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Croydon & Lewisham Street Lighting PFI

LED Lighting Replacement Business Case Model (Input Requirements)

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October 2019

Quality Management / Revision Updates

Version		Draft						
Date								
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File Ref: 0122k_lbc_led_technical_req

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INTRODUCTION

Background Information

In **October 2018** the Authority (London Boroughs of Croydon & Lewisham) prepared an LED business case for internal distribution that investigated the viability LED street lighting.

When preparing the business case the Authority made its own technical and financial assumptions based on the information available. The values included within the business case model demonstrated that the payback period for an LED investment wholly funded by the Authority is approximately nineteen (19) years. The Authority considers that for the installation of LED lighting to be considered viable the payback / breakeven period would need to be five (5) years, it was therefore concluded that, based on the information available, an LED investment scheme was not considered viable.

In July 2019 the Authority met with Service Provider (one of several meetings) and presented the findings of its business case. At the meeting the Service Provider agreed to work with the Authority to see if the financial model could be improved to achieve an improved payback / breakeven period.

Note; The business case model was shared in electronic format with the Service Provider in July 2019.

Aims and Objectives

The key aims and objectives that should result from this paper for the Authority are:

- > Confirm the Authority's requirement for an LED specification.
- > Provide the opportunity for the Service Provider to input into the LED investment business case.
- > Finalised the Authority's LED investment business case and make a decision on viability of the investment (ie, can the business case show a 5 year pay back).

This paper reviews the technical and financial considerations that affect the business case model outcome and confirms the Authority's requirements specific to each variable embedded within the model. It then gives the Service Provider the opportunity to review the input value included within the model and suggest updated / revised values (with justification).

It should be noted that this paper is not a comprehensive addendum to the output specification, it does not assess the effect that the introduction of LED lighting may have on the Service Provider's service delivery obligation. This would need to be considered in detail by both parties if the payback / breakeven period was considered acceptable to the Authority.

FINANCIAL & TECHNICAL INPUT VARIABLES

The variables included within this section need to be reviewed / updated and confirmed by Service Provider (Input table provided in Appendix A). If values are changed from the benchmark set by the Authority the Service Provider will need to provide information that supports the proposal.

Note; if the Authority considers that the value for any given variable is fixed then this has been indicated in the unit / comment column.

Pre-start Works

The Authority's business case model has included an estimate of the pre-start works costs.

The pre-start costs included by the Authority include:

Item	Description	Unit / Comment
1	Senior Lender Due Diligence	£
2	Service Provider HV change cost	£
3	External Expert Advice	£
4	Service Provider Profit	% (where applicable to the above)

Note; no allowance has been made for the Authority internal costs.

Capital Investment Works

The Authority's business case model has included an estimated cost for the capital investment element of the works.

The capital costs included by the Authority include:

Item	Description	Unit / Comment
1	LED Luminaire (including supply cable)	£
2	CMS Cell / Node	£ (the Authority would like to retain a CMS capability if LED is installed)
3	Design	£
4	Installation	£
5	Service Provider Profit	% (where applicable to the above)
6	Inflation / Indexation during investment works	%
7	Authority Investment share	%
8	Investment programme	% per annum over 3 years max
9	Authority Investment share	%

Maintenance Savings

The Authority's business case model has included an estimated of the maintenance savings that would be realised by introduction of LED street lighting.

The Maintenance Savings (per unit) included by the Authority include:

Item	Description	Unit / Comment
1	Bulk lamp change saving	£
2	Faults Per Annum Per Unit	£
3	One off (£200k saving offered by SP)	£
4	Revenue Inflation	£
5	Authority share	% (items 1 to 4 establish the savings achieved on the project – this item confirms the share realised by the Authority)

The figures included within this table at present are based on information garnered from discussions with the Service Provider.

Energy Savings

The Authority's business case model has included an estimated of the energy savings that would be realised by introduction of LED street lighting.

Item	Description	Unit / Comment
1	Energy Cost Pence Per kWh	£ - fixed by the Authority based on current costs
2	Energy Inflation Per Annum (typical)	% - Fixed at 2.5% by the Authority
3	Authority Savings Share	%

LED Equivalent Watts

The Authority communicated the design solution and product specification issues to the Service Provider in July 2019 and the Service Provider confirmed that these issues had not been considered when providing an 'LED equivalent' within their LED proposal.

The 'LED equivalent' provided in the Service Providers proposal is as listed below.

Lamp Type	Existing Lamp (CCT Watts)	LED Equivalent (CCT Watts)
SGS451 45w CPO	50	20.9
SGS451 60w CPO	66	22.8
SGS451 90w CPO	98	41.8
SGS253 140w CPO	153	60.8
SGS253 210w CPO	225	129.2
SGS253 150w CDO	164	80.75
SGS253 50w SON	57	20.9
SGS253 70w SON	77	22.8
SGS253 100w SON	105	61.75
SGS253 150w SON	159	80.75
SGS254 250w SON	267	129.2

It was agreed that the Authority should develop an outline street lighting specification / policy specific to the design and product requirements for the introduction of LED. This would then allow the Service Provider to give a more accurate 'LED Equivalent (CCT Watts)'.

The Authoritys outline requirements are summarised below.

The technical considerations identified within the business case included a number of design solution and product specification issues. The design and product considerations identified were:

1) Compliance with lighting design standards, - the Service Provider is currently contracted to provide light levels defined within the PFI contract that are consistent with BS5489-1, 2003. The light level requirements within the Output Specification are defined as "Specific Lighting Design Standards".

The latest version of the BS - BS5489-1, 2013 allows for the light level requirement in residential areas to be lowered based on application of an S/P ratio - The SP ratio is a factor applied to the light level requirement based on the colour rendering properties of the lamp. The Authority can confirm that for the purposes of developing an LED business case it would accept the application of the S/P ratio in BS5489-1, 2013 for residential areas.

2) Product specification, - the existing conventional gas discharge light source introduced during the PFIs initial 5-year core investment period has a colour temperature of approximately 2800 or lower, producing a 'warm white' design solution.

Authority Requirement, - The colour temperature requirement for LED will be 3000k in all areas other than district and town centres where the limit will be 4000k.

Action Required, - Service Provider to provide an updated table that shows the equivalent LED Equivalent (CCT Watts) for each lamp type based on the light level and colour temperature requirement specified above. (table included in Appendix A).

Capital Investment Costs

There Authority have identified two capital investment costs that will directly affect the business case model outcome.

1) Central Management System (CMS) requirement, - the existing lighting introduced during the PFIs initial 5-year core investment period incorporates a CMS as a core requirement.

Authority Requirement, - The Authority can confirm that the capital investment (unit rate) included within the model should include for continued CMS capability in each lantern.

Action required, - Service Provider to confirm capital investment (unit rate) for continued CMS capability in each lantern.

Heritage & Feature Lighting requirement, - the existing lighting replaced during the PFIs initial 5-year core investment period was replaced with lanterns that provide a product guarantee for the full contract term with a 5-year hand-back provision.

Authority Requirement, - The Authority can confirm that it would require an LED solution that ensures the existing product warranties and hand-back liabilities remain intact. At this stage the Authority's understanding would be that the ALL lantern units would need to be replaced without any retrofits. This includes architectural and heritage lanterns. The per unit capital investment cost within the model should therefore reflect this requirement.

Action required, - Service Provider to provide typical cost for replacement of architectural and heritage lanterns with new lantern unit and confirm how many architectural and heritage lanterns exist on the network.

Appendix A (Business Case Model Input Variables)

Pre-start costs

Item	Description	Authority Input		Service Provider Input	
		Input Value	SP Profit Applied	Input Value	SP Profit Applied
1	Senior Lender Due Diligence	180000	y		
2	Service Provider HV Change Cost	120000	y		
3	External Expert Advice	180000	n		
4	[other]	blank			
5	[other]	blank			
6	Service Provider Profit (%)	0.15			

Capital Investment Works

Item	Description	Authority Input		Service Provider Input	
		Input Value	SP Profit Applied	Input Value	SP Profit Applied
1	LED Luminaire (including supply cable)		y		
2	CMS Cell / Node		y		
3	Design		y		
4	Installation		y		
5	[other]	blank			
6	[other]	blank			
7	Service Provider Profit (%)	0.15			
8	Inflation / Indexation per annum (%)				
9	Authority Investment (%)				

Investment Profile

Item	Description	Authority Input		Service Provider Input	
		Input Value		Input Value	
1	Year 1 (%)	50			
2	Year 2 (%)	50			
3	Year 3 (%)	0			

Luminaires Replaced

Item	Description	Authority Inputs		Service Provider Input	
		Input Value		Input Value	
1	Luminaires Replaced	39307			

Maintenance Savings (per unit/per annum)*

Item	Description	Authority Inputs		Service Provider Input	
		Input Value		Input Value	
1	Bulk lamp change saving	3.33			
2	Faults Per Annum Per Unit	2.45			
3	One off (£200k saving offered by SP)	0.45			
4	[other]	blank			
5	[other]	blank			
6	Revenue Inflation	0.025			
7	Authority Savings (share)	0.043			

Energy Savings

Item	Description	Authority Inputs		Service Provider Input	
		Input Value		Input Value	
1	Energy Cost Pence Per kWh	0.12		Fixed	
2	Energy Inflation Per Annum (typical)	0.025		Fixed	
3	Authority Savings Share	0.5			

* Note; Authority estimated savings it considers exist and then applied an "Authority Savings (share)" based on the value offered by the Service Provider.

Equivalent LED

Lamp Type	Existing Lamp (CCT Watts)	Assumed lighting class existing	Proposed lighting class*	New LED Equivalent (CCT Watts)*
SGS451 45w CPO	50	S4		
SGS451 60w CPO	66	S4		
SGS451 90w CPO	98	S3		
SGS253 140w CPO	153	S2		
SGS253 210w CPO	225	ME2		
SGS253 150w CDO	164	ME3b		
SGS253 50w SON	57	S4		
SGS253 70w SON	77	S4		
SGS253 100w SON	105	ME4b		
SGS253 150w SON	159	ME3b		
SGS254 250w SON	267	ME2		