial transfer (short- medium-term load shedding; mort- medium-term load Partial transfer (short- medium-term load Partial transfer (sho	Option 4-R	STP minor upgrade, ' NS, partial transfer f	2.8 1.24	1 0.12	-2		2	•	-0.15	÷.		-1 -0.5 -0.5	0.97	1
R, min (OSSTP) Option 4R, min (OSSTP) 2005 increating (hout- mentioned (prior) Fantial transfer (hout- mentioned cyclic) Fantial transfer (hout- mentioned (hout- mentioned epole) Fantial transfer (hout- metioned epole) Fantial transfer (hout- epole) Fantial transfer (hout- metioned epole) Fantial transfer (hout- epole) Fantial transfer (hout- epole) Fantial transfer (hout- epole)<	Option 4- hybrid Op	Partial t mediu sheddingl sheddingl sheddingl shus minimum tansfer & major upgi defem	-23	3.0	7		7	1.5	4.5	Ŧ		Υ Υ		
Option 4R, min OSSTP1 Option 4R, min OSSTP1 Option 4R, min OSSTP1 Partial transfer (short, medium term load resolution; minor upgade def WSTP (mol. WWS); minor upgade e OSSTP minor upgade of BVST minor upgade of BVSTP minor upgade of BVS	R, min OSSTP/ ption 1-R, 2035	ransfer (short- mr-term load F (inc) upgrade P (incl. WWS); pgrade OSSTP; v Option 1-R (full & completion of rade of BVSTP; ed to 2035)	1.04	2E.0	0.11	ę			-0.14	0.0		9070-	 -0.98	7
A. 2005 Option 4.R, min OSS TP1 Option 4.R, min OSS TP1 R. 2005 Fund Isster (short- load Pantal transfer (short- min OSSTP, 2005) Fund OSSTP, 2005 WWS: Fortial transfer (short- modum term baid shedding): medium term baid shedding): medium term baid shedding: medium term baid sheding sheding about the sheding sheding sheding sheding about the sheding sheding sheding sheding sheding about the sheding sheding sheding sheding sheding sheding about the sheding sheding sheding sheding sheding sheding about the sheding sh	Option 4-R, min hybrid Option 1	Partial transfer medium-term schedding; minor of BVSTP (incl. minimun upgrade followed by Optio transfer & comp major upgrade of hong deferral to	0.6	2.0	7		7	-	2	Ŧ		- 7	-0.01	
April 1 arrefer (short, and (sst TF, 2033) Option 4.4, min OSS TF, 2033 full OSS TF, 2033 Partial transfer (short, and shedding), medium term boad shedding), mout where a by STF (min SST Frint), more upgrade of DVS, minimum and constrained and an apprance of SSTF in 255 05177 in 255 2.0 0.34 1.0 0.1 2.0 0.34 1.0 0.1 2.1 0.34 1.0 0.1 2.1 0.34 1.0 0.1 2.1 0.34 1.0 0.1 2.1 0.34 1.0 0.1 2.1 0.34 1.0 0.1 2.1 0.34 1.0 0.3 2.1 0.34 1.0 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 2.1 0.3 0.0 0.0 2.1 0.3 0.3 0.1 3.1 0.3 0.3 0.3 4.1 0.3 0.3 0.3 4.1 0.3 0.3 0.3	OSSTP/ 0	(short- I load med upgrade med WWS); m wWS); m 0.055TP, (diang fetion of ((62.0	924	4 <u>7</u>	9		0	-0.18	6,0-		-0.05 -0.12		4
[P] Option 4.8, min OSS full OSS IP, 2005 full OSS IP, 2005 (medium term load sheddo medium term lo	ption 4-R, min OSS full OSSTP, 2035	Partial transfer (short dium term load shedd inor upgrade of BVS inor upgrade of BVS milmuru radeo OSSTP in 2035 beferred) full upgrade CSSTP in 2035	-2.7 -1.20	2.0 0.24	но Р		7	0.0	60°-	-0.5		500- 900-	-1.31	80
R, min OSS 55TF, 2005 55TF, 2005 55TF, 2005 55TF, 2005 55TF, 2005 775 and sheat of thy and sheat of the second start and start and sheat of the second start and start and start and sheat of the second start and start	P/ Option 4- full 05	- Partial tr ng): medium tern pinor upg n minor upg n by upgrade C of by (deferre	1.5	1.0	7		7	0.0	4. 8.	5°0-		ن ب		
	R, min OSSTP SSTP, 2055	ansfer (short- n load shedding rade of BVSTP VS): minimum SSTP, followed Of full upgrade o	1910	0.12	921	ş		3	9.14	0.02		-0.15	0.23	2

Pipeline route

STAFF REPORTS - INFRASTRUCTURE SERVICES

archaeological deposit to the south of the existing STP.

Council obtained an easement in 2012 for the proposed transfer pipeline. The easement passes through Cape Byron Marine Park, Coastal Wetlands and sclerophyll forests and would require extensive vegetation clearing and approval requirements, therefore is not currently preferred.

5 Preliminary biodiversity assessments investigated the potential impacts of different pipeline transfer routes to identify which of those route options would best achieve the objective of avoiding and minimising impacts to biodiversity values in the locality.

A preferred sewer rising main route has been identified which minimises biodiversity impacts. This route utilises parts of the existing pipeline easement as well as an electricity

10 easement, cleared areas, requires little to no clearing of shrubs or trees and would not contribute to fragmentation of habitat within the locality.

All other routes investigated would require clearing of high environmental value vegetation and subsequently create cleared corridors and fragmentation of habitat. Vegetation potentially impacted through other routes would include estuarine vegetation communities,

15 floodplain forests and wet sclerophyll forests containing good quality Koala habitat. The preferred route (refer figure below) has been chosen to avoid and minimise impacts on the biodiversity values of the proposal area.

Future stages of this project will identify preferred construction methods based on a range of considerations including biodiversity impacts. Additional investigation is likely to be required to determine if any Aboriginal objects are present along the rising main route. It is also recommended that the expansion of BVSTP avoids an existing registered potential

Minor upgrades to the OSSTP undertaken within the existing operation footprint are unlikely to significantly impact on terrestrial biodiversity. The major upgrade of the OSSTP would require expansion to the east of the current footprint and into vegetation analogous with Coastal Swamp Forests, which is of significant value and is potential habitat for numerous threatened flora and fauna species. The vegetation within the potential expansion area is homogonous in both age and diversity and is unlikely to be avoided during a major upgrade.

30 The area identified south and west of the BVSTP is predominantly cleared land, dominated by exotic pasture with only some native ground layer wetland vegetation interspersed along the drainage line and lowest lying areas of the site.

for threatened species, and predominantly fauna classes such as amphibians.

Native wetland vegetation extent and condition is likely to fluctuate depending on seasonal and climatic variations, however, is generally in poor to very poor condition. In the absence of mid and upper storey vegetation layers, the site provides only marginal habitat

Based on initial preliminary surveys, it is considered unlikely that the area will provide potential habitat for threatened flora species. The expansion of BVSTP would result in significantly less biodiversity impacts than the OSSTP expansion and would be consistent with the 'avoid and minimize' objective.

40 with the 'avoid and minimise' objective.

20

STAFF REPORTS - INFRASTRUCTURE SERVICES

There are issues/ considerations common to all upgrade options which could be managed effectively using standard mitigation measures, (e.g. ASS, noise, water quality). Cultural heritage values exist throughout the project area and measures can be developed to avoid Aboriginal objects for most (if not all) of the project area. Considering the options and

5 potential issues, the key determining factors are the terrestrial and aquatic biodiversity within the project area. Therefore, the selection of treatment plant site upgrade and preferred pipeline route is mainly dictated by the biodiversity protection objective.

The rising main along Route A, a BVSTP upgrade and a minor upgrade to OSSTP are all permissible without development consent. These activities would be assessed under Part

10 5 of the *Environmental Planning and Assessment Act, 1979* and would require a Review of Environmental Factors (REF).

The recommended options are expected to trigger the Biodiversity Offsets Scheme under the *Biodiversity Conservation Act 2016* and require a Biodiversity Development Assessment Report (BDAR) to accompany the REF.

15 If Aboriginal objects are found and the pipeline route cannot be re-designed to avoid the site an Aboriginal heritage impact permit (AHIP) would be required for permission to harm Aboriginal objects. BSC would be the proponent and determining authority for the project.

Recommended Biodiversity Assessment Method (BAM) surveys were undertaken in late summer 2022/23 and early autumn 2023 in preparation for a BDAR. Surveys evolved with changing considerations, with access to the two largest properties being denied by the landowners after the commencement of this survey work.

This significantly impacted survey design and delivery considerably and adaptations were required. This access constraint impacted the completeness and efficiency of the surveys undertaken to date and additional surveys are still likely to be required.

25 The surveys undertaken were able to target most of the highly relevant species in line with their respective survey month requirements. However, access constraints impacted surveys targeting some of the better condition habitat within the proposal footprint and adds limitations and caveats to the surveys undertaken.

STAFF REPORTS - INFRASTRUCTURE SERVICES



Preferred pipeline route and original easement

STAFF REPORTS - INFRASTRUCTURE SERVICES

5 **RECOMMENDATION:**

That the Committee: -

- 1. Notes the presentation; -
- 2. Recommends that:-.
- 10

15

- a) Council notify the NSW EPA in response to their letter requesting Councils strategic direction being - Option 4R - Partial transfer to BVSTP, with WWS & Retain OSSTP (capacity limited, with load shedding and a wet weather storage).
- b) Council staff start project initiation stage for Option 4R Partial transfer to BVSTP, with WWS & Retain OSSTP (capacity limited, with load shedding and wet weather storage).

Attachments:

1 OS-BV sewage transfer and treatment, E2023/117217 , page 58 $\frac{1}{2}$

STAFF REPORTS - INFRASTRUCTURE SERVICES

<<Type text here>>

<u>4.2</u>

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



→ 16 November 2023

Byron Shire Council - Committee Workshop

Ocean Shores – Brunswick Valley sewage transfer and treatment study

WSAC Agenda

16 November 2023

4.2 - ATTACHMENT 1

Acknowledgement & respect

We the acknowledge the Bundjalung of Byron Bay Arakwal people, the Minjungbal people and the Widjabul people as Traditional Owners and custodians for parts of Byron Shire, the land, water and sky, on which we do business today.

We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



→	Ą	gei	nd	a	

ltem	Description	Name	Timing (approx.)
Intro	Acknowledgement of Country Introductions	All	9:00 am
Session 1	Workshop objectives and ground rules Project context & background What we want from today Why this is important Decision criteria	GHD	9:20 am
Session 2	Overview of main options	GHD	10:00 am
Tea Break (15 mins)			10:15 am
Session 3	Unpack the options	GHD/ BSC Engineers	10:30 am
Session 4	Committee response	All	11:45 am
Lunch Break (20 min	s)		12:30 pm
Session 5	Recap Key decisions/ recommendations	All Led by C Clark	12:50 pm
Close			02:00 pm

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1

Introductions



Please introduce yourself with:

- Your Name
- Your Company
- Your Position/Role
- Project involvement and experience

If you are online, please record your name, role and company in the teleconference chat in addition to speaking for our records

MASDP P50 & P90 Risk Workshop

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



→ Workshop Objectives



- Discuss study options
- Discuss decision (MCA) criteria
- Gain committee insights
- Discuss preferred option
- Way forward

Ground rules



Remember to:

- Mute microphone if not speaking (those on phone)
- Raise hand and use chat (those on phone)

6 Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

I GHD

STAFF REPORTS - INFRASTRUCTURE SERVICES





Session 1: Project context

Background & problem statement

Background

- Byron Shire Council operates two STPs, located quite close to each other (~3.5 km) apart.

- Ocean Shores Sewage Treatment Plant (OSSTP) and
- Brunswick Valley Sewage Treatment Plant (BVSTP)

- OSSTP (Older plant, ~27 years since last significant upgrade in 1996)

- Has several issues that impact on its safe and reliable operation with a view to protecting the environment and Council staff responsible for running and maintaining it
- NSW EPA letter response by BSC required on planned strategy for OSSTP

- BVSTP (~12 years old, new build in 2011)

- Has 'spare' dry weather capacity, comparing design capacity to current dry weather flows/ loads.
- Does **not** have significant spare wet weather capacity.
- A few components of the plant that need attention to correct existing issues (e.g. UV).
- Previous feasibility study (GHD, 2016) recommended closing OSSTP with transfer via new pipeline and treatment consolidated at BVSTP (staged upgrade, 'Option 4')

4.2 - ATTACHMENT 1

The problem statement: Which strategy is best for Council?

1. Major upgrade at OSSTP only?

- No transfer facility, no pipeline?
- Address the issues at BVSTP separately (e.g., new UV)

2. Major upgrade at BVSTP only?

- Full transfer facility and pipeline(s)
- OSSTP decommissioned

3. Staged approach?

- Stage 1:
 - Minor (or 'minimum') upgrade at OSSTP ('de-rated' capacity)
 - 1st transfer pipeline (SPS5004) commissioned (2nd pipeline built but not commissioned)
 - Minor upgrade at BVSTP including wet weather storage facility (flow balancing)
- Stage 2 (potentially deferred to ~2035.....2055)
 - Transfer facility completed and 2nd pipeline commissioned
 - Major upgrade at BVSTP completed
 - OSSTP decommissioned
- 9



Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

What do we want from today?

Council's preferred Strategy (see Problem Statement)

- 1. Upgrade OSSTP only
- 2. Upgrade BVSTP only, transfer, close OSSTP
- 3. Staged approach, partial transfer, minor upgrades to both, deferred OSSTP closure etc.

Comments/ feedback on GHD Report

- Strategy/ basis of decision
- Lots of technical work already completed (> 5 years' work)

Decision on way forward

- Committee recommendation
- Letter to EPA

I © 2023 GHD. All rights reserved.

What is important to Council?

- Water & sewerage infrastructure to support future growth
- Cost (CAPEX, OPEX, NPV i.e., Net Present Value or 'whole of life')
- Consolidation of Operations (two STPs vs. one STP): operational efficiency/ ease of operation, aligned with staffing, resilience, setup for success and adaptable for future
- Brunswick River water quality and amenity, community value ('Bring back the Bruns' program)
- Environmental Protection / EPA Licence compliance
- Risk mitigation
 - Community: Health, Amenity, Social, Environmental values
 - Flooding, Climate Change
 - OH&S (E)
 - Operation & Maintenance, complexity, reliability
 - Construction

Decision criteria (MCA)

Cost

Operation, resilience/ reliability, safety

Environment, Community/ Social impact

Technical risk

- Operation
- Construction



I © 2023 GHD. All rights reserved.

Multi-criteria Analysis (MCA)



Non-Cost Criteria: 55% weighting

- **Operation & resilience (23%)** (Note: Safety a given, for all options)
- > All options are feasible to construct and operate
- Some options are more difficult/ complex to operate & maintain and/or less robust and/or less certain to give required performance

Environment, Community/ Social impact (21%)

- Compliance & regulation (effluent/ river, biosolids, planning approvals)
- Climate change impact (energy, GHG emissions, biosolids, sea level rise)
- Customer/ community receptors, complaints (trucks, noise, odour, visual)
- > Impact during pipeline construction and approval by community

Technical risk (11%)

- > All options are feasible to construct and operate
- Some options are harder/ riskier to construct and/or less robust/ less certain to give required performance

Cost Criteria: 45 % weighting

All allocated to Net Present Value (whole of life cost is important)

I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Flow projections

→ Growth to 2045, extrapolated to 2055

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1


STAFF REPORTS - INFRASTRUCTURE SERVICES





Session 2: Overview of Main Options

WSAC Agenda

16 November 2023

Symbols key:

Existing STP



Major/full STP upgrade



Minor STP upgrade



17

Ref: https://www.flaticon.com/

Minimum STP upgrade



Wet Weather Storage



Wetland



Transfer facility



Percentage of raw sewage flow from OSSTP catchment transferred to BVSTP



Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



STAFF REPORTS - INFRASTRUCTURE SERVICES

15 min Tea Break

WSAC Agenda

16 November 2023

page 76

4.2 - ATTACHMENT 1

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Session 3: Unpack the options

→ 4 Main Options

WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Option 0 → Base case

WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

XISTING GRIT TANK NEW VEHICLE ACCESS ROAD LEGEND: NEW COVERED BIOSOLIDS STORAGE AND DRYING FACILITY EXISTING INLET WORKS EXISTING ACCESS NEW FINE SCREENING 12m RADIUS) ROAD EXTENSION ACILITY EXISTING SLUDGE LAGOON NO. NEW SLUDGE DEWATERING AND OUTLOADING BUILDING (11m x 16m) NOTES: EXISTING DEMOUNTABLE SLUDGE AFROBIC DIGESTER DEWATERING EQUIPMENT TO BE 1 (NOTE 1 DECOMMISSIONED EXISTING SUPERNATANT PUMP STATION 2. FUNCTION. EXISTING SLUDGE LAGOON NO. 3 TO BE DECOMMISSIONED 3. EFFLUENT STORAGE TANK Sal to EXISTING CHEMICAL STORAGE (NOTE 2) AND DOSING AREA TO BE 4 DECOMMISSIONED State Pro-DECOMMISSIONED 30 PASVEER CHANNEL RAS AND WAS PUMPS EXISTING PLANT SWITCHROOM BLOWER BUILDING (7m x 15m) Statute and 2.1 ML BIOREACTOR SWITCHROOM (14m x 29m) (7m x 15m) MEMBRANE BIOREACTOR 100 EMERGENCY STORAGE TANK NO. 1 (13m x 3m) MEMBRANE BIOREACTOR POND (NOTE 4) TANK NO. 2 (13m x 3m) EXISTING BIOSOLIDS DRYING AREA TO BE DECOMMISSIONED MEMBRANE FEED PERMEATE TANK CIE TANK AND PUMPS PUMPS AND SERVICE WATER PUMPS CHEMICAL STORAGE (7m x 15m) NEW STORAGE ROOM FOR MECHANICAL/ELECTRICAL EQUIPMENT (13m x 8m) UV SYSTEM (NOTE 3) TERTIARY LAGOON NO. 2 AS I A STATE EXISTING UV EFFLUENT PUMP STATION SYSTEM TO BE DECOMMISSIONED EXISTING UV FEED PUMP STATION TERTIARY LAGOON NO. 1 NEW VEHICLE ACCESS ROAD **Option 0** TERTIARY LAGOON NO. 3 5.70 EXISTING VEE NOTCH VEIR TO BRUNSWICK RIVER OUTFALL

4.2 - ATTACHMENT 1

NEW PIPEWORK AND FLOW DIRECTION

NEW STRUCTURE

EXISTING STRUCTURE TO BE DECOMMISSIONED

- EXISTING DAT RETROFITTED WITH DIFFUSED AERATION FOR AEROBIC DIGESTION AND NEW DECANTER FOR SUPERNATANT WITHDRAWAL.
- EXISTING IAT REPURPOSED AS AN EFFLUENT STORAGE TANK. IF EBBTIDE DISCHARGE IS REQUIRED THEN EFFLUENT STORAGE TANK WILL BE DESIGNED TO INCORPORATE THAT FUNCTION.
- 3. PROPOSED NEW UV REACTOR MOUNTED LONGETUDINALLY IN AN OPEN CHANNEL SYSTEM CONSTRUCTED FROM STAINLESS STEEL, SUCH THAT ALL THE ASSOCIATED EQUIPMENT IS OUT OF THE Q100 FLOOD LINE.
- 4. EXISTING CATCH POND REPURPOSED AS A WET WEATHER/ STORMFLOW EMERGENCY STORAGE POND.

WSAC Agenda

24

Option 0 (Base Case) - Strengths & weaknesses

Strengths	Weaknesses
Membrane bioreactor (MBR) layout of revised Base Case (this study) → space efficient design, fits within existing OSSTP site, minimises environmental impact (no increase in footprint)	Council continues to operate two STPs within ~3.5 km of each other, both discharging to Brunswick River \rightarrow adds complexity and operating cost
MBR \rightarrow Micro/ ultrafiltration, high quality effluent, excellent disinfection, near-zero suspended solids, well suited to water recycling	Operational complexity of MBR and relatively high OPEX, incl. relatively high energy use (GHG emissions)
Avoids CAPEX (~\$7 M) for transfer facility and pipeline	Relatively high CAPEX (~\$37.6 M) for OSSTP full upgrade
Avoids potential environmental risks associated with constructing transfer facility and pipeline	MBR not ideally suited to handling high peak weather flows (~11x ADWF) typical of OSSTP
	Does not address minor upgrade requirements at BVSTP (e.g., UV) \rightarrow will add ~\$2.6 M CAPEX

If we do Base Case, then....

Option Short description	STP upgrades	Transfer to BVSTP	Comments	Option No.	Similarity to Previous studies
OSSTP Full upgrade	OSSTP: New treatment process on existing site to meet future (new) license requirements and OS growth for 30 years+ BVSTP: No upgrade	No	OS-BVSTP pipeline and transfer facility not built Rehabilitate existing site for alternative new MBR process (smaller footprint) to make it easier to obtain environmental approvals	Option 0 (Base case)	GHD (2015) Planning Study Further work needed around site works, alternative (MBR) plant process/ layout/ footprint & environmental approvals (refer to Section 5.3 of report)

Key opportunities

- Simpler approvals and no pipeline/ transfer pump station to build
- Improved effluent quality at OSSTP with better reuse potential

Key risks

- High capital expenditure at OSSTP ("nothing left for BVSTP"?)
- Brownfields construction (more complex)
- Relatively high operating costs ("two plants to manage, maintain, higher energy use, GHG" etc)
- No flexibility to manage flows and loads between the two plants, including high wet weather flows and changes in future growth ("no dispersion of risks")
- Makes little use of the remaining life in the existing OSSTP serviceable assets ("over the top"?)
- OSSTP is more flood prone than BVSTP (more "vulnerable" to Climate Change)

26

4.2 - ATTACHMENT 1

MCA Scoring for Base Case



MCA Criteria	Description/ Value		Comments Voice of the second s			
Cost (NPV, 30 yr, 4.5% pa)	\$74.0 M	0	All other options scored relative to the Base Case			
Operation and Re	silience					
	Resilience and longevity (flexibility of option to adapt to changing requirements, dispersed risk)	0	Cost and evaluation			
	Complexity, reliability, regularity of maintenance and potential degree of difficulty (includes recruitment, number of sites)	0	against all Criteria considered acceptable			
Environmental an	d Community/Social Impact					
Environmental/Community Social Risk in Construction & Community Approval including new transfer pipeline construction			All Risks considered Medium			
Climate change impact (including electricity/energy demand, biosolids management, GHG emissions, prone to sea level rise)						
	Compliance & Regulations (river discharge, biosolids disposal/reuse, risk of environment incident - extent of planning approvals and risk of approval success including new transfer pipeline)	0	Likelihood Consequence Ris Almost Insignificant Me		Risk Medium	
	Customers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearby, noise & odour)	0	Likely	(≤⊅25 K)		
Technical Risk			Likely or Possible	Minor (>\$25k - \$100k		
	In construction (including commissioning)	0	Possible or Unlikely	Moderate (>\$100k to \$1M)		
	In Service (proven technology/track record)	0	Unlikely or Rare	Major (>\$1M to \$10M)		

27

STAFF REPORTS - INFRASTRUCTURE SERVICES





Transfer pipeline

Common to other options

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



OSSTP to BVSTP → transfer pipeline alignment & environmental overlay (GHD/ Hydrosphere Consulting, 2022)



Preliminary OSSTP to BVSTP transfer pipeline profile (elevation data from Google Earth - approximate only)



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



OSSTP to BVSTP → transfer pipeline alignment & environmental overlay (GHD/ Hydrosphere Consulting, 2022)



Section	Length (m)	Method of Construction
A	306	OTE
В	968	HDD
С	1122	OTE
D	121	HDD
E	996	OTE
Total	3513	

OTE: Open trench excavation

HDD: Horizontal Directional Drilling

Provisional only: Subject to geotechnical survey and detailed design

STAFF REPORTS - INFRASTRUCTURE SERVICES





Option 1-R

→ Full transfer to BVSTP with WWS

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



32

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

Option 1-R - Strengths & weaknesses

Strengths	Weaknesses
One STP (instead of two) to operate, maintain & manage	High capital cost upfront, high NPV
Resilience to wet weather with 'flow balancing'/ storage facility;	Wet weather flow diversion and managing/ maintaining wet weather storage facility (some added complexity)
Ability to use wet weather storage for essential plant maintenance or in emergencies	Construction risks for transfer pipeline
	Approvals for pipeline slow/ complex
Dual treatment trains (oxidation ditches, clarifiers, sludge dewatering units), with ability to take one train offline	Perceived risks with wet weather storage (e.g. minor odour risk)
Low process complexity, same process & familiar fleet of assets	Construction risks for upgrade (incl. wet weather storage) trucks, dust, noise more visible at BVSTP
Constructed wetland \rightarrow adds robustness, effluent quality compliance certainty	
35	I © 2023 GHD. All rights reserved.

If we do Option 1-R, then....

Option	STP upgrades	Transfer to BVSTP	Comments	Option No.	Similarity to Previous
Short description					studies
BVSTP Full upgrade With Wet Weather	OSSTP: Decommission BVSTP: Duplication of	Yes (100%, all flows)	OS-BVSTP pipeline and transfer facility built	Option 1-R (with WWS)	GHD (2016) OS-BVSTP Transfer Feasibility Study
(Balancing) Storage (WWS)	existing plant capacity with new process units (parallel		OSSTP decommissioned (no interim minor upgrade)		Option 1 (ADWF 5.7 ML/d) with WWS (to ca. 2045)
	treatment trains)		BVSTP planning horizon to 30+ years, ultimate ADWF 7.6 ML/d		Revised to Option 1-R (here) for ultimate ADWF 7.6 ML/d with WWS (to beyond 2055)

Key opportunities

- Consolidated treatment at one plant, enough capacity for the long term/ growth of M+BH+OS catchments
- BVSTP gets "sorted" (includes addressing existing issues)
- Robust solution, good management of wet weather flows

Key risks

- High capital expenditure on Transfer Facility/ Pipeline and full upgrade at BVSTP ("future capacity locked in early"/ "no deferral") → leading to high NPV
- Approvals for pipeline might be slow/ difficult ("delays"/ "objections" etc)
- Design / Construction risks for pipeline and BVSTP upgrade incl. wet weather storage
- Managing/ maintaining wet weather storage (or "perceptions" around it)

I © 2023 GHD. All rights reserved.

36

Multi-Criteria Analysis

Scoring

4	Very Much Better (exceeds expections and has no risks or omissions)
3	Significantly Better (fully acceptable with no risks or weaknesses)
2	Moderately Better (and has minor risks, weaknesses or omissions, substantially compliant with regulations and is acceptable in current form)
1	Marginally Better
0	Base Case (option equal or nearest to base case)
- 1	Marginal Disadvantage
- 2	Moderate Disadvantage (some acceptable risks, weaknesses and/or omissions)
- 3	Significant Disadavantage (major risks, weaknesses and/or omissions including not fully compliant with regulations)
- 4	Very Large Disadvantage (Show-stopper - unacceptable with serious and fundamental risks, weaknesses and/or omissions including non-compliance with regulations)

4.2 - ATTACHMENT 1

MCA scoring for Option 1-R			II Score: -0.9 2 Model: Model: State: France: State:
MCA Criteria	Description/ Value	Score	Comments Understanding of the second of the
Cost (NPV, 30 yr, 4.5% pa)	\$98.1M	-4.0	High NPV
Operation and R	esilience		
	Resilience and longevity (flexibility of option to adapt to changing requirements, dispersed risk)	4	Resilience to wet weather with WWS, significantly better than Base Case
	Complexity, reliability, regularity of maintenance and potential degree of difficulty (includes recruitment, number of sites)	3	One site compared to two, relatively low complexity, reduced maintenance vs. Base Case
Environmental ar	nd Community/Social Impact		
	Environmental/Community Social Risk in Construction & Community Approval including new transfer pipeline construction	-2	Pipeline construction and BVSTP full upgrade
	Climate change impact (including electricity/energy demand, biosolids management, GHG emissions, prone to sea level rise)	2	Lower energy use, less flood / sea level prone
	Compliance & Regulations (river discharge, biosolids disposal/reuse, risk of environment incident - extent of planning approvals and risk of approval success including new transfer pipeline)	-1	Engineered for compliance, but some complexity around pipeline approvals
	Customers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearby, noise & odour)	-1	Marginal increase in truck movements (ops), construction risks, minor odour risks
Technical Risk			
	In construction (including commissioning)	-1	Overall construction risks bit higher incl. pipeline
	In Service (proven technology/track record)	2	Base Case MBR more flux limited & WWS better
38			I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Option 8

→ Full transfer to BVSTP without WWS

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



40

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

16 November 2023

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Option 8 - Strengths & weaknesses

Strengths	Weaknesses
One STP (instead of two) to operate, maintain & manage	High capital cost upfront, high NPV
Less infrastructure to manage/ maintain (no wet weather storage)	Less resilience to manage wet weather flows, more process performance dependent (no WWS)
Dual treatment trains (oxidation ditches, clarifiers, sludge dewatering units), with ability to take one train offline	No ability to use wet weather storage for essential plant maintenance or in emergencies
Low process complexity, generally familiar process & fleet of assets	Construction risks for transfer pipeline Approvals for pipeline slow/ complex
	Construction risks for upgrade (incl. wet weather storage) trucks, dust, noise more visible at BVSTP

If we do Option 8, then....

Option	STP upgrades	Transfer to BVSTP	Comments	Option No.	Similarity to Previous
Short description					studies
BVSTP Full upgrade	OSSTP: Decommission	Yes	OS-BVSTP pipeline and transfer	Option 8 (without	-
Without WWS	BVSTP: Duplication of	(100%, all flows)	facility built	WWS)	(New option)
	existing plant capacity with new process units (parallel		OSSTP decommissioned (no interim minor upgrade)		(Added for this Study after Council committee workshop
	treatment trains)		BVSTP planning horizon to 30+ years, ultimate ADWF 7.6 ML/d		in Sep-2021)

Key opportunities

- Consolidated treatment at one plant, enough capacity for the long term/ growth of M+BH+OS catchments
- BVSTP gets "sorted" (includes addressing existing issues)
- Less infrastructure to manage (no wet weather storage)

Key risks

- No WWS \rightarrow Less robust solution around managing wet weather flows at BVSTP
- Still relatively high capital expenditure on Transfer Facility/ Pipeline and full upgrade at BVSTP ("future capacity locked in early"/ "no deferral") → leading to high NPV
- Approvals for pipeline might be slow/ difficult ("delays"/ "objections" etc)
- Design / Construction risks for pipeline and BVSTP upgrade

I © 2023 GHD. All rights reserved.

44

4.2 - ATTACHMENT 1

MCA scoring for Option 8			II Score: -0.7	Scoting Very Nech State auror specific and the site parameter Very Nech State auror specific and the site parameter Very Nech State auror specific and the site parameter Very Nech State auror specific auror spe
MCA Criteria	Description/ Value	Score	Comments	Moderate Descharatage (one anytein risk watereaus patter memory) Significant Disadarantage may risk watereau water memory and the impact and application applications and the impact and the pattern risk watereau watereau watereau watereaus water memory Very Large Descharatage may memory accurate with water and beginning and the impact and applications and memory accurate and impact and applications with memory accurate and applications and beginning and applications and any memory accurate and applications and applications and any memory accurate and applications and applications and any memory accurate any accurate any accurate any applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications and applications applications and applications and applications and applications and applica
Cost (NPV, 30 yr, 4.5% pa)	\$84.2M	-1.7	Still relatively hi	gh NPV
Operation and R	esilience			
	Resilience and longevity (flexibility of option to adapt to changing requirements, dispersed risk)	1	Less resilience to wet wea marginally better than Base	ther without WWS, e Case (e.g. two trains)
	Complexity, reliability, regularity of maintenance and potential degree of difficulty (includes recruitment, number of sites)	2	One site compared to two, complexity, reduced mainted	relatively low enance vs. Base Case
Environmental a	nd Community/Social Impact			
	Environmental/Community Social Risk in Construction & Community Approval including new transfer pipeline construction	-1.5	Pipeline construction, BVS	TP upgrade, no WWS
	Climate change impact (including electricity/energy demand, biosolids management, GHG emissions, prone to sea level rise)	1	Lower energy use, less flo	od / sea level prone
	Compliance & Regulations (river discharge, biosolids disposal/reuse, risk of environment incident - extent of planning approvals and risk of approval success including new transfer pipeline)	-2	Engineered for compliance around pipeline approvals	e, but some complexity
	Customers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearby, noise & odour)	-2	Marginal increase in truck construction risks, minor o	movements (ops), dour risks
Technical Risk				
	In construction (including commissioning)	-1	Overall construction risks t	bit higher incl. pipeline
	In Service (proven technology/track record)	0	Similar to Base Case, flux	limited & no WWS
45			I © 2023 (GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES





Option 4-R

Partial transfer to BVSTP, with WWS & Retain OSSTP (capacity limited, with load shedding)

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



47

WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

16 November 2023

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

16 November 2023

Option 4-R - Strengths & weaknesses

Strengths	Weaknesses
Lower capital cost upfront, with deferral \rightarrow lowest NPV	Still two STPs to operate, maintain & manage; difficulties recruiting and retaining O&M staff
Flexibility to manage flows with loading shedding $OS \rightarrow BVSTP$	Wet weather flow diversion and managing/ maintaining wet weather storage facility (some added complexity)
Ability to use wet weather storage for essential	Construction risks for transfer pipeline
plant maintenance or in emergencies	Approvals for pipeline slow/ complex
Generally familiar process & fleet of assets, but.	Perceived risks with wet weather storage (e.g.
(BAU with different processes at OSSTP and BVSTP)	minor odour risk)
Extending the life of existing assets at OSSTP, albeit with necessary minor upgrades	Postpones decision around OSSTP future (upgrade or close and fully upgrade BVSTP)
Constructed wetland \rightarrow adds robustness, effluent quality compliance certainty	Construction risks for upgrades at two sites, trucks, dust, noise etc (more visible at BVSTP)

51
If we do Option 4-R, then....

Option Short description	STP upgrades	Transfer to BVSTP	Comments	Option No.	Similarity to Previous studies
BVSTP Minor upgrade, with Wet Weather (Balancing) Storage OSSTP Minimum upgrade	OSSTP: Minimum upgrade of existing plant to keep it operational, with load shedding to BVSTP, to meet current and future (new) license and OS growth for 30 years+ BVSTP Minor upgrade includes diversion to WWS and inlet works, UV and other existing capacity issues	Partial (20-30% flow/ load shedding from OSSTP to BVSTP)	WWS at BVSTP essential to handle PWWF from OS (else full upgrade with new major plant process units, due to existing hydraulic constraints) Due to process constraints at BVSTP (with minor upgrade only i.e. without full upgrade), it will only be able to accommodate a portion of the dry weather flows and loads transferred from OS (see <i>Similarities to Previous</i> <i>studies</i> column of this table)	Option 4-R (with WWS)	GHD (2016) OS-BVSTP Transfer Feasibility Study Option 4 (ADWF 5.7 ML/d) with WWS and 100% OS transfer, allowing deferral of major plant upgrade until ca. 2032 (then till ca. 2045) Revised to Option 4-R (here) for optimised current capacity ADWF 3.8 ML/d with WWS and 20-30% OS transfer, allowing deferral of major plant upgrade until ca. 2055 (30+ years)

Key opportunities

- Deferral of major upgrades at either STP (indefinitely for OSSTP) → lower capital cost and NPV
- Extends useful remaining life of existing assets at OSSTP
- 'Load shedding': flexibility → manage flows and loads between two plant, including wet weather flow **Key risks**
- Operating and maintaining two STP sites indefinitely, incl. 'load shedding' / flow splits, different processes...
- Success depends on maintaining old plant at OSSTP to meet license, after minor upgrade
- Approvals for pipeline might be slow/ difficult ("delays"/ "objections" etc)
- Design / Construction risks for pipeline and BVSTP minor upgrade incl. wet weather storage

52

I © 2023 GHD. All rights reserved.

4.2 - ATTACHMENT 1

MCA sco	ring	for Option 4-R	Overa	II Score 11.0
MCA Criteria	Descrip	tion/ Value	Score	Comments ¹² and an and a set of the set of
Cost (NPV, 30 yr, 4.5% pa)	\$57.4M	Note: we did not allocate a full score of +4 here i.e., conservatively assumed that \$57.1 M is moderately/ significantly better than \$98.1 M (highest NPV = -4 score for Option 1-R)	2.8	Lowest NPV, See Note
Operation and Re	esilience			
	Resilience an requirements,	d longevity (flexibility of option to adapt to changing dispersed risk)	1	Resilience to wet weather with WWS; flexibility cancelled out by BVSTP capacity constraints
	Complexity, re difficulty (inclu	liability, regularity of maintenance and potential degree of des recruitment, number of sites)	-2	Two sites, likely more maintenance vs. Base Case due to old plant at OSSTP; managing split
Environmental an	d Commu	inity/Social Impact		
	Environmenta Approval inclu	I/Community Social Risk in Construction & Community ding new transfer pipeline construction	-2	Pipeline construction and BVSTP full upgrade
	Climate chang management,	e impact (including electricity/energy demand, biosolids GHG emissions, prone to sea level rise)	1	Marginally lower energy use incl. pumping than Base Case; still flood/ sea level prone
	Compliance 8 environment i success inclu	Regulations (river discharge, biosolids disposal/reuse, risk of noident - extent of planning approvals and risk of approval ding new transfer pipeline)	-2	Less opportunity to engineer for compliance, plus some complexity around pipeline approvals
	Customers/Co visibility, livea	ommunity Receptor Complaints Risk (truck movements, traffic, pility for residents nearby, noise & odour)	-1	Marginal increase in truck movements (ops), construction risks, minor odour risks
Technical Risk				
	In construction	n (including commissioning)	-1	Overall construction risks bit higher incl. pipeline
53	In Service (pr	oven technology/track record)	0.5	Base Case MBR more flux limited but load shedding has an element of risk
				I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Session 3: MCA Scores for → Main Options

Excludes 'Hybrid Options'

WSAC Agenda

Main Options

Multi-Criteria Analysis

c	ption Numbe	er Base Case	(Option 0)	Optio	on 1-R	Option	18	Option	4-R	
Optic	on Descriptio	No tra n No Upgrad Full Upgrad	insfer. e of BVSTP le of OSSTP	Full transfe upgrade at W	er and major BVSTP (with WS)	Full transfer a upgrade at B WWS	nd major /STP (no)	BVSTP mino with WWS, par plus OSST upgra	r upgrade, tial transfer P minor de	
1 Financial (Cost) 1.1 NPV	45% 45.0%	0	0.00	-4.0	-1.80	-1.7	-0.76	2.8	1.24	
 2 Operation and Resilience 2.1 Resilience and longevity (flexibility of option to adapt to changing requirements, dispersed risk) 2.2 Complexity, regularity of maintenance and potential degree of difficulty (includes recruitment, number 	23% 12.2% 10.7%	0	0.00 0.00	4 3	0.49 0.32	1 2	0.12 0.21	1 -2	0.12 -0.21	
 Environmental and Community/Social Impact Environmental/Community Social Risk in Construction & Community Approval including new transfer pipeline Climate change inpact (including electricity/energy domand bicsolids mageagement (ENG emiccines, promoto) 	21% 1.5% 7.6%	0	0.00	-2 2	-0.03 0.15	-1.5 1	-0.02 0.08	-2 1	-0.03 0.08	
 3.3 Compliance & Regulations (river discharge, biosolids disposalireuse, risk of environment incident – extent of planning approvals and risk of approval success including new transfer pipeline) 	9.2%	0	0.00	-1	-0.09	-2	-0.18	-2	-0.18	
3.4 Customers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearby,noise,odour)	3.1%	0	0.00	-1	-0.03	-2	-0.06	-1	-0.03	
Iechnical Hisk 4.1 Technical Risk in construction (including commissioning) 4.2 Technical Risk in Service (proven technology/track record addressed in this criteria)	11% 4.6% 6.1%	0 0	0.00 0.00	-1 2	-0.05 0.12	-1 0.0	-0.05 0.00	-1 0.5	-0.05 0.03	
TOTAL WEIGHTED SCORE	100% 100%	0.	00	-0	.91	-0.66		0.97	7	
Overall Ranking			3		6		5		1	© 2023 GHD. All rights r

Outcomes from today

Council's preferred Strategy (see Problem Statement)

- 1. Upgrade OSSTP only = Base Case (Option 0)
- 2. Upgrade BVSTP only, transfer, close OSSTP = Option 1-R or Option 8
- 3. Staged approach, partial transfer, minor upgrades to both, deferred OSSTP closure etc. = Option 4-R

Way forward

- Comments & questions
- Preferred Strategy/ basis of decision

Decision on way forward

- Committee recommendation
- Letter to EPA

I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES





Optional: Overview of Hybrid Options

Variations of Option 4-R

WSAC Agenda

16 November 2023

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



All Options

Multi-Criteria Analysis

c	Option Number	Base Case	(Option 0)	Optic	on 1-R	Optio	n 8	Optior	1 4-R	Option 4-R, mi hybrid Option	n OSSTP/ 1-R, 2035	Option 4-R, mi hybrid Option	in O SS TP/ 1-R, 2055	Option 4-R, full OSS	min OSSTP/ (P, 2035	Option 4-R, m full OSST	nin OSSTP/ P, 2055
Option Description		No transfer. No Upgrade of BVSTP Full Upgrade of OSSTP WWS)		Full transfer and major upgrade at BVSTP (no WWS)		BVSTP minor upgrade, with WWS, partial transfer plus OSSTP minor upgrade		Partial transfer (short- medium-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade OSSTP, followed by Option 1-R (full transfer & completion of major upgrade of BVSTP, deferred to 2035)		Partial transfer (short- medium-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade OSSTP, followed by Option 1.R (full transfer & completion of major upgrade of BVSTP, long deferral to 2055)		Partial transfer (short- medium term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade OSTP, followed by (deferred) full upgrade of OSSTP in 2035		Partial transfer (short- medium term load e shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade OSSTP, followed by f (deferred) full upgrade of OSSTP in 2055			
1 Financial (Cost) 1.1 NPV	45% 45.0%	0	0.00	-4.0	-1.80	-1.7	-0.76	2.8	1.24	-2.3	-1.04	0.6	0.29	-2.7	-1.20	1.5	0.67
 2 Operation and Resilience 2.1 Resilience and longevity (flexibility of option to adapt to changing requirements, dispersed risk) 2.2 Complexity, reliability, regularity of maintenance and potential degree of difficulty (includes recruitment, number 	23% 12.2% 10.7%	0	0.00 0.00	4 3	0.49 0.32	1 2	0.12 0.21	1 -2	0.12 -0.21	3.0 -1	0.37 -0.11	2.0 -2	0.24 -0.21	2.0 -1	0.24 -0.11	1.0 -2	0.12 -0.21
3 Environmental and Community/Social Impact 3.1 Environmental/Community Social Risk in Construction & Community Approval including new transfer pipeline	21%	0	0.00	-2	-0.03	-1.5	-0.02	-2	-0.03	-2	-0.03	-2	-0.03	-2	-0.03	-2	-0.03
3.2 Climate change impact (including electricity/energy demand, biosolids management, GHG emissions, prone to	7.6%	0	0.00	2	0.15	1	0.08	1	0.08	1.5	0.11	1	0.08	0.0	0.00	0.0	0.00
3.3 Compliance & Hegulations (river discharge, biosolids disposal/reuse, risk of environment incident – extent of planning approvals and risk of approval success including new transfer pipeline (Lustomers/Community Receptor Complaints Risk (truck movements, traffic, visibility, liveability for residents nearth projec educ)	3.2%	0	0.00	-1 -1	-0.03	-2 -2	-0.18	-2 -1	-0.18	-1.5 -1	-0.14	-2 -1	-0.18	-1 -0.5	-0.09	-1.5 -0.5	-0.14
	11% 4.6% 6.1%	0	0.00 0.00	-1 2	-0.05 0.12	-1 0.0	-0.05 0.00	-1 0.5	-0.05 0.03	7 7	-0.05 -0.06	-1 -2	-0.05 -0.12	-1 -1	-0.05 -0.06	-1 -2	-0.05 -0.12
TOTAL WEIGHTED SCORE	100% 100%	0.0	00	-0	.91	-0.6	6	0.9	7	-0.98	}	-0.01	1	-1.	31	0.2	3
Overall Ranking			3		6		5		1		7		4		8		2

60

Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

Financial - NPV of Options



Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

61

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1

Session 4: Committee Response

→ Q&A

WSAC Agenda

16 November 2023

STAFF REPORTS - INFRASTRUCTURE SERVICES

20 min Lunch Break

WSAC Agenda

16 November 2023

page 120

4.2 - ATTACHMENT 1

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Session 5: Recap & key → decisions/ recommendations

Cameron Clark

WSAC Agenda

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



***** Thank You



WSAC Agenda

16 November 2023

page 122

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



Supporting Information

→ WWS, pipeline,
 adaptive plans &
 cost summary



Transfer pipeline - method of construction



Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

Banora Pt WWTP wet weather storage 'storm lagoon' Empty



4.2 - ATTACHMENT 1

Banora Pt WWTP wet weather storage 'storm lagoon' Empty



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1



WSAC Agenda

16 November 2023

4.2 - ATTACHMENT 1

Banora Pt WWTP wet weather storage 'storm lagoon', filled after rain event



71

I © 2023 GHD. All rights reserved.

STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1

Ocean Shores and Brunswick Valley STP - Adaptive Plan 1

The roadmap below outlines considered STP upgrade options at Ocean Shores and Brunswick Valley sewage treatment plants (STPs). The timeframe for which options are implemented and effective is represented by the horizontal bars. The options are shown nominally for the planning horizon of 2055, subject to future population and flow projections. The numbers reflect the drivers of change and uncertainty that were deemed to materially impact the strategy (key decision points). The arrows indicate the available options in response to the key decision points.



STAFF REPORTS - INFRASTRUCTURE SERVICES

4.2 - ATTACHMENT 1

Ocean Shores and Brunswick Valley STP - Adaptive Plan 2

The roadmap below outlines considered STP upgrade options at Ocean Shores and Brunswick Valley sewage treatment plants (STPs). The timeframe for which options are implemented and effective is represented by the horizontal bars. The options are shown nominally for the planning horizon of 2055, subject to future population and flow projections. The numbers reflect the drivers of change and uncertainty that were deemed to materially impact the strategy (key decision points). The arrows indicate the available options in response to the key decision points.



Options Cost summary

Descriptor	Base Case (Option 0)	Option 1-R	Option 8	Option 4-R	Option 4-R, hybrid with OSSTP minimum upgrade, then Option 1-R deferred to 2035	Option 4-R, hybrid with OSSTP minimum upgrade, then Option 1-R deferred to 2055	Option 4-R, hybrid with OSSTP minimum upgrade, then deferred full OSSTP upgrade in 2035	Option 4-R, hybrid with OSSTP minimum upgrade, then deferred full OSSTP upgrade in 2055
Adaptive Plan #	# #1 & #2	#1	#1	#1	#2	#2	#2	#2
Adaptive Plan Key Decision Areas	1, 2, & 3	1, 2, 4 & 6	1, 2, 4 & 7	1, 2, & 5	1, 2, 4 & 5	1, 2, 4 & 5-alt	1, 2, 4 & 6	1, 2, 4 & 6-alt
Brief Description	No transfer; OSSTP Full	Option 1-R, full transfer and major upgrade at BVSTP (with WWS)	Partial transfer (long-term load shedding); minor upgrades of both OSSTP & BV/STP (without WWS)	Partial transfer (long-term load shedding); minor upgrades of both OSSTP & BVSTP (incl. WWS)	Partial transfer (short- medium-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by Option 1-R (full transfer & completion of major upgrade of BVSTP deferred to 2035)	Partial transfer (long-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by Option 1-R (full transfer & completion of major upgrade of BVSTP, long deferral to 2055)	Partial transfer (short- medium-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by (deferred) full upgrade of OSSTP in 2005	Partial transfer (long-term load shedding); minor upgrade of BVSTP (incl. WWS); minimum upgrade, followed by (deferred) full upgrade of OSSTP in 2055
Total Capex	\$37.59 M	\$66.68 M	\$55.04 M	\$29 47 M	\$74 10 M	\$74 10 M	\$61.42 M	\$61.42 M
Total Opex (30 years)	\$60.17 M	\$52.67 M	\$51.59 M	\$44.25 M	\$52.88 M	\$67.43 M	\$74.65 M	\$66.66 M
NPV of Total Capex	\$37.59 M	\$66.68 M	\$55.04 M	\$29.47 M	\$59.98 M	\$40.41 M	\$50.26 M	\$34.79 M
NPV of replacement Capex (Mech/ Elec/ I&C)	\$5.35 M	\$6.86 M	\$4.27 M	\$3.40 M	\$5.17 M	\$2.56 M	\$6.33 M	\$2.56 M
NPV of Total Opex	\$33.82 M	\$29.59 M	\$28.97 M	\$26.75 M	\$29.50 M	\$36.40 M	\$39.48 M	\$35.67 M
Discounted Residual Value of initial Capex	\$1.53 M	\$3.42 M	\$3.13 M	\$1.41 M	\$4.55 M	\$8.65 M	\$3.29 M	\$7.34 M
Discounted Residual Value of replacement Capex (Mech/ Elec/ I&C)	\$1.20 M	\$1.63 M	\$1.01 M	\$0.78 M	\$2.11 M	\$0.59 M	\$2.67 M	\$0.59 M
TOTAL NPV	\$74.03 M	\$98.08 M	\$84.15 M	\$57.43 M	\$87.99 M	\$70.14 M	\$90.11 M	\$65.08 M
Score 8 (worst) = Highest NPV 1 (best) = Lowest NPV	4	8	5	•1	6	•3	•7	2

[Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

74

Options – CAPEX summary

Key:
DJC = Direct Job Cost

M = Mechanical

E = Electrical

IC = Instrumentation/ Control

	MEDIAN					
Cost Item	% Civil	% {M+E+IC}	\$M CIVIL	\$M {M+E+IC}	\$ M	\$ M
INITIAL CAPITAL EXPENDITURE	of DJC	of DJC	DJC	DJC	DJC	Total Cost
OS-BVSTP transfer facility (for SPS5004), Transitional	83%	17%	\$0.96	\$0.20	\$1.16	\$2.07
OS-BVSTP transfer facility (for SPS5009), Ultimate	83%	17%	\$2.30	\$0.48	\$2.77	\$4.97
OS-BVSTP transfer facility, Ultimate (excluding deferred OSSTP P/Stn for SPS5009 re-pump)	100%	0%	\$1.52	\$0.00	\$1.52	\$2.72
Deferred OSSTP Pump Station (SPS5009 re-pump) for Ultimate scenario	62%	38%	\$0.78	\$0.48	\$1.26	\$2.25
BVSTP minor upgrade, incl. WWS (for Option 4-R)	76%	24%	\$7.00	\$2.25	\$9.25	\$14.34
BVSTP major upgrade, incl. WWS (for Option 1-R)	67%	33%	\$25.94	\$12.57	\$38.51	\$59.63
BVSTP major upgrade, <u>excl</u> . WWS (for Option 8)	76%	24%	\$23.46	\$7.54	\$31.00	\$47.99
Completion of BVSTP major upgrade, incl. WWS (deferred items for Option 4-R/ Option 1-R hybrid)*	65%	23%	\$18.94	\$10.32	\$29.26	\$45.29
OSSTP Minimum Upgrade	48%	52%	\$2.15	\$2.35	\$4.50	\$7.42
OSSTP Minor Upgrade	51%	49%	\$4.04	\$3.89	\$7.93	\$13.06
OSSTP Full (MBR) Upgrade	57%	43%	\$13.02	\$9.80	\$22.82	\$37.59

*Completion of BVSTP major upgrade (after minor), Option 4-R/1-R hybrid (marginal cost)

[Ocean Shores – Brunswick Valley sewage transfer and treatment study I © 2023 GHD. All rights reserved.

FOR INFORMATION ONLY

Re	eport No. 6.1	Byron STP Condition 9 Additional Load - Quarterly Report
Dir	ectorate:	Infrastructure Services
Re	port Author:	Vivianne Lins, Environmental Planner
File	e No:	12023/1713

Summary:

This report is for the Committee's information and reviews compliance with the Byron BaySewerage Augmentation Scheme - Conditions of Approval (2002).

Condition 9(iii) requires that sufficient reuse (recycled water) capacity be available before the acceptance of any additional load at the treatment plant.

15 In the years since the approval was granted (2002 to date) 2,871 Equivalent Tenements (ET) have been approved, resulting in an additional load of 1.69 ML/day at the treatment plant. The current day operating capacity of the reuse system equates to 2.02ML/day or 3,427ET. Therefore, the reuse system provides sufficient capacity to accommodate the additional load as defined in the Conditions of Approval.

20

5

RECOMMENDATION:

That the report is noted.

25

FOR INFORMATION ONLY

Report

The relevant section from Condition 9 of the Approval is Condition 9(iii), which states, "Additional load at West Byron STP will not be accepted until: availability of sufficient reuse capacity to accommodate 100% of the volume of treated effluent generated by the additional load".

5 "*Additional Load*" is defined in the report as "any sewage load resulting from development consents after the date of this approval". Date of Approval is 9 December 2002.

From December 2002 through to September 2023 there have been 2,871 additional Sewer Equivalent Tenements (ET) approved by Council via development consents. This additional load (including approvals for secondary dwellings) is also adjusted based on development applications that have been medified, withdrawn, refused or when the approval expires during the same period

10 that have been modified, withdrawn, refused or when the approval expires during the same period. Figure 1 shows the annual approved additional ET load from 2002 to September 2023.



Figure 1 - Equivalent Tenements approved by Council from 2002 to September 2023

The current day operating capacity of the reuse system to produce treated effluent is 26 Litres per second or 2.25ML/day less 10% of water for filter backwash purposes equates to 2.02ML/day or 3,427ET. (Note: 1ET = 590L/day for sewer = 0.215ML/annum)

Definition of an Equivalent Tenement: Sewage: That for the purpose of the policy an Equivalent Tenement is 590 litres per day of unmetered sewage discharge. These loadings are the average loading per dwelling. The sewer figure allows for base load infiltration to the sewerage system.

20

	Current	ET	Available
	Approved	Megalitres	Capacity
	ET	per annum	(ET)
Condition 9(iii) Additional Load Calculation	2,871	618.3	-
Current effluent reuse system capacity 2022	3,427	736.8	556

Therefore, the existing reuse system provides sufficient capacity to accommodate the additional load as defined in the Conditions of Approval.

Committee Report Tracking Summary:	Current	Difference
Condition 9. Additional Load at Byron STP	Approved	(ET)
	ET	
30 January 2020	2,408	-
30 July 2020	2,478	70
29 October 2020	2,508	30
18 February 2021	2,738	230
29 April 2021	2,749	11

FOR INFORMATION ONLY

19 August 2021	2,683	(66)
21 October 2021	2,727	44
18 March 2022	2,791	64
18 August 2022	2,810	19
16 November 2023	2,871	61

Note that ET load is adjusted (reduced in some cases) based on development applications that have been modified, withdrawn, refused or the approval expires.

In terms of the actual reuse volumes for Byron Bay since the system was commissioned the following annual figures are provided in the table and figure below.

			Environmen	
		On-site	tal Reuse	Total Reuse
Year	Urban Reuse (ML)	Reuse (ML)	(ML)	(ML)
2006	258.8			258.8
2007	336.1			336.1
2008	204.4			204.4
2009	174.5			174.5
2010	257.2			257.2
2011	287.4			287.4
2012	294.0			294.0
2013	287.2			287.2
2014	296.9			296.9
2015	261.9			261.9
2016	221.8			221.8
2017	257.8			257.8
2018	246.3			246.3
2019	425.3			425.3
2020	405.2			405.2
2021	382.5			382.5
2022	207.2	30.8	185.1	423.0
*2023	146.6	19.8	142.8	309.2
* Dortial v	- Dar		•	

5

* Partial year

On-site reuse and environmental reuse achieved via evapotranspiration at the Byron Bay Integrated Water Management Reserve (BBIWMR) were included in the Total Reuse Flows as shown in Figure 2 (2022-2023).

Environmental reuse was calculated using a water-balance model of the BBIWMR system. On
 average, the estimated daily reuse at the BBIWMR is 0.5 ML/day. Improvements are underway to double this potential.

Additionally, urban reuse demand has decreased to an average of 0.5 ML/day from 2022. This is attributed to heavy rainfall events and the decommissioning of recycled water connections for indoor purposes.

15

FOR INFORMATION ONLY



Figure 2 – Total Reuse Flows

Report No. 6.2	Mullumbimby Inflow and Infiltration	
Directorate:	Infrastructure Services	
Report Author:	Lee Griffiths, Capital Works Engineer	
File No:	12023/1765	

5 **Summary:**

The purpose of this report and presentation is to summarise the works related to Council Resolution 18-054 to date.

This covers the Inflow and Infiltration assessment and remediation works program in both Mullumbimby and the rest of the Shire.

10

Attachments:

- 1 I and I Sewer Report Nov 2023, E2023/116881 , page 140 🗓 🛣
- 15 2 Sewer Asset Management Presentation PDF, E2023/117138, page 151 🗓 🖀

FOR INFORMATION ONLY

Report

5

From Council Resolution 18-054, this project was initiated in FY19/20 after the flow on effects of poor asset management practices were experienced with sewer pump stations exceeding the allowable peaking factors. The program has now entered its final year.

The Inflow and Infiltration report and presentation are to detail and address any concerns, while providing insight into projects value so far.

Strategic Considerations

10 **Community Strategic Plan and Operational Plan**

CSP Objective	CSP Strategy	DP Action	Code	OP Activity
5: Connected Infrastructure	5.5: Provide continuous and sustainable water and sewerage management	5.5.2: Wastewater management - Manage effluent in an ecologically sustainable way that ensures public health and protects and enhances the natural environment	5.5.2.6	Undertake wastewater network inflow and infiltration reduction initiatives at Mullumbimby
5: Connected Infrastructure	5.5: Provide continuous and sustainable water and sewerage management	5.5.2: Wastewater management - Manage effluent in an ecologically sustainable way that ensures public health and protects and enhances the natural environment	5.5.2.8	Undertake wastewater network inflow and infiltration reduction initiatives (except Mullumbimby which has dedicated program of work)

FOR INFORMATION ONLY

Recent Resolutions

• Council Resolution 18-054

Legal/Statutory/Policy Considerations

5 Not applicable.

Financial Considerations

Not applicable

Consultation and Engagement

Not applicable

Inflow and Infiltration – Sewer Asset Management



1. INTRODUCTION

Byron Shire Council is responsible for the management of ~190km of gravity sewer mains throughout the shire. This report provides a summary of the findings relating to the gravity sewer infrastructure that has been visually condition assessed as part of the ongoing gravity sewer asset management program over the past four years as well as the remediation works that have resulted from these assessments.

2. BACKGROUND

From Council Resolution 18-054, this project was initiated in FY19/20 after the flow on effects of poor asset management practices were experienced with sewer pump stations exceeding the allowable peaking factors. Following a review of the 30 year capital program in 2019, it was identified that 40 gravity sewer mains within the Mullumbimby catchment were proposed for renewal within the 2022-2031 horizon. This prompted some flow monitoring of the network to identify if I&I was an issue which is a high level indication of the networks condition. It was identified that I&I was evident, hence visual condition assessments were undertaken to determine each individual pipe and maintenance holes overall condition and consequence of failure scores to establish the subsequent overall risk rating. This assessment enabled the appropriate remediation measures to be proposed for assets that were a high risk.

3. RISK

Good asset management can assist with reducing the risk associated with managing asset bases such as gravity sewer networks. Desirable outcomes that this project aims to achieve through the ongoing program of condition assessments followed by prioritised rectification works are as follows:

- A reduction in expensive emergency rectification works due to timely preventative intervention.
- Reduced on-going sewerage operational costs due to limiting the capture, transfer, and treatment of both groundwater and stormwater that can infiltrate into poorly managed sewer networks.
- A reduction of infiltration into the sewer network that often results in the migration of supportive material beneath road pavements which can cause their collapse (sink hole).
- Increased public health due to reduced sewage spills into private property and public spaces.
- Increased asset lifespan due to well-timed remediation.
- Data driven decision making.
- Improved serviceability and infrastructure resilience.
- Improved customer satisfaction.

If council fail to implement the ongoing program of asset management works, the contrary to the above desirable outcomes will be realised especially during system failures or extreme weather events consuming councils' budget, damaging the reputation, and compromising the health of the

1 | P a g e

community and the environment. Data driven rectification works fed by proactive and targeted condition assessments are the best way forward to ensure the resilience and integrity of the sewer network is maintained.

4. CONDITION ASSESSMENTS

4.1. Risk Analysis

To ensure that the highest risk sewer catchments were assessed in order of priority, a sewer catchment risk analysis was established based on various factors such as average age, depth, material type, peaking factors, and depth below water table.

4.2. Assessments

Over the past four years, eighteen catchments have been condition assessed with another sixteen smaller sewer catchments to be assessed in FY23/24. Across the five towns on average almost 50% of the sewer network has been visually assessed to date, the following graph identifies the length of the sewer network in each town and the length that has been assessed to date.



Figure 1 – Condition Assessment Summary

4.3. Findings

The findings from the assessments to date have resulted in a large array of rectification works that are identified in Section 5 of this report, however an average risk score for the sewer network that has been assessed to date in each town within Byron Shire is identified in the below graph. It is necessary to consider the length of each of the below catchments that have been assessed when comparing average overall scores for each towns sewer system whilst noting that the higher risk catchments are completed first. It would be expected that the average risk score for each town will reduce as the program continues as lower risk portions of the network yet to be assessed will reduce the average.





It should be noted that a risk score of 1 indicates a low risk and a risk score of 5 represents a high risk.

4.4. Re-assessments

During the assessment of gravity sewer networks, each asset is assigned an overall risk score that assists with the proposed outcome. Outcomes can be either a re-assessment in a future date (4 year intervals) depending on the assigned risk, or to undertake rectification works specific to the defects of the particular asset.

As the program has been ongoing for 4 years to date, the first of the proposed re-assessments are due this FY23/24 from the original Mullumbimby catchment 4001. There are 18 mains from this catchment that are due for re-assessment that will be included in the CCTV program for FY23/24. In FY24/25 there will be a further 38 mains from catchments 3002 and 5012 that will be included in the CCTV package.

4.5. Unassessed Mains

There were 14 mains from the original Mullumbimby 4001 catchment that were unable to be assessed due to access issues. It should be noted that where mains have not been able to be assessed due to access issues associated with buried maintenance holes or other limitations, these mains have not yet

3 | Page

been assessed throughout the network. These works are often complicated and have a heavy resource load often requiring community / private landowner consultation. The focus has been on the majority of the network that does not have access limitations to begin with whilst documenting access limitations for future rectification packages. This project will likely require the assistance of a dedicated project manager.

5. RENEWALS

5.1. Works Completed

Stemming from the condition assessment works, there have been 430 sewer mains recommended for some form of rectification of which 244 have been completed. Rectification works range from root removal, isolated pipe patching, full structural relines, and isolated repairs requiring excavation. A summary of the total number of mains proposed for rectification and the sewer mains that have had rectification works completed are detailed below in Figure 3.



Figure 3 – Summary of Sewer Main Rectifications

It should be noted that approximately 185 sewer maintenance holes have also been rectified as part of this program of works over the past four years.

6. CONCLUSION

It is evident that the asset management program involving ongoing condition assessments and rectification works has proven valuable. Hundreds of assets in poor condition identifying high risk to Byron Shire Council have been rectified because of this program. In addition to this, the Utilities department have detailed information of the condition of the network which enables data driven decisions to be made to ensure that capital expenditure is prudent and economical. It is recommended that beyond the initial five year inflow and infiltration project that the program of works should continue into perpetuity. The sewer network should not depend on a project but should be managed into perpetuity as ongoing asset management that all government bodies responsible for large asset bases should undertake.

However, it is clearly evident that the performance of the I&I program is dependent on the stormwater infrastructure and associated hydraulic capacity of the stormwater network. To achieve the desired outcome, asset management across both sewer and stormwater infrastructure should be aligned and strategic in nature. The poor condition and/or inadequate sizing of stormwater infrastructure in an area where sewer infrastructure is also below the hydraulic grade line of the stormwater system caused significant infiltration and inflow into the sewer reticulation system via the gravity sewer mains, junctions, inspections points and pump stations. The ingress of this stormwater is then pumped to associated sewage treatment plants and processed through the system. This has significant cost impacts including environmental and social impacts. The Ocean Shores STP is currently deemed high risk under EPA's risk assessment tool. This is due to wet weather events causing additional inflow into the STP that cannot be processed to EPA licence requitements. In addition, these events can cause uncontrolled discharge to the Brunswick River which is an EPA notifiable incident.

5 | P a g e
7. QUESTIONS FROM CR. HUNTER

Please see below consolidated response to Cr. Hunter's questions.

Please find the answers to each question below in blue.

1. How many of the sewer drains, of the 22 identified and recommenced for replacement in the Willow Sparrow (2019) report have been replaced?

Of catchment 4001, twenty-seven mains had relining which also includes twenty one of the twenty-two mains that required remediation works.

Each of these mains has been relined except for line 81 ID32702. This main was removed from scope due to major difficulties/costs associated with remediation.

The table below details the pipes that have undergone remediation work.

In FY23/24 we will be assessing catchments 4005 and 4012 within Mullumbimby.

Pipe ID	Report Line #	W+S Recommendation	Renewal Works		
32305	13	Replace	Relined		
33027	1	Replace	Relined		
33044	9	Replace	Relined		
33629	11	Replace	Relined		
33650	22	Replace	Relined		
32901	24	Replace	Relined		
33627	25	Replace	Relined		
36101	45	Replace	Relined		
35838	49	Replace	Relined		
33033	50	Replace	Relined		
33034	51	Replace	Relined		
32733	52	Replace	Relined		
32691	69	Replace	Relined		
32720	70	Replace	Relined		
32728	72	Replace	Relined		
32726	74	Replace	Relined		
32729	75	Replace	Relined		
32712	76	Replace	Relined		
32717	77	Replace	Relined		
32702	81	Replace	Removed from scope		
32742	83	Replace	Relined		
32716	85	Replace	Relined		
32691	95	Replace	Relined		
32883	98	Replace	Relined		

6 | Page

33634	99	Replace	Relined
32847	100	Replace	Relined
33635	109	Replace	Relined

2. Of the remaining 22 assessed; how many have been attended to with rectification work as recommended?

Please refer to the above.

3. How many mains recommended for re-assessment in or by the end of 2023 are yet to be completed?

The assessment of mains in other Byron Shire catchments has been prioritised over the reassessment of previously surveyed areas. Mains recommended for reassessment will become a priority once Council has developed a clear representation of the entire sewer network.

Further elaboration as requested by Cr. Alan Hunter:

Regarding Q3, I've consulted with Councils Asset Engineer and believe Cr. Hunter is relying on the Condition assessment reports (that have now been superseded) and not the latest remediation work information. See screen shot below.

- Of the 5237 gravity sewer mains we have in total, 2267 have been physically inspected leaving 2970 to complete. These will hold priority over recently inspected assets.
- We now do not rely on contractors to supply us with a capital works program as we have developed a complex and comprehensive predictor model on this asset class which assigns capital works based upon condition, risk, priorities and optimises capital funding each year.

7 | P a g e

υρατισιν

			Capital Works Delivery Period					30yr Capital	
#	Pipe Section	Decision Outcome	2019	2023	2027	2031	2035	Pipe Age at Next Assessment (yrs.)	Program – Replacement Year
1	EA04-EA05	Replace	Immediate					37	
2	EA03-EA04	Monitor (Cat 1)		Assess				41	
3	EA02-EA03	Monitor (Cat 2)			Assess			45	
4	EA01-EA02	Monitor (Cat 2)			Assess			45	
5	EA01-EA01/End	Monitor (Cat 2)			Assess			45	
6	E18-EA01	Monitor (Cat 2)	Patch liner		Assess			45	
7	E14-E16	Leave (Cat 3)				Assess		67	
8	E13-E14	Monitor (Cat 2)			Assess			63	
9	E17-E18	Replace	Immediate					59	
10	K01 -E08	Leave (Cat 3)				Assess		67	
11	K01-K02	Replace	Immediate					55	
12	E08-E09	Monitor (Cat 2)			Assess			59	
13	E09-E10	Replace	Immediate					55	2035
14	K02-K03	Monitor (Cat 2)			Assess			63	
15	E10-L01	Monitor (Cat 2)	Patch liner		Assess			63	
16	L01-DE	Leave (Cat 3)				Assess		67	
17	E10-E11	Monitor (Cat 2)			Assess			63	2035
18	E07-E08	Monitor (Cat 1)	Re-assess	Assess				59	2028
19	E06-E07	Monitor (Cat 2)			Assess			67	2028
20	J01-J02	Monitor (Cat 2)			Assess			63	
21	E06-J01	Monitor (Cat 2)			Assess			63	
22	E05-E06	Replace	Immediate and clear line					63	
23	E05-DE	Leave (Cat 4)					Assess	71	2030
24	E04-E05	Replace	Immediate					59	2030
25	E03-E04	Replace	Immediate					55	2029
26	N04-N05	Monitor (Cat 1)		Assess				59	2032

4. How many of the 14 mains that were not assessed at all in this W/S report are yet to be assessed?

These mains were not assessed due to access limitations. This could be that the maintenance holes are buried/built over or that landowners did not grant access. Unassessed mains have not been revisited to date.

Further elaboration as requested by Cr. Alan Hunter:

Q4: Of the mains that could not have assessment work completed, a register will be developed to arrange for the inspection of assets. While Council has the powers of entry to a Council asset, this will need to be completed in a respectful approach with the community. The approach elected will impact the time frame of these works.

This is an item I would like to discuss further given it can become sensitive in nature.

5. Could staff also provide a short list of the risks of a system failure that could impact any social, environmental or financial responsibilities of council and any comment about the amelioration of such?

Further elaboration as requested by Cr. Alan Hunter:

Utilities have a Business Contingency Plan that is executed when any of the below risks to operational system failure occurs.

Risks associated with system failure include but are not limited to;

• Possible increased frequency and severity of blockages

8 | Page

- Slow running drains or back flowing
- General Maintenance issues
- Stormwater inflow and pump station load burdening
- Inadequate stormwater condition and capacity
- Reputation damage for Council

In any sewer reticulated system. Rain events are allowed for in design through capacity requirements to Industry standards. However, sometimes the rain events exceed these standards. Council staff are currently in the process of building resilience into the sewer system (from the recent natural disaster data) And working closely with Public works to look at high risk areas subject to social, environmental health and impacts to service delivery. This includes increasing invert heights of key pump stations.

Regarding your comments relating to social, environmental, and financial responsibilities. The overall asset management of the sewer system program has been driven by a risk approach. This means not only condition assessment gives a priority of works. The use Of multicriteria analysis using condition rating and risk (around financial, social, and environmental factors) have been used to drive prioritisation through financial social and environmental multi-criteria assessment. This follows best practice asset management principles to ISO 55000 series Assessment Management Standards.

9 | P a g e

FOR INFORMATION ONLY

6.2 - ATTACHMENT 2

SEWER ASSET MANAGEMENT

PREPARED BY WILLOW & SPARROW JULIAN VIVOLI & ALAN NEWNHAM

WSAC Agenda

16 November 2023



WSAC Agenda

FOR INFORMATION ONLY

6.2 - ATTACHMENT 2



WSAC Agenda

FOR INFORMATION ONLY

6.2 - ATTACHMENT 2

WHAT HAVE WE RECTIFIED

GRAVITY SEWER RECTIFICATION SUMMARY



FOR INFORMATION ONLY

WHAT HAVE WE LEARNT

- Identified hundreds of defects that were contributing to poor network performance.
- Established more economical means to deliver certain aspects of work e.g. pipe defect patching.
- Condition assessments of the gravity sewer network also serve as imperative maintenance.
- Incorporated asset management software to assist with documenting and prioritizing expenditure.
- Asset prioritisation means more targeted, evidence based and timely expenditure.



FOR INFORMATION ONLY

6.2 - ATTACHMENT 2

WHAT DOES THE PATH AHEAD LOOK LIKE

- Continuation of prudent Asset Management until the entire network is assessed
- Increased capacity during wet weather events
- Managing lower risk sewer catchments
- Cost savings due to preventative works rather than reactive
- Improved serviceability and infrastructure resilience
- Data driven decision making
- Maximising asset lifespan

