

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

Lighting Calculations

For

External Lighting

At

DFE – River Academy

ISSUE STATUS :

PRELIMINARY	
DESIGN STAGE	
CONSTRUCTION STAGE	X

Document Reference : FS0949-DBS-ZZ-ZZ-CA-E-0002

Revision No. : C02

Issue Date : 14/12/23

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

Form : MPF 4.15
Issue : E
Sheet : 2 of 11

DESIGN

TECHNICAL SUBMISSION CA-E-0002



PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

Main Contractor / Client : Bowmer & Kirkland Ltd

High Edge Court
Heage
Belper
Derbyshire
DE56 2BW

Consultant : Couch Perry Wilkes

St Johns House
30 East Street
Leicester
LE1 6NB

Mechanical & Electrical Services Contractor : Derry Building Services Limited

Newark Office

The Old Hospital
London Road
Newark
Nottinghamshire
NG24 1JP

Birmingham Office

Fort Dunlop
Suite 418
Fort Parkway
Birmingham
West Midlands
B24 9FD

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

Form : MPF 4.15
Issue : E
Sheet : 3 of 11

DESIGN

TECHNICAL SUBMISSION CA-E-0002



PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

TECHNICAL SUBMISSION ISSUE REGISTER

Document Ref : FS0949-DBS-ZZ-ZZ-CA-E-0002

Technical Submission For : External Lighting Calculations

Rev	Issue	Date	Issued by
P01	Issued for Review & Comment	21.10.22	Vaidas Perednis
P02	Ditch area & Spill lighting calculations added	15.12.22	Vaidas Perednis
P03	DBS / SSE GRP area lighting calculations added	18.09.23	Vaidas Perednis
C01	Ditch lighting control and fitting updated. Issued for Construction	13.10.23	Vaidas Perednis
C02	Ditch lighting full output time reduced to 5min.	14.12.23	Vaidas Perednis

Prepared by :

Vaidas Perednis
Electrical Design Engineer

Signed :

V. Perednis

On behalf of :

Derry Building Services

Checked by :

Neil Meredith
Senior Electrical Design Engineer

Signed :

N. Meredith

On behalf of :

Derry Building Services

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

Form : MPF 4.15
Issue : E
Sheet : 4 of 11

DESIGN

TECHNICAL SUBMISSION CA-E-0002



PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

CONTENTS

1.0	Introduction
2.0	Lighting Calculations

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

1.0 Introduction

This document is presented to facilitate the approval of the external lighting calculations for the River Academy School project. The Lighting calculations have been performed utilising lighting calculation software.

Please note this document is to be read in conjunction with the DBS external lighting technical submission reference FS0949-DBS-ZZ-ZZ-TS-E-0004.

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

2.0 Lighting Calculations

Lighting calculations are as shown on the following pages.

- Please refer to the DBS external lighting technical submittal for details of the lighting criteria to be achieved.

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

Luminaires Schedule									
Symbol	Qty	Label	Ref Code	Description	LF	Luminaire Watts	Luminaire Meters	Total Watts	Mounting Height
	1	21A	96662562	FX2424 12V 40W 1900-840 HF AMT	0.790	3844	15.4	15.4	2.2
	1	21B	96662562	FX2424 12V 40W 1900-840 HF AMT	0.790	3844	15.4	15.4	2.2
	4	22A	92029495	TP 12355-740 40W CL1 CL2 6V 716F GV-8	0.790	2044	15	60	6
	10	22B	92029495	TP 12355-740 40W CL1 CL2 6V 716F GV-8	0.790	2044	15	60	6
	11	22C	92029495	TP 12355-740 40W CL1 CL2 6V 716F GV-8	0.790	2044	15	60	6
	11	22E	92029462	TP 24510-427 80W CL1 CL2 6V 716F GV-8	0.790	4438	38	418	6
	10	22B	92029495	TP 12355-740 40W CL1 CL2 6V 716F GV-8	0.790	2044	15	60	6
	2	22C	92030051	TP 12355-740 40W CL1 CL2 6V 716F GV-8	0.790	2044	15	60	6
	4	24	96652586	TP 1900A-VARIFLEX 100 2200-840 FANLI	0.790	2202	21.5	86	2.2
	1	25A	96652586	TP 1900A-VARIFLEX 100 2200-840 FANLI	0.790	2202	21.5	86	2.2
	12	58B	96628333	LEOPTM 7W 100W 12V 1240	0.790	8397	90	540	4
	12	58C	96628333	LEOPTM 7W 100W 12V 1240	0.790	8397	90	540	4
	12	58D	96628333	LEOPTM 7W 100W 12V 1240	0.790	8397	90	540	4

Calculation Summary		Calculation	Units	Avg	Max	Min	Min/Avg
All Car Park	illumination	Lux	13.00	36	3.78	0.30	
All Service Area	illumination	Lux	12.84	37	4.11	0.30	
All Pathway to Building	illumination	Lux	12.84	37	4.11	0.30	
All Cycle Store	illumination	Lux	15.68	23	14	0.72	
All Car Park Path	illumination	Lux	14.05	24	11.35	0.45	
All Entrance Area	illumination	Lux	26.55	47	13	0.49	
All Car Park	illumination	Lux	24	46.80	10	0.41	
All Surround Spill	illumination	Lux	31.25	126.9	0.00	0.00	
All Surround Spill	illumination	Lux	2.26	0.59	0.11	0.05	
Option 6-1	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-2	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-3	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-4	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-5	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-6	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-7	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-8	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-9	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-10	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-11	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-12	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-13	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-14	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-15	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-16	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-17	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-18	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-19	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-20	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-21	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-22	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-23	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-24	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-25	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-26	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-27	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-28	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-29	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-30	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-31	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-32	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-33	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-34	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-35	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-36	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-37	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-38	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-39	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-40	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-41	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-42	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-43	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-44	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-45	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-46	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-47	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-48	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-49	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-50	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-51	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-52	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-53	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-54	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-55	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-56	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-57	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-58	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-59	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-60	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-61	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-62	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-63	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-64	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-65	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-66	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-67	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-68	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-69	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-70	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-71	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-72	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-73	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-74	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-75	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-76	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-77	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-78	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-79	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-80	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-81	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-82	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-83	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-84	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-85	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-86	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-87	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-88	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-89	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-90	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-91	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-92	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-93	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-94	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-95	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-96	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-97	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-98	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-99	illumination	Lux	0.04	0.25	0.17	0.25	
Option 6-100	illumination	Lux	0.04	0.25	0.17	0.25	

Isoline Legend	
Illuminance (Lux)	
Color	Value
	1

UWLR Area Summary		
Label	UWLR	%
Upward Waste Light Ratio	0.019	1.9

Mounting heights and positions are given
for guidance only. All final positions to be agreed with client

Note
2 x Ref Z2B Share the same 6m Column as 2 x Z2C
and make a twin back to back arrangement

Note
An additional back louvre attachment is available for the Issro Pro
and may be useful on the lanterns backing the ditch to reduce some backspill.
Photometric files are currently not available.

Nesting Box Type (As Per DeltaSimons Mark up on Landscape architect drawing)

-  Kestrel nest box
-  Tawny owl / Stock dove nest box
-  Pole mounted bat boxes (Two poles at each location with two boxes on each pole)
-  Open fronted nest box
-  Starling nest boxes (x2)
-  Hole fronted nest

R4	12.10.23	11Ns .Z2D changed to Z2E PIR
R4	15.09.23	DEG / SSE GRP area lux levels added
R3	13.12.22	Luminaire adjustments
R2	12.12.22	Revised site layout as per clients drawing
No.	Date	Revision

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

3.0	Comments received from Consultant and DBS responses
------------	--

1	Date Comment Received:	08.12.22
	Comment Transmission Method:	E-mail
	Building Reference:	1038
	Comment Reference :	08.12.2022 (BNK AT)
	Client/Consultant Comment:	Above ground Condition 38 No development above foundation level shall commence until a report detailing the external lighting scheme and how this will not adversely impact upon wildlife has been submitted to and approved in writing by the Local Planning Authority. The report shall include the following figures and appendices: • A layout plan with beam orientation demonstrating that the ditch shall not be illuminated to more than 1 lux • A schedule of equipment • Measures to avoid glare • An isolux contour map showing light spillage to 1 lux. The approved lighting plan shall thereafter be implemented as agreed.
	DBS Response:	(15.12.2022) <i>This document is to be read in conjunction with external lighting technical submission reference FS0949-DBS-ZZ-ZZ-TS-E-0004.</i> External lighting circuits controlled by an arrangement of photocell, time switch and manual override external lights switched off between the hours of 23:00-07:00. Additional time switch off lighting groups around ditch can be added with amended lights off time to reduce impact upon wildlife. Please see Lighting calculation drawing in Section 2 For layout plan with beam orientation A schedule of equipment An Isolux contour for light spillage to 1 lux

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

		Measures to avoid glare – Luminaires main beam angle off all luminaires directed towards any observer is not more than 10 degrees (max 70 degrees) as per GN01:2011 Notes for the reduction of obtrusive lighting.
--	--	--

2	Date Comment Received:	01.09.23
	Comment Transmission Method:	E-mail (Andy Taylor BNK)
	Building Reference:	1038
	Comment Reference:	RE: River Academy Ecology condition report amends – Condition 38
	Client/Consultant Comment:	1. Area around service yard noted as omitted from contour drawing (page 9 of the external lighting technical submittal report). I wouldn't say it was omitted, rather the corner was "cut off" from the report. As per the lux plot drawing this area has been modelled. @Vaidas Perednis could the report be updated to include this area? @Kiri Shuttleworth thoughts on just re-issuing the lux plot drawing and lighting calculation report? 2. Request noted asking for lighting lux/contours overlaid with location of biodiversity enhancements (our report as submitted in response to condition 39 89826.550972_REP_River-Academy-Reading_BES_2023-06-26 attached). @Vaidas Perednis can you look into providing this bird and bat boxes to be located as per page 4 of that report? 3. Further questions from the council's ecologist remain regarding lux levels in the ditch area. 5 lux again mentioned in the memo as being too high.

Head Office

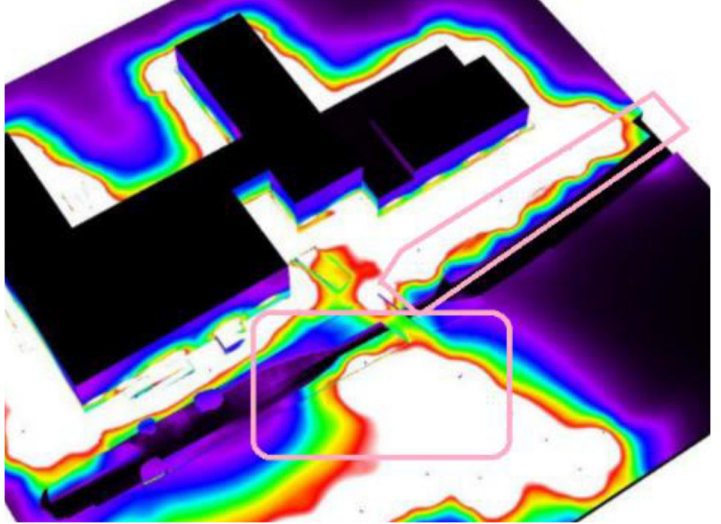
Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

		4. @Vaidas Perednis I believe the contour map is in the scenario of all lights on. Can this be clarified in the report with a second contour map showing the situation with those 7 lights switched off between the hours of 10pm and 7am?
	DBS Response:	(15.09.2023) <i>This document is to be read in conjunction with external lighting technical submission reference: FS0949-DBS-ZZ-ZZ-TS-E-0004.</i> - Report updated with service yard corner could be seen. - Nesting box locations have been added to lux plot drawing Ref: 0002223324-EX-R4-dwg-A0 - Additional 4No. Luminaires near ditch added to group of luminaires switching off between the hours of 22:00-07:00. As per Cathy Holwill (RBC Ecology Consultations) mark up (See below)  - Two contour maps added to FS0949-DBS-ZZ-ZZ-TS-E-0004 showing lux levels when all lights on and other when 11No. luminaires around ditch switched off between the hours of 22:00-7:00

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

3	Date Comment Received:	02.10.23
	Comment Transmission Method:	DOC 38 meeting notes
	Building Reference:	1038
	Comment Reference:	
	Client/Consultant Comment:	- Option with PIR controlled luminaires around the ditch? - Warmer colour temperatures 2700K/3000K to reduce blue light component and cause less impact on bats and other wildlife?
	DBS Response:	(12.10.2023) <i>This document is to be read in conjunction with external lighting technical submission reference: FS0949-DBS-ZZ-ZZ-TS-E-0004.</i> - Additional PIR control to 11No. post luminaires added. Light levels output will be 10% of full output when no one is within the area. When PIR will be activated full output remains for 10 min when someone leaves the area the lantern reduces back down to absence level 10% output. Controlling luminaires around ditch with PIR (Absence level 10% of max output) allows us to achieve lux levels below 1lux at the ditch. (Results below) 11No. Z2D 4000K around the ditch changed to Z2E 2700K PIR controlled luminaire when not activated working at 10% of full output levels. Three contour maps added to FS0949-DBS-ZZ-ZZ-TS-E-0004 showing lux levels when all lights on, 11No. luminaires around ditch switched off between the hours of 22:00-23:00 & 11No. luminaires around ditch in absence mode (10% of full output). All scene lux levels around the ditch: All lights on (23:00-7:00 off) 06.1 Ditch _ Eav - 2.26lx / Emax – 4.59lux / Uo – 0.108 06.2 Ditch _ Eav - 0.04lx / Emax – 0.25lux / Uo – 0.170 Ditch lights off 22:00-7:00 06.1 Ditch _ Eav - 0.11lx / Emax – 0.25lux / Uo – 0.556 06.2 Ditch _ Eav - 0.03lx / Emax – 0.21lux / Uo – 0.088 Ditch lights 10% PIR controlled (22:00-7:00 off) 06.1 Ditch _ Eav - 0.31lx / Emax – 0.57lux / Uo – 0.540 06.2 Ditch _ Eav - 0.03lx / Emax – 0.22lux / Uo – 0.099

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880

PROJECT DETAILS

Project Title :	DFE River Academy	Project Ref :	FS0949
Main Contractor :	Bowmer & Kirkland		

4	Date Comment Received:	11.12.23
	Comment Transmission Method:	E-mail (Georgia Goff Nexusplanning)
	Building Reference:	1038
	Comment Reference:	RE: [FS0949-River] – TS-0004_P04, CA-0002_C01 Ext Ltg TS & Calc
	Client/Consultant Comment:	Hi Vaidas, We have now received comments from the Ecology Officer following the submission of the revised lighting strategy. In short, he is predominately happy with the approach but has requested that the PIR section is updated so the lights stay on for 5 minutes after someone has left the area rather than 10minutes. Is this acceptable?
	DBS Response:	(14.12.2023) Request been made to manufacturer. Full output time reduce from 10min to 5min for 11No. luminaires with PIR control around the ditch.

Head Office

Derry Building Services, The Old Hospital, London Road,
Newark, Nottinghamshire, NG24 1JP
t: 01636 614300

Birmingham Office

Fort Dunlop, Suite 418, Fort Parkway, Birmingham,
West Midlands, B24 9FD
t: 0121 730 4880