

Document:	Lighting Plan Review – Technical Note
Project:	Neilston Greener Grid Park Section 36 Application
Client:	TNEI (on behalf of Statkraft UK Ltd.)
Project Number:	784-B042549
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INTRODUCTION

Tetra Tech has been commissioned by TNEI on behalf of their client Statkraft UK Ltd. to produce this technical note to support the Neilston Greener Grid Park Section 36 application.

This technical note summarises the appraisal of the external lighting design aimed at limiting the risk of adverse impacts to ecological receptors.

DISCUSSION

This technical note has been provided to summarise Tetra Tech’s review of the proposed lighting scheme and assess its compliance with the Institute of Lighting Professionals/Bat Conservation Trust Guidance Note 08/18 on Bats and Artificial Lighting in the UK. In review it was found that the Institute of Lighting Professionals and Bat Conservation Trust has recently updated guidance and therefore this lighting design has been appraised against the document GN08/23 Bats and Artificial Lighting at Night, hereafter referred to as “the guidance”.

This section discusses when the lighting will be in operation, how light will spill from the new lighting regime into surrounding habitats and then provides discussion on likely impacts upon protected or sensitive ecological receptors.

The lighting for the site when in full operation will provide an average of 25 Lux directed to illuminate seven plant areas and a roadway network within the Greener Grid Park.

ECOLOGICAL RECEPTORS

The Greener Grid Park development is located within a field that is bordered on the east and west sides by woodland and scrub habitats, with additional scrub and mature trees along the opposite side of the B775 Gleniffer Road at the north of the site. Such vegetation is considered typically utilised by a range of bat species for the purposes of foraging and commuting, and activity of breeding and foraging/hunting birds, as well as other fauna, all of which may be nocturnal or crepuscular and therefore could be negatively affected by poorly designed lighting.

LIGHTING SPECIFICATION

This section discusses when the lighting will be in operation, how light will spill from the new lighting regime into surrounding habitats, and then provides discussion on likely impacts upon protected or sensitive ecological receptors.

The client has provided the External Lighting Plan presented on drawing number NGG-RPS-XX-XX-DR-E-6301 - External Lighting – P10 which states:

- 1) Scheme utilises LED luminaires with sharp cut-off, good colour rendition. No metal halide or fluorescent fittings used.
- 2) Fittings capable of being dimmed.
- 3) Lanterns utilise 2700K LEDs.
- 4) All columns limited to a height of 6m.
- 5) All fittings have upward light ration of 0%.
- 6) All fittings installed horizontally - no upward lighting.
- 7) Security lighting controlled by motion sensors.
- 8) The lighting details shown on this drawing have been developed in accordance with the Bat Conservation Trust's Guidance Note 08/23 on Bats and Artificial Lighting in the UK and reviewed by a suitably qualified ecologist.

The Luminaire Specification is described as shown in Figure 1 below:










Luminaire Schedule	
A1 	Kingfisher Lighting - 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m 
A2 	Kingfisher Lighting - 2 No. 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m (back to back) 
A3 	Kingfisher Lighting - 2 No. 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m (at 90°) 
C1 	Kingfisher Lighting - 40W LED (5238 lumens) VIVA-CITY Pro 1050mA with FW70 forward throw optic column mounted at 6m 
C2 	Kingfisher Lighting - 2 No. 40W LED (5238 lumens) VIVA-CITY Pro 1050mA with FW70 forward throw optic column mounted at 6m 

Fig. 1: Luminaire Specification

The lux levels of the lighting installation when in full operation are described as shown in Figure 2 below:

Area	Ave (lux)	Max (lux)	Min (lux)	Uniformity
Access Road to PH3 & PH4	9.33	38	0	0.00
Battery Area PH 1	8.16	35	2	0.25
Battery Storage PH2	7.79	35	2	0.26
Battery Storage PH3	10.71	34	3	0.29
Battery Storage PH4	6.82	36	1	0.15
Future Battery Area PH1	8.51	36	3	0.32
HV Compound PH1	26.38	48	7	0.27
HV Compound PH4	18.60	73	1	0.05
Roadway PH3	11.31	35	3	0.27
Roadway PH2	10.53	35	3	0.28
Roadway PH4	12.02	35	1	0.08
Roadway PH1	14.01	60	4	0.29
Welfare Compound	27.95	60	7	0.25

Fig. 2: Lighting levels calculation summary

Additional information describing the lighting function includes:

- Lighting will be off when the site is unmanned (i.e. most of the time).
- Passive infrared sensors (PIRs) will be active during the hours of darkness to detect the movement of people (or large objects/animals).
- The PIRs will be located on each lighting column which will illuminate the lantern on the column where movement is detected locally. This will ensure that only a small portion of the site is lit at any one time.
- Additionally, these circuits will be controlled remotely. This control will also allow for faults to be rapidly picked up if, for any reason, the lights become faulty (e.g., a PIR sensor becomes damaged and causing the lights to be switched on when not triggered).
- Full operational lighting will only be used in the event of nighttime maintenance which would be undertaken as required, and it is very unlikely that all the operational lighting would be on at the same time.
- Should there be any occasions when full operation lighting is functioning, light spillage to the adjacent vegetation limited to 3 lux at between 0.5m and 1m from the site boundary in places, dropping to 1 lux at 2m from the site boundary in places.

APPRAISAL AGAINST ILP GUIDANCE

Habitats

Grassland and scrub habitats on site provide a foraging resource for bats, and linear features such as tree lines at the edges of the site provide linear features suitable for commuting bats; however, these linear features are poorly connected with other habitats and roosting features within the wider landscape. It is therefore considered that these are likely to be supporting habitats which may be used opportunistically by lower numbers of bats.

The lighting for the site affects supporting habitats along the development edge, or “transition zone”, as described in section 4.28 of the guidance.

Luminaire Specifications

As per section 4.29 of the guidance, the luminaire specification as described above appears to be appropriate and compliant. Specifically, the luminaires will be LED and warm white (2700Kelvin), lacking metal halide or fluorescent sources, and will be primarily controlled by PIR sensors with an additional remote management system.

Sensitive Site Configuration

The design as shown in the site plan and described in its functionality is appraised as being sensitive in comparison to the alternative option, which would be full-time lighting not meeting the guidance.

Physical Screening

There is no physical screening of light spill. However, in compliance with the guidance, all luminaires are directed inward and are considered “forward throw”, which minimises light spill.

Dimming and Part-Night Lighting

In line with the guidance, light fittings will be capable of dimming, and lights will be turned off most of the time. The use of PIR sensors during hours of darkness will ensure that lighting columns are locally activated, and therefore only a small portion of the site will be lit at any one time.

Compliance with Illuminance (Lux) Limits and Buffers

The lighting contours on the provided plan show that light spillage to the tree lines and vegetation adjacent to the site will be limited to 3 lux at between 0.5m and 1m from the site boundary in places, dropping to 1 lux at 2.5m from the site boundary.

Full moonlight often produces light levels in the region of 0.5-2 lux, and therefore this level of light spill is considered very low.

As the habitats surrounding the site are considered to be supporting rather than key habitats, are likely to be used by low numbers of bats, and the lighting for the site is likely to only occasionally be active, the lighting plan for the site appears to be appropriate and compliant with illuminance limits and buffers.

Post-Construction/Operational Phase Compliance-Checking

To ensure that lighting on the site is compliant with guidelines post-construction/during the operational phase, it is recommended that lighting surveys are conducted by a suitably qualified competent person on completion of installation. These surveys should ensure that the proposed lighting levels on the site have been achieved, that the specifications of the lighting are as proposed, and that the levels of light spillage are as expected.



CONCLUSION

The guidance states: *“the importance of integrating avoidance measures (as per the first step of the mitigation hierarchy) into developmental design, cannot be overemphasised. Retaining ecologically functional ‘dark corridors’ and Key Habitats for bats within schemes (in preference to seeking lighting mitigation strategies), avoids costly and time-consuming additional surveys, mitigation and post-development monitoring.*

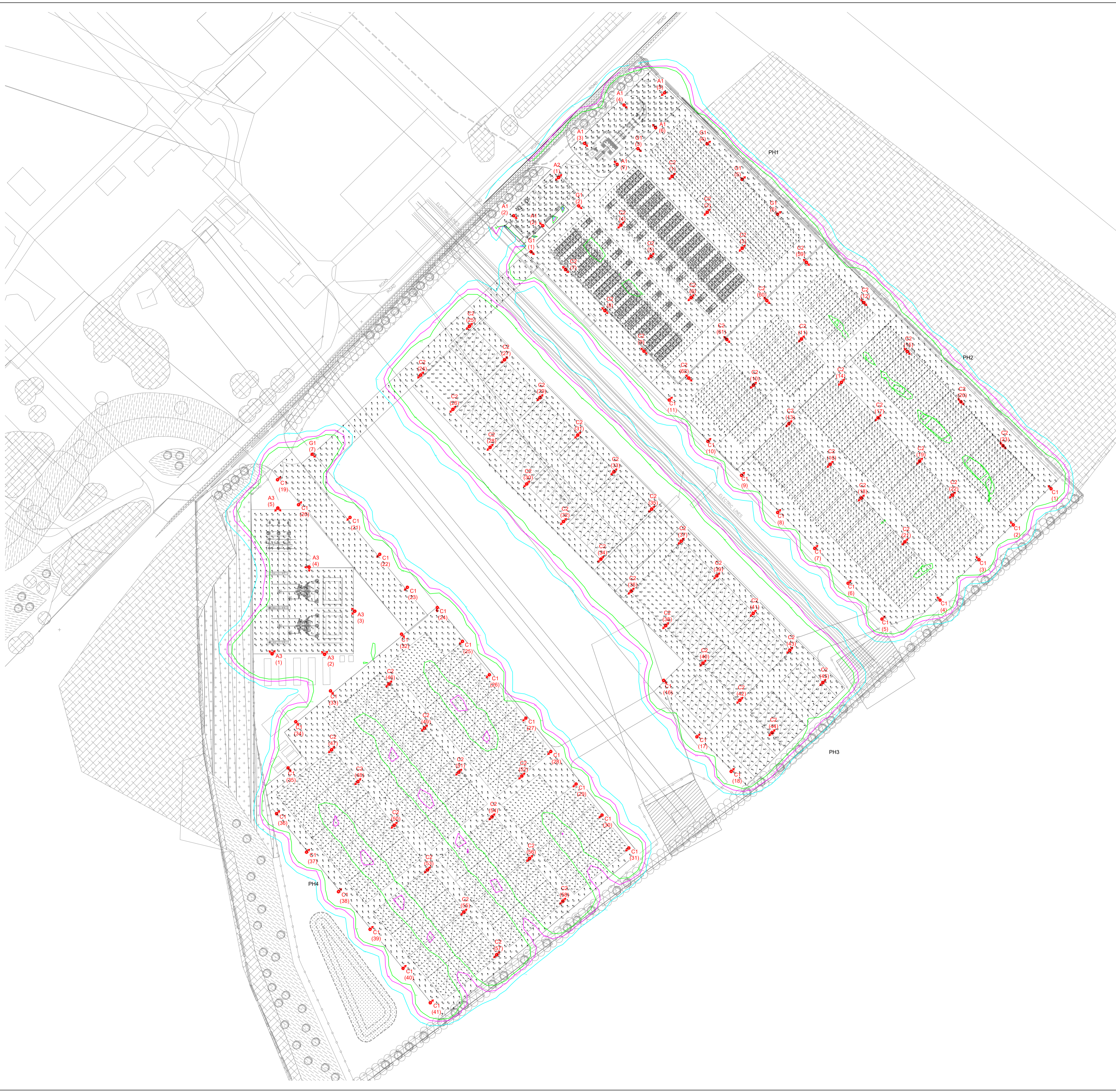
Ultimately, light levels should always be designed to minimise potential environmental impact, and maximise the potential of habitat and species enhancement work, through multidisciplinary working and evidence based new, or retrofit, scheme design.”

All lighting is inward facing and “forward throw”, with very low levels of light spill into adjacent supporting habitats. PIR sensors will be used so that the lighting is only triggered by people (or objects large enough) and during any nighttime maintenance. This would be on occasional basis and would likely only involve a small portion of the site being lit at any one time, with the site otherwise remaining in in darkness at all other times. Assuming installation is conducted as per the design specification, impacts to bats or nesting birds from the effects of artificial lighting at the site are expected to be minimised to within the accepted levels stipulated in standard guidance.

Document Control

Revision:	V2	Prepared by:	Ash Ronaldson BSc (Hons) Consultant Ecologist
Date:	16.08.2024		
Status:	Final	Approved By:	Doug Blease BSc (Hons) MCIEEM Associate Director
Description of Revision:	Minor update to reflect final plan		

**APPENDIX A: EXTERNAL LIGHTING PLAN (REF: NGG-RPS-XX-XX-DR-E-6301 -
EXTERNAL LIGHTING – P10)**

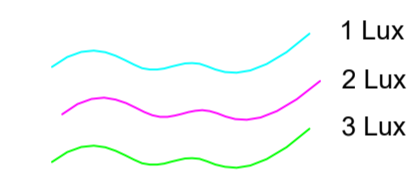


Notes:-

- 1) Scheme utilises LED luminaires with sharp cut-off, good colour rendition. No metal halide or fluorescent fittings used.
- 2) Fittings capable of being dimmed.
- 3) Lanterns utilise 2700K LEDs.
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Luminaire Schedule

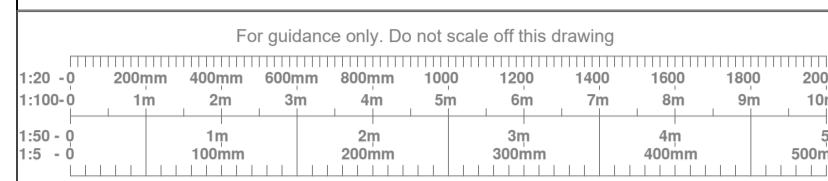
- A1** Kingfisher Lighting - 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m 
- A2** Kingfisher Lighting - 2 No. 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m (back to back) 
- A3** Kingfisher Lighting - 2 No. 80W LED (10452 lumens) VIVA-CITY Pro 805mA with FW70 forward throw optic column mounted at 6m (at 90°) 
- C1** Kingfisher Lighting - 40W LED (5238 lumens) VIVA-CITY Pro 1050mA with FW70 forward throw optic column mounted at 6m 
- C2** Kingfisher Lighting - 2 No. 40W LED (5238 lumens) VIVA-CITY Pro 1050mA with FW70 forward throw optic column mounted at 6m 



Calculation Summary

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Roadway PH3	11.31	35	3	0.27
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Roadway PH4	12.02	35	1	0.08
Roadway PH1	14.01	60	4	0.29
Welfare Compound	27.95	60	7	0.25

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Safety, Health & Environment Information

In addition to the hazards / risks normally associated with the types of work detailed on this drawing take note below. It is assumed that all works on this drawing will be carried out by a competent contractor, working, where appropriate, to an appropriate method statement.

Construction risks	Maintenance/Cleaning risks	Demolition/Adaption risks

Rev	Description	By	Ckd	Date
P10	Wall fittings deleted. Columns added on Phase 2 site. C2 fittings 7-9 relocated and re-orientated.	DB	RP	13:08:24
P09	Scheme updated to reflect comments discussed at Rev 08.	DB	RP	29:07:24
P08	Provisional mark up.	DB	RP	17:07:24
P07	Whole site scheme detailed. Fittings amended.	DB	RP	26:06:24
P06	Scheme reduced to 6m columns. Scheme designed present for Phase 1 only. Hatched area in abeyance.	DB	RP	06:06:24
P05	Drawing presentation updated in line with Clients requirements.	DB	RP	07:02:24
P04	Site layout updated. 2 No. plant areas deleted and addition battery storage added. Plant area levels enhanced.	DB	RP	26:01:24
P03	Note 8) amended.	DB	RP	24:08:23
P02	Notes added.	DB	RP	17:08:23
P01	First issue	DB	RP	10:10:23



MAKING COMPLEX EASY

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Project: **Neilston Greener Grid Park**

Title: **External Lighting**

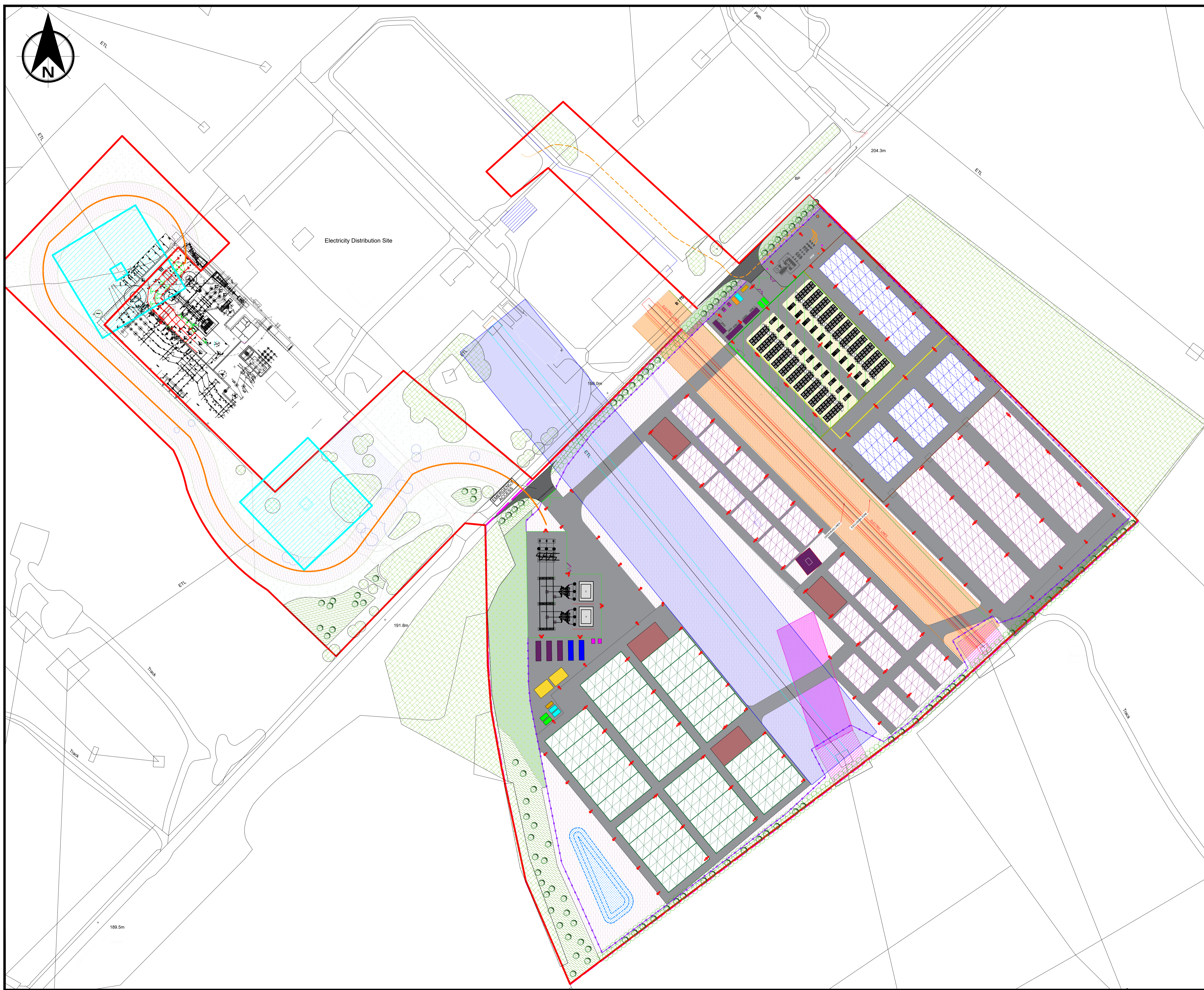
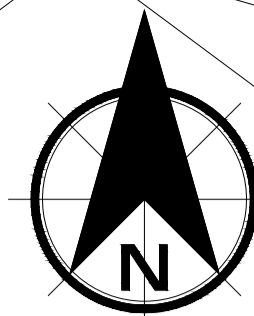
Status	Scale	Date Created
Planning	1:1000 @A1	07.07.23
Task Team Manager	Information Author	Task Information Manager
SB	DB	RP

Document Number
NGG-RPS-XX-XX-DR-E-6301

RPS Project Number: **BSB14390** Suitability: **S0** Revision: **P10**

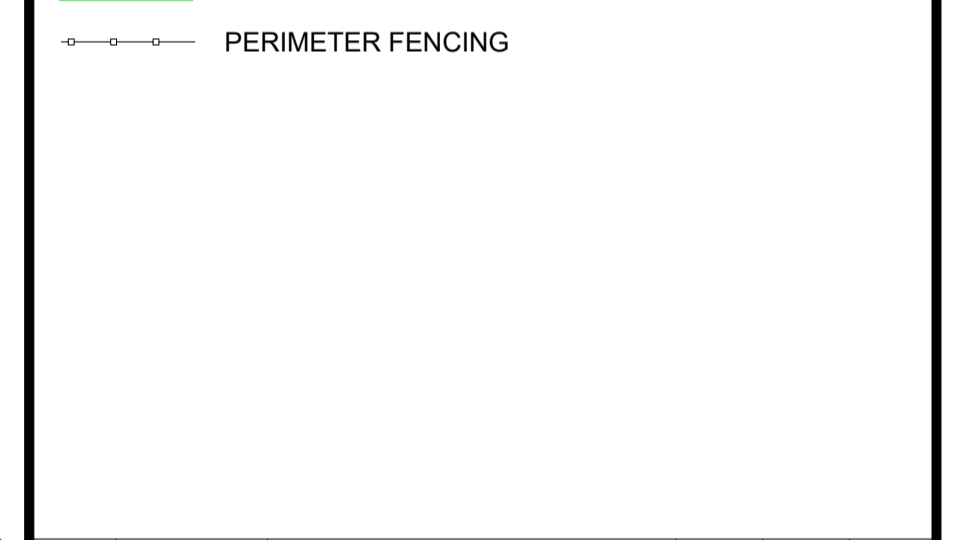
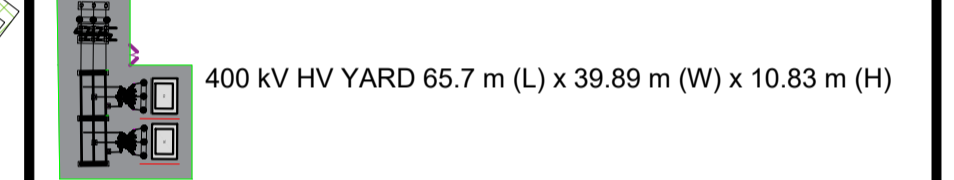
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APPENDIX B: SITE LAYOUT PLAN



LEGEND

- SITE BOUNDARY
- AREA OF 50 MW TYPE A BESS UNDER CONSTRUCTION
- EXISTING WW2 BUNKER
- CONSENTED UNDERGROUND CABLE ROUTE
- PROPOSED UNDERGROUND CABLE ROUTE
- 117.6w LED 4000K VIVA CITY FLOOD 780mA WITH FW70 OPTIC COLUMN MOUNTED AT 6 m (H)
- 58.8w LED 4000K VIVA CITY FLOOD 585mA WITH FW70 OPTIC COLUMN MOUNTED AT 6 m (H)
- PERIMETER FENCE 3.4 m (H)
- RETAINING WALL
- AUX TRANSFORMERS 2.4 m (L) x 3.3 m (W) x 2.5 m (H)
- PROTECTION CONTROL BUILDING
- MV SWITCHGEAR BUILDING 14.1 m (L) x 3.7 m (W) x 5.55 m (H)
- GENSET 12.95 m (L) x 3.5 m (W) x 3.5 m (H)
- STORES 6.2 m (L) x 3.1 m (W) x 43.5 m (H)
- WELFARE 6.2 m (L) x 3.1 m (W) x 43.5 m (H)
- DIESEL GENERATORS 6.2 m (L) x 3.1 m (W) x 3.5 m (H)
- UNDERGROUND WATER TANKS 12 m (L) x 8 m (W) x 1.2 m (H)
- MV ROOMS 26 m (L) x 16.18 m (W) x 3.8 m (H)
- 12 m OHL BUFFER (132 kV)
- 25 m OHL BUFFER (275 kV)
- TENSIONING 90 m BUFFER
- INTERNAL ROADS (TARMAC)
- INTERNAL ROADS
- PYLON 30 m BUFFER
- SUBSTATION CONTROL BUILDING
- OFFICES 9.8 m (L) x 3.1 m (W) x 3.5 (H)
- EXTERNAL GATE 11.4 m (W) x 3.4 m (H)
- INTERNAL GATE 11.4 m (W) x 2.4 m (H)
- CCTV / LIGHTNING POLES
- SUDS PONDS
- BOLLARDS
- EXISTING VEGETATION TO BE RETAINED
- EXISTING GRASSLAND TO BE RETAINED
- PROPOSED NATIVE TREE
- PROPOSED NATIVE WOODLAND EDGE MIX
- PROPOSED NATIVE MIXED HEDGEROW
- PROPOSED NATIVE WILDFLOWER MEADOW
- PROPOSED NATIVE WETLAND MEADOW
- PROPOSED LIGHTING 1 NO. LED 6 m (H)
- PROPOSED LIGHTING 2 NO. LED 6 m (H)
- TYPE A BESS 26 m (L) x 16.18 m (W) x 3.8 m (H)
- TYPE B BESS 26 m (L) x 16.18 m (W) x 3.8 m (H)
- TYPE C BESS 38 m (L) x 15 m (W) x 3.8 m (H)



7	21/08/24	EDITS TO SITE LAYOUT	ST	BP	BP
Rev.	Date	Amendment Details	Dr'n	Chk'd	App'd

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Drawing Status: **FOR INFORMATION**

Project Title: **NEILSTON GREENER GRID PARK SECTION 36 APPLICATION**

Drawing Title: **PROPOSED SITE LAYOUT**

Scale	1:1250	Designed	ST	Drawn	ST	Checked	BP	Approved	BP	
Original Size	A1	Date	21/08/24	Date	21/08/24	Date	21/08/24	Date	21/08/24	
Drawing Number	15957 - 025								Revision	7