Document No: A344742	
Report To:	**Council**
Waitomo District Council	**Meeting Date:** 28 March 2017
	Subject: Progress Report: Major Capital Works Report

Purpose of Report

1.1 The purpose of this business paper is to inform Council of progress on major new and renewal projects as identified in Council's Activity Management Plans, or which have arisen during the course of normal maintenance and operation of the Roading infrastructure, the three Waters and some projects in the Community Services area.

Local Government Act S.11A Considerations

2.1 Waitomo District Council, in performing its role as a Local Authority, must have particular regard to the renewal of all it assets as determined through prudent asset management to consistently meet the needs of the community.

Commentary

3.1 Roads

Location	Description	Action	Progress
Totoro Road	RP 8.378 to RP11.316 Various slips – retreat into bank and improve drainage	Design & Contract documentation	Completed
		Tender	Awarded - ICL
		Construction	January 2017 – May 2017
Ramaroa Road	2016-17 Rehabilitation site	Pre Design process in progress	
Rangitoto Road	2016-17 Rehabilitation site	Pre Design process in progress	
Te Waitere Road	RP 0.45 & two other Sea undermining road	Concept Designs	Alternative solutions identified and being developed
		Seashore Consent	To follow
Taharoa Road	RP 7.1 Hillside moving	Concept Designs	On hold while monitoring earth movement
Maraeroa Road	Seal extension	Design & Contract documentation	Complete
		Construction	Contractor on site - Construction completion targeted early part of 2017 summer period

3.2 Waters

Location	Description	Action	Progress
Te Kuiti Water Treatment Plant - **Phase 1**	Stage 1 – Buffer tanks		Complete
	Stage 2 - Building, high and low level pump stations, UV installation, chemical dosing, main electrical supply and associated pile work		Complete
	Filter pipe work renewal	Pipe work manufacture	Complete
		Installation – 2 stages	Target dates Stage 1 - 4 to 8 April Stage 2 – Target completion April 2017
Te Kuiti Water Treatment Plant - **Phase 2**	Intake pump station renewal	Take Consent	Completed
		Prelim design and WRC construction Consent	Completed
		Final design & Tender documentation	Awarded
		Construction	January – May 2017. Construction delayed due to high level of river and final consent matters.
Te Kuiti Water Treatment Plant - **Phase 3**	Clarifier super structure renewal	Concepts identified	
	Clarifier refurbishment	Design, documentation & Tender	January 2017 to August 2017
		Construction – 4 stages	September 2017 to June 2018

3.3 Community Projects

Location	Description	Action	Progress
Security Fence	Behind I- site	Design	Complete
		Tender docs	Being finalised
		Tender & Railway approval	Approved
		Limited time construction	Require Kiwi Rail site safety approval and sign off.
		Construction & Kiwi Rail oversight	Temporary fencing installed. Permanent solution will form part of the over bridge upgrade.
Over Bridge	At I- Site	Structural investigation	Complete
		Design - Tender & Railway approval	Complete Initial estimates of works exceeded budget capacity. Revised designs for safety railings are being investigated.
		Limited time construction	Require Kiwi Rail site safety approval and sign off.
		– Kiwi Rail oversight – Close proximity to high tension power	
		Design and construct	

Location	Description	Action	Progress
TK Campground	New development	Preliminary concepts	Complete
		QS Rough Order of costs and Staging	Complete
		Feasibility study & business case	August 2016 Complete
		Funding	A business paper was presented to Council in November 2016 outlining the findings of the feasibility study. Further investigation is now being undertaken to inform LTP 2018-28 considerations.
Brook Park Entrance	Entrance Construction	Design & Tender documentation	Council Approved at its meeting on 6 October 2016 to include the upgrade to the entrance as a strategic issue for the EAP 17/18.
Benneydale Toilet	Toilet construction	Design and tender documentation	Complete Tenders close 24 November 2016 Resource Consent obtained
		Construction	Complete The contract has been awarded and design is being finalized completion date is scheduled for late May 2017.

Suggested Resolution

The Progress Report: Major Capital Works be received.

KOBUS DU TOIT
GROUP MANAGER - ASSETS

HELEN BEEVER
GROUP MANAGER – COMMUNITY SERVICES

Document No: A345265	
Report To:	**Council**
	Meeting Date: 28 March 2017
	Subject: **Progress Report: Monthly Report for Water, Sewerage and Stormwater**
	Type: Information Only

1.0 Purpose of Report

1.1 The purpose of this business paper is to provide a progress report on the three Waters activities, including contracted services.

2.0 Background

2.1 The three Waters activities (Water Supply, Wastewater and Stormwater) provide for the environmentally safe extraction, treatment and distribution of water. Collection, treatment and disposal of wastewater and the collection and disposal of storm water within Council's stated parameters.

2.2 Water Supply networks are provided by Council at:

- Te Kuiti
- Mokau
- Piopio
- Benneydale

2.3 Wastewater networks are provided by Council at:

- Te Kuiti
- Benneydale
- Piopio
- Te Waitere

2.4 WDC's only reticulated Stormwater disposal network is in Te Kuiti and any exceptions will be reported on for the other areas as these arise.

2.5 There are three activities under each of the three Waters activities:

1 **Planned Maintenance:** Operation and maintenance involves the planned servicing of the three waters infrastructure – reticulation, pump stations, cleaning reservoirs, replacing old water meters, hydrants and valves.

These activities are predominantly contracted out and at present are performed by Veolia Water by means of Schedule which is worked out in accordance with the operating instructions from the manufacturer or best practices.

2 **Emergency Repairs:** Emergency Repairs are dealt with as they occur. They are usually dealt with immediately, and at times this impacts on the delivery of Planned Maintenance and Service Requests, which is postponed to a later time.

3 **Service Requests:** Service Requests are initiated by Ratepayers or Businesses across the District and are phoned in, emailed or they could be provided to the Customer Services by means of walk-in. Service Requests

are logged and forwarded to the Water Services Unit to resolve with the Contractor as a resource as needed.

2.6 Capital Works

2.7 Progress reporting on Capital Works will predominantly focus on Renewals and Upgrades.

2.8 Water Rates and Charges

2.9 Residential and small business water rates are charged quarterly. Extraordinary water user meters are read half yearly. The two major Trade Wastewater user meters are read monthly and charged monthly.

3.0 Commentary

3.1 Drinking Water Standards 2005 (Amended 2008)

3.2 The Health (Drinking Water) Amendment Act 2007 amended the Health Act 1956. This impose a duty on all water suppliers to ensure their water is safe to drink.

3.3 Drinking water supplies must meet the standards as set out by the Drinking Water Standards 2005 (Amended 2008).

3.4 These Standards are to ensure a minimum safe standard for drinking water, appropriate for the level of population and compliance with statutory monitoring requirements.

3.5 **Treatment Process and Log Reduction**

3.6 The supply of treated of drinking water is a process that takes place from the abstraction from the source through to the final consumption. To mitigate the risk for public health a number of barriers against risk of potential contaminant are introduced to eliminate, or at least minimise, the risk to acceptable levels.

3.7 There are 3 dominant levels of potential contaminants that may cause harm to public health, namely:

3.7.1 Protozoa with the standard organism determining the level of treatment being Cryptosporidium.

3.7.2 Bacteria with the standard organism determining the level of treatment being Escherichia Coli (E.Coli).

3.7.3 Pollutants that occur with specific treatment for the type of environmental, chemical or other pollutants.

To take account of the additive effect of a series of cumulative treatment processes on the removal of protozoa,'Log Credits' are used, Cryptosporidium being used as the reference organism. The level of treatment and the resultant "Log Credits" are detailed in the DWS NZ 2005 (2008). The log credit for a treatment process is related to the percentage of the protozoa the process can remove, by the expression:

log credit = log10[1/{1–(percentage removal/100)}]

3.8 The Drinking Water Assessor appointed by the District Health Board assigns the Log Credits after an assessment is made of the raw water source and abstraction location.

3.9 The level of treatment is determined by the Log Reduction required with resulting Credits obtained to assign a score to the treatment barriers provided.

3.10 Treatment processes range from:

- Bores – secure, interim and non-secure.
- Coagulation / flocculation – chemical treatment to settle out heavier contaminants by attracting particles together for easier removal.
- Filtration - this can be through various types of filters with sand being the most common type.
- Disinfection – can either be chemical (chlorine, ozone, etc) or by means of irradiation (ultra-violet light).
- A combination of the above.

3.11 Each treatment process, or barrier, reduces the risk of harm to public health. To test for the effectiveness of the treatment, the water quality is tested and monitored for compliance both with operational and regulatory requirements. The regulatory compliance results are reported to the District Health Board.

3.12 The appropriate level of monitoring is determined by the population size of the drinking water scheme. The smaller the population the lower the risk of a major outbreak of disease with a resultant smaller impact. The drinking water schemes in the Waitomo District under Council's control fall in a small scale range:

- Te Kuiti – Minor (permanent population less than 5,000)
- Benneydale – Small (permanent population less than 500)
- Piopio – Small (permanent population less than 500)
- Mokau – Small (permanent population less than 500)

3.13 The DWS NZ prescribes the number, frequency and maximum period of days between sampling for various compliance criteria. The test has to be performed to strict standards at an accredited laboratory. WDC currently send all compliance samples to Watercare Laboratories in Auckland. Operational sampling is done by means of portable analysers and on-line instrumentation.

3.14 **Te Kuiti Water Supply**

3.15 In accordance with the DWS NZ, the Te Kuiti water supply is classified as a Minor Water Supply due to Te Kuiti's permanent population being less than 5,000 residents.

3.16 At this time, the water treatment process cannot comply with the standard set for the Log 4 requirement due to a technicality (each water filter within the TKWTP (4) must be fitted with its own turbidity meter). Currently there is only one turbidity meter to measure the operation for the four filters, resulting in technical non-compliance for Protozoa treatment, although the physical barrier for protozoa removal is in place.

3.17 The Te Kuiti Water Treatment Plant upgrade project will address this in that each filter will have a separate turbidity meter. In addition the upgrade will introduce an additional contaminant barrier through the introduction of Ultra Violet disinfection to ensure protection for Protozoa contamination.

3.18 During this period the Te Kuiti treated reticulated water complied with bacteriological standards..

3.19 During this period the Ultraviolet disinfection reactors were commissioned and brought on line, adding another barrier to protozoa compliance.

3.20 The Te Kuiti water supply has been confirmed safe to drink and the supply is continuously monitored for compliance utilising on-line analysers for direct compliance reporting.

3.21 More sampling is done than the minimum required by the DWS NZ to manage any potential risk as a result of potential failure of one of the treatment processes.

3.22 Although technically not compliant in accordance with the New Zealand Drinking Water Standards, the treated drinking water is safe to drink, as it undergoes the following treatment barriers:

3.22.1 Coagulation, sedimentation and filtration

3.22.2 Ultraviolet disinfection through multi-wave UV reactors

3.22.3 Chlorination

3.23 All the filters are now installed with the connecting pipe work also completed. This part of the plant in currently undergoing programming to allow automation of the filter operation.

3.24 Te Kuiti Wastewater

3.25 The effluent complied with the Discharge Resource Consent during the period under review.

3.26 Te Kuiti Stormwater

3.27 Although the Waitomo District received very heavy rainfall during this period, no flooding occurred.

3.28 However, a complaint was received of an open drain that overflowed onto the road in Elizabeth Street. No damage occurred. The complaint is being investigated.

3.29 Piopio Water Supply

3.30 The water source was assessed to require treatment to Log 4 (due to the raw water source being a river/stream with a certain level of contaminants and potential disease causing organisms) There have been no issues with the Piopio water supply and the water is safe to drink.

3.31 The Piopio Water Supply is classed as a Small Water Supply.

3.32 Piopio's treated reticulation water supply complies with the Log 4 treatment requirements.

3.33 The Piopio treated reticulation water supply is compliant with the bacteriological requirements and is safe to drink.

3.34 A Backwash Water Discharge Resource Consent change has been lodged with the Waikato Regional Council to bring the backwash discharge into line with the current (new) plant operation. The plant operated under the existing Resource Consent that is no longer valid due to operational changes to the plant.

3.35 Piopio Wastewater

3.36 The Piopio Waste Water Treatment Plant Discharge Consent requires that the Ammoniacal Nitrogen levels remain below 10 mg/l throughout the year.

3.37 The parameters have stabilized below the threshold.

3.38 The Piopio WWTP discharge is compliant in terms of the Waikato Regional Council discharge consent.

3.39 All aspects of the WWTP are within expectations.

3.40 Benneydale Water Supply

3.41 The water source was assessed to require treatment to Log 3 (due to the raw water source being a river/stream with a certain level of contaminants and potential disease causing organisms).

3.42 The Benneydale Water Supply is classed as a Small Water Supply.

3.43 The current configuration of the treatment process does not allow this Log reduction to be achieved. WDC is in discussion with the Waikato District Health Board to address certain restrictions that currently prevent the Plants compliance with the required barrier arrangements. These restrictions are technical in nature that prevents log credits being obtained for treatment barriers in place.

3.44 The Benneydale reticulated treated water supply is compliant for bacteriological requirements and is tested safe to drink.

3.45 There were no problems with the Benneydale water supply.

3.46 Benneydale Wastewater

3.47 Since the upgrading and renewal of the Benneydale Wetland the quality of the treated effluent has improved.

3.48 The discharge is being monitored for all parameters to ensure compliance.

3.49 Mokau Water Supply

3.50 The water source was assessed to require treatment to Log 4 (due to the raw water source being a river/stream with a certain level of contaminants and potential disease causing organisms)

3.51 Water quality of Mokau is good and within limits of the Drinking Water Standards.

3.52 The Mokau Water Supply is classed as a Small Water Supply.

3.53 Although the WTP is currently non-compliant for Log 4 treatment, the plant incorporates both chlorine and Ultra-Violet disinfection treatment processes to disinfect the treated water that allows safe drinking water to the community. The source water has a high concentration of iron and the plant is not designed for iron

removal. This causes the water to be aesthetically being affected by colour, taste and odour.

3.54 The Manager: Water Services is reviewing the treatment process to determine alterations, if required, to bring the WTP to comply with the Log 4 treatment requirements.

3.55 The process engineer visited the site and is in the process of writing up his findings into a report. Once the report is received the actions required will be set in motion.

3.56 The water in Mokau has shown an improvement in quality since chemical dosing is being trialed.

3.57 Investigation into providing a permanent solution to the Mokau water issue is being undertaken. This includes both the water quality and pressure issues.

3.58 The new high level water supply tanks are installed. Pipe work connecting the new tanks to the supply main has been completed.

3.59 The next phase is to install the new high lift pump supplying the new tanks from the existing reservoirs.

3.60 The ultra-sonic algae control devise has been installed permanently and is showing good results with the raw water in the dam clearing up.

3.61 The treated water quality is very good since the remedial work has been started and customer feedback indicates that the water aesthetics of taste and odour are much improved.

3.62 No further issues have been found with the reticulation and the midnight flow, an indication or inherent leaks, show that the leakage has slowed considerably.

3.63 Te Waitere Wastewater

3.64 Te Waitere Wastewater pump stations operated without any faults and the pump operation is monitored remotely.

3.65 The Te Waitere Waste Water Discharge Consent is due for renewal and the process has begun to apply for this.

3.66 The renewal application has been received by the Waikato Regional Council.

4.0 Capital Projects

1. Water

Description of Project	Estimate	Project Start	Progress	Current Expenditure
Water Treatment Plant Upgrade – Pipe Work Installation	$850,000 (Engineer Estimate - $737,311 original estimate) plus variations to date $775,784	August 2015	Work has been delayed due to the replacement of the filters. This contract can now resume. The commissioning of the UV disinfection units is scheduled to be completed before the end of February 2017.	$812,709.51
Water Treatment Plant Upgrade Electrical, SCADA & Telemetry	Tender plus variations $1,324,379	April 2015	Progress is maintained as civil works progress	$1,232,794.80
Hetet Street water main replacement	$60,000	May 2017	Tenders received and evaluation in progress.	$3,005.00
Awakino / Blackmans water main replacement	$35,000	March 2017	Tenders received and evaluation in progress.	$3,005.00
Henderson / Earl Street water ring main	$35,000	April 2017	Tenders received and evaluation in progress.	$1,995.00

2. Wastewater

Description of Project	Estimate	Project Start	Progress	Current Expenditure
Te Kuiti River Crossing	$95,000	March 2017	Tenders received and evaluation in progress.	$8,079.00
Carroll Street Pipe Insertion	$45,000	April 2017	Tenders received and evaluation in progress	$17,879.00
Nettie Street Pipe Reroute	18,000	March 2017	Tender received and evaluation in progress.	$4,087.50
Benneydale Sewer Rehabilitation	$35,000	Due to current work load this has been delayed and will be completed before the end of April 2017	One pipe bridge requires repairs and 3 minor faults are to be rectified	$21,485.00

3. Stormwater

Description of Project	Estimate	Project Start	Progress	Current Expenditure
Edwards Street 450 mm	$80.000	March 2017	Tenders received and evaluation in progress.	$5,292.50
Hill Street Storm Water	$42,000	April 2017	Tenders received and evaluation in progress	$1,500.00

Suggested Resolution

The Progress Report: Monthly Report for Water, Sewerage and Stormwater be received.

KOBUS DU TOIT
GROUP MANAGER - ASSETS

23 March 2017

Document No: A345277	File No:qA551

Report To:	Council

Waitomo District Council

Meeting Date: 28 March 2017

Subject: Progress Report: WDC Resource Consent – Compliance Monitoring

Information Only

1.0 Purpose of Report

1.1 The purpose of this business paper is to brief Council on compliance reporting against Resource Consent conditions.

2.0 Local Government Act S.11A Considerations

2.1 Section 11A of the LGA reads as follows:

11A Core services to be considered in performing role

In performing its role, a local authority must have particular regard to the contribution that the following core services make to its communities:

(a) network infrastructure:
(b) public transport services:
(c) solid waste collection and disposal:
(d) the avoidance or mitigation of natural hazards:
(e) libraries, museums, reserves, and other recreational facilities and community amenities.

2.2 Compliance and monitoring against Resource Consent conditions is consistent with Section 11A of the Local Government Act 2002.

3.0 Risk Considerations

3.1 This is a progress report only, and as such no risks have been identified in regards to the information contained in this business paper.

4.0 Commentary

4.1 WDC is required to report on Resource Consent compliance to the Waikato Regional Council (WRC) in accordance with the conditions that regulate the various Resource Consents held by WDC.

4.2 The following tables set out details of the compliance reporting requirements for WDC's Resource Consents.

RESOURCE CONSENT	REPORT DUE
Monthly	
No. 112639 - Te Kuiti Wastewater Treatment Plant Conditions 7 to 19 (Discharge) Condition 30 (Reasonable Mixing)	Monthly
No. 116844 - Benneydale Water Treatment Plant Condition 9 (Surface Water Take)	Monthly
No. 117290 - Piopio Wastewater Treatment Plant Condition 26 (Discharge)	Monthly
Quarterly	
No. 101753 - Rangitoto Quarry Landfill, William Street, Te Kuiti Condition 11 TEKLR 20	February, May, August, November
No. 124718 - Rangitoto Quarry Landfill, William Street, Te Kuiti Conditions 7 and 14 (SW2) TEKLR 32	February, May, August, November
Six Monthly	
No. 133317 - Te Kuiti Water Treatment Plant Condition 11 (Water Take)	January/July
No. 118813 - Benneydale Wastewater Treatment Plant Condition 16 to 23	January/July
No. 120048 - Te Kuiti Wastewater Treatment Plant Condition 6 (Groundwater b1 to b7)	February and August *(also include in Annual Report 30th September)*
No. 117945 - Benneydale Water Treatment Plant (Backwash)	April/October
No. 124718 - Te Kuiti Landfill (William Street) Condition 6 and 14 DH2/3/4/7 (Oct to March, April to Nov)	April/October
No. 107477 - Piopio Water Treatment Plant Conditions 6 and 9 (Water Take) (Nov-April, May-Oct)	May/November
No. 107478 - Piopio Water Treatment Plant (Backwash) (Nov-April, May-Oct)	May/November
No. 101753 - Rangitoto Quarry Landfill, William Street, Te Kuiti Condition 10 TEKLR10 **(*)**	May/October

RESOURCE CONSENT	REPORT DUE
Annually	
No. 118813 - Benneydale Wastewater Treatment Plant Condition 23 (Discharge to Land and Water)	31st March
No. 124718 - William Street, Te Kuiti Conditions 7 & 14 (SW1,SW2, SW3, SW4, SW5)	April or May
No. 120340 - Mokau Closed Landfill Condition 3, 6 & 10	May
No. 113038 - Te Kuiti Water Treatment Plant Conditions 1 & 2 (Ground Water Take)	1st of May
No. 105054/55/56/57/58/59/60 - Waitomo Stormwater Schedule A (22) Conditions 4,5 & 6	31st May
No. 105054 - Te Kuiti Stormwater Condition 6	31st May
No. 116274 - Benneydale Water Treatment Plant Conditions 2, 3, 4 & 7 (Groundwater Take)	1st of June
No. 113544 - Mokau Water Treatment Plant (Water Take)	July
No. 113545 - Mokau Water Treatment Plant (Backwash)	July
No. 101753, 101754 and 124718 - Rangitoto Quarry Landfill, William Street, Te Kuiti Annual Report Condition Schedule 1(5) and 13	1st August
No. 101753, 101754 - Rangitoto Quarry Landfill, William Street, Te Kuiti Annual Report Consents Schedule 1 (6) ***Independent Peer Reviewer***	1st September
No. 112639 - Te Kuiti Wastewater Treatment Plant Condition 20 (Discharge)	September 30th
No. 103287, 103288 and 103289 - Te Kuiti Walker Road - Closed Landfill Discharge to Land, Air and Divert (Nov, Jun)	November *(within two months of sampling)*
No. 103193 - Benneydale Closed Landfill SH30 Conditions 2, 3 and 5 No. 103194 - Conditions 2 and 3	November *(within two months of sampling)*

RESOURCE CONSENT	REPORT DUE
No. 103196 - Piopio Closed Landfill Condition 2, 3 and 4	November *(within two months of sampling)*
No. 103198 - Aria Closed Landfill Conditions 2 and 4	November *(within two months of sampling)*
Biennial	
No. 120048 - Te Kuiti Wastewater Treatment Plant Condition 7 (Groundwater b1 to b7)	December 2016
No. 117290 - Piopio Wastewater Treatment Plant Condition No 7 and 9 (Discharge) (Operations and Management)	September 2014, 2016, 2018, etc.
No. 112639 - Te Kuiti Wastewater Treatment Plant Condition 24	June 2015 (*and every two years after*)
No. 118813 - Benneydale Wastewater Treatment Plant Condition 27 (Management Plan Review)	from 2010 every two years
Other	
No. 112639 - Te Kuiti Wastewater Treatment Plant Condition 28 (after 3 years Fish Passage/Migration Barrier Assessment)	Monday, 18 December 2017
No. 133317 - Te Kuiti Water Treatment Plant Condition 10 (Telemeter)	1st July 2018

4.3 The following Resource Consent Compliance Reports have been made to WRC:

1. RC 117290 – Piopio WWTP – Monthly Report for January 2017 (Doc A34173)

   - Compliance Achieved

2. RC 117290 – Piopio WWTP Effluent Discharge – February 2017 (Doc A344044)

   - Compliance Achieved

3. RC 112639 - Te Kuiti WWTP – Monthly Report for January 2017 (Doc A341715)

   - The Total Nitrogen trigger limits were breached during the first three weeks of January, returning to normal values below trigger limits on the last week of January and remaining compliant since then.

   - Remedial actions were put in place during last reporting period, and as expected, the concentrations of Total Nitrogen in the discharge decreased and returned to normal during the fourth week of January at 24.82 Kg/day on the 27th January 2017.

Suggested Resolution

The Progress Report: Resource Consent – Compliance Monitoring be received.

KOBUS DU TOIT
GROUP MANAGER – ASSETS

Document No: A 344719	
Report To:	**Council**
Waitomo District Council	**Meeting Date:** 28 March 2017
	Subject: Progress Report: Solid Waste Activity

1.0 Purpose of Report

1.1 The purpose of this business paper is to brief Council on Solid Waste operations, maintenance and capital development activities. This business paper is set out under the following headings:

2.0 Local Government Responsibilities

2.1 The Waste Minimisation Act encourages a reduction in the quantity of waste generated and disposed of in landfills, with the aim of reducing the environmental harm of waste while providing economic, social and cultural benefits.

2.2 WDC is meeting its obligations under the 2008 Waste Minimisation Act and the Solid Waste (asset) Management and Minimisation Plan (SWaMMP), by providing a weekly Kerbside Refuse and Recyclables Collection Service and disposal thereof in parts of the district and Transfer station for the remainder of the district.

3.0 Risk Considerations

3.1 This is a progress report only, and as such no risks have been identified in regards to the information contained in this business paper.

4.0 Introduction

4.1 This business paper focuses on the operations of the Solid Waste activity, refuse and recyclable collection and disposal, and the promotion of recycling.

5.0 Background

5.1 Solid Waste Management is the combination of asset management, financial, engineering and technical practices to reduce and dispose of general refuse and the promotion of waste minimisation.

5.2 The Solid Waste Activity provides for education on waste minimisation, collection and separation of recyclables, and the disposal of residual waste to landfill.

5.3 Solid Waste Services

5.4 WDC is meeting its obligation under the 2008 Waste Minimisation Act and SWaMMP by providing:

1 **Weekly Kerbside Refuse and Kerbside Recyclables Collection Services** for the communities of -

- Te Kuiti
- Piopio
- Mokau
- Waitomo Village
- that part of the Rural Ward between Te Kuiti and Waitomo Village

2 **Waste Transfer Stations** in the communities of –

- Benneydale
- Piopio
- Marokopa
- Kinohaku
- Mokau/ Awakino

3 **Street Side Recycling Stations** at –

- Waitomo Village
- Piopio
- Mokau
- Marokopa

5.5 Management of Solid Waste Services

5.6 Collection Services (both Refuse and Recyclables) are carried out under contract. The present Contractor is Envirowaste.

5.7 Management of the refuse at **Te Kuiti Landfill** is carried out under contract. Envirowaste also holds this contract.

5.8 **Piopio Litter Bins** are serviced by WDC's Internal Services Unit on Mondays and Fridays.

5.9 **Te Kuiti and Waitomo Village Litter Bins** are serviced through WDC's Road Maintenance Contract.

5.10 **Mokau Litter Bins** are serviced under contract with a private person.

5.11 **Marokopa Litter Bins** are serviced by the Marokopa Community Trust under a long standing agreement with WDC.

5.12 **Benneydale Litter Bins** are serviced by the Council Transfer station operator.

6.0 Service Requests / Complaints

6.1 Service requests are initiated by ratepayers or businesses across the District. The Service Requests are then followed up by WDC staff.

6.2 It must be noted that almost all Service Request complaints received for kerbside refuse or recyclables not being collected are due to the person placing the bag or recycle bin out too late.

6.3 Service Requests or complaints relating to Solid Waste operations and/or Solid Waste Assets for 2016/2017 include:

Description	Jul 2016	Aug 2016	Sep 2016	Oct 2016	Nov 2016	Dec 2016
Kerbside Refuse not collected	1	1	2	2	0	0
Landfill Complaint	0	0	0	2	0	0
Transfer Station Complaint	0	0	0	0	0	0
Litter Bins not being emptied	1	0	0	2	1	0
Request for additional service					1	0

Description	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017
Kerbside Refuse not collected	0	3				
Landfill Complaint	0	0				
Transfer Station Complaint	0	0				
Litter Bins not being emptied	0	1				
Request for additional service	1	1				

~~6.4 During the month of November service requests were received relating to Solid Waste activities.~~

~~6.5 One request related to Roading and does not fall under the Solid Waste umbrella as it related to littering along a section of the roading network. The second request related to residents from Piopio who placed their refuse out later than the operational times and therefore was not collected.~~

~~6.6 No Solid Waste complaints were received for the month of December 2016.~~

~~6.7~~6.4 ~~During January one Service Request was received from a local resident advising that the Mokau supermarket had run out of official Council refuse bags and requesting additional bags.~~ During the month of February 2017 5 service requests were received by the Solid Waste department. Three of these related to kerbside collections being missed, one related to a request to retrieve an object not intended to be dumped, and one request related to the driver of the waste truck removing the recycle bin

7.0 Te Kuiti

7.1 The Waitomo District Landfill has a consented volume of 232,000 tonne and the Resource Consent expires in 2032.

7.2 Revenue for the Landfill is trending downward as a direct result of reduced levels of waste being deposited.

7.3 Emissions Trading Scheme

7.4 The Government has started on a review of New Zealand's carbon footprint and this may have a more significant impact on the cost of disposing rubbish in the future.

7.5 Consideration should be given to forward purchasing NZU's for all of remaining consented volume.

7.6 The impact of this review will be taken into account during the assessment of the future of the Landfill in preparation of the next LTP.

7.7 Landfill Volumes

7.8 Landfill Consented Volume: 232,000 Tonnes

Description	Tonnes Deposited July 2016	Tonnes Deposited Aug 2016	Tonnes Deposited Sept 2016	Tonnes Deposited Oct 2016	Tonnes Deposited Nov 2016	Tonnes Deposited Dec 2016
Deposited to Date	172,293.78	173,114	173,970	174823.41	175,694.21	176,536.76
WDC Bags Collected	1.95	1.94	1.98	1.72	1.51	2.70
Total over Weighbridge	806.91	890.68	933.01	912.02	913.80	899.43
Less Diverted Recycle	-21.53	30.40	52.67	30.14	33.44	38.68
Less Stock out Gate	-28.33	42.03	26.32	30.16	11.07	20.90
Total To Landfill	759.00	**820.19**	**856.00**	**853.44**	**870.80**	**842.55**
Tonnage Space Available	59,706.22	**58,886.03**	**58,030.03**	**57,176.59**	**56,305.79**	**55,463.24**

Description	Tonnes Deposited Jan 2017	Tonnes Deposited Feb 2017	Tonnes Deposited Mar 2017	Tonnes Deposited Apr 2017	Tonnes Deposited May 2017	Tonnes Deposited Jun 2017
Deposited to Date	177,341.75	178101.09				
WDC Bags Collected	1.96	1.99				
Total over Weighbridge	936.41	810.40				
Less Diverted Recycle	120.17	39.82				
Less Stock out Gate	13.21	13.23				
Total To Landfill	804.99	**759.34**				
Tonnage Space Available	**54,658.25**	**53898.91**				

7.9 Recyclables

~~Diverted recyclables = November 2016 33.14 tonnes~~

~~Diverted recycling = December 2016 38.68 tonnes~~

~~Diverted recycling = January 2017 120.17 tonnes. A large amount of concrete, bricks and timber contributed to this increase in recycling for the month.~~

Diverted recyclables = February 2017 = 39.82 tonnes

7.10 Capital Projects

Description	Estimate / Budget	Actual July 2016	Actual August 2016	Actual September 2016	Actual October 2016
Development Cell 3	$774,000.00	$641,686.20	$641,686.20	$641,686.20	$641,686.20
High Wall Safety Work	$25,650	$0.00	$0.00	$ 0.00	$ 5000.00
Recycling Shed	$	$	$	$	$

Description	Estimate / Budget	Actual November 2016	Actual December 2016	Actual January 2017	Actual February 2017
Development Cell 3	$774,000.00	$641,686.20	$641,686.20	$641,686.20	$641,686.20
High Wall Safety Work	$25,650	$0.00	$0.00	$0.00	$0.00
Recycling Shed	$	$	$	$	$

7.11 Development of the Cell 3

7.12 Development of Cell 3 is largely complete with only some remedial work outstanding. A total of $41,580.00 excl. GST has been retained for repairs. This was included as an addendum to the practical completion certificate. The contract is now in the retention period. The retention amount is $37,704.97 excl. GST.

7.13 The final contract value for this project was $720,971.17 excl. GST.

7.14 High Wall Shaping

7.15 High wall shaping involves the removal and shaping of earth above the landfill space and is carried out for safety purposes to prevent landslides. Whilst this work has been completed and the desired outcomes have been achieved for now, the area remains unstable and future works are likely to be required to ensure ongoing safety.

7.16 Recycling Shed

7.17 In order to promote recycling and provide a customer friendly, all weather recycling service, a roof over the recycling area has been constructed.

7.18 This project has been completed and has been well received by the public utilising the facility.

Suggested Resolution

The Progress Report: Solid Waste Activity be received.

KOBUS DU TOIT
GROUP MANAGER – ASSETS

20 March 2017

Document No: A345090	
Report To:	**Council**
Waitomo District Council	**Meeting Date:** 28 March 2017 **Subject:** Conversion of Streetlights to LED Technology

1.0 Purpose of Report

1.1 The purpose of this business paper is to present the Business Case Report for the conversion of streetlights from existing lighting technology to LED technology, and to request permission to proceed with the procurement process.

2.0 Background

2.1 WDC own and operate 776 streetlights and a number of other lights. The table below shows the WDC lights as well as other lights in the District.

DESCRIPTION	NUMBER	OWNER/OPERATOR
WDC owned Streetlights	776	WDC Roading
WDC owned Illumination lights	21	WDC Roading
Festive Lighting	48 strings	WDC Roading
Amenity and Access-way lights	7	WDC other
Parks lights	6	WDC other
Not Connected to Network lights	2	WDC other
NZTA Urban State Highway Lihts	184	NZTA
NZTA Rural State Highway Lights	30	NZTA
Private (incl. The Lines Company)	18	Private
TOTAL =	1092	

2.2 All the streetlights in the above list are old technology sodium lights. The new LED technology is advised as a replacement option because it promises significant cost savings long term.

2.3 WDC operates all streetlights owned by NZTA in residential areas, all amenity and accessway streetlights, all lights in parks, all festive strings, all illumination lights and all WDC owned streetlights, amounting to a total of 1,042 lights. From all these lights, 776 are streetlights of conventional technology, and these lights are targeted in this submission to be replaced with LED technology streetlights.

2.4 In the past the conversion to LED streetlights was considered and rejected due to the new technology not being proven and no track record available to justify the conversion. It was considered best to wait for LED streetlight prices to come down and the technology to mature.

2.5 Since then the new technology has been used in numerous other places/other countries and the required track record has been established. LED street lights are shown to require reduced maintenance due to their inherent longer service life, as well as a significantly reduced energy consumption for similar or better levels of light. Suppliers now offer long warrantees on LED lamps, further reducing the financial risk of such a conversion.

2.6 NZTA requires a Business Case motivated application in order to approve FAR funding for LED conversions.

2.7 A business case for a LED streetlight renewal project was developed for WDC by Power Solutions Limited (PSL), an independent consultant.

2.8 The report (attached) shows that a conversion with the standard NZTA FAR-subsidy would be viable with economic payback within nine years (based on a concervative estimate of cost savings). This option assumed a five year conversion period.

2.9 The report also shows that utilising the newly offered (non-standard) NZTA FAR-subsidy of 85% will reduce payback time to 8 years. Of note is that this 85% FAR-subsidy is offered by NZTA as a once off and has a time limit condition that requires project completion by around June 2018.

2.10 The report shows that completing the full conversion utilising the higher 85% FAR option will reduce the cost to WDC to $62,000 compared with a cost of $204,000 utilising the normal FAR and a five year conversion time.

3.0 Commentary

3.1 Based on the budget, the operational cost of these streetlights amounts to $320,000 per year, with $140,000 spent on a maintenance contract, $120,000 on network charges to The Lines Company and around $60,000 on energy charges for electricity consumed.

3.2 LED streetlights are designed to provide a service life of between 17 and 25 years, against 3 to 4 years life for current technology. The way the service life is defined differs substantially: current technology expects 50% of the installed lights to still be in service at the defined service life (and the other 50% has expired). LED lights define the service life as the age of the light when light levels has deteriorated to 70% of the original level, but the light is still working.

3.3 Power consumption for a complete LED unit of around 34W compares favourably against the 85W consumed by a conventional streetlight unit with its driver gear included.

3.4 The more sophisticated LED units can reduce consumption further with an optional dimming function during selected time periods, but this analysis ignores this feature. Some of the latest LED designs are of light weight and can be fitted on the same streetlight poles as existing technology lights, at the same height and spacing as before, without any deteriorated lighting of the roads.

3.5 To note, is that this LED conversion project is not addressing the new street light standard (ASNZS1158) for lighting uniformaty and light levels which may/may not require additional poles and/or pole spacings. The reason is that the work required

to determine if and where there is a difference between this standard and the current layout, would require a survey of existing lights and a comparitive design, which would be cost prohibitive and is not an NZTA requirement for this FAR application. Therefore, this project is aimed at a straight replacement strategy.

3.6 The majority of the savings are realised through a 75% reduction in maintenance costs. Energy cost is reduced by 57%, but lines charges are not reduced at all.

4.0 Details from the Calculations

4.1 A conversion model was used to quantify the expected cost savings of the LED streetlight conversion project. The calculations were done over a twenty year period to exploit the full extended life of the technology. Attachment A includes the full business case report.

4.2 Paragraph 7.2 in the attached Business Case Report summarises the results of the analysis: The existing network 20 year life cycle cost is $1.17 million. For a five year rollout programme the life cycle cost including project implementation is $1.03 million, and a one year rollout with 85% FAR assistance is $0.993 million. Simple payback would be 9 years for the five year rollout and 8 years for the one year rollout.

4.3 The cost of the rollout would be $416,000 before the inclusion of NZTA assistance through the Financial Assistance Rate. The 5 year rollout with a standard FAR will cost WDC $204,000, and the one year rollout with 85% FAR will be $62,000.

4.4 An optional Central Management System (CMS) would add additional cost for the hardware required to communicate with each individual streetlight. For a small Council with low energy costs this upfront costs turns out to be prohibitive, having to spend more than $200,000 for the CMS in order to save 15% of the LED energy cost of about $25,000 per year. Payback of this additional investment is more than 50 years.

5.0 Discussion

5.1 From the analyses, using information supplied by NZTA regarding the experience of other councils, it is clear that the conversion to LED streetlights has become an attractive option for councils from a purely financial point of view, and with the possibility to utilise the NZTA subsidy of a FAR at 85% for the next financial year, the conversion to LED streetlights can be done with an 8 year payback period.

5.2 Maintenance cost will be reduced by 75% or more due to the substantial longer design life of the LED fixtures, and energy cost by at least 57% without any compromise on lighting levels.

5.3 It could be possible to include conversion of NZTA streetlights at the same time if NZTA agrees to pay for their portion of the cost.

5.4 Similarly all amenity and accessway lights and parks lights could also be included in the project, but no NZTA assistance would be forthcoming for these lights. This option will be explored during the procurement process and if not cost effective will be done afterwards as part of the normal maintenance replacements.

5.5 The 21 lights to illuminate various features in town would be of a completely different design and would not benefit from economies of scale if included, and should be upgraded in a separate process.

6.0 Financial Implications

6.1 A one year rollout wil result in an additional cost of $62,000 in financial year 2017/18. This additional cost is expected to result in a corresponding overspend on the relevant budget.

6.2 The business case models the annual costs to reduce by about $55,000 from $320,000 to $255,000 per year from 2018/19 onwards.

6.3 The inclusion of a Central Management System (CMS) was evaluated and is not recommended. It could save up to 15% of LED streetlight energy, but the cost of such a system was prohibitive, resulting in a pay back time of more than 50 years. (Cost above $200,000, and annual savings below $4,000.) By ensuring new LED lights with the required seven pin NEMA socket is installed, a CMS remains an option in future should costs be reduced.

7.0 Conclusion and Recommendations

7.1 The proposed conversion of streetlights to LED technology is an attractive project that should result in financial benefits and reduced maintenance requirements after only a moderate intial outlay (due to the new 85% FAR option from NZTA) during the first year of the project.

7.2 The one year rollout is recommended as the preferred option due to a Financial Assistance Rate of 85% from NZTA for this conversion to LED streetlights (available for the next financial year only). As a result, the one year rollout has a reduced payback period of eight years compared to nine years for a five year rollout.

7.3 Although options are recommended in the Business Case Report, specifics about the type/specification of luminares are not finalised yet and will be decided during the tender phase.

7.4 Possible collaboration with other Councils are being explored to determine if any benefits can be derived from that.

Suggested Resolutions

1 The business paper presenting the Conversion of Streetlights to LED Technology Business Case, be received.

2 Council approve/not approve to proceed with the procurement process to replace existing streetlights with new LED technology with a one year rollout.

JOHAN ROSSOUW
MANAGER – LOCAL ROADS

28 March 2017

Attachment: A 345127 Waitomo District Council LED Street Light Renewal Business Case Report

Waitomo District Council
LED Street Light Renewal
Business Case Report

Report compiled by:
Power Solutions Limited
Date:
February 2017

CONTENTS

ABBREVIATIONS

CMS	Central Management System
CRI	Colour Rendering Index
FAR	Funding Assistance Ratio
DALI	Digitally Addressable Lighting Interface
GPRS	General Packet Radio Service
HID	High Intensity Discharge
HPS	High Pressure Sodium
LED	Light Emitting Diode
NZTA	New Zealand Transport Agency
PLC	Power Line Carrier
PSL	Power Solutions Limited
PV	Present Value
RCA	Roading Control Authority
WDC	Waitomo District Council
W	Watt

COVER PHOTO KCE Tree of Light

1. EXECUTIVE SUMMARY

1.1 INTRODUCTION

Waitomo District Council (WDC) is considering a programme to replace the vast majority of their high intensity discharge (HID) street lighting with Light Emitting Diode (LED) luminaires to realise the many benefits that this technology offers such as significant energy and maintenance savings, improved control possibilities, improved lighting, reliability and safety and reduced carbon emissions.

This Business Case Report provides the background and information relating to the existing street lighting network and technology, the benefits that a change to LED luminaires will provide and the associated financial analysis.

1.2 WHAT IS PROPOSED

The proposed project is to replace the bulk of the street lights within the WDC network over a planned project term of 5 years. The overall investment required is projected to be $416k. The base Funding Assistance Ratio (FAR) from New Zealand Transport Agency (NZTA) for WDC is 64% increasing to 70% over the next 5 years. Recent communications suggest this will be increased to 85% for LED renewals until June 2018. The remaining funds will come from the existing street light renewals budget.

This business case does not recommend a preferred luminaire although the financial analysis is based on recent quotes from Orangetek and Philips for their DALI controllable LED street lighting luminaires. Allowance has been made for the new LED luminaires to be "CMS ready". That is they have a DALI driver and 7 pin NEMA socket to allow for future connection to a Central Management System (CMS) offering dimming capability, control, metering and maintenance benefits. An estimation of the cost of a simultaneous implementation of a Central Management System with the LED renewal programme is included as an optional business case.

An investment profile spread over five years and an investment profile with all the upgrades in the first year were both considered.

1.3 BUSINESS CASE RESULTS

Based on the assumptions in the NZTA business case spreadsheet, this evaluation shows that a change to LED technology over the estimated 20 year life will:-

- Require $416k total investment.
    - At a FAR of 64% this will require $204k from WDC
    - At a FAR of 85% this will require $62k from WDC

For a five year rollout programme:

- Provide cost savings of $267k in electricity costs over the 20 year life.
- Provide life cycle cost savings of $452k over the 20 year life.
- Offer a simple pay back of 9 years.

- Reduce electricity consumption by 2,385,000 kWh over 20 years.
- Save 327 tonnes of carbon.
- Provide improved lighting and system reliability.

For a one year rollout programme:

- Provide cost savings of $306k in electricity costs over the 20 year life.
- Provide life cycle cost savings of $541k over the 20 year life.
- Offer a simple pay back of 8 years.
- Reduce electricity consumption by 2,733,000 kWh over 20 years.
- Save 374 tonnes of carbon.
- Provide improved lighting and system reliability.

The figures above do not include the installation, cost or benefits associated with a CMS installation. It has been estimated to require an investment of approximately $205k depending on the technology, in addition to the LED renewal programme. The incremental benefits attributed by the CMS are estimated to be approximately $3.7k/year in electricity savings through the ability to dim the lighting network through the middle of the night. WDC has indicated preference not to proceed with a CMS although some information on possible systems and costs is provided.

2. PROJECT SUMMARY

The project covers the replacement of approximately 776 existing luminaires in the WDC street lighting network with new LED luminaires. Initially an installation programme over of 5 years was considered. Due to the prospect of a limited term, increased FAR ratio, an investment period of one year is also considered. In addition to the increased assistance, this strategy has a lower PV and shorter payback period.

This report does not carry out an assessment of the various luminaires available but does provide the financial evaluation of installing the new LED technology based on current luminaire technology and costs.

The NZTA has built on work by Auckland Transport and Christchurch City Council to develop a specification and preferred LED street light luminaires list (M30 Accepted Luminaires List). In order to secure NZTA funding, LEDs used should be selected from this list. Luminaires listed in section 4, are all on the NZTA M30 list.

It is intended that the new luminaires would be capable of being controlled by a Central Management System (CMS) as a means of future proofing the network. It is increasingly common that LED street lighting luminaires sold in New Zealand include a 7 pin NEMA socket allowing the attachment of a light point controller as standard and without adding additional cost. This has been allowed for in this report and the financial analysis. It is recommended that luminaires have a DALI driver to maximise the currently available CMS functionality.

An estimate is also included to implement a CMS at the same time as the LED renewals are being carried out for information purposes. There are efficiencies to be gained by

simultaneous implementation of these programmes. However, the economic and energy benefits of CMS are not as clear as LED. There are a number of other benefits and potential benefits that are harder to quantify.

It should be noted that this approach does not address compliance with the street lighting standards AS/NZS 1158. Achieving compliance across the network would require further investment in system design that would likely jeopardise the financial viability of the project. Swapping to LED will provide white light which will significantly increase the effectiveness of the lighting. All suggested replacements on a “one for one” basis are carried out to maintain or improve existing lighting levels and reduce energy consumption, maintenance and accidents. No lighting design has been allowed for.

3. EXISTING STREET LIGHT NETWORK

3.1 EXISTING TECHNOLOGY

The existing WDC street light network totals approximately 1,092 luminaires that fall into various ownerships categories including Parks, Roading, Council Amenity, Festive Lighting, Private and NZTA. The Council Roading luminaires (797) make up 73% of luminaires in the network.

As with most networks there is a mix of luminaire makes, models, lamps, age and condition. This report covers an accelerated LED renewal programme for 776 luminaires – 97% of WDC roading luminaires. These are selected from the WDC RAMM database based on:

- Ownership class: roading
- Not already LED
- 70 – 150 W inclusive

It is envisaged that higher wattage luminaires, amenity and park lighting will be replaced at a later date or towards the end of this proposed upgrade programme.

The predominant luminaire is the Gough brand with a 70W High Pressure Sodium (HPS) lamp. These luminaires are old technology that has served the industry for well over 20 years but has now been surpassed in performance in light delivery, energy efficiency, maintenance and aesthetics.

Figure 1: Common HPS luminaire - Gough 500

The HPS lighting technology has been in use for many years and had been the preferred technology based on cost, efficiency, and reliability. These lights produce a monochromatic yellow/gold colour of light that has a poor Colour Rendering Index (CRI) of about ≈ 25.

The HPS lamp life is typically 12,000 -16,000 hours which equates to 3-4 years of operation between lamp changes for a street light. The way lamp life is determined is that 50% of the lamps will still be operating at their given lamp life therefore there will be failures expected earlier.

Also present in the Waitomo network are a number of Mercury Vapour (MV) lamps. Mercury Vapour do not suffer the same rate of failure as HPS but are subject to lumen depreciation, becoming dimmer and dimmer with time. They also have a lower lumen

efficacy than HPS i.e. fewer lumens per watt. Upgrading of these luminaires to LED gives the most significant energy saving and light improvement per light point.

Some of the newer street light installations use Metal Halide technology. Metal halides lamps have a similar life expectancy to HPS (with a wider range) a better CRI, provide a white light, more rapid lumen depreciation (i.e. become dimmer faster) and similar efficacy. Especially for higher wattage installations, metal halide are still often the lamps of choice.

All these lamp technologies are a form of high intensity discharge (HID) lighting.

3.2 Street Light Network Maintenance

The street light network is maintained by Alf Downs Street Lighting Ltd through a Street Light Maintenance Contract administered by WDC.

Overall maintenance of the street light network involves scheduled lamp replacements, fault repairs, emergency response for damage and night surveys for outage identification.

Replacing the luminaires with LED technology will greatly reduce maintenance costs partly because the luminaires are new but mainly because of the greatly extended lamp life.

The implementation of a CMS would further reduce this maintenance as the system will report individual failures removing the requirement for night patrols and allowing for targeted maintenance.

3.3 Existing Control

As with most street light networks throughout New Zealand, the WDC network is controlled on and off by way of ripple control signals that are provided and maintained by the Lines Company. There is a cost associated with maintaining the ripple control plant, system and relays in the network that is passed on to Council. The signal is sent via the power lines to trigger the relays that turn the light circuits on and off. The timing of the ripple control signals is determined by a clock with backup a daylight sensor. The duration of the “on” hours are logged and collated each month to allow the calculation of energy consumption for billing purposes.

This type of control only provides the ability to turn lights on and off with the lamps on at 100% output levels.

A “DALI” based Central Management System replaces this control and billing methodology very effectively making luminaires individually addressable through two-way communication. It provides for adaptive lighting control (dimming) and failure reporting by the luminaire itself.

4. LED TECHNOLOGY

4.1 LED DESCRIPTION

Light Emitting Diodes (LED) are semiconductor devices that emit light when current is passed through them and have been developed into a very effective light source capable of high lumen efficacies. LED's (like all other light sources) produce heat that must be dissipated to allow high light output and reliability.

Rapid development in the LED technology has produced luminaires that provide improved light output using significantly less energy and lasting much longer than most other light sources.

LED's are able to produce light in the full colour spectrum although the preferred colour temperature for street lighting is 4000K which provides a white light. The existing HPS technology provides yellow light that has a colour temperature of approximately 2000K.

4.2 LED STREET LIGHT ADVANTAGES

Rapid development has occurred in street light LED luminaire development and road lighting has proven to be a very good application of the technology. LED street light luminaires can provide improved light output using significantly less energy and lasting much longer than the common existing high intensity discharge technology.

Figure 2: Typical modern LED street lights

4.2.1 ENERGY SAVINGS

The use of LED street lights provides the opportunity to reduce energy by over 50% when replacing HID technology. Conversions to LED road lighting nationally and internationally have proven the ability to obtain this level of energy saving.

The 70 W HPS luminaires have a connected load of 83 W and could be replaced by an LED luminaire of 30- 36 W providing a comparable light output.

On completion of this proposed LED street light upgrade the electrical load on the WDC network is estimated to reduce by 57%. Areas identified that may require an increase in light level could have slightly higher wattage LED's installed.

4.2.2 Long Life

Once the lumen output of an LED reaches 70% of its original design output measured in lumens (position called L70), an LED street light is considered to have reached its rated life. The luminaire will still operate but the lumen output will continue to depreciate after this. This rated lifetime seldom includes critical failures but these are expected to be much lower for a solid state device than for HID technology.

Typically an LED street light expected life will be 70,000 – 100,000 hours.

4.2.3 Maintenance Savings

The primary advantage of changing to LED is often seen as energy savings however reduction in maintenance costs is also significant. A new LED street light network will require considerably less maintenance due to greatly increased reliability and extended life of the LED luminaires.

See section 7.1 for an explanation of the maintenance savings assumptions used in the financial analysis.

4.2.4 Other benefits

Based on the reduced electricity consumption of the proposed LED street light network there will be commensurate carbon emission reduction. This has been estimated to be over 374 tonnes of CO2-e over a 20 year life cycle.

LED street lights provide a white light that will provide a marked change from the existing yellow HPS lights. There is scientific evidence suggesting that white light at low light levels provides significant improvement to reaction times and peripheral visibility. There is also evidence suggesting that the public perception of safety improves.

The lumen depreciation of LEDs therefore it takes longer for the 70% illumination level (L70) to be reached than with the current HID technology. The requirement to over light to allow for this can be removed entirely through a Central Management System by dimming to match the lumen depreciation curve – providing for consistent light levels and reduced energy consumption.

HID lamps contain mercury. LED street light luminaires do not. This provides long term benefits to the environment and simplifies recycling of decommissioned luminaires and lamps.

LED luminaires are solid state devices that enable much broader control options than with the existing High Intensity Discharge (HID) technology.

A significant advantage comes from the ability to dim the luminaires during low traffic periods (e.g. 11.00pm to 5.00am) that will achieve further energy savings. Dimming

profiles can be tailored to specific areas according to local requirements and these profiles can be preloaded into the drivers of the luminaires.

As LEDs have a very controlled and specific optic performance there is very little light lost to the environment therefore upward light spill is greatly reduced. The elimination of this “light pollution” supports Dark Skies initiatives and reduces light spill onto neighbouring properties.

LEDs are much more resistant to shock and vibration from wind and traffic than HID light sources.

The power factor of an LED luminaire is much better than HID technologies that rely on a capacitor in the luminaire for power factor correction.

5. AVAILABLE LED LUMINAIRES

There is an extensive selection of LED Street light luminaires on the market with large variation in quality, performance and price.

Auckland Transport, Christchurch City Council and NZTA have each developed a specification and approved luminaire list to reduce the available luminaires to a reasonable number and weed out some of the lower standard luminaires. This significantly simplifies the selection process for other councils.

PSL looked at the more commonly installed luminaires that feature on both the Auckland Transport and NZTA M30 list to get an indication of typical price and wattage of suitable replacements. These are summarised below with the companies listed in alphabetical order.

Along with price and quality, weight is also a consideration as a large number of roading luminaires are mounted on power poles which will generally support a maximum of about 7 kg.

5.1 ADVANCED LIGHTING TECHNOLOGIES LIMITED (ADLT)

ADLT are a reputable lighting provider that has been operating since 1983. They have their head office in Tauranga and offices in Auckland, Christchurch and Dunedin. ADLT supply and support Cree XIL LEDway and Cree XSP series, both of which are M30 accepted.
The XIL LEDway series is on the ATCOP, Christchurch City Council and M30 approved lists. It is worth noting that although ADLT claim that these luminaires are "CMS ready" this means they are equipped with a 0-10 V driver. **They are not capable of DALI control** which provides a more effective 2-way communication and control.

The smallest of the XIL range is lightweight, price competitive and provides a good level of lighting. The rest of the range, rapidly increases in wattage, lighting level, weight and price. The Cree XSP1 series is also on the M30 Accepted Luminaires list and lighting levels and wattages are better suited to P category roads. However, the luminaires weigh approximately 12.5 kg and are considered too heavy for mounting on power poles. The XSPR is light and price competitive but is not on the NZTA M30 due to a lack of NEMA socket.

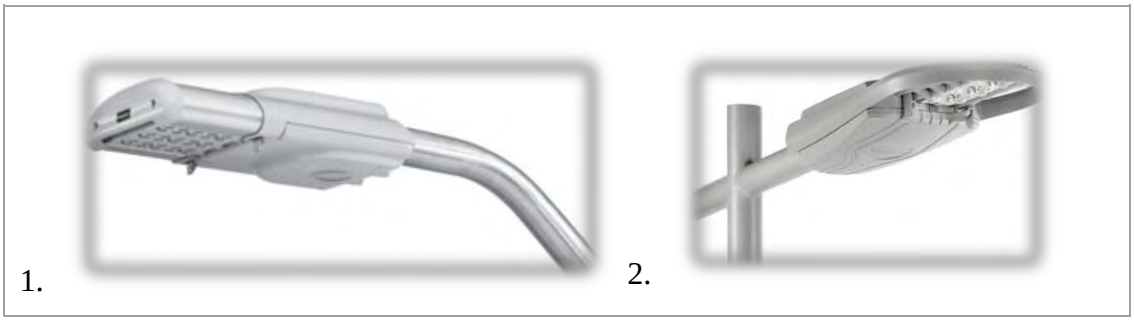


Figure 3: Cree XIL and XSPR luminaires

Luminaire	Optic	Wattage (W)	Weight (kg)	Price without CMS
XIL03-02-350 mA	3M	23	5.9	$440
XIL03-02 525 mA	3M	35	5.9	$440
XIL03-02 700 mA	3M	47	5.9	$440

Table 1: ADLT Cree XSPR luminaires

5.2 ENERGY LIGHT

Energy Light are a Christchurch-based lighting company who have been supplying LED lighting solutions since 2009. The NXT-S and NXT-M luminaires that they supply for road lighting are on the M30 Accepted Luminaire list. The NXT-C, NXT-S and NXT-M are progressively heavier, more expensive and have a greater light output. The NXT 36-S and the M series are M30 accepted for V category roads only. The NXT-12S and NXT-24S is accepted for P category only. The NXT-12C is on the Auckland list but not on the M30 list. It is a lightweight and efficient light source for P category roads.

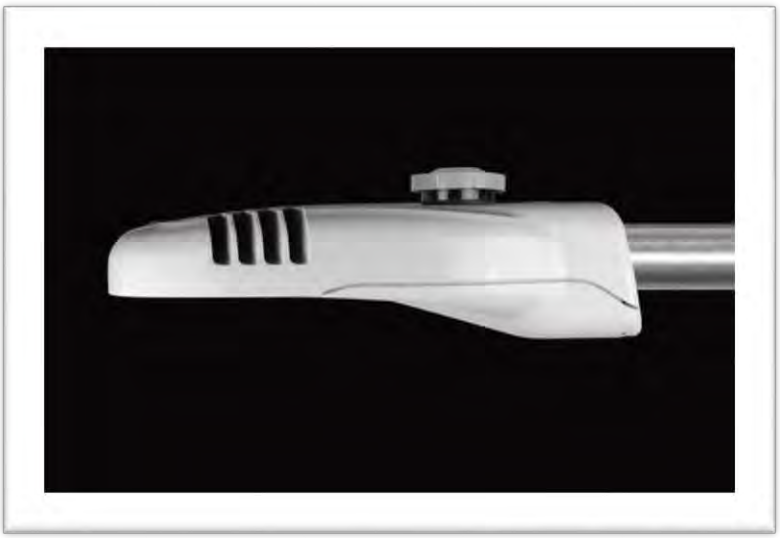


Figure 4: NXT-C luminaire

The NXT-C is the only fitting that is competitive in terms of both weight and price to other fittings here for P category. NXT luminaires are the same price with and without CMS capability. Their list price is $530 but for orders over 250 units it is expected that lower price would be negotiated.

Luminaire	Optic	Wattage (W)	Weight (kg)	Price with CMS
NXT-12C 525mA	4AH	22	5.4	$530
NXT-12C 700mA	4AH	27	5.4	$530
NXT-12S 700mA	4AH	27	8.2	$770
NXT-24S 350mA	4AH	28	8.2	$770
NXT-36S 525 mA	4AH	60	8.2	$770
NXT-60M 700mA	4AH	133	11.8	$1030

Table 2: NXT luminaires

5.3 ORANGETEK

Orangetek is a United Kingdom based company with a sales office in Australia. Their Terra LED MINI luminaire has had considerable success in New Zealand as the first quality street lighting luminaire at a truly competitive price.

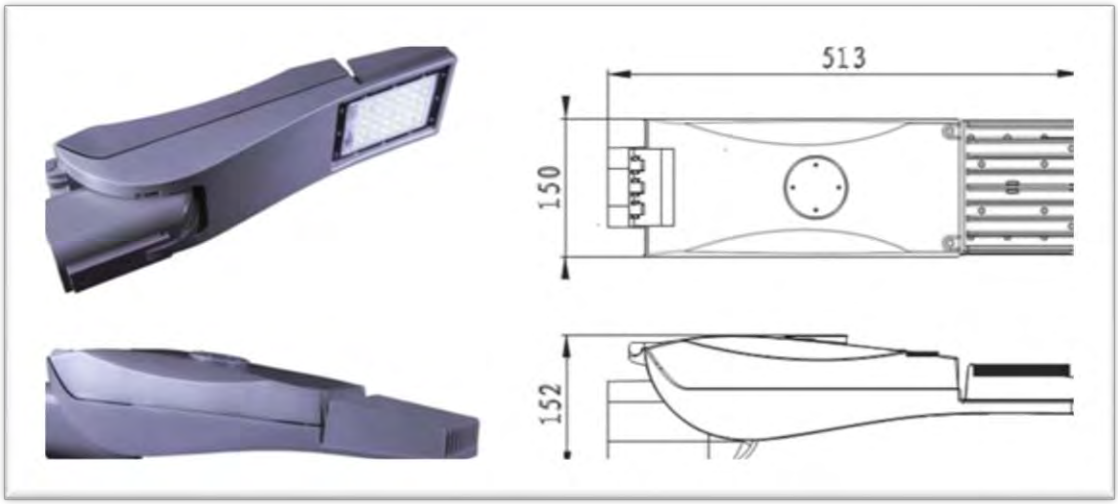


Figure 5: TerraLED MINI luminaires

Luminaire	Optic	Wattage (W)	Weight (kg)	Price with CMS
TERRALED MINI 12 WX1	WX1	12	5 kg	$399
TERRALED MINI 12 MX1	MX1	12	5 kg	$399
TERRALED MINI 18 WX1	WX1	18	5 kg	$399
TERRALED MINI 18 MX1	MX1	18	5 kg	$399
TERRALED MINI 24 WX1	WX1	24	5 kg	$399
TERRALED MINI 24 MX1	MX1	24	5 kg	$399
TERRALED MINI 30 WX1	WX1	30	5 kg	$399
TERRALED MINI 30 MX1	MX1	30	5 kg	$399

Table 3: Terra LED MINI luminaires

The above pricing is based on single units. If more than 100 units were ordered this would come down to $345 (excluding GST) per unit.

5.4 PHILIPS

As an established lighting supplier, Philips has just entered the market for street lighting with a well-priced and placed luminaire.

Figure 6: RoadGrace luminaire

The RoadGrace has very recently been included on both M30 and Auckland Transport lists and is a suitable luminaire for P category roads.

Luminaire	Optic	Wattage (W)	Weight (kg)	Price with CMS
BRP711 LED22/NW	DWP	19.7	6.5	$375
BRP711 LED23/NW	DWP3	20	6.5	$375
BRP711 LED30/NW	DWP3	26	6.5	$375
BRP711 LED40/NW	DWP3	36	6.5	$395
BRP711 LED61/NW	DWP3	56	6.5	$395
BRP711 LED81/NW	DWP3	73	6.5	$395
BRP711 LED78/NW	DWP3	70	6.5	$395

Table 4: Philips RoadGrace luminaires

As with other suppliers, Philips pricing is dependent on order quantity. The price listed above is for a single unit. For 100 > 500 units the price is $350/$365 (20 – 30 LEDs / 40 – 78 LEDs) per unit and for orders over 500 units this drops to $325 / $345.

5.5 TECHLIGHT

Techlight is a lighting company based in Rotorua that specialise in exterior and industrial lights. Their street light offering is the Italian made AEC Italo range. Many of these luminaires are already installed throughout New Zealand.

They are on the M30 accepted list. Traditionally, they are not the cheapest of the surveyed luminaires but they do appear to be superior in design aesthetics and light spread. Their newest optic gives the largest allowable pole spacing for P4 category roads.

Figure 7: AEC Italo 1 luminaire

Luminaire	Optic	Wattage (W)	Weight (kg)	Price with CMS
ITALO 1 0F2 4.5-2M	STA1	28.5	6.8	$760
ITALO 1 0F3 4.5-3M	STW	61	6.8	$845
ITALO 1 0F3 4.5-4M	STW	78	6.8	$915
ITALO 2 0F3 4.7-6M	STE-M	150	6.8	$1,165
ITALO 1 0F2 4.7-1M	STA-NEW	19	6.8	$670
ITALO 1 0F2 4.5-2M	STA-NEW	28.5	6.8	$760

Table 5: Italo luminaires from Techlight

Again prices are dependent on quantity. For orders of 250 units or more:
ITALO 1 0F2 4.7-1M (DALI capable) $595
ITALO 1 0F2 4.5-2M (DALI capable) $675

AEC have also just released a new street lighting luminaire (the I-Tron) that is likely to compete with the cheapest approved luminaires in market for price and quality. This has not been included in this analysis as details of pricing are not yet confirmed. We would strongly advise that Techlight was included in any tender process and/or approached for details of the new luminaire before embarking on the luminaire procurement process.

Figure 8: AEC I-Tron luminaire

Luminaire	Optic	Wattage (W)	Weight (kg)	Price with CMS
I-TRON ZERO 0C6 STA 4.31-3M	STA	19	4.5 kg	≈$300
I-TRON ZERO 0C6 STA 4.49-2M	STA	20	4.5 kg	≈$300

Table 6: I-Tron luminaires from Techlight

5.6 LUMINAIRE SELECTION

Based on the above comparison and the following luminaires were selected as example replacements in order to carry out the financial analysis. Final selection will need to be made based on a procurement and implementation strategy.

Existing lamps			Example Replacement		
Lamp type	# of	Energy (W)	Luminaire	Energy (W)	Cost (NZD)
80 W MV	10	90	Orangetek mini 18	20.4	345
70 W HPS	676	83	Orangetek mini 30	36	345
150 W HPS	90	168	Philips Roadgrace	73	395

Table 7: Example replacement luminaires used for financial analysis

These are the most cost effective LED luminaires that are suitable for mounting on power poles (which make up a large portion of the network) and have a DALI driver and NEMA socket.

PSL have anecdotal evidence of both supply and installation prices below those used in this analysis which depend to some extent on the scale and method of LED rollout. So although the cheapest luminaires have been used in the analysis there is some margin for either more expensive luminaires, more extensive installation scope or lower capital investment if procurement and tendering of the installation contract is managed effectively.

6. CENTRAL MANAGEMENT SYSTEM (CMS)

6.1 CMS DESCRIPTION

A Central Management System is a software based control system that manages, controls and monitors the street light network. Each street light luminaire has a control module with an individual address so the CMS can control the light output, monitor that the light is working, turn it on and off and measure how much electricity has been consumed. These features will reduce energy and maintenance costs.
The communication network required for this and the nodal nature of the network can provide a platform for future smart city initiatives.

It appears to be industry standard in New Zealand now to order luminaires with a DALI driver and 7 pin NEMA socket to allow for the implementation of a CMS system. However, few RCA's are implementing a CMS system now. Auckland Transport is rolling out a city-wide system.

It is acknowledged that WDC has indicated that it will unlikely be installing a CMS system in conjunction with this proposed LED upgrade. The following is provided for information purposes only.

6.2 CMS BENEFITS

CMS control of LED street lighting networks is an effective means of control of the solid state lighting system. As with LED street lighting, CMS is relatively new but seems likely to be a standard part of a system upgrade in the future. It is expected to offer the following benefits:-

- **Switching** control of individual luminaires – removing the requirement for ripple controlled switching.
- **Energy metering** of individual luminaires – removing the requirement to report via a lighting database. Acceptance of this for energy billing purposes is imminent.
- Reduced maintenance and patrols through **failure reporting** – luminaires report light module, driver and communications module failures.
- **Dimming control** of individual luminaires – providing energy saving by dimming to allow for lumen depreciation and reduced light levels at low traffic periods. There is also provision for adaptive lighting around specific events and areas.
- Provides a platform for **smart city applications**. The network and communication nodes can be used for a city wide implementation of carpark monitoring, water metering, security cameras, traffic signals/monitoring, smart signage etc.

6.3 CMS ARCHITECTURE

There are a number of different ways of implementing a CMS system. Fundamentally it comprises:-

- A light point controller at each luminaire which communicates with the luminaire driver and the network.

- A communications network or infrastructure that connects these. Powerline carrier signals on the supply lines have been used in the past and currently WIFI or 3G networks are often used. Recent larger scale systems generally employ some form of radio network.
- Hardware associated with this communications network which may include base stations, collectors and relays.
- The central management software and front end user interface.

It is a prerequisite for acceptance to the Auckland Transport Approved Luminaires List to be 'CMS ready' with a DALI or 0-10 V driver and a 7 pin NEMA socket to allow fitting or retrofitting of communication modules. The prevailing CMS systems can then be fitted to any of these luminaires.

Figure 9: 7 pin NEMA socket

6.3.1 CMS SOFTWARE

There are a myriad of CMS management software offerings internationally. Some of those systems deployed or proposed for New Zealand markets include:

Street Light Vision (SLV)

Street Light Vision is supported in New Zealand by Pioneer Energy. Christchurch City Council, Hastings District Council and Auckland Transport are both using Street Light Vision to manage the street lights that they have on a CMS. Street Light Vision can be integrated with an existing RAMM database. Nationally and internationally, Street Light Vision appears to be preferred due to its ability to interface with a variety of communication networks and hardware.

CityTouch LightWave

The Philips CMS system has been used in a number of small applications in New Zealand. They are still in the process of developing new architectures to connect with this. It is generally sold as a complete system, potentially locking out other suppliers and architectures.

Telematics

Telematics have their own proprietary front end software that is not supported or recommended by their agents (Techlight Ltd) in New Zealand.

City Manager

The Tvilight offer of CMS software uses open architecture and interface to allow interoperability with software and hardware from other suppliers.

6.3.2 COMMUNICATIONS NETWORK

The prevalent communications network solutions in New Zealand are:

Telematics

Auckland Transport has chosen to use the T-Light Galaxy system coupled with Street Light Vision for their CMS. The Galaxy system is a 1 – 1 communication (as opposed to a mesh network). Each light point controller can act as a repeater but only once. Auckland Transport expect to cover their network with three base stations, North, South and Central. Galaxy operates on a private 450 MHz signal range where there is less potential for interference than other frequency ranges.

SilverSpring

SilverSpring is a radio mesh network that uses an open IP protocol (IPv6). This is the radio communications provider that is used by Unison Networks to manage many of their netword. SilverSpring do not manufacture light point controllers (LPC) but provide their specification to a number of manufacturers. This provides for competitive procurement and reduces dependency on any one LPC manufacturer or supplier. LPCs double as repeaters. SilverSpring is used by Christchurch City Council for their Avon Precinct Project.

Philips City Touch

City Touch operates a couple of different architectures. One utilises the cellular network to communicate with each individual light. Another system communicates with local gateways via the cellular network and each of these talks to the individual light controllers via a locally generated WIFI.

Telensa

Telensa provide a total solution for street light control (i.e. communications network, central management software and light point controllers are all patented by them) using ultra narrow band radio. As far as we know there are no installations in New Zealand but Telensa have a considerable market share internationally.

Power line carrier

This is used extensively overseas and for many of the earliest CMS installations to communicate between a gateway and the LPCs. It has been used by a variety of CMS providers, most likely with a variety of protocols. As far as we know, there are no PLC controlled lighting installations in New Zealand.

Vizion by Lucy Zodion

The Vizion Central Management System (CMS) provides a complete street lighting management solution. Vizion CMS is a 'quick to install' system using the WiMAC protocol (a secure, wireless communication channel) between collectors and up to 256 nodes. In practice, working numbers may be less due to localised conditions. The Collector collects the information from all the street lights in its area and, using GPRS (mobile data service), sends the information to the Vizion Host. The Collector also receives messages from the Vizion Host and transmits them to the individual Nodes on the street lights.

6.3.3 LIGHT POINT CONTROLLERS

There are a myriad of different light point controllers (also called telecells, lighting control units, communication modules…) depending on which communications architecture, medium and protocol is employed. These typically cost USD 100 – 200 and form the bulk of the capital investment in a CMS.

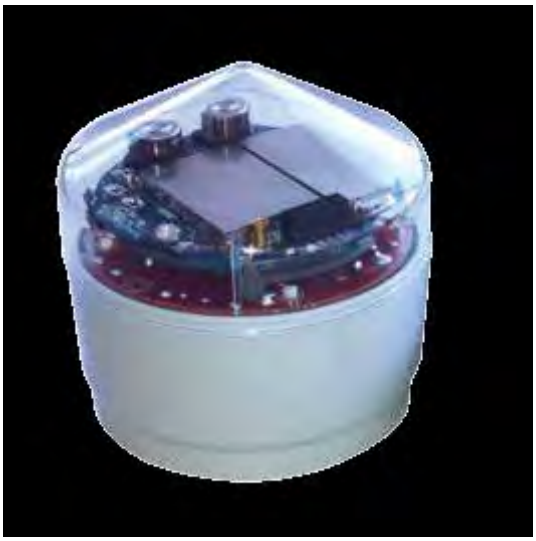


Figure 10: SELC external CMS module

6.4 INDICATIVE COSTS

To obtain a quote for a CMS system, some level of design is required. There are frequently ongoing costs associated with either the software or radio licencing used for a CMS.

Based on previously obtained CMS system network costs an indicative installation cost for WDC has been estimated at $190k. This would largely be dependent on the technology and system architecture that would be adopted. This assumes that the CMS is rolled out simultaneous with the LED renewal programme avoiding the requirement to visit any luminaire more than once.

CMS provides failure reporting adding maintenance benefits in the reduced requirement for night patrols. Dimming profiles provide energy savings by reducing

light levels and hence power consumption during periods of low traffic. However, both the energy savings (potentially an additional 25%) and maintenance savings are small compared with those made with the initial LED upgrade and the investment is not insignificant. As a result, it is difficult to justify a CMS installation based on these savings alone. Most installations have some strategic reasoning based on using the platform to support other services. Coordinating both the cost sharing and technical installation of other services is a challenge as is quantifying their benefit in many cases.

7. FINANCIAL ANALYSIS

7.1 METHODOLOGY AND ASSUMPTIONS

The latest version of the NZTA Business Case spreadsheet along with the associated assumptions were used to carry out a financial analysis of the LED street light upgrade. This is on the basis of the life cycle costs for operating the WDC Street light network over a 20 year term.

It should be noted that **this calculation assumes minimal maintenance or renewals costs associated with the new LEDs for the period of the PV calculation. A 6 yearly cleaning regime is recommended and allowed for**.

Renewals for the option "maintaining existing" consists of replacing luminaires with LEDs at the rate of luminaire failure (3% per year) and the energy consumption has been progressively reduced at the same rate.

WDC budgets were used to estimate luminaire maintenance for the existing assets resulting in an average of $80 per luminaire per year.

No savings on network charges (the Lines Company portion of the electricity bill) have been allowed for.

7.2 SUMMARY RESULTS

Key figures from the analysis are:-

- The existing network 20 year life cycle cost is $1.17M.

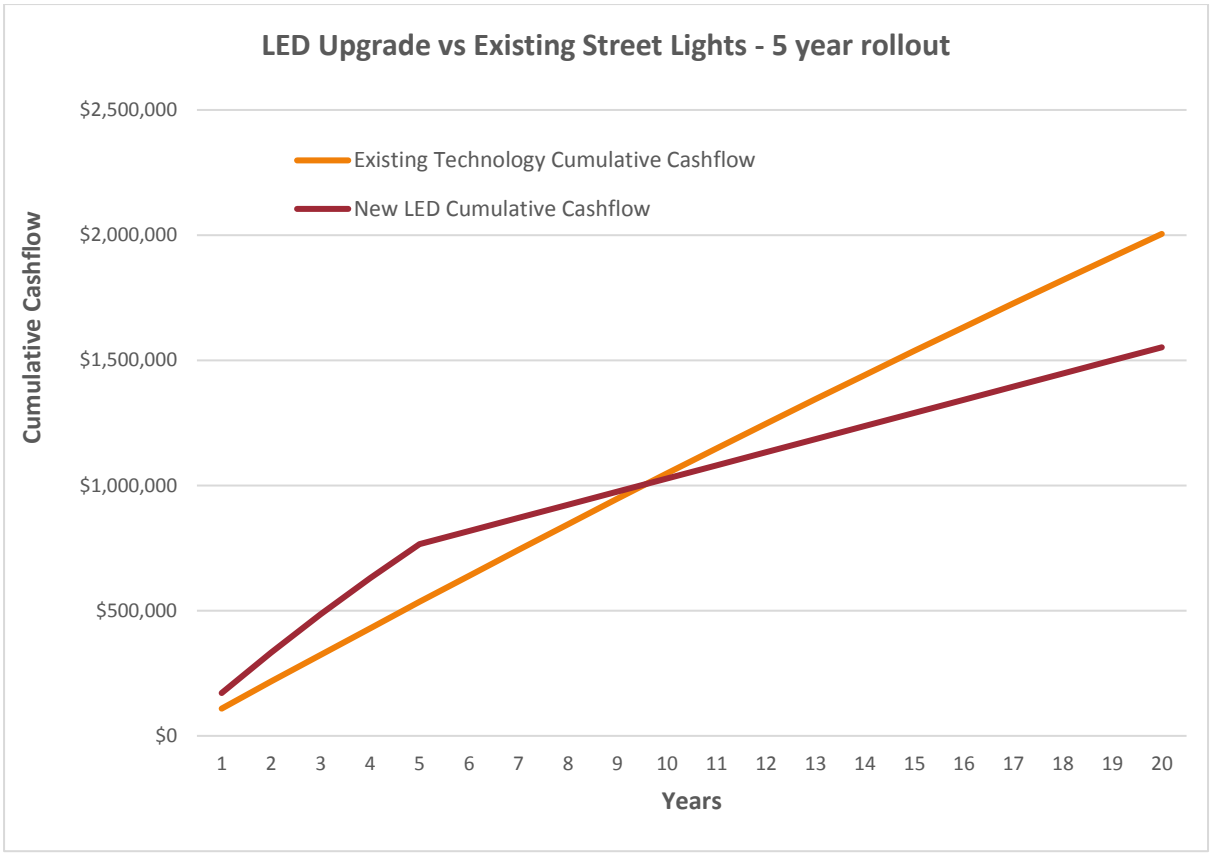
For a five year rollout programme:

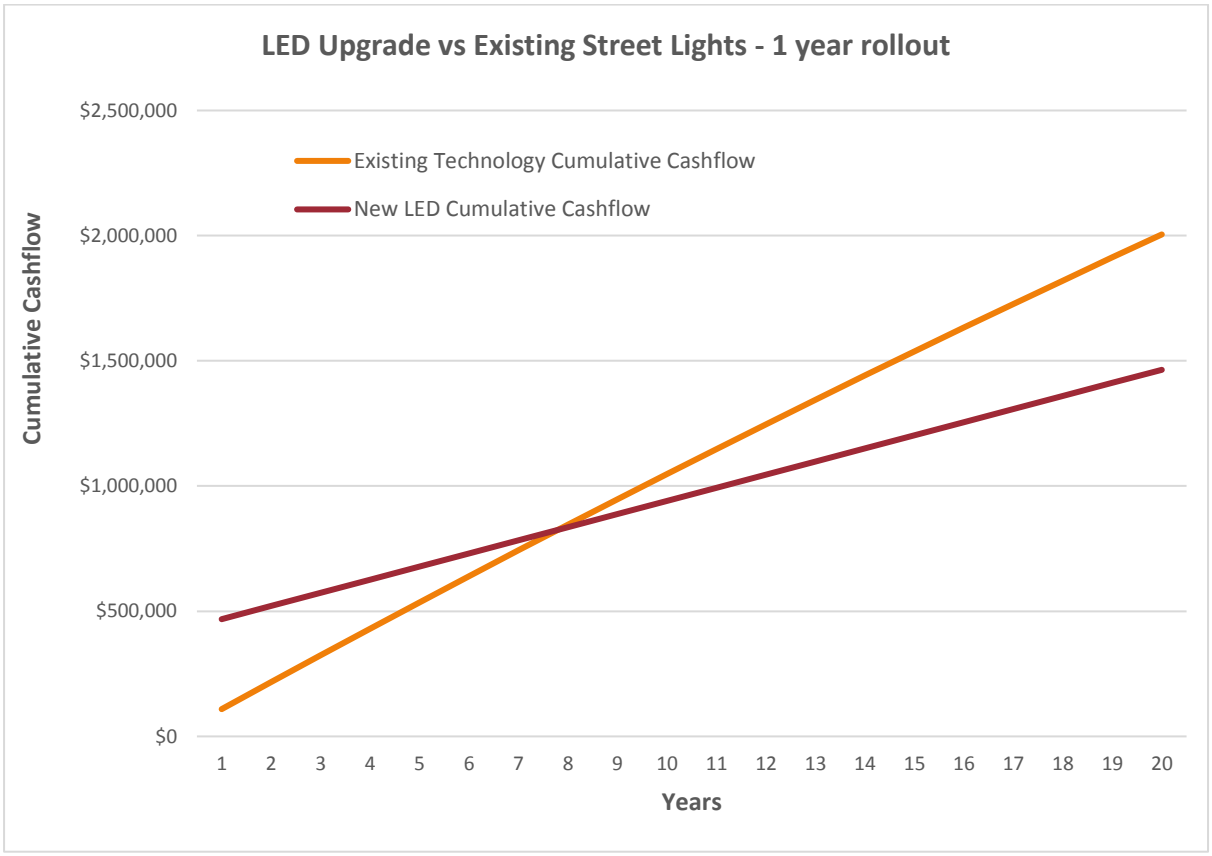
- The new LED network 20 year life cycle cost (present value at 6% discount rate) including the project implementation period is $1.03M.
- The simple payback is 9 years.
- The total investment of new LED street lights is $416k.

For a one year rollout programme:

- The new LED network 20 year life cycle cost (present value at 6% discount rate) including the project implementation period is $993K.
- The simple payback is 8 years.
- The total investment of new LED street lights is $416k.

The following graph shows comparative results between the cumulative cashflow for the existing street light network and the proposed LED street light network.


LED Upgrade vs Existing Street Lights - 5 year rollout
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
Cumulative Cashflow
Existing Technology Cumulative Cashflow
New LED Cumulative Cashflow
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Years


LED Upgrade vs Existing Street Lights - 1 year rollout
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
Cumulative Cashflow
Existing Technology Cumulative Cashflow
New LED Cumulative Cashflow
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Years

7.3 INPUTS

The following figures, costs and assumptions were used in the financial analysis. Actual WDC rates have been used where possible.
Please note that network charges (the Lines Company portion of electricity billing) have been excluded from the electricity costs. Any reduction in these costs associated with an LED upgrade would be additional to savings shown in this financial analysis.

Input Item	Value	Unit
Electricity cost (energy only)	11.2	c/kWh
Number of new LED Luminaires	776	units
LED supply cost	As per Table 7, page 17	
Labour to install - bulk	$185	$/luminaire
Maintenance cost, new LED luminaires	$20	$/luminaire/year
Maintenance cost, existing luminaires	$80	$/luminaire/year
Reduced Network charge per LED unit	0	$/unit/annum
Energy saving by dimming (CMS)*	25	%
Hours lights are on	4,250	Hours
HID Lamp replacement 50 – 100 W	90	$
HID Lamp replacement 150 W	120	$
LED Luminaire energy consumption	As per Table 7, page 17	
HID Luminaire energy consumption	As per Table 7, page 17	
HID Luminaire rate of replacement	3	%
HID lamp life	4	years

* Savings from dimming are not included in the business case but shown separately in the CMS financial analysis

7.4 SUMMARY OF PV CALCULATION RESULTS

The following tables summarise the results of Present Value calculations carried out for each existing luminaire type.

Part number	Lighting network part name	Number of existing luminaires	PV cost of maintain existing option (cost 'A')	PV cost of replace w LED option (cost 'B')	PV cost saving (A-B) at 6% discount rate	Year in which cost of LED conversion paid back	Annual average cost saving
1	80 W mercury vapour	10	$15,136	$12,261	$2,875	9	$394
2	70 W high pressure sodium	676	$984,214	$873,398	$110,815	10	$18,670
3	150 W high pressure sodium	90	$170,201	$144,241	$25,961	9	$3,579
TOTALS		776	$1,169,551	$1,029,900	$139,651	9	$22,643

Table 8: Present Value calculations - 5 year rollout

Part number	Lighting network part name	Number of existing luminaires	PV cost of maintain existing option (cost 'A')	PV cost of replace w LED option (cost 'B')	PV cost saving (A-B) at 6% discount rate	Year in which cost of LED conversion paid back	Annual average cost saving
1	80 W mercury vapour	10	$15,136	$11,637	$3,499	7	$459
2	70 W high pressure sodium	676	$984,214	$844,254	$139,959	9	$22,330
3	150 W high pressure sodium	90	$170,201	$137,569	$32,633	7	$4,248
TOTALS		776	$1,169,551	$993,460	$176,091	8	$27,037

Table 9: Present Value calculations - 1 year rollout

Summary of Energy Use and Carbon emissions comparison									
		Existing Technology				LED's			
	Technology	Annual Existing (kWh/yr)	Elect Use Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO2-e)	Annual LED (kWh/yr)	Elect Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO_2-e)
1	80 W MV	3,825	71,558	$8,015	10	867	23,256	$2,605	3
2	70 W HPS	238,459	4,179,640	$468,120	573	103,428	2,338,223	$261,881	320
3	150 W HPS	64,260	1,126,042	$126,117	154	27,923	631,125	$70,686	86
		306,544	5,377,240	$602,251	737	132,218	2,992,604	$335,172	410
	Saving					174,327	2,384,637	$267,079	327

Table 10: Energy Use and Carbon emissions comparison - 5 year rollout

Summary of Energy Use and Carbon emissions comparison									
		Existing Technology				LED's			
	Technology	Annual Existing (kWh/yr)	Elect Use Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO2-e)	Annual LED (kWh/yr)	Elect Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO_2-e)
1	80 W MV	3,825	71,558	$8,015	10	867	17,340	$1,942	2
2	70 W HPS	238,459	4,179,640	$468,120	573	103,428	2,068,560	$231,679	283
3	150 W HPS	64,260	1,126,042	$126,117	154	27,923	558,450	$62,546	77
		306,544	5,377,240	$602,251	737	132,218	2,644,350	$296,167	362
	Saving					174,327	2,732,890	$306,084	374

Table 11: Energy Use and Carbon emissions comparison - 1 year rollout

SUMMARY			
Annual Reduction in Electricity	174,327	kWh/yr	57%
Total reduction in Electricity over 20 year Life Cycle	2,384,637	kWh	
Total reduction in Electricity Cost over 20 year Life Cycle	$267,079	$	
Total reduction in Life Cycle Cost	$452,857	$	
Total reduction in Carbon emissions over 20 year Life Cycle	327	TCO_2 -e	

Table 12: Summary of Energy Use and Carbon emissions savings – 5 year rollout

SUMMARY			
Annual Reduction in Electricity	174,327	kWh/yr	57%
Total reduction in Electricity over 20 year Life Cycle	2,732,890	kWh	
Total reduction in Electricity Cost over 20 year Life Cycle	$306,084	$	
Total reduction in Life Cycle Cost	$540,741	$	
Total reduction in Carbon emissions over 20 year Life Cycle	374	TCO_2 -e	

Table 13: Summary of Energy Use and Carbon emissions savings – 1 year rollout

7.5 CMS COSTS

Based on previous cost estimates for lighting CMS, figures were scaled to match the WDC roading lighting network. A Telematics communication network using Street Light Vision software as the user interface and control software has been considered here.

	Number of luminaires	**776**	
#	**Description**	**per unit**	**total**
1	Product Radio Licence	$300	$300
1	Survey for available radio frequency by licensed engineer	$2,500	$2,500
1	Set-up costs with RSM via a licensed engineer	$2,500	$2,500
1	Galaxy Base Station and Cabinet	$36,000	$36,000
1	Antenna	$226	$226
40	Feed Cable (Heliax LDF4-50A) - Per Metre	$21	$840
1	Feed Cable Connectors x 2	$35	$35
1	Antenna Mounting Pole/Attachment	$450	$450
1	Set-up Engineering Support/Software Training	$5,000	$5,000
776	LCU 150 (NEMA 7 Pin), DALI, Energy Meter, GPS with NFC	$161	$124,936
776	LCU installation and commissioning (if done with LED upgrade)	$40	$31,040
3	NFC PDA/GPS Unit (Required only for the GPS with NFC unit)	$450	$1,350
	Total Capital cost		**$205,177**
776	SLV Software Install & Ongoing Support (cloud based)	$3.00	$2,328
	Total Annual cost		**$2,328**

Table 14: Indicative cost breakdown for Telematics CMS

Prices for a Silversprings/Street Light Vision solution were comparable.

Assuming:

- Average LED luminaire wattage of 40 W
- Energy saving through dimming of 25%
- CMS installation for 776 luminaires in Waitomo costing $205,000
- CMS installation completely voids night patrols – estimated saving $500 per month
- Annual CMS software licensing fee of $3 per node
- No maintenance of CMS system required or other ongoing costs.
- No other direct financial benefits or savings associated with CMS installation.

Based on these optimistic assumptions, energy costs will drop from $14,800 to $11,100 annually for those 776 luminaires. There will be a maintenance saving of $6,000 each year. After an initial investment of

$205,000, the CMS system has a payback period of 21 years and an NPV of **negative** $84,443 (using a 6% discount rate).

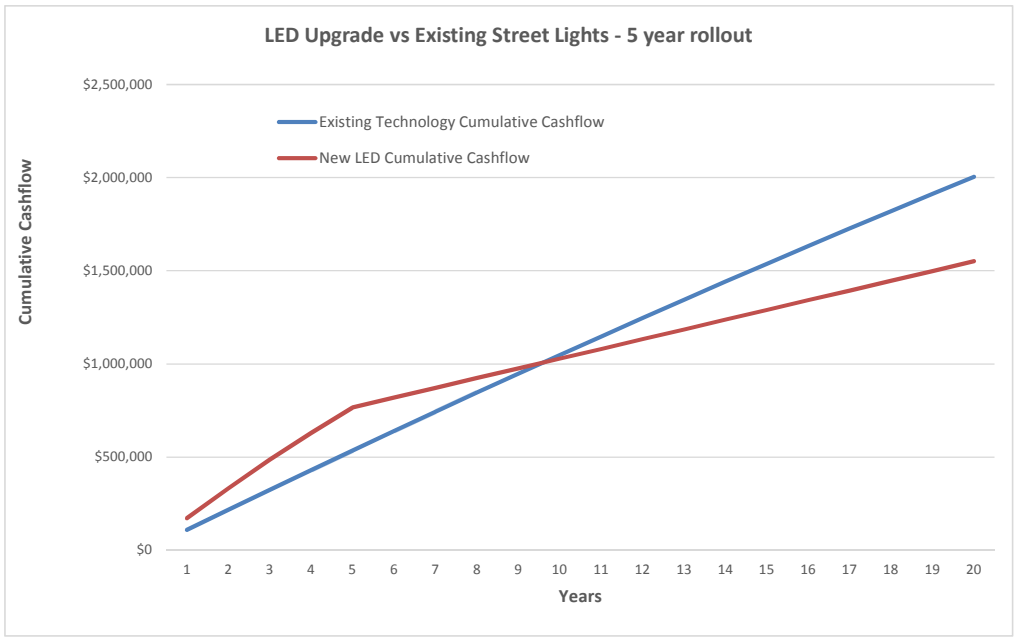
An installation of a CMS system at a later date is likely to incur a greater installation cost (although equipment may be cheaper) as each luminaire will have to be revisited to install and commission the light point controller.

APPENDICES

Summary of the PV calculation results for WDC Street Light network - 5 year rollout

Part number	Lighting network part name	Number of existing luminaires	Number of proposed LED luminaires	PV cost of maintain existing option (cost 'A')	PV cost of replace w LED option (cost 'B')	PV cost saving (A-B) at 6% discount rate	Year in which cost of LED conversion paid back	PV of energy cost savings from dimming	Annual average cost saving	PV cost saving (A-B) at 8% discount rate	PV cost saving (A-B) at 4% discount rate
1	*80 W mercury vapour*	*10*	*10*	*$15,136*	*$12,261*	*$2,875*	*9*	*$0*	*$394*	*$1,975*	*$4,075*
2	*70 W high pressure sodium*	*676*	*676*	*$984,214*	*$873,398*	*$110,815*	*10*	*$0*	*$18,670*	*$64,228*	*$173,378*
3	*150 W high pressure sodium*	*90*	*90*	*$170,201*	*$144,241*	*$25,961*	*9*	*$0*	*$3,579*	*$17,711*	*$36,932*
TOTALS		776	776	$1,169,551	$1,029,900	**$139,651**	**9**	0	$22,643	$83,914	$214,385

		Existing Technology Cumulative Cashflow	New LED Cumulative Cashflow
1	**Year 1**	$108,886	$171,150
2	**Year 2**	$216,863	$332,982
3	**Year 3**	$323,929	$486,026
4	**Year 4**	$430,086	$630,281
5	**Year 5**	$535,333	$765,747
6	**Year 6**	$639,670	$818,164
7	**Year 7**	$743,097	$870,581
8	**Year 8**	$845,615	$922,997
9	**Year 9**	$947,222	$975,414
10	**Year 10**	$1,047,920	$1,027,831
11	**Year 11**	$1,147,708	$1,080,247
12	**Year 12**	$1,246,586	$1,132,664
13	**Year 13**	$1,344,554	$1,185,081
14	**Year 14**	$1,441,612	$1,237,497
15	**Year 15**	$1,537,761	$1,289,914
16	**Year 16**	$1,632,999	$1,342,331
17	**Year 17**	$1,727,328	$1,394,748
18	**Year 18**	$1,820,747	$1,447,164
19	**Year 19**	$1,913,256	$1,499,581
20	**Year 20**	$2,004,855	$1,551,998
	Saving		$452,857



	Summary of Investment Required	Total	NZTA Portion (@ 85% FAR)	WDC Portion (@ 85% FAR)	NZTA Portion (@ 64% FAR)	WDC Portion (@ 64% FAR)
1	*80 W mercury vapour*	$ 5,300	$ 4,505	$ 795	$ 3,392	-$ 2,597
2	*70 W high pressure sodium*	$ 358,280	$ 304,538	$ 53,742	$ 229,299	-$ 175,557
3	*150 W high pressure sodium*	$ 52,200	$ 44,370	$ 7,830	$ 33,408	-$ 25,578
		$ 415,780	**$ 353,413**	**$ 62,367**	**$ 266,099**	**-$ 203,732**

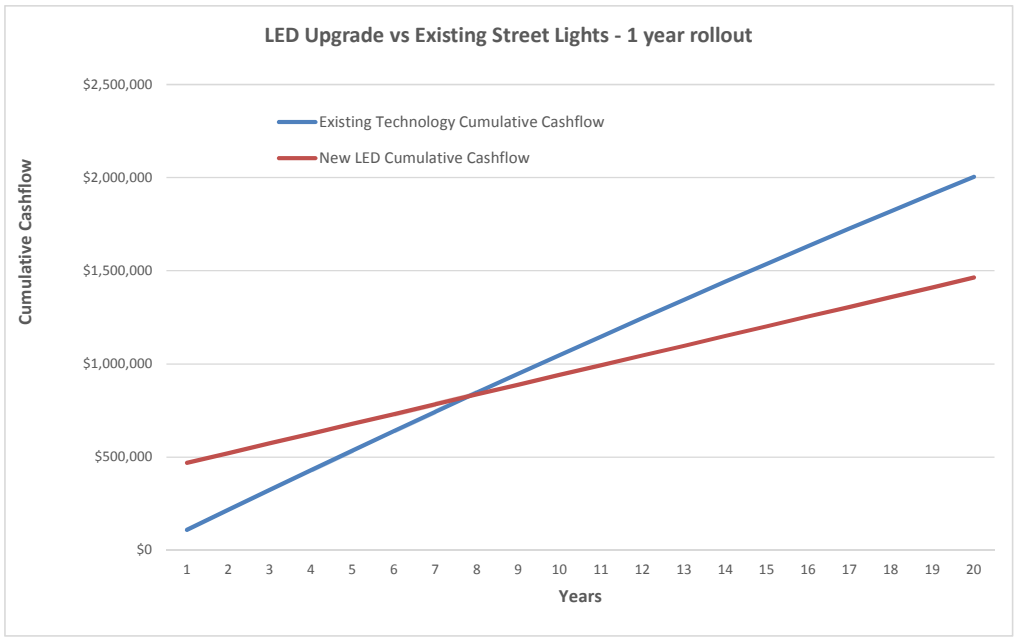
		Existing Technology				LED's			
	Summary of Energy Use and Carbon emissions comparison	Annual Existing (kWh/yr)	Elect Use Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO2-e)	Annual LED (kWh/yr)	Elect Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO_2-e)
1	*80 W mercury vapour*	3,825	71,558	$ 8,015	10	867	23,256	$ 2,605	3
2	*70 W high pressure sodium*	238,459	4,179,640	$ 468,120	573	103,428	2,338,223	$ 261,881	320
3	*150 W high pressure sodium*	64,260	1,126,042	$ 126,117	154	27,923	631,125	$ 70,686	86
		306,544	**5,377,240**	**$ 602,251**	**737**	**132,218**	**2,992,604**	**$ 335,172**	**410**
	Saving					**174,327**	**2,384,637**	**$ 267,079**	**327**

SUMMARY			
Annual Reduction in Electricity	**174,327**	**kWh/yr**	**57%**
Total reduction in Electricity over 20 yr Life Cycle	**2,384,637**	**kWh**	
Total reduction in Electricity Cost over 20 yr Life Cycle	**$ 267,079**	**$**	
Total reduction in Life Cycle Cost	**$ 452,857**	**$**	
Total reduction in Carbon emissions over 20 yr Life Cycle	**327**	**TCO_2 -e**	

Summary of the PV calculation results for WDC Street Light network - 1 year rollout

Part number	Lighting network part name	Number of existing luminaires	Number of proposed LED luminaires	PV cost of maintain existing option (cost 'A')	PV cost of replace w LED option (cost 'B')	PV cost saving (A-B) at 6% discount rate	Year in which cost of LED conversion paid back	PV of energy cost savings from dimming	Annual average cost saving	PV cost saving (A-B) at 8% discount rate	PV cost saving (A-B) at 4% discount rate
1	*80 W mercury vapour*	*10*	*10*	*$15,136*	*$11,637*	*$3,499*	*7*	*$0*	*$459*	*$2,417*	*$4,900*
2	*70 W high pressure sodium*	*676*	*676*	*$984,214*	*$844,254*	*$139,959*	*9*	*$0*	*$22,330*	*$81,589*	*$215,636*
3	*150 W high pressure sodium*	*90*	*90*	*$170,201*	*$137,569*	*$32,633*	*7*	*$0*	*$4,248*	*$22,578*	*$45,609*
TOTALS		776	776	$1,169,551	$993,460	**$176,091**	**8**	0	$27,037	$106,585	$266,145

		Existing Technology Cumulative Cashflow	New LED Cumulative Cashflow
1	**Year 1**	$108,886	$468,197
2	**Year 2**	$216,863	$520,613
3	**Year 3**	$323,929	$573,030
4	**Year 4**	$430,086	$625,447
5	**Year 5**	$535,333	$677,863
6	**Year 6**	$639,670	$730,280
7	**Year 7**	$743,097	$782,697
8	**Year 8**	$845,615	$835,113
9	**Year 9**	$947,222	$887,530
10	**Year 10**	$1,047,920	$939,947
11	**Year 11**	$1,147,708	$992,363
12	**Year 12**	$1,246,586	$1,044,780
13	**Year 13**	$1,344,554	$1,097,197
14	**Year 14**	$1,441,612	$1,149,613
15	**Year 15**	$1,537,761	$1,202,030
16	**Year 16**	$1,632,999	$1,254,447
17	**Year 17**	$1,727,328	$1,306,863
18	**Year 18**	$1,820,747	$1,359,280
19	**Year 19**	$1,913,256	$1,411,697
20	**Year 20**	$2,004,855	$1,464,113
	Saving		$540,741



	Summary of Investment Required	Total	NZTA Portion (@ 85% FAR)	WDC Portion (@ 85% FAR)	NZTA Portion (@ 64% FAR)	WDC Portion (@ 64% FAR)
1	*80 W mercury vapour*	$ 5,300	$ 4,505	$ 795	$ 3,392	-$ 2,597
2	*70 W high pressure sodium*	$ 358,280	$ 304,538	$ 53,742	$ 229,299	-$ 175,557
3	*150 W high pressure sodium*	$ 52,200	$ 44,370	$ 7,830	$ 33,408	-$ 25,578
		$ 415,780	**$ 353,413**	**$ 62,367**	**$ 266,099**	**-$ 203,732**

		Existing Technology				LED's			
	Summary of Energy Use and Carbon emissions comparison	Annual Existing (kWh/yr)	Elect Use Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO2-e)	Annual LED (kWh/yr)	Elect Over 20yr Life Cycle (kWh)	Elect only Cost Over 20yr Life Cycle ($)	Carbon Emissions Over 20 Yr Life Cycle (T CO_2-e)
1	*80 W mercury vapour*	3,825	71,558	$ 8,015	10	867	17,340	$ 1,942	2
2	*70 W high pressure sodium*	238,459	4,179,640	$ 468,120	573	103,428	2,068,560	$ 231,679	283
3	*150 W high pressure sodium*	64,260	1,126,042	$ 126,117	154	27,923	558,450	$ 62,546	77
		306,544	**5,377,240**	**$ 602,251**	**737**	**132,218**	**2,644,350**	**$ 296,167**	**362**
	Saving					**174,327**	**2,732,890**	**$ 306,084**	**374**

SUMMARY			
Annual Reduction in Electricity	**174,327**	**kWh/yr**	**57%**
Total reduction in Electricity over 20 yr Life Cycle	**2,732,890**	**kWh**	
Total reduction in Electricity Cost over 20 yr Life Cycle	**$ 306,084**	**$**	
Total reduction in Life Cycle Cost	**$ 540,741**	**$**	
Total reduction in Carbon emissions over 20 yr Life Cycle	**374**	**TCO_2 -e**	

Auckland Transport
LED Approved Luminaire List - AT-LALL

Manufacturer	Luminaire Model	System Wattage (W)	LED Count /Module	Colour Temperature (K)	Category	Supplier	Notes
AEC	A2 LED	37 - 71	20 - 30	3950	P only	Techlight	
	LED-in (ST/OC) 4.5-18 - 4.5-90	28 - 145	18 - 90	3950	P and V		
	LED-in (ST/OC) 4.7-27 - 4.7-54	60 - 118	27 - 54		P and V		
	Italo 1 (STA1 or 7SS)	28.5 (37.5 max)	1 - 2 M	4000	P only		
	Italo 1	15 - 103	1 - 4 M	4000	V only		
	Italo 2	60 - 154	4 - 8 M				
	Italo 3	132 - 289	7 - 15 M				
Betacom	GL520P (Premium driver and 5032, 7012, 7022, 7032 & 7052 optics only)	17 - 33 (max)	24	3750	P only	Betacom (1988) Ltd	
CREE	LEDway XIL 3M 'E'	Up to 35	20 (525mA)	4000	P only	Advanced Lighting Technologies	
	LEDway XIL 3M 'E'	Up to 35	30 (350mA)	4000	P only		
	LEDway XIL 'E'	35 - 279	Up to 120	4000	V only		
	Edge Round/Square (Series E)	Up to 66 (max)	40 (350mA)	4000	P only		
	XSP1 (3M optic only)	29 (34 max)	N/A	4000	P only		
	XSP1	52	N/A	4000	V only		
	XSP2	101 - 153	N/A	4000	V only		
DLEDS	Stratos N 6M (W23A optic only)	12 - 35	6M	4100	P only	Globelink Ltd	
IGuzzini	Wow Mini (BU59/60/62/63)	37/29/31/35	12	4000	P only	ECC	

The luminaire's performance and data will be assessed from time to time which could result in the need to reassess the luminaire for inclusion on the approved list. Acceptance onto the AT approved list does not in any way imply that AT will purchase the luminaire. Purchase of the luminaire will be subject to suitable commercial terms and each specific site will be evaluated to select the most appropriate luminaire.

	Wow Small (BH34/38/41)	38/68/80	24	4000	P and V		
	Wow Large (BH59/60)	118/116	24	4000	V only		
	Woody Street LED	30 - 51	12 - 36	4000	P only		1. Cannot provide NEMA socket
Kim Lighting	Warp 9 LED	65 - 130	60 - 120	4200	P and V	Spectratech Lighting Ltd	1. No integral tilt available
KTL	Shard B28 – F (LL17056 optic only)	28	1 COB	4000	P only	Brilliant Ltd	1. Note: COB = Chip on Board
LED Roadway Lighting (LRL)	NXT-C - 4AH	28 (max)	24	4000	P only	Energy Light Ltd	
	NXT-S (except 2ES optic for Cat P roads)	14 - 80	12 - 36	4000	P only		
	NXT-M	53 - 158	48 - 72	4000	P and V		
LeTehnika	Luxtella S12XPL-20AT	19.5W	12	3900	P only	ECOLight	1. Luminaire not to be painted 2. Must be supplied with flex and plug (AT spec)
OrangeTek	Terraled Mini (WX1 & MX1 optics only)	12 - 36	12 - 30	4000	P only	OrangeTek	
	Terraled Mini (AP1 optic + Nichia LED only)	12 - 36	12 - 30	4000	P only		
	Terraled Mini (AP2 optic + PMMA Lens + Osram LED)	20	18	4000	P only		
	ARIALED (NV4, NX3 & NX4 optics only)	33-300	30-140	4000	V only		1. Internal tilt range with adapters: -5 to +10 degrees 2. External adapters for -10/-15 not approved
Panhost	TransLEDer TL015, TL020 & TL023	15-23	42	4000	P only	Transleder Lighting Ltd	1. Must be supplied with flex and plug (AT spec)
Philips	Stela+Gen 2 (NRN Optic only)	36 (max)	24	4000	P only	IBEX International	

The luminaire's performance and data will be assessed from time to time which could result in the need to reassess the luminaire for inclusion on the approved list. Acceptance onto the AT approved list does not in any way imply that AT will purchase the luminaire. Purchase of the luminaire will be subject to suitable commercial terms and each specific site will be evaluated to select the most appropriate luminaire.

						Ltd (Kendelier)	
	Roadgrace BRP 711	20 - 73	48 - 96	4000	P only	Philips New Zealand Ltd	
	Roadstar GPLS	45 - 102	30 - 49	4000	V only		
	Roadstar GPLM	119 - 204	79 - 98	4000	V only		
	Luma 1 80 (R5 optic only)	88-135	80	3900	V3 & V4 only	IBEX International Ltd (Kendelier)	
Schreder	Teceo 1 (5068 optic only)	35 (max)	24	4100	P only	Betacom (1988) Ltd	
	Teceo 2 (5118 optic only)	86 - 279	80 - 128	4100	V only		
Sylvania	StreetLED (Aeroscreen version only)	26.7	18	4000	P only	Aesthetics Lighting	1. MC1 (-5/+5) adapter & internal mounting bolts
	StreetLED (Aeroscreen version only) with MC2 (-15/+5) adapter & external mounting bolts	26.7	18	4000	P only	Aesthetics Lighting	1. MC2 (-15/+5) adapter & external mounting bolts
Simon Electric Co.	Nath-S 24W 80-155°	25W	32	3900	P only	Lumenworks Ltd	
Vizulo	Mini Stork	23.9 - 28	4	3900	P only	IBEX International Ltd	
	Mini Martin	23.9 - 28	4	3900	P only		
Vulkan	V3630-0.1Cu	11.3 – 140.1	1 – 4	4000	P and V	O-Light Limited	1. Must be supplied with flex and plug (AT spec)

The luminaire's performance and data will be assessed from time to time which could result in the need to reassess the luminaire for inclusion on the approved list. Acceptance onto the AT approved list does not in any way imply that AT will purchase the luminaire. Purchase of the luminaire will be subject to suitable commercial terms and each specific site will be evaluated to select the most appropriate luminaire.

We-ef	VFL 530	14 - 55	12 - 24	4080	P only	Mark Herring Lighting Ltd	1. No integral tilt available 2. Must be supplied with flex and plug (AT spec)

The luminaire's performance and data will be assessed from time to time which could result in the need to reassess the luminaire for inclusion on the approved list. Acceptance onto the AT approved list does not in any way imply that AT will purchase the luminaire. Purchase of the luminaire will be subject to suitable commercial terms and each specific site will be evaluated to select the most appropriate luminaire.

M30 ACCEPTED LUMINAIRES

As at 15 November 2016, the following luminaires have been assessed using M30 criteria and granted acceptance for installation. Please ensure reference is made to the notes following this table.

Manufacturer & Luminaire	Luminaire Model	System Wattage (W)	LED Count /Module	Nom. Colour Temperature	Mass (kg) (see Note 3)	Category or Intended Use	Supplier
AEC A2 LED	A2 LED	37 - 71	20 – 30	3950K	7.5	Specific projects	Techlight Ltd
AEC Italo	Italo 1 Italo 1 Italo 2 Italo 3	13 - 80 43 - 103 54 - 154 93 - 306	1 – 3M 3 – 4M 4 – 8M 7 – 15M	4000K	6.8 6.8 12 19	P and V V only V only V only	Techlight Ltd
Betacom GL520	GL520 (Premium Driver with 7012, 7022, 7032 optics only)	29 (33 max)	24	4000K	3.2	P only	Betacom (1988) Ltd
Cree LEDway	XIL 02 XIL 04 XIL 07 XIL 10	23 - 70 45 - 134 80 - 203 117 - 263	20 – 30 40 – 60 70 – 90 100 - 120	4000K	4.8 7.3 9.5 10.9	P and V V only V only V only	Advanced Lighting Technologies Ltd
Cree EDGE	Square Round	25 - 261 45 – 202	20 - 240 40 - 120	4000K	10 - 22 17 - 20	Specific projects	Advanced Lighting Technologies Ltd
Cree XSP	XSP1 3M optic XSP1 XSP2	29 (34 max) 15 - 52 29 – 168	n/a n/a n/a	4000K	10 10 15 - 16.3	P only P and V P and V	Advanced Lighting Technologies Ltd
DLEDS Stratos	Stratos N 6M (W23A optic only)	12 - 35	6M	4100K	5.5	P only	Globelink Ltd

Manufacturer & Luminaire	Luminaire Model	System Wattage (W)	LED Count /Module	Nom. Colour Temperature	Mass (kg) (see Note 3)	Category or Intended Use	Supplier
iGuzzini	Wow Mini Wow Small Wow Large Woody LED Street (see Note 7)	29 – 37 38 – 80 116 - 118 30 - 51	12 24 24 12 - 36	4000K	9 12 16.4 10.5	Specific projects	ECC Lighting Ltd
KIM Lighting	Warp 9 LED (see Note 5)	65 – 130	60 - 120	4200K	7.7 – 15.9	Specific projects	Spectratech Lighting Ltd
KTL Shard-P	B28-F (LL17056 optic only)	28	1 COB	4000K	8.5	P only	KTL Technologies Ltd
LED Roadway NXT	NXT-C - 4AH	22-48	12	4000K	5.4	P and V	Energy Light Ltd
	NXT-12S NXT-24S-4AH NXT-36S (all optics except 2ES)	14 – 27 28 42 - 80	12 24 36	4000K	8.2 8.2 8.2	P only P only V only	Energy Light Ltd
	NXT-M	53 - 158	48 - 72	4000K	11.8	V only	Energy Light Ltd
Le Tehnika	Luxtella S12XPL-20AT (see Notes 8 & 9)	19.5	12	3900K	4	P only	ECOLight
OrangeTek	Terraled Mini (AP1, MX1 & WX1 optics) Arialed (NV4, NX3, & NX4 optics)	12 – 36 33 - 300	12 – 30 30 - 140	4000K	5 6.5 - 14	P only V only	OrangeTek Ltd

Manufacturer & Luminaire	Luminaire Model	System Wattage (W)	LED Count /Module	Nom. Colour Temperature	Mass (kg) (see Note 3)	Category or Intended Use	Supplier
Philips Luma	Luma 1 80 (R5 optic only)	80	88 - 135	3900K	11	V3 / V4 only	IBEX International Ltd
Philips Roadgrace	BRP711	20 - 73	48 - 96	4000K	6.5	P and V	Philips (NZ) Ltd
Philips Roadstar	GPLS GPLM	45 - 102 119 - 204	30 – 49 79 - 98	4000K	9.1 14.1	V only V only	Philips (NZ) Ltd
Philips Stela	Stela+ (gen2)	36 (max)	18	4000K	7	P only	Kendelier Lighting
Schréder PIANO	PIANO 1 PIANO 2	21 - 63 84 - 128	16 – 48 64 - 96	4250K	8.7 14.5	P and V V only	Betacom (1988) Ltd
Schréder TECEO	TECEO 1 (5068 optic only) TECEO 2 (Optics 5102, 5103 & 5118 only)	19 – 113 62 - 279	16 – 48 56 - 144	4100K	9.6 17.5	P and V V only	Betacom (1988) Ltd
Simon Electric Co Ltd	Nath-S 24W 80-1550	25	32	3900K	7.3	P only	Lumenworks Ltd
Sylvania	StreetLED (aero screen only)	26.7	18	4000K	7	P only	Aesthetics Lighting
Vizulo	Mini Martin Mini Stork	23.9 - 28 23.9 - 28	4 4	3900K	5.5 8.6	P only	IBEX International Ltd
Vulkan	V3630-0.1Cu (see note 9)	11.3-140.1	1-4	4000K	9.5	P and V	O-Light Ltd

Manufacturer & Luminaire	Luminaire Model	System Wattage (W)	LED Count /Module	Nom. Colour Temperature	Mass (kg) (see Note 3)	Category or Intended Use	Supplier
We-ef	VFL530 (see Note 6)	14 - 55	12 - 24	4000K	6.6	Specific projects	Mark Herring Lighting Ltd
Windsor (see Notes 4 & 7)	Ely C Trafalgar	27 - 33 33	24	4000K	3.2 8.8	P only	Windsor Urban Ltd

Notes:

1. The Light Emitting Diode (LED) luminaires listed above have been assessed by the Transport Agency and are accepted for use as road lighting luminaires on the New Zealand network. A detailed design is required to determine the best suited luminaire for the particular application.
2. All luminaires listed above must be supplied with a CMS compatible driver and provision for an LPC (Light Point Controller or Luminaire Controller) via a capped socket (7 contact NEMA ANSI) or hard wired (mini/micro aerial or plugged conduit entry) as required by M30 Section 16.3. All required internal wiring and external modifications (e.g. hole cutting) must be completed ex-supplier.
3. Ensure the weight of the luminaire is considered in regard to column design. **Luminaires over 12kg** require specific structural design of the lighting column and outreach with written confirmation that there are no adverse effects to the performance and life of the lighting column and outreach though the use of the nominated luminaire. Refer Transport Agency Specification M26
4. Luminaire only to be used for new (“green field”) installations, not suited to general road/street lighting applications.
5. Luminaire has no internal tilt capability. Must be used on horizontal outreach arms only.
6. Luminaire has no internal tilt capability. 8° and 13° adapters available.
7. Special purpose luminaire with no surfaces available for a NEMA socket. External control required.
8. Acceptance is for unpainted luminaire only
9. Luminaire should be supplied with flex and IP68 plug

For further information on any of the above products, please contact the respective supplier.

This list is available on line at www.nzta.govt.nz/resources/specification-and-guidelines-for-road-lighting-design/index.html

Luminaire details and status correct at date of publication.

For all other enquiries, please contact the NZTA National Manager Traffic & Safety

Document No:	File No:
Report To:	**Council**
Meeting Date:	28 March 2017
Subject:	**Draft Government Policy Statement on Land Transport Funding 2018/19-2027/28**

Purpose of Report

1.1 The purpose of this business paper is provide a summary of the Draft Government Policy Statement on Land Transport Funding for 2018/19-2027/28 (GPS).

Introduction

2.1 Purpose of the GPS

2.2 The GPS outlines the Government's strategy to guide land transport investment over the next 10 years. It also provides guidance to decision-makers about where the Government will focus resources, consistent with the purpose of the Land Transport Management Act 2003, which is:

"To contribute to an effective, efficient, and safe land transport system in the public interest"

2.3 Role of the Government Policy Statement on land transport

2.4 Transport is a critical part of daily life for all New Zealanders. We use transport for access to services, travel for work, education, and for visiting family and friends. Transport networks allow businesses, regions, and cities to be well connected and productive.

2.5 Transport investments have long lead times, high costs, and leave long legacies. This requires planning ahead, while allowing for uncertainties, to ensure today's transport network will be able to meet our future needs.

2.6 The Government Policy Statement on land transport (the GPS) outlines the Government's strategy to guide land transport investment over the next 10 years. It also provides guidance to decision-makers about where the Government will focus resources. The Land Transport Management Act 2003, sets out the scope, and requirements for the GPS (see Appendix A, B and C for details).

2.7 The GPS influences decisions on how money from the National Land Transport Fund (the Fund) will be invested across activity classes, such as State highways and public transport. It also guides the NZ Transport Agency and local government on the type of activities that should be included in Regional Land Transport Plans and the National Land Transport Programme.

2.8 The GPS provides guidance on how over $3 billion of New Zealanders' money is spent through the Fund each year. It also provides signals for spending of a further $1 billion each year on land transport through local government investment and another $1 billion a year of Crown investment is spent each year.

2.9 The GPS takes into account how changes to New Zealand's transport needs and changes in Government policies affect land transport investment.

2.10 Land Transport Planning and Funding Documents

2.11 The New Zealand Transport Strategy (non-statutory) describes the high level vision for transport, along with key components and targets, and has a 30 year outlook to 2040 (likely to be revised every six years). This document guides both the GPS (statutory) and the National Land Transport Programme (statutory).

2.12 The GPS describes government's funding priorities for the next six years. It outlines expected expenditure levels by broad transport type, e.g. public transport, and is developed every three years. The GPS determines the NLTP.

2.13 The National Land Transport Programme (NLTP) describes transport activities/packages of activities expected to be considered for funding for the next three years. The NLTP gives effect to the GPS.

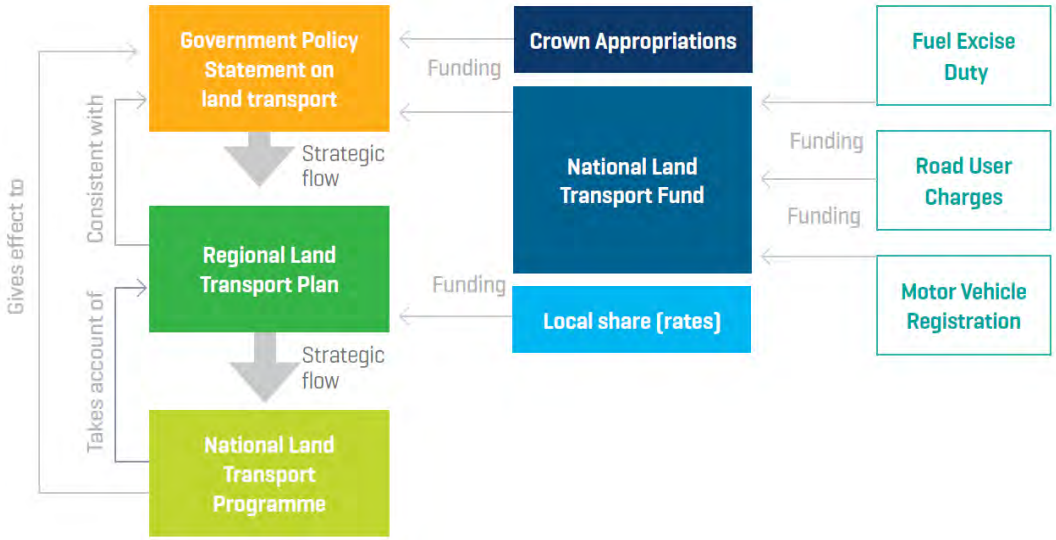
2.14 Land Transport Planning and Funding System

2.15 The New Zealand Transport Agency must give effect to the GPS in developing the NLTP and take account of the GPS when approving funding for activities.

2.16 Regional Land Transport Strategies must take account of the GPS.

2.17 Regional Land Transport Programmes must be <u>consistent</u> with the GPS.

Figure A: Linkages between land transport documents



Strategic direction

3.1 The GPS takes into consideration a range of Government policies. Those relevant to GPS 2018 are summarised below.

3.2 Business Growth Agenda
Focus: growing New Zealand's economy, expanding business and creating jobs

3.3 Connecting New Zealand
Focus: improving the productivity efficiency of our transport networks

3.4 Safer Journeys 2010 – 2020
Focus: a land transport system where deaths and serious injuries are decreasing

3.5 Intelligent Transport Systems Technology Action Plan 2014-2016
Focus: enabling intelligent transport systems to enhance the operation, use, and expansion of the transport system

3.6 New Zealand Energy Efficiency & Conservation Strategy
Focus: unlocking our energy productivity and renewable potential

3.7 National Infrastructure Plan
Focus: providing national direction to infrastructure development in New Zealand, and providing confidence to the private sector so they can make long term investment decisions

3.8 Regional Economic Development
Focus: supporting regional economic development plans where regions are missing out on growth opportunities

3.9 Housing Infrastructure Fund
Focus: unlocking housing development in high growth areas

3.10 Kaikoura earthquake and tsunami recovery
Focus: restoring access to North Canterbury

3.11 The three strategic priorities, continued from GPS 2015 are:

- economic growth and productivity
- road safety
- value for money

The key priority for GPS 2018 is economic growth and productivity.

3.12 The transport sector supports economic growth and productivity by providing quality transport connections that enable goods and people to reach their destinations efficiently. This is achieved by considering the whole transport system (a one transport system approach) which means considering all modes (including those the GPS does not fund). The appropriate transport connections

will be a mix of transport modes (road, rail, sea, air, public transport and active modes), and vehicles (car, bus, truck, trains, boats, planes) and hubs (for example, inland ports and bus interchanges). This also means considering both physical changes to the network and digital solutions.

3.13 Road safety remains a priority for the Government

3.14 Road safety is a responsibility we all share. Partnerships and shared solutions underpin a Safe System and support value for money across investment by a range of road safety partners. GPS 2018 supports cost effective, coordinated investment in road safety outcomes achieved through partnership between central and local government, industry, and stakeholders.

3.15 Strategic priority: Value for money

3.16 GPS 2018 increases the emphasis on value for money. Value for money in transport will deliver the right infrastructure and services to the right level at the best cost. Determining the right infrastructure and services to the right level requires considering the strategic priorities, objectives and results in the GPS. It takes into account the benefits and costs over the whole of the life of the investments.

3.17 The GPS 2018 strategic priorities are supported by the national land transport objectives and results. Each strategic priority has associated objectives, long term results (for a 10 year period), and short-medium term results (over 1-6 years).

3.18 The objectives that directly support economic growth and productivity are those that look to achieve a land transport system that:

- addresses current and future demand for access to economic and social opportunities
- is resilient

3.19 The objectives that directly link to safety and value for money are for a land transport system that:

- is a Safe System increasingly free of death and serious injury
- delivers the right infrastructure and services to the right level at the best cost

3.20 The other objectives which are important to economic growth and productivity but have less focus in GPS 2018 are for a land transport system that:

- provides appropriate transport choices
- increasingly mitigates the effects of land transport on the environment.

3.21 Total funding for GPS 2018

To help achieve the Government's results for land transport, the funding available for allocation is from the Fund. The revenue for the Fund is projected to increase from around $3.70 billion in 2018/19 to $4.25 billion in 2027/28 based on current level of fuel excise and road user charge rates. This funding is likely to be supplemented by about $1 billion a year of local government transport funding in the form of a local share.

3.22 Under GPS 2018, the NZ Transport Agency (NZTA) is expected to continue to:

- take a lead role in securing integrated planning of the transport system by network providers

- take a lead role in securing prudent activity management, particularly in road asset management and public transport
- monitor and report on investment efficiency, productivity changes, and results under the GPS.

Considerations

4.1 The three strategic priorities, continued from GPS 2015 did not change namely:

- economic growth and productivity
- road safety
- value for money.

4.2 The 2018 GPS purpose is well defined and consistent with the 2015 GPS direction.

4.3 The Minister Of Transport (MOT) consultation period on the GPS opened on 28th February and closes on Friday 31 March 2017.

Suggested Resolution

The business paper on the Draft Government Policy Statement on Land Transport Funding 2018/19-2027/28 be received.

KOBUS DU TOIT
GROUP MANAGER - ASSETS

20 March 2017

Attachments:

- The GPS at a Glance
- GPS on Land Transport 2018 (Enclosed separately)

New Zealand Government

The GPS at a glance...

Background information

What is it?

While the term GPS might be more familiar when talking about global positioning, in the transport sector it's more commonly used to refer to the Government Policy Statement on land transport.

Instead of directing us where to go, this GPS helps to direct money – like petrol taxes and road user charges – from the National Land Transport Fund into things that the Government wants to achieve for New Zealand's land transport network.

How do we achieve this?

The GPS helps guide investment in transport by providing a longer term strategic view of how we prioritise things in the transport network. The NZ Transport Agency and councils then collaborate on how National and Regional Land Transport Plans can help deliver these priorities.

Why do we need it?

The GPS sets aside money to:

- maintain our existing transport network to ensure we can get where we need to go, and this includes maintaining our roads
- improve our land transport network so that it functions better, through investing in roads like the Roads of National Significance, in public transport services, and in walking and cycling initiatives like through the Urban Cycleways Programme
- deliver specific objectives including lifting economic growth and productivity, improving safety, and improving preparedness for events like the Canterbury and Kaikoura earthquakes.

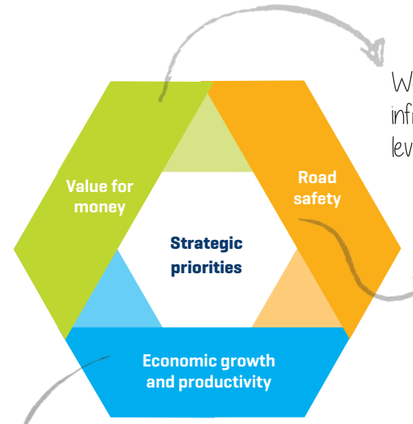
How do we keep it relevant?

A new GPS has been released every three years, and each of them provides a 10 year horizon. The next GPS will come into force on 1 July 2018, and will cover the period 2018–2028. It is usually released 6–12 months ahead of when it takes effect, so the NZ Transport Agency and local councils can use it in their planning.

VIEW A DRAFT OF THE GPS 2018 ONLINE AT: WWW.TRANSPORT.GOVT.NZ/GPS2018

Where we're at

Since 2009, the Government has focussed investment on the following three priorities – these remain largely unchanged



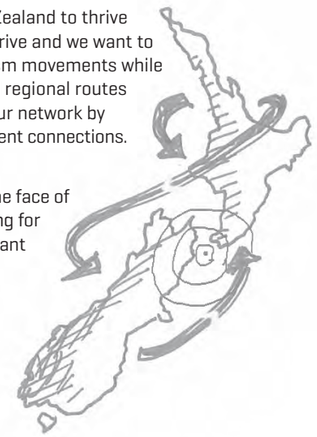
We want to provide the right infrastructure, to the right level and at the best cost.

Our approach to Road Safety is governed by the Safer Journeys Strategy 2010–2020 which sets out the strategic approach to improving road safety in New Zealand

Conversations we've had with the sector, lessons learned from recent events and some big challenges on the horizon globally have led us to update our approach to supporting economic growth and productivity.

For GPS 2018 we're focussing on...

- putting the right infrastructure in place to support high growth urban areas
- supporting the regions – for New Zealand to thrive we need our local economies to thrive and we want to support regional freight and tourism movements while increasing the resilience of critical regional routes
- improving how freight moves on our network by focussing on high quality and resilient connections.



Resilience

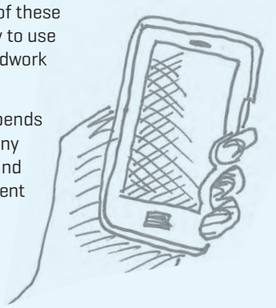
We're also focussing on ensuring that our network is resilient in the face of shocks and challenges – like responding to earthquakes or catering for increasing numbers of tourists using our transport network. We want to minimise the risk of transport disruption.

What we need to think about

There are some broader challenges we need to think about as we deliver the strategic priorities

Technology

Technology is changing so many aspects of our lives – and transport is no exception. New opportunities are being created every day. We need to start planning now to take advantage of these opportunities, whether that's increasing our ability to use wireless and smart technology or laying the groundwork we need to support autonomous vehicles.



How fast and how much transport will change depends on a range of other factors including the cost of any new technology, people's willingness to adopt it, and central and local government creating an environment that supports change. GPS 2018 encourages investment in innovative or new technology and its potential to offer different solutions to how people and goods move around New Zealand.

One-transport system approach

These changes are going to have a big impact on how we use the transport network. We have to look past land transport and across the whole system to plan for how we adapt to get the benefit of new technologies. GPS 2018 encourages a one-transport system approach, seeking the best solutions across transport modes (road, rail, sea, air) with seamless connections between them.

Document No: A334774	
Report To:	**Council**
	Meeting Date: 28 March 2017
	Subject: **Progress Report: Monitoring Against 2015-2025 Long Term Plan – Land Transport**
	For Information

1 Purpose of Report

1.1 The purpose of this business paper is –

- To brief Council on the implementation of the Work Plan for the Land Transport activity as contained in the current year of the 2015-2025 Long Term Plan (LTP)
- To establish a framework for monitoring the on-going implementation of the 2015-25 LTP as part of the Road Map Work Programme.

1.2 This business paper is set out under the following headings:

2 Local Government Act S.11a Considerations

2.1 Waitomo District Council, in performing its role as a Local Authority, must have particular regard to the contribution that the network infrastructure makes to the community.

2.2 The provision and maintenance of the roading infrastructure, is consistent with section 11A Local Government Act 2002 (including amendments).

3 Risk Considerations

3.1 This is a progress report only, and as such no risks have been identified in regards to the information contained in this business paper.

4 Introduction

4.1 This business paper focuses on informing the Council on the operational and maintenance activities of the Roading division. The Roading capital works programme is reported separately, except for the Roading Capital Works budget, which is reported with this business paper.

5 Background

5.1 The scope of Land Transport activities in the Waitomo District is almost entirely related to the roading assets. This includes:

- Roads (excluding state highways),
- Footpaths, bridges,
- Traffic services,
- Street lights

5.2 There are no passenger transport services available other than the inter-regional bus connections operating on the state highway network.

5.3 The nature of Council's roading activity is:

- Managing and maintaining the District's road network.
- Undertaking road rehabilitation and upgrading of the roading structure and ancillary systems such as street lights, signs and road markings.

6 Roading Subsidies

6.1 New Zealand Transport Agency (NZTA), the national road funding authority, provides a financial assistance subsidy (currently at 63% FAR rate) for works that meet agreed subsidy criteria via the Land Transport Programme.

6.2 Commentaries detailing progress on activities currently subsidised by NZTA in the 2016/17 year of the LTP are provided below. (Please note that these budgets are current and differs from the budgets in the original 2012-22 LTP due to transfers from one budget to another as required.)

7 2016/2017Maintenance Expenditures Budget

7.1 The 2016/17 FY Maintenance budget is $5,225,000 (excluding Loss on Asset Disposal) but including the total Road Safety Promotion budget of $120,000 (The corresponding NZTA budget is $130,000, which is the budget used for the current driver training program).

8 Road Safety Promotion

8.1 **Introduction**

8.2 Waitomo DC and Otorohanga DC are working together on this activity and share the allocated budget.

8.3 The Road Safety Promotion activities for 2015-18 are guided by the NZTA/Waikato Bay of Plenty Investment section.

8.4 At present there is no Road Safety coordinator for the Waitomo District Council. The Road Safety Action Plan is limited to the Driver License Training program. Otorohanga District Council has obtained the temporary use of a Road Safety Coordinator for specific activities they were committed to.

8.5 **Road Safety Funding**

8.6 The Road Safety Promotion activity started out at a higher FAR-rate funding than the rest of the NZTA funding. It started at 100% and was reduced each year until from 1 July 2015 it is at the WDC standard FAR rate (63% for 2016/17, but changing each year if the FAR rate changes). It is noted that the ODC FAR rate is not the same as for WDC.

8.7 **Future Situation**

8.8 Because the changes in the FAR funding rate required a higher local share, it was deemed opportune to review the future delivery model options in order to fit a delivery solution to best match the needs of the communities in the two councils.

- The following considerations forms part of this review: To bring all the stakeholders, both agencies and our local community together in developing a delivery plan.
- To establish stronger governance arrangements in developing programmes and in overseeing delivery.
- Assess opportunities to deliver part of the promotion effort through local providers and to target our local youth in particular.
- Assess opportunities to use a grants funding arrangement to encourage both local community engagement and targeted grass roots delivery.

8.9 WDC and ODC have developed a 3-year program with a primary focus on young driver training outcomes.

8.10 The proposal was developed by a joint WDC and ODC team, assisted by Hillary Karaitiana - the Social Sector Trials manager and also the NZTA. The primary objective is to reduce road accidents by creating the best practice model for driving training in rural New Zealand towns. A Service Delivery Agreement has been signed between the Te Kuiti Community House, WDC and ODC.

8.11 The Program is now on-going and quarterly reports will be provided by Community House as the WDC/ODC Contractor.

9 2016/17 Operating Expenditure

9.1 **Budget Update**

9.2 The over expenditure of some sub-categories in this Maintenance expenditure budget is balanced for by under expenditures on other Maintenance expenditure sub-categories. These budgets will have to be adjusted with the start of the next 3-Year GOP funding cycle. **The Projection of Expenditure column reflects the impact of the December 2016 budget cuts on both Maintenance and Capital budgets.**

DESCRIPTION OF SERVICE	2016/17 BUDGET	PROJECTION	EXPENDITURE TO DATE	COMMENTS
Total Maintenance Expenditures (excluding Loss on Asset Disposal)	**$5,225,552**	**5,584,736**	**3,684,648~~3,348,420~~**	Expenditure to date = 70.5% of original 2016/17 Budget and 66.0% of Projection Budget~~Expenditure to date = 64.1% on original 2016/17 Budget. Expenditure to date = 60.0% on Projection Budget~~
Road Safety Promotion 431 – 433	$120,000	130,000	75,833~~75,833~~	Driver Training Program is delivered under contract by Community House for WDC and ODC.
Emergency First Response 106 (GL = 730 31 715)	$180,000	250,000	305,593~~301,080~~	Unforeseen weather events requiring emergency first response works under this category (include trees blown down, slips, and erosion).
Environmental Maintenance 121	$300,000	428,000	361,344~~314,347~~	The NZTA has changed their criteria. Emergency Work is now funded under this Environmental Category. Other work includes Hazardous Trees, Pest Plant Control, Mowing, etc.
Environmental Maintenance 121 For Stock Effluent Facility	$30,000	42,000	16,287~~10,718~~	On-going Maintenance of the Stock Effluent facility, including water, electricity and trade waste levies.
Level Crossings	$15,000	15,000	2,980~~2,383~~	Kiwi Rail determines repairs and does the work required and then invoices WDC.
RBU Unit Costs	$719,440	730,192	563,226~~462,218~~	Salaries, overheads and some consultant fees
Routine Drainage Maintenance 113	$380,000	440,000	237,913~~217,259~~	Water table maintenance and Culvert maintenance.
Sealed Pavement Maintenance 111	$1,400,000	1,400,000	1,184,830~~1,118,062~~	Pre-reseal repairs and general sealed pavement maintenance.
Structures Maintenance 114	$133,000	170,000	109,051~~100,349~~	Routine maintenance on guardrails and bridge decks.
Traffic Services Maintenance 122	$50,000	150,000	28,132~~25,774~~	District wide maintenance of signs and road furniture.
Street Lights Maintenance 122	$320,000	320,000	163,049~~151,256~~	Cyclic maintenance and electricity costs. The maintenance of street lights are affected by the amount of lights that has to be replaced.
Unsealed Pavement Maintenance 112	$1,000,000	1,000,000	256,479~~227,478~~	Re-metalling of unsealed roads.
Asset Management Plans	$15,000	0	0~~0~~	As required every 3rd year.
Minor events: NZTA Budget	0	0	0~~0~~	NZTA Budget item, not in WDC Budget
Administration Services for Roading	$578,112	509,544	379,931~~341,663~~	New item in budget.

9.3 **Spending and Budgeting Advisory**

9.4 In general, it is of note that the current budget falls within the 3-Year GOP budget grouping of 2015/16 to 2017/18. This means that the NZ Transport Agency allows flexibility in the budget so that funding can be carried over between the different financial years.

9.5 The current budget for Emergency First Response is $180,000 with a "Projection budget" of $250,000 and while the emergency works cannot be forecasted due to it being responsive to weather events, we expect to spend up to about $400,000 by the end of this financial year based on historic requirements.

9.6 Current budget for Environmental Maintenance is only $300,000 with a "Projection budget" of $428,000 and we expect to spend up to about 560,000 by the end of this financial year due to the reason that works that previously qualified under Emergency works, now has to be done under this category. The shortfall will be funded from the unspent portion of other maintenance categories like Structures Maintenance and Unsealed Pavement Maintenance and any available Emergency funds.

9.7 The current budget for Stock Effluent is $30,000 with a "Projection budget" of $42,000and we expect to spend up to about $42,000 by the end of this financial year due to the fact that more trucks are using this facility than anticipated. The Regional Council contributes a maximum of $15,000 to this and NZTA pays the FAR rate on the full amount.

9.8 The current budget for Level Crossings is $15,000 and we expect to spend up to about $27,000 by the end of this financial year due to Kiwirail costs for repairs which they pass on. The shortfall will be funded from the unspent portion of other maintenance categories like Structures Maintenance and Unsealed Pavement Maintenance.

9.9 The current budget for Routine Drainage Maintenance is $380,000 with a "Projection budget" of $440,000 and we expect to spend up to about $440,000 by the end of this financial year due to having to do more culverts cleaning.

9.10 The current budget for Structures Maintenance is $133,000 with a "Projection budget" of $170,000 and we expect to spend up to about that amount on this activity by the end of this financial year.

9.11 The current budget for Street Lights is $320,000 and we expect to spend up to about that amount on this activity by the end of this financial year.

9.12 The current budget for Unsealed Pavement Maintenance is $1,000,000 and we expect to spend up to about $600,000 by the end of this financial year due to this being rated as a relatively lower maintenance priority to allow for a balance to be used to fund other higher priority maintenance categories.

10 2016/17 Capital Expenditure

10.1 The available Capital budget for 2016/17 is $6,500,000 (including the budget of $820,000 for Emergency Projects), with a "Projection budget" of $5,450,700

10.2 It should be noted that although the Emergency Projects budget is fully subsidised, there are several conditions for this subsidy and the NZTA does not allocate a specific budget for the Emergency Works category. NZTA allows for subsidy of such projects as and when they are approved upon applications received on a case by case basis for "qualifying" events, which means that they

are over $100,000 per event, and meets some other approval qualification thresholds.

10.3 The combined budget of $345,000 for Minor Improvements is included here, but is noted that this is separately grouped under the NZTA budget. Also included, are the two budgets for the Maraeroa Road Seal Extension (original budget = $505,000, but the revised budget = $843,000 plus consultants and variations) and the Oparure Road Retaining Structure ($380,000), but we have not received separate funding for these two projects from NZTA and these projects will have to be sharing NZTA FAR rate from other capital budgets. Since the Oparure Retaining Structure is put on hold, the corresponding budget can make up for the increased budget of Maraeroa Seal Extension.

10.4 There are a number of mismatches between the WDC budget items compared with the NZTA categories. In some cases the NZTA has changed the description slightly or the budget is different. This has occurred due to the fact that the WDC budgets were finalised more than six months before NZTA finalised their budget.

10.5 The over-expenditure of some sub-categories in this Capital expenditure budget is balanced for by under expenditures on other Capital expenditure sub-categories.

10.6 A separate report to Council serves to report progress details on the Major Capital Works projects. The Reseals Project has is now under way. Some work categories like Drainage Renewals, Traffic Services Renewals and Unsealed Road Metalling ~~have~~ had also been delayed until 1 March 2017, mostly due to a NZTA funding agreement requirement.

DESCRIPTION OF SERVICE	2016/17 BUDGET	PROJECTION	EXPENDITURE TO DATE	COMMENTS
Total Capital Expenditures (excluding Capitalisable Overheads)	**$6,500,000**	**5,450,700**	**~~1,212,916~~1,956,286**	Expenditure to date = 30.1% of original 2016/17 Budget and 35.9% of Projection Budget~~Expenditure to date = 18.7% on original 2016/17 Budget.. Expenditure to date = 22.3% on Projection Budget.~~
Minor Safety Improvements 341	$240,000	208,960	~~51,500~~53,402	Identified and NZTA approved minor projects to improve hazards like sharp curves, slip prone cuttings, etc.
Preventative Maintenance 241	$250,000	0	0	
Associated Improvements for Renewals 231	$80,000	0	1,244	In association with Rehabs or other projects.
Drainage Renewals 213	$400,000	315,700	~~124,163~~126,649	Upgrading of Network wide drainage issues.
Minor Improvements 341	$105,000	0	0	In association with other projects.
Pavement Rehabilitation 214	$1,400,000	1,200,000	~~14,936~~102,325	The annual Pavement Rehabilitation Contract, Totoro Rd (km 8 to 11)
Sealed Road Surfacing 212	$1,300,000	1,300,000	~~615,704~~1,250,946	In process to be done before winter.
Structures Components Replacement 215	$300,000	300,000	37,269	Annual replacing of structural bridge components on various bridges.
Traffic Services Renewals 222	$120,000	120,000	~~16,685~~17,340	Annual Traffic Signs replacement and the District wide Line Remark project.
Unsealed Road Metalling 211	$600,000	193,040	183,432	Unsealed Road Metalling is done under the Maintenance Contract, during the wet season.
Emergency Reinstatements Projects 141	$820,000	970,000	~~153,124~~168,821	To be prioritised as they may happen.
Maraeroa Rd Seal Extension	$505,000	0	14,589	ICL appointed to complete the seal extension this financial year.
Structures Maintenance - Oparure Rd Ret Wall	$380,000	843,000	0	New item in budget

11 Summary of Network Issues

11.1 Kawhia Harbour Road Slip Sites: - Thirteen Slip sites have been identified along this section of road. All but two of them consist of both Underslips/Washouts on the lagoon side and Fretting/Over slips on the opposite side. These sites have been inspected and measured up and prioritised. Mass concrete blocks have been installed along some sections of the over slip sites in order to reduce the effects of continuing fretting from the cutting side. Further sections will be completed over time as funding allows. This method is proving to be effective in reducing the problem of small rocks and stones landing on the road with risk to the traffic. A slip repairs contract has been completed and is reported under the Major Capital Works Report.

11.2 Extreme weather over the last few summers resulted in an increased expenditure on our unsealed roading network due to more frequent pavement repairs, lost aggregate and dust. This work is on-going and is showing improvement in the general condition of unsealed roads.

11.3 Potentially hazardous trees are an issue. These are dealt with under the emergency reaction budget. Work is on-going on a priority basis as it is identified.

11.4 Consultant (McKay Consulting) has completed the Road Pavement Rehabilitation Forward Works Programme.

11.5 The Totoro Road pavement rehabilitation: Phase 1 was completed in 2014/15. Phase 2 was split in two separable portions, due to consent issues and budget considerations. This has now been resolved and Inframax has been appointed to complete both Separable Portion 1 (- between RP 8,378 and RP 9,800) and Separable Portion 2 (- between RP 9,800 and RP 11,316) as project 500/15/013. This project is currently underway.

11.6 The structural Bridge Maintenance Contract is ~~underway~~being tendered.

12 REG and the One Network Road Classification (ONRC)

12.1 The Road Efficiency Group (REG) is a collaborative initiative by the road controlling authorities of New Zealand. Its goals are to drive value for money and improve performance in maintenance, operations and renewals throughout the country.

12.2 REG focuses on three key areas:

- A One Network Road Classification (ONRC) to standardize data and create a classification system which identifies the level of service, function and use of road networks and state highways
- Best Practice Asset Management to share best practice planning and advice with road controlling authorities
- Collaboration with the industry and between road controlling authorities to share information, staff and management practices.

12.3 The ONRC has three elements.

- The first element is classifying roads into categories based on their function in the national network. This was completed in December 2014.

- The second element is the Customer Levels of Service (CLoS), defining the "fit for purpose outcomes" for each category in terms of mobility, safety, accessibility and amenity.
- The third element is the development of the performance measures and targets, which effectively determine how the categories and customer levels of service translate into specific maintenance, operational and investment decisions.

12.4 The process of applying performance measures to our network, meanwhile, is underway. WDC will need to consider the ONRC CLoS and performance measures when applied in the local context to the network, and assess current performance in relation to the REG provisional targets.

12.5 Definition and clarification around the meaning of "Fit for Purpose" is still being worked on by NZTA. It is expected to be implemented over the period 2015 – 2018.

12.6 A number of required actions have been identified over the coming three year period to ensure that the ONRC is embedded fully by 2018. This is in line with the expectation from REG that all funding applications for the 2018-2021 National Land Transport Plan will be based on a fully implemented ONRC - enabling investment in outcomes that are consistent and affordable throughout the country. The actions identified to be relevant for WDC have been documented into a preliminary "Transition Plan".

12.7 **Financial Status**

12.8 As evaluated there are no specific financial implications on the current budget other than an administrative cost for managing all of the extra activities that is required by NZTA through the likes of REG. We are in the process to measure this additional time requirements.

12.9 The regional roading collaboration for strategic asset management (RATA - Road Asset Technical Accord) is supporting the work being undertaken to implement the ONRC within the Waikato. Various work items such as the development of Emergency Procedures and Response Plan(s), Network Resilience, Maintenance, Monitoring and Priority Improvement Plan(s), benchmarking of performance measure outcomes, are anticipated as being completed by RATA with support from each participating Council.

12.10 **Assessment of Significance and Engagement**

12.11 The issues discussed in this report have a medium degree of significance because this work will affect the delivery of future levels of service on the roading network. Community feedback will be gauged as a part of embedding the ONRC into the strategic and tactical asset management planning and delivery. The purpose of the ONRC is to develop consistent levels of service across the country. This will have to be communicated with the public in order to manage expectations. The final LoS may or may not be affordable or appropriate when applied in the local context.

12.12 **Maintenance and renewing sealed pavements under ONRC**

12.13 The customer focused service levels of the ONRC require a modified approach to traditional asset management if they are to be delivered effectively and efficiently. This is because they focus effort on customers and outcomes and not on outputs, requiring outputs to be sufficient to minimise long term life cycle costs and meet service level targets.

12.14 The One Network Road Classification framework has customer levels of service related to:

- Effective access
- Pavement safety
- Ride comfort, and
- Cost effective provision.

12.15 The level of service targets and performance measures essentially require that there should be no pavement defects that, at the operating speed :

- Impede access
- Are unsafe
- Are uncomfortable
- And that Maintenance and renewal of the surface and pavement should be cost effective and efficient.

13 RATA (Road Asset Technical Accord)

13.1 RATA (Road Asset Technical Accord) is the Centre of excellence for road asset planning in Waikato. It is the vehicle by which Waikato's councils co-operate over roading expenditure issues. Its work is carried out under the auspices of the Waikato Mayoral Forum, involving the region's mayors and regional chair.

13.2 WDC is participating in the RATA Multi-Party Data Collection contract for the core Services (Roughness Survey and RAMM Condition Rating Survey), as well as two additional Services, namely Footpath Condition Rating and Traffic Counting.

13.3 The RAPT report (report on road maintenance and renewal practices across the region) was first made available by January 2015. Good practical information was received based on best industry practices in road maintenance and pavement rehabilitation. A RAPT Tour was done on the 13 October 2016 with the intention to inspect our selection of roads identified for the upcoming Reseals programme and for the Pavement Rehabilitation programme. The discussions included a review of the business case approach for the selected treatments. Some recent projects were visited to "showcase" good examples of how we dealt with specific challenges.

13.4 In February 2015 a Road Asset manager's forum was formed under the auspices of RATA. The group is meeting once month to discuss RAMM, ONRC Transition Planning, ONRC Performance Measures (the Customer Outcome Measures, Technical Outcome Measures and Cost Efficiency Measures) and the Transition Plan. Monthly meetings are scheduled to share developments and learning about a range of topic including Seal age, ONRC, Forward Works Programmes, treatment selection decision making, Data use in asset management and RAMM.

13.5 WDC is participating in the RATA managed traffic counting program. This work is currently contracted to BECA. BECA has prepared program to include a list of specific sites that WDC requires to include quarry and logging sites.

13.6 The Business Case methodology, which the NZTA now requires the new Activity Management Plans to be prepared by mid-2017, is currently a main focus at RATA to develop understanding and best practice.

13.7 A new Multi-Party Funding Agreement for the next 3 Year is now in place.

13.8 RATA is now offering the option to WDC to join in with other Councils on a Bridge Inspections Tender/Contract. This option is has been assessed and RATA has

indicated that the proposed Tender will include the option of having the tendering and Contract Management of the Bridge Structural Maintenance Repairs included~~now being assessed, as the proposed joint Bridge Inspections Contract does not~~ to cover all the outcomes that our current contract delivers. Therefore, it deemed opportune to advise joining the RATA Tender activity, as it also would be helpful to ensure the same standard is applied compared with other Districts. The current contract is up for renewal by 1 July 2017, so it is opportune to compare this now.

14 Streetlighting (LED)

14.1 NZTA see LED lighting as a major potential cost saver. Indications gleaned from industry information are that the expected savings are being realized more and more as technology rapidly advances and more experience with LED Streetlighting becomes available. The whole argument is based on energy saving and lower maintenance costs. Feedback from contractors indicates promising performance levels with 5 year maintenance free operations from LED installations already recorded.

14.2 LED lights now have similar light intensity levels as the existing equipment and when correctly installed the electrical controls have shown to be quite robust and maintenance free for extended periods.

14.3 Most of the existing street light equipment in Waitomo is mounted on aging power poles, but the latest LED streetlight options could possibly utilize spacing and light fittings from existing lighting installations. Changing over to LED streetlights will not alter requirements for pole renewals.

14.4 WDC will access NZTA subsidies to convert to LED street lighting. Technology has reached the point where LED Street lighting could be the better choice offering reduced energy consumption and proven maintenance savings. A business case has been prepared for the conversion subsidy offered.

14.5 The current Street Light Maintenance Contract was signed with Alf Downs. This document was prepared to also accommodate the LED Replacement project scheduled over the next five years and incorporates an adjustment to allow for the expected reduced maintenance cost requirement of LED lights.

14.6 At the moment the proposal is to start the first batch of LED replacements at one of the smaller towns in the District in order to optimize the maintenance savings by not having to pay for maintenance crews to go out to remote small villages to do maintenance repairs.

14.7 In order to finalise the decision on the specific type of LED luminaire to use, we are busy with a business case investigation, which will be reported to Council by end of March 2016.

14.8 The proposed upgrading to LED technology over the next five years is expected to reduce costs significantly, both through reduced electricity consumption and reduced maintenance requirements. Calculations indicated a payback of the initial expense of the conversion of about five years. NZTA offers a support package to Councils to assist with the upgrades, with a Financial Assistance Rate of 85% available until June 2018 for LED conversions.

14.9 In order to access NZTA support, a business case ~~is~~ was~~being~~ developed by Power Solutions Limited (PSL) to identify costs and savings over a period of time appropriate for the project, ~~with expected completion date of~~completed on 28

February 2017. PSL has experience with similar business cases for other Councils. ~~Further reporting will then follow.~~

~~14.10~~ Through co-operation with the Waikato LASS Energy Management Programme (part of the Energy Efficiency and Conservation Authority Collaboration Agreement) WDC can access funding to offset a part of the cost of the business case. The business Case Report to motivate this work is presented as a separate report for this Council meeting.

~~14.11~~ ~~**Progress as at February 2017**~~

~~14.12 On Thursday 23 February 2017, NZTA confirmed that an enhanced Financial Assistance Rate (FAR) of 85% will be made available for a limited time frame, up to June 2018. This option is now being checked as part of the business case to confirm a new option to try and do all or most of the LED conversion within the 2017/18 financial year, instead of completing the LED conversion over the next five years.~~

~~14.13 This timing is out of step with the recently completed EAP development cycle. The implications of this opportunity will be investigated and reported to Council for consideration at the March Council meeting.~~

15 The Road Maintenance Contract – Progression Report

15.1 The new maintenance contract started on the 1st of ~~October~~ March 2017~~2015~~ with the entered agreement between Inframax Contractors Limited and Waitomo District Council.

15.2 The maintenance contract has been divided into 24 maintenance zones. The zonal maintenance work to give an equal distribution of ratepayer funding to the entire roading network. This ensures that there is a measure of attention given to general maintenance of the entire network

15.3 An annual routine (zonal) road maintenance programme is based on two complete maintenance cycles of the entire network per year.

15.4 Monthly routine maintenance programmes will be drawn from 24 roading zones of approximately 40km each (sealed and unsealed) based on geographical sequence and asset planning data.

15.5 Full compliance with all the zonal requirements was not achieved (the target threshold performance scores for October and November were not met.) The main issues being the new zonal requirements for full compliance rather than the historical general physical works outcomes. The indication so far is that the new zonal format is resulting in an improving outcome on the whole.

15.6 The contractor term sits at the nine month mark (by end of June 2016) and the evaluation to assess progress and performance levels is on-going. The new minimum performance level standards for the first four consecutive months have not been achieved. The technical performance in executing works is mostly acceptable, but an administrative issue such as late submission of programs and reports is a frustration. The start of the new form of contract (first six months period) was a settling in period for many new requirements and the first six months scores are not counted for the initial (Two years and six months) evaluation period. The target is a minimum average score of 400.

15.7 The Contractor has achieved an improved evaluation score over the last months. An average score of 400 over the next two and a half years will be required in

order for the Contractor to qualify for an extension to the Contract term. They have caught up on the zonal works program and their Service Requests achievements have improved in terms of significantly reducing the number of overdue items. Some issues are still to be improved on, for example the safety maintenance of paved sidewalks, the depth control maintenance of side drains, etc.

15.8 The monthly scores for the previous Road Maintenance and Reseals Contract (500/14/001) are as follows:

	2015	2016	2017
January		325	480
February		355	
March		385	
April		400	
May		400	
June		410	
July		410	
August		360 *	
September		460	
October	305	460	
November	315	460	
December	330	480	

* *(This lower score was a direct outcome of the funding uncertainty during this period)*

15.9 The NZTA/Broadspectrum has asked if the WDC Road Maintenance Contractor could maintain the Kerb and Channel, the Sumps/catchpits and lead pipes and sweeping on State Highways inside the urban areas of the Waitomo District on their behalf and then WDC invoice them accordingly. A price for this work was requested from ICL.

15.10 NZTA is also working on a revised MOU Corridor Agreement to clarify the split of responsibilities for maintenance works on urban sections of State Highways. We have requested several changes to a draft document that they presented during a meeting at NZTA offices on 14/10/2016. NZTA is still working on the new MOU draft.

15.11 The ~~Current~~ previous Road Maintenance and Reseals Contract ~~are coming~~ came to an end on 28 February 2017. ~~A~~ The current new Road Maintenance and Reseals contract 2017-2020 was successfully procured (December 2016), including the once off 2016/17 Reseals contract and both are now in place.

Suggested Resolution

The Progress Report: Monitoring Against 2015-2025 Long Term Plan – Land Transport be received.

KOBUS DU TOIT
GROUP MANAGER – ASSETS

Document No: A345151

Report To:	**Council**
	Meeting Date: 28 March 2017
	Subject: **Deputation: Local Government Funding Agenda**
	Type: Information Only

Purpose of Report

1.1 The purpose of this business paper is to advise Council that Mark Butcher (CEO) and John Avery (Director) of the Local Government Funding Agency (LGFA) will be in attendance at 1.00pm to make a presentation to the Council.

Commentary

2.1 Council at its meeting on 28 February 2017 resolved to -

a) Join the LGFA as a Guarantor and Borrower.

Council understood this decision to be inconsistent with the Financial Strategy contained in the 2015-25 LTP, with respect to the giving of securities, however considered that the risk of the guarantee was considered low, with the financial benefits outweighing that risk.

Further, this aspect of the Financial Strategy; with respect of providing a guarantee to the LGFA, will be amended as part of the development of the 2018-28 LTP.

b) The Mayor and Chief Executive be delegated the authority to execute all documents and transactions to give effect to the Resolution.

2.2 Prior to WDC borrowing through the LGFA, the LGFA CEO and Directors require the opportunity to address the elected Council in person.

Suggested Resolutions

The Deputation from the Local Government Funding Agency be received.

MICHELLE HIGGIE
EXECUTIVE ASSISTANT

Document No: A345188	
Report To:	**Council**
	Meeting Date: 28 March 2017
	Subject: Motion to Exclude the Public for the Consideration of Council Business

Purpose of Report

1.1 The purpose of this business paper is to enable the Council to consider whether or not the public should be excluded from the consideration of Council business.

Commentary

2.1 Section 48 of the Local Government Official Information and Meetings Act 1987 gives Council the right by resolution to exclude the public from the whole or any part of the proceedings of any meeting only on one or more of the grounds contained within that Section.

Suggested Resolutions

1 The public be excluded from the following part of the proceedings of this meeting.

2 Council agree the following staff, having relevant knowledge, remain in attendance to assist Council with its decision making: …

3 The general subject of each matter to be considered while the public is excluded, the reason for passing this resolution in relation to each matter, and the specific grounds under Section 48(1) of the Local Government Official Information and Meetings Act 1987 for the passing of this resolution are as follows:

General Subject of each matter to be considered	Reason for passing this resolution in relation to each matter	Section 48(1) grounds for this resolution
1. Progress Report: Health and Safety	7(2)(a) Protect the privacy of natural persons, including that of deceased natural persons;	48(1)(a)
2. Progress Report: Waikato Mayoral Forum Work Streams and Regional Shared Service Initiatives	7(2)(i) Enable any local authority holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations)	48(1)(a)
3. Inframax Construction Ltd – Half Annual Report to 31 December 2016	7(2)(i) Enable any local authority holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations)	48(1)(a)

General Subject of each matter to be considered	Reason for passing this resolution in relation to each matter	Section 48(1) grounds for this resolution
4. Draft Statement of Intent for Year Ending 30 June 2018 – Inframax Construction Ltd	7(2)(i) Enable any local authority holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations)	48(1)(a)

This resolution is made in reliance on Section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act or Section 6, Section 7 or Section 9 of the Official Information Act 1982 as the case may require are listed above.

MICHELLE HIGGIE
EXECUTIVE ASSISTANT