

# WQTAG Meeting 30 May 2016

Sewage update- Rotoma Rotoiti

Consultation on WWTP upgrade - feedback


N discharge – a mechanism to allow for growth

P discharge – working together

# Sewage Update – ROTOMA ROTOITI

- The Resource Consent application is currently being developed.
- The **proposed** WWTP is an MBR
- The proposed discharge is to land through a trench disposal system.
- The hydrogeological investigation confirmed the suitability of the site for the proposed trench disposal system.



The background of the slide is a photograph of a forest. The top half shows tall, thin tree trunks reaching upwards, with some green foliage in the foreground. The bottom half shows a dense carpet of bright green ferns on the forest floor. A semi-transparent green rectangular box is overlaid in the center, containing the title text in white.

# Finding a solution for the future

## Wastewater proposals for the Rotorua district

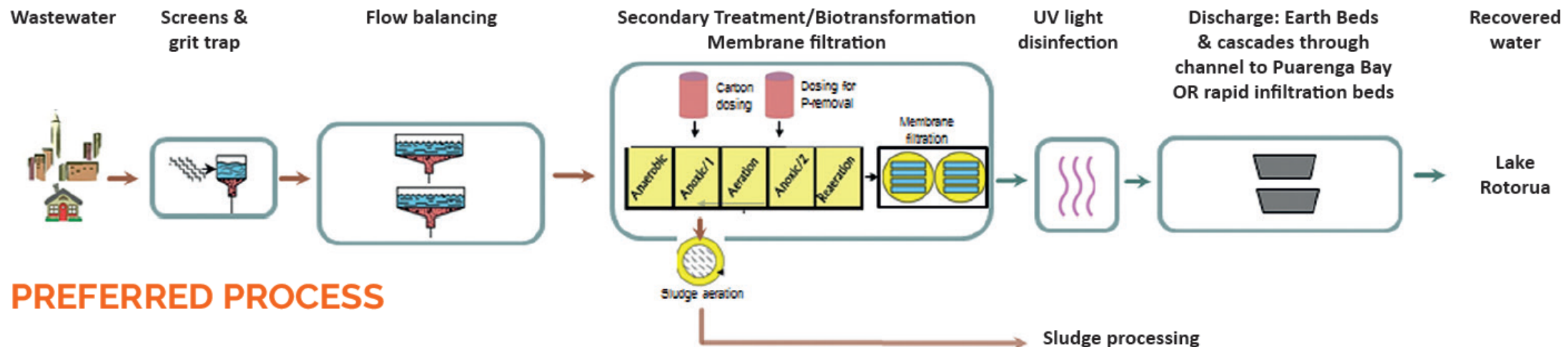
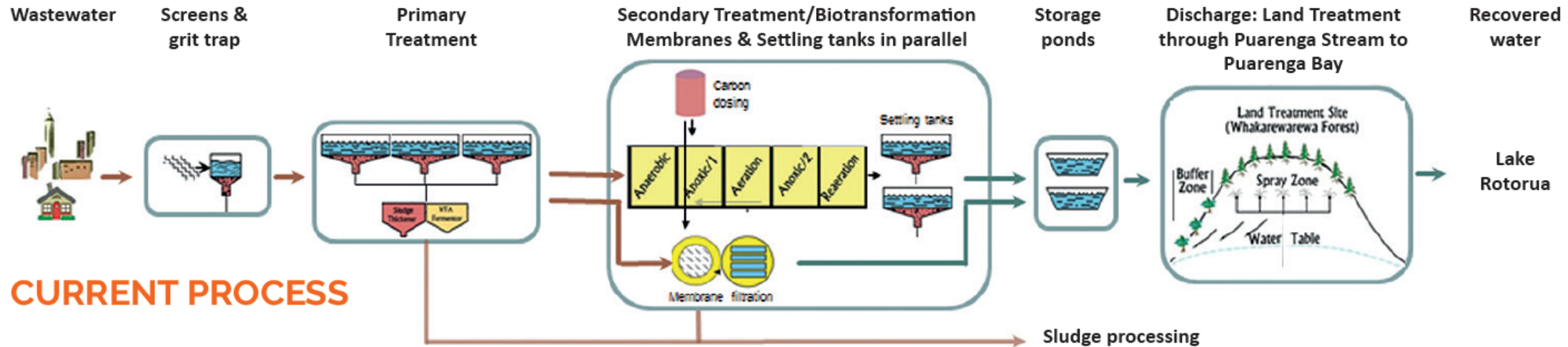
7 May 2016

**ROTORUA**  
LAKES COUNCIL



# OUTCOME OF THE COMMUNITY ENGAGEMENT PROCESS

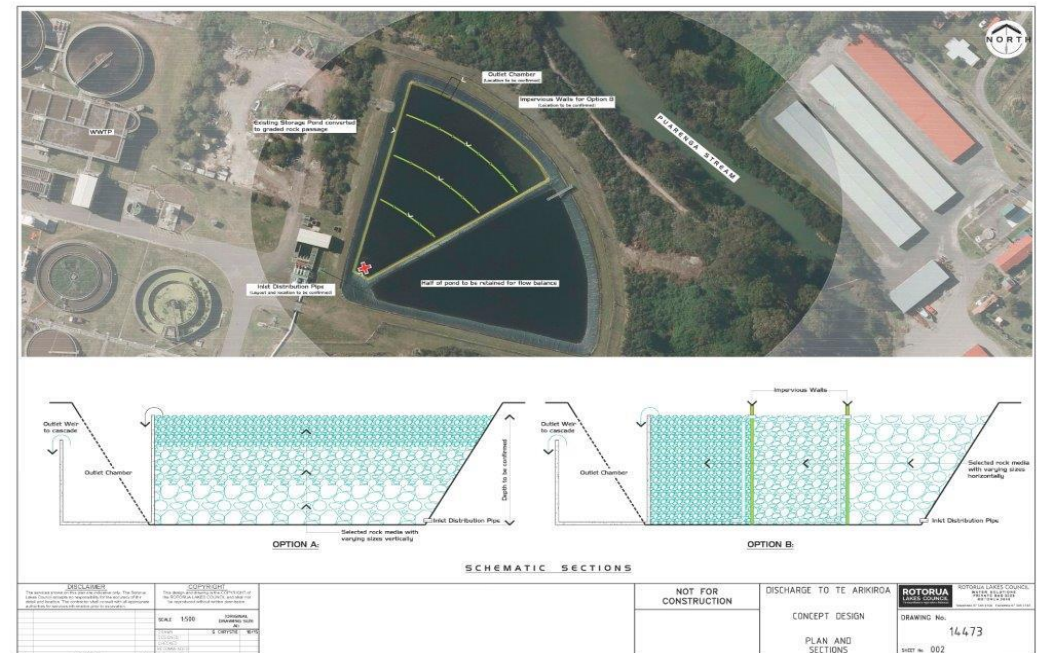
After 18 months, the Steering Committee, in conjunction with the supporting advisory panels (Technical Advisory Group, Cultural Assessment Sub-Committee, Council's team, and engineering advisors), came to a unanimous decision to consult on a preferred treatment process and narrowed the discharge down to two options.



# Where will the recovered water go?

**Cost \$1.5M**

**Proposed Land Contact Concept?**



**Steering Committee not unanimous  
on discharge location and method**



## ECONOMIC

- Allows for Rotorua to grow – the process capacity is not constrained.
- Lower operational costs than other options that reduce nutrients sufficiently.
- No increase in the council targeted annual rate for wastewater for the proposed upgrade and preferred discharge option.

## CULTURAL

- Addresses iwi concerns about the use of the land at Whakarewarewa Forest.
- Addresses iwi concerns about discharge in the Puarenga Stream catchment.
- A cultural advisory sub-committee supports the plant upgrade and a cultural impact assessment is well underway.

### Impacts of the proposed treatment upgrade and discharge options

## ENVIRONMENTAL

- A new discharge location that can cope with increasing volumes.
- Improves Puarenga Stream water quality – no more discharging to Puarenga catchment.
- Insignificant change in lake water quality and nutrient load to the lake.
- Reduced environmental risk through better process that carries fewer operational risks.
- Reduced ethanol dosing costs.
- Reduced energy use and costs
- Reduced sludge production.
- Reduces footprint of the process.

## SOCIAL

- Reduced risk to human health associated with irrigation in the forest.
- Reduced risk to human health through improved water quality in Puarenga Stream.
- Reduced discharge of pathogens to Lake Rotorua.



A photograph of a forest with tall, thin trees and dense green foliage. A horizontal green band is overlaid across the middle of the image, containing the word 'Phosphorus' in white text.

# Phosphorus

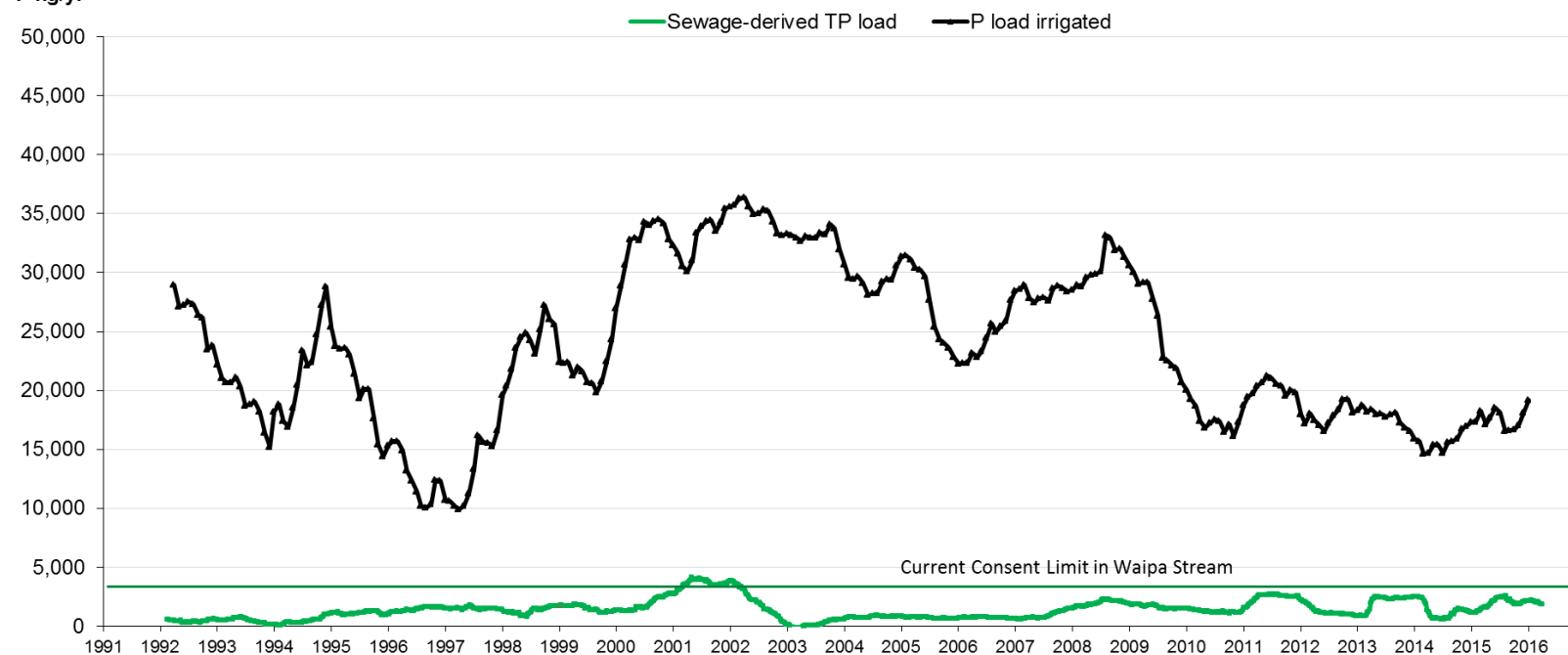
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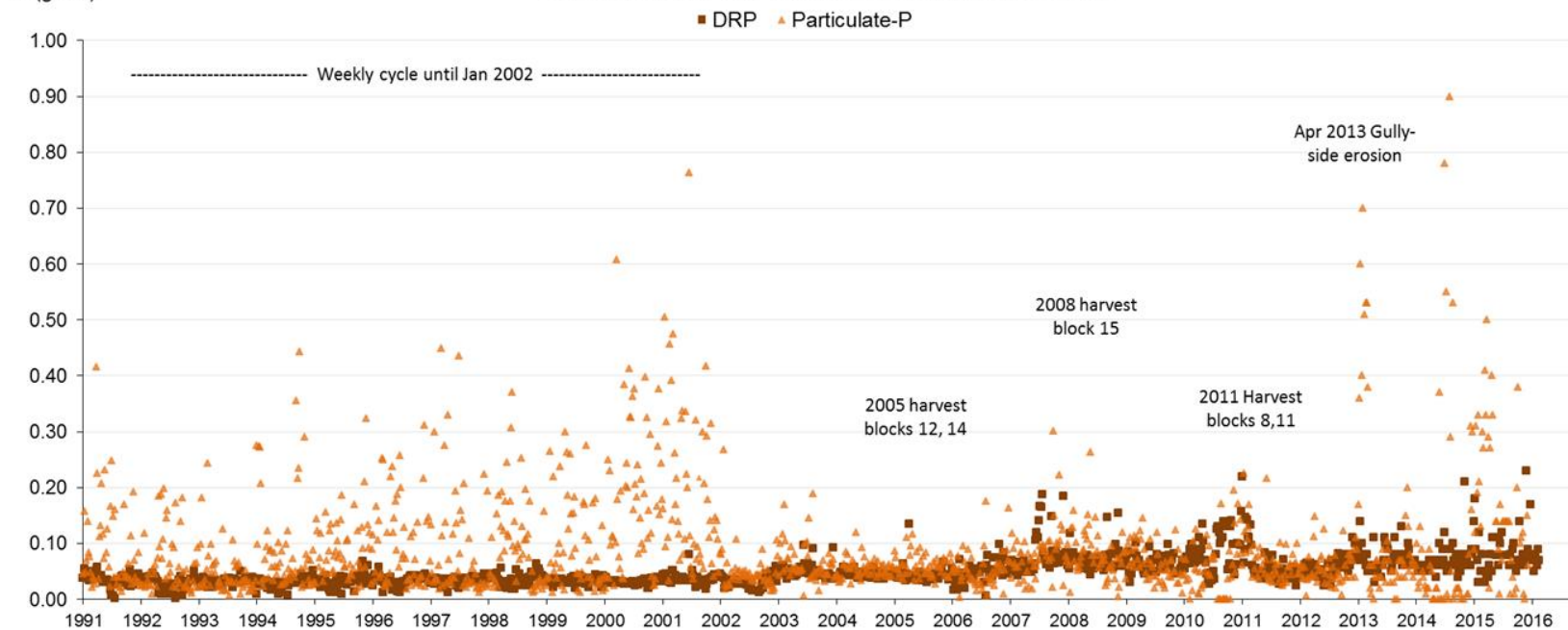
P kg/yr

### Phosphorus irrigated and 'sewage-derived P' exported



P (g/m3)

### Concentration of DRP and particulate-P in Waipa Stream





# P - Consented limit or Operational targets

- Consented Limit – is a maximum, will allow for growth, will allow for intermittent issues
- Operational Target for WWTP?
- Or is there an opportunity to work together - base the stream dosing and WWTP dosing on the lake DRP levels?
- Anthropogenic P?



The background of the slide is a photograph of a forest. The upper portion shows tall, thin tree trunks reaching towards a bright sky. A solid green horizontal band is superimposed over the middle of the image, containing the word 'Nitrogen' in white. Below this band, the image shows a dense forest floor covered with lush green ferns and other undergrowth. A dark, horizontal object, possibly a pipe or log, is visible in the lower-left foreground.

# Nitrogen

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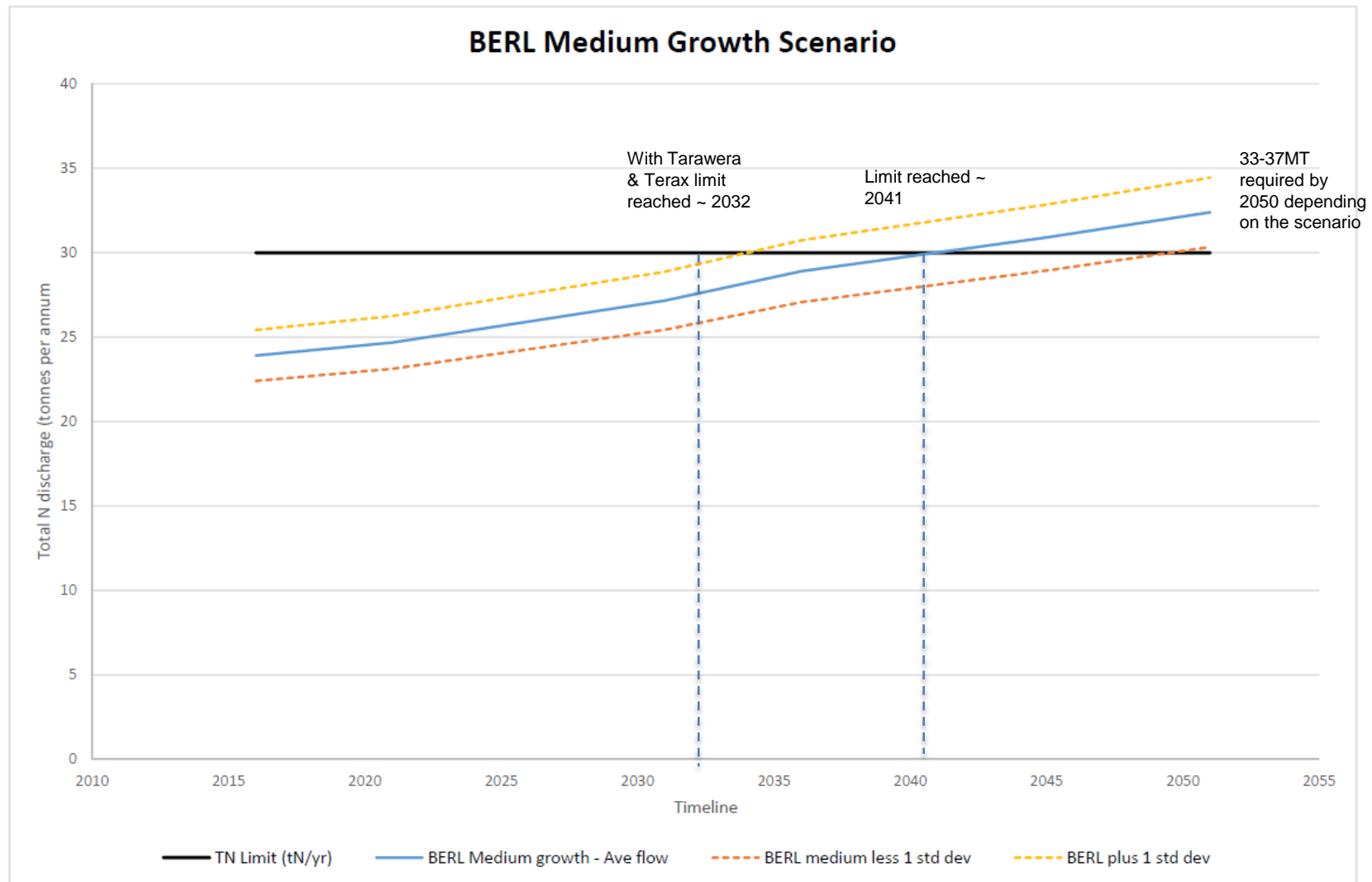
# Integrated framework is silent on WWTP limits

Table 4-2: Nitrogen loads to Lake Rotorua – Current and predicted

Sector		ROTAN 2010 Ultimate N Load <sup>2</sup> (tN/yr)	ROTAN 2010 N Load Subtotal (tN/yr)	Reduction (tN/yr)	2032 Ultimate Load (tN/yr)
Pastoral	Dairy	273	526	-96	256
	Drystock/Lifestyle	253		-44	
	Incentives scheme			-100	
	Gorse	(part of above)		-30	
Forest		76	76	0	76
Urban	Urban	24 <sup>3</sup>	93	-20	73
	Urban open space	8 <sup>4</sup>			
	Septic tanks	26 <sup>5</sup>			
	Sewage treatment	34 <sup>6</sup>			
Other	Geothermal	30	30	-30	0
	Rain	30	30	0	30
<b>TOTALS</b>		<b>755</b>	<b>755</b>	<b>-320</b>	<b>435</b>

Source: MWH, National & Regional Planning Documents – Implications for the Three Waters, November 2015

- Propose a conc limit – allows for growth & additional reticulation
- need mechanism in the programme to deal with future N discharge
- WQ TAG question – when does it need to kick in... 30, 34, 39 t?





# Loads up to 2010

		Historic 0	1985 54,000	early Targets	1985 -2010	2010
Sector		Estimated Load (tN/yr)	Measured Load - stream separated (tN/yr)	Target Load - stream separated (tN/yr)	Reductions & Increases (change in tN/yr)	Ultimate Load (tN/yr)
RURAL - land	Pastoral - dairy					273
	Pastoral -dry stock, lifestyle, horticulture					253
	Pastoral sector - gorse					part of above
	Pastoral land					526
	Forested land					76
	<b>Total rural-sector land</b>					<b>602</b>
URBAN - land	Urban land - residential					24
	Urban land - open spaces					8
	<b>Total urban-sector land</b>					<b>32</b>
OTHER - land?						
<b>Land subtotal (subject to Rule 11)</b>		<b>200</b>	<b>345</b>	<b>345</b>	<b>289</b>	<b>634</b>
URBAN - built environment	semi-Urban - septic tanks		10	0	16	26
	Urban - landfill				30	4 transferred to WWTP
	Urban - WWTP Domestic sewage		150	30	-116	34
	Urban - WWTP Domestic sewage (residual from septic tanks)					
	Land-use-WWTP N in reticulated water		incl in 150	incl in 30	0	included in 34
	Urban - WWTP other (incl residuals transferred from landfill, geothermal)		0	0	0	4.5
	<b>Urban-built environment</b>		<b>160</b>	<b>30</b>	<b>-100</b>	<b>60</b>
<b>URBAN subtotal</b>		<b>0</b>	<b>&gt;190</b>	<b>&gt;30</b>	<b>-100</b>	<b>92</b>
Other	Rainfall	30	30	30	0	30
	Geothermal - Tikitere	30	30	30	0	30
	Geothermal - Other		?	?	0.5	0.5 transferred to WWTP
	Other engineering reductions					
	<b>Other subtotal</b>	<b>60</b>	<b>60</b>	<b>60</b>	<b>0</b>	<b>60</b>
<b>TOTALS</b>		<b>260</b>	<b>565</b>	<b>435</b>	<b>190</b>	<b>755</b>

# Loads up to 2032

		2010	2010-2032	2032	2032
Sector		Ultimate Load (tN/yr)	Target Reduction (change in tN/yr)	Current Target Load (tN/yr)	Suggested Target Load (tN/yr)
RURAL - land	Pastoral - dairy	273			
	Pastoral -dry stock, lifestyle, horticulture	253			
	Pastoral sector - gorse	part of above			
	Pastoral land	526	-270	<256	<256
	Forested land	76		>76	>76
	<b>Total rural-sector land</b>	<b>602</b>	<b>-270</b>	<b>332</b>	<b>332</b>
URBAN - land	Urban land - residential	24		24	24
	Urban land - open spaces	8		8	8
	<b>Total urban-sector land</b>	<b>32</b>		<b>32</b>	<b>32</b>
OTHER - land?					
<b>Land subtotal (subject to Rule 11)</b>		<b>634</b>		<b>364</b>	<b>364</b>
URBAN - built environment	semi-Urban - septic tanks	26	-10	16	16
	Urban - landfill	4 transferred to WWTP		0	0
	Urban - WWTP Domestic sewage	34	0	34	34
	Urban - WWTP Domestic sewage (residual from septic tanks)				2.3
	Land-use-WWTP N in reticulated water	included in 34			included in 34
	Urban - WWTP other (incl residuals transferred from landfill, geothermal)	4.5			4.5
	<b>Urban-built environment</b>	<b>60</b>	<b>-10</b>	<b>50</b>	<b>50</b>
<b>URBAN subtotal</b>		<b>92</b>	<b>-10</b>	<b>82</b>	<b>82</b>
Other	Rainfall	30		30	30
	Geothermal - Tikitere	30	-30	0	0
	Geothermal - Other	0.5 transferred to WWTP			
	Other engineering reductions		-10	-10	-10
	<b>Other subtotal</b>	<b>60</b>		<b>20</b>	<b>20</b>
<b>TOTALS</b>		<b>755</b>	<b>-320</b>	<b>434</b>	<b>434</b>

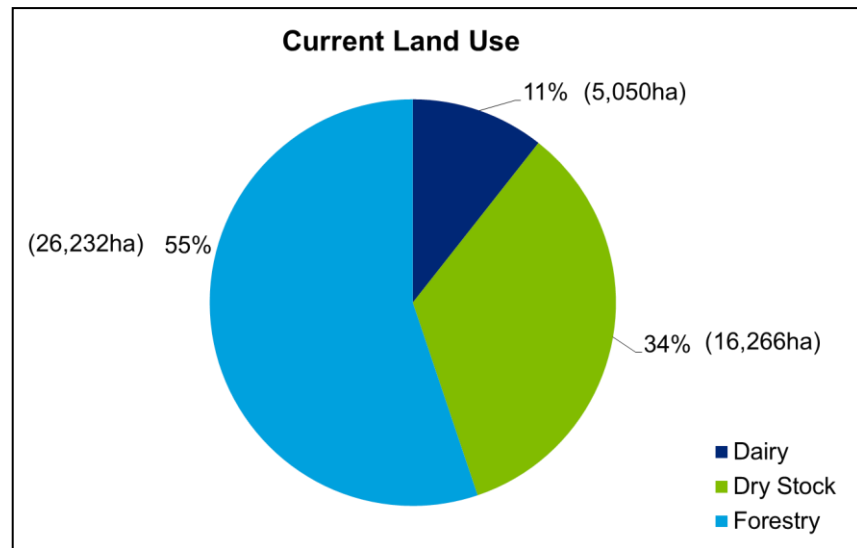


# Loads post- 2032

		2032	2032	2051	Future increasng	
Sector		Current Target Load (tN/yr)	Suggested Target Load (tN/yr)	Suggested Target Load (tN/yr)	Ultimate Load (tN/yr)	
						Notes
RURAL - land	Pastoral - dairy					
	Pastoral -dry stock, lifestyle, horticulture					
	Pastoral sector - gorse					
	Pastoral land	<256	<256	<256		transfer to forest
	Forested land	>76	>76	>76		transferred from pasture
	<b>Total rural-sector land</b>	<b>332</b>	<b>332</b>	<b>332</b>	<b>reducing</b>	based on area
URBAN - land	Urban land - residential	24	24	24		
	Urban land - open spaces	8	8	8		
	<b>Total urban-sector land</b>	<b>32</b>	<b>32</b>	<b>32</b>	<b>increasing</b>	based on area
OTHER - land?						
	<b>Land subtotal (subject to Rule 11)</b>	<b>364</b>	<b>364</b>	<b>364</b>	<b>364</b>	
URBAN - built environment	semi-Urban - septic tanks	16	16	16	16	
	Urban - landfill	0	0	0	0	
	Urban - WWTP Domestic sewage	34	34	40.8	increasing	mg/l based on population
	Urban - WWTP Domestic sewage (residual from septic tanks)		2.3	2.3 transferred	discretionary	Lakes Program
	Land-use-WWTP N in reticulated water		included in 34	included in 34	-	transfer mg/l from landuse
	Urban - WWTP other (incl residuals transferred from landfill, geothermal)		4.5	4.5 transferred	discretionary	Lakes Program
	<b>Urban-built environment</b>	<b>50</b>	<b>50</b>	<b>56.8</b>	<b>16</b>	
	<b>URBAN subtotal</b>	<b>82</b>	<b>82</b>	<b>88.8</b>	<b>16</b>	
Other	Rainfall	30	30	30	30	
	Geothermal - Tikitere	0	0	0	0	
	Geothermal - Other					
	Other engineering reductions	-10	-10	-10	-10	
	<b>Other subtotal</b>	<b>20</b>	<b>20</b>	<b>20</b>	<b>20</b>	
<b>TOTALS</b>		<b>434</b>	<b>434</b>	<b>441</b>	<b>400</b>	

Spare slides follow

# 140tN or 44% of 320tN reduction will come from pastoral sector reductions to NDA levels (rules)



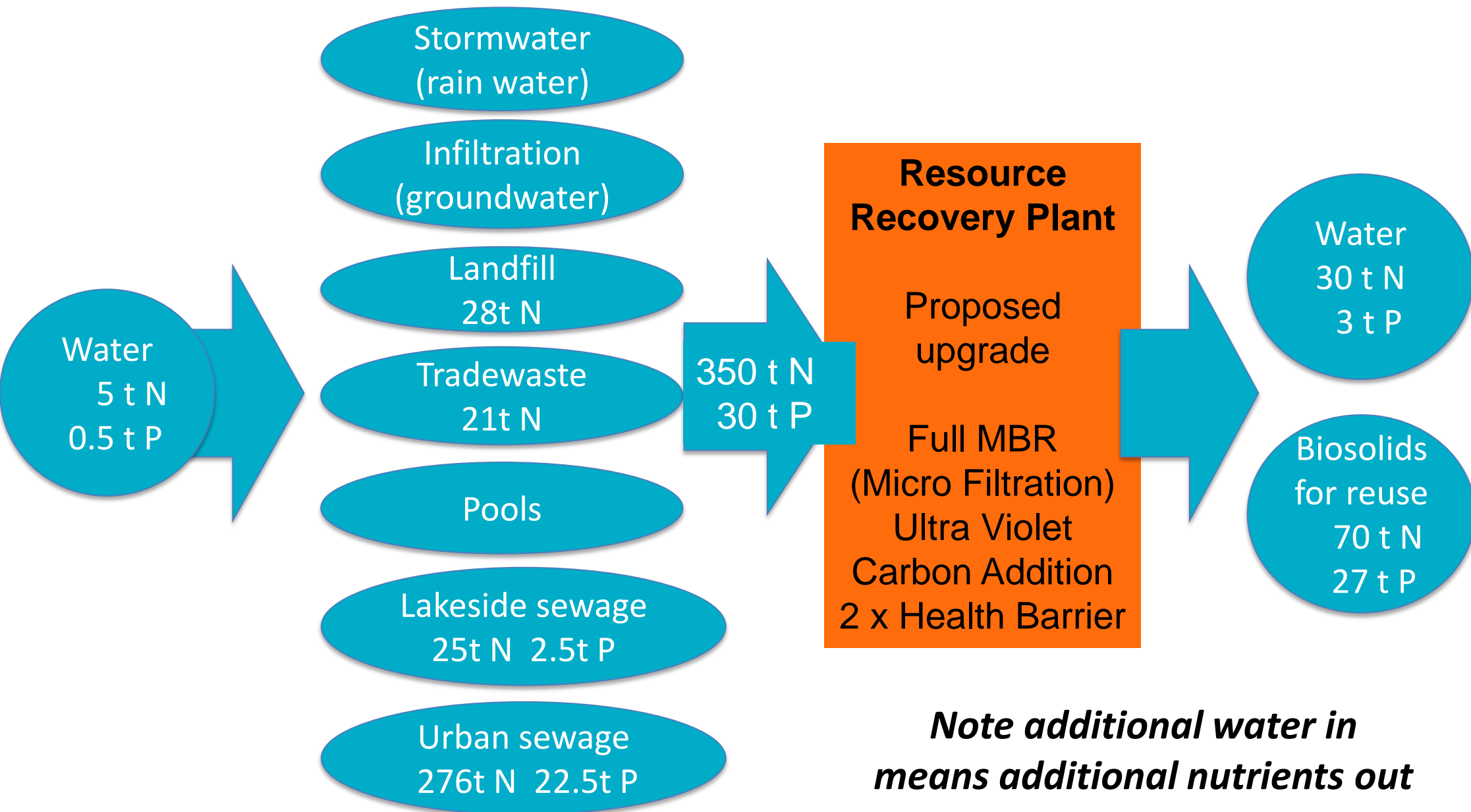
- 5,050 ha of dairy is in catchment and expected to reduce tN/yr by 35.3%
- 16,125ha of drystock is in catchment and expected to reduce tN/yr by 17.2%

Sector	ROTAN <sup>1</sup> 2011 Area (ha)	ROTAN 2011 Load (tN/yr)	2032 Sector allocation (tN/yr)	Reduction (tN/yr)	Proportional reductions from sector as % of sector load
Dairy	5050	273.2	176.8	96.4	35.3%
Drystock	16125	253.2	209.6	43.6	17.2%

*Table note: The values used are based on OVERSEER® 5.4 numbers and reflect the best science estimates of nitrogen entering the lake. The dairy and drystock areas are effective grazing areas (including fodder crops).*

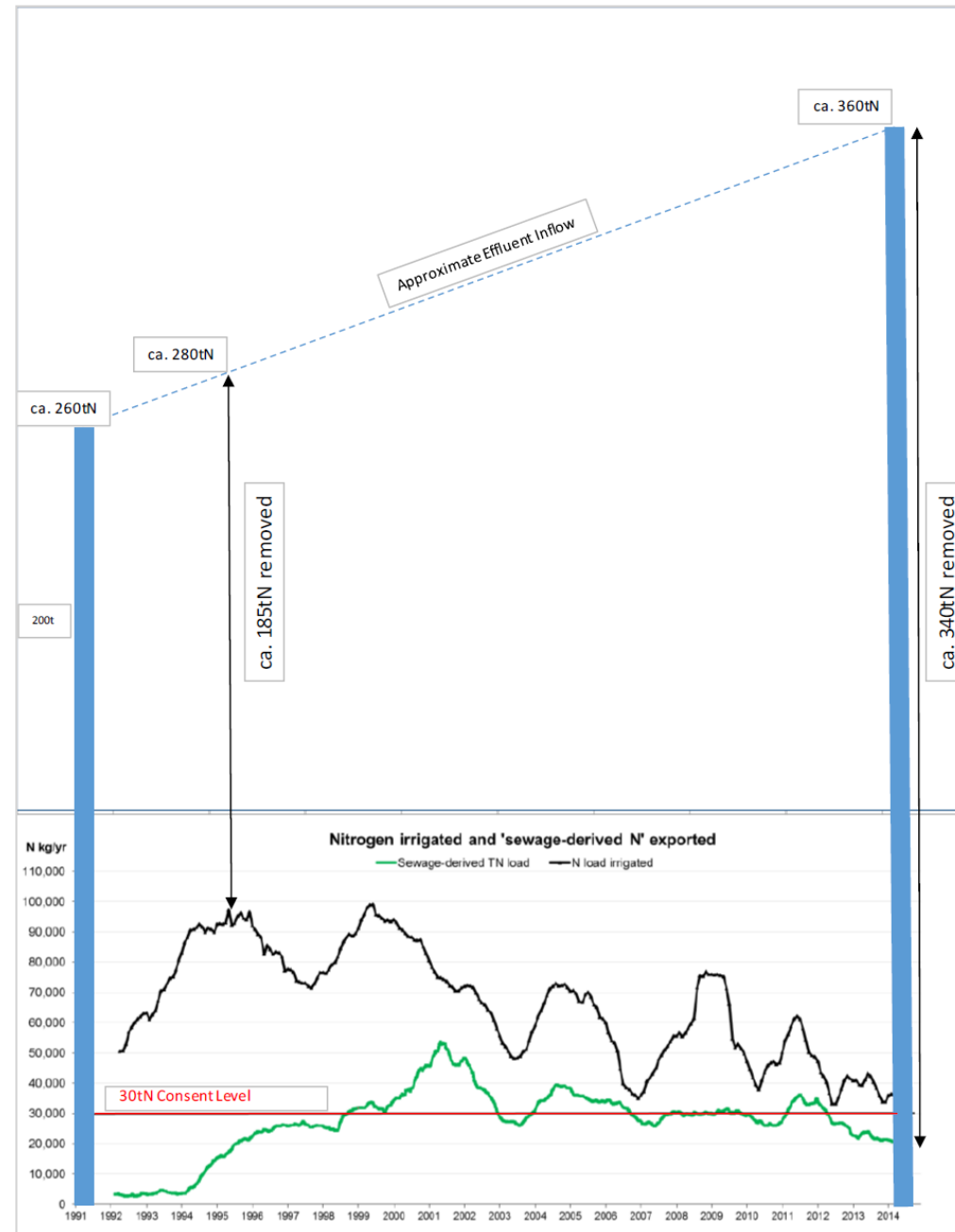


# WWTP already stops 320t N and 27t P



# Estimated WWTP Inflows & Outflows

Treated wastewater is  
**less than 5%** of the N  
going into Lake Rotorua





# Competing pressures exist on WWTP

Potential pressure to lower the allowance

- N removal from gorse at risk
- N removal from Tikitere springs at risk
- Treatment of the LTS legacy load
- Development of under-developed māori owned land

WWTP  
30 MT  
Nitrogen  
Consent

Need to increase the allowance

- Urban population growth
- Visitor economy doubling by 2030
- Natural hot spring focus
- Reticulation of other lakeside communities e.g. Tarawera ~ 1t
- New industrial areas e.g. For example of magnitude, if Red Stag had to join it would be ~1.5t
- Terax ~ 2t

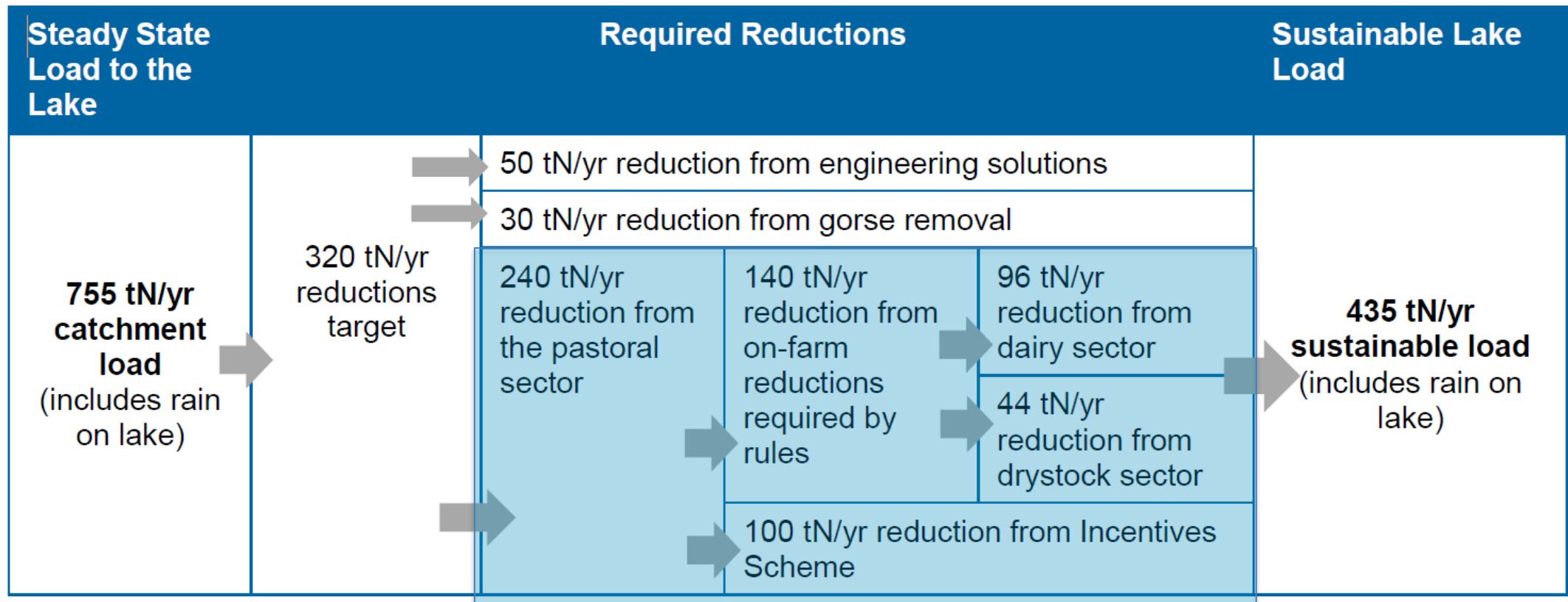
At technical limit for  
nitrogen removal (best in  
NZ)

# Integrated framework – roles and investment

Action	Date complete	\$m	Responsibility	tN /yr
Engineering – reticulation	Complete		RLC	10
Engineering – other			BOPRC	10
Engineering – geothermal			BOPRC	30
Gorse removal	1 Dec 2022	2.5	BOPRC	30
Incentives	1 Dec 2022	40 + 3.3 fund to investigate land use change	BOPRC	100 (over and above NDA)
Rules	Staged from 2022→2032	2.3 land use advice and support	BOPRC	140
TOTAL				320

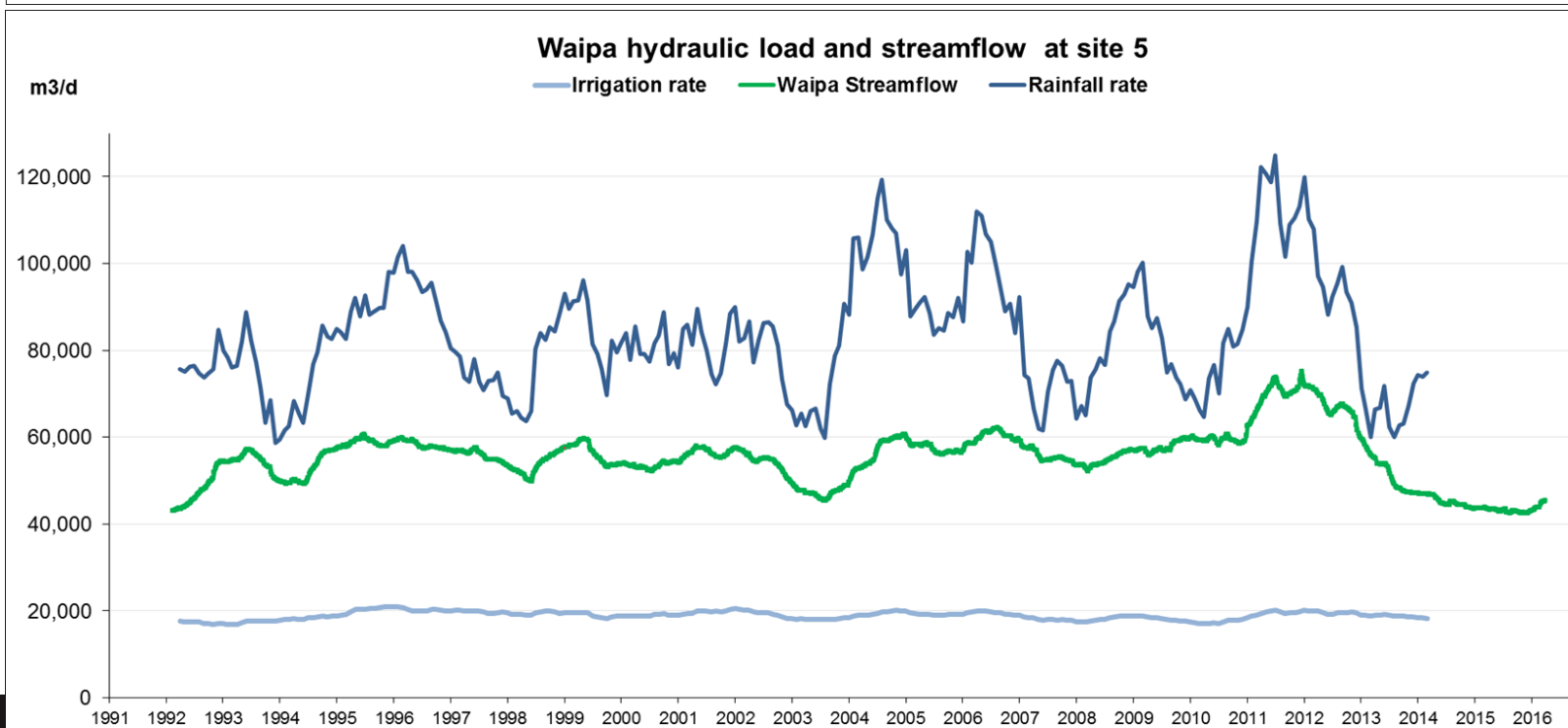
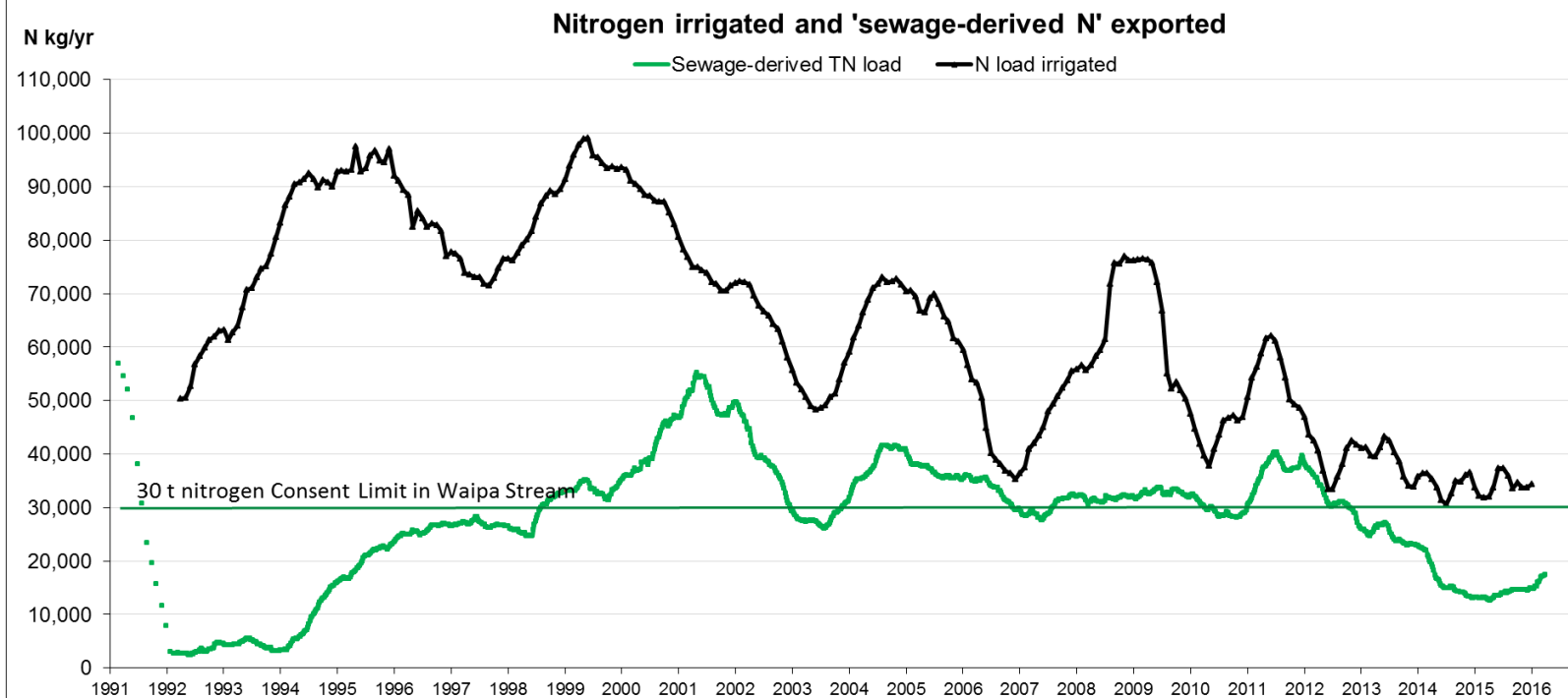


# Agreement to reach the 320tN through an integrated framework approach



*Table notes: (a) The values used are based on OVERSEER<sup>®</sup> 5.4 for pastoral land uses and reflect the best science estimates of nitrogen entering the lake;*

*(b) tN/yr is the load to the lake in “tonnes of nitrogen per year”.*



mm/yr

## Total hydraulic loading rate on the LTS

Irrigation Rainfall

