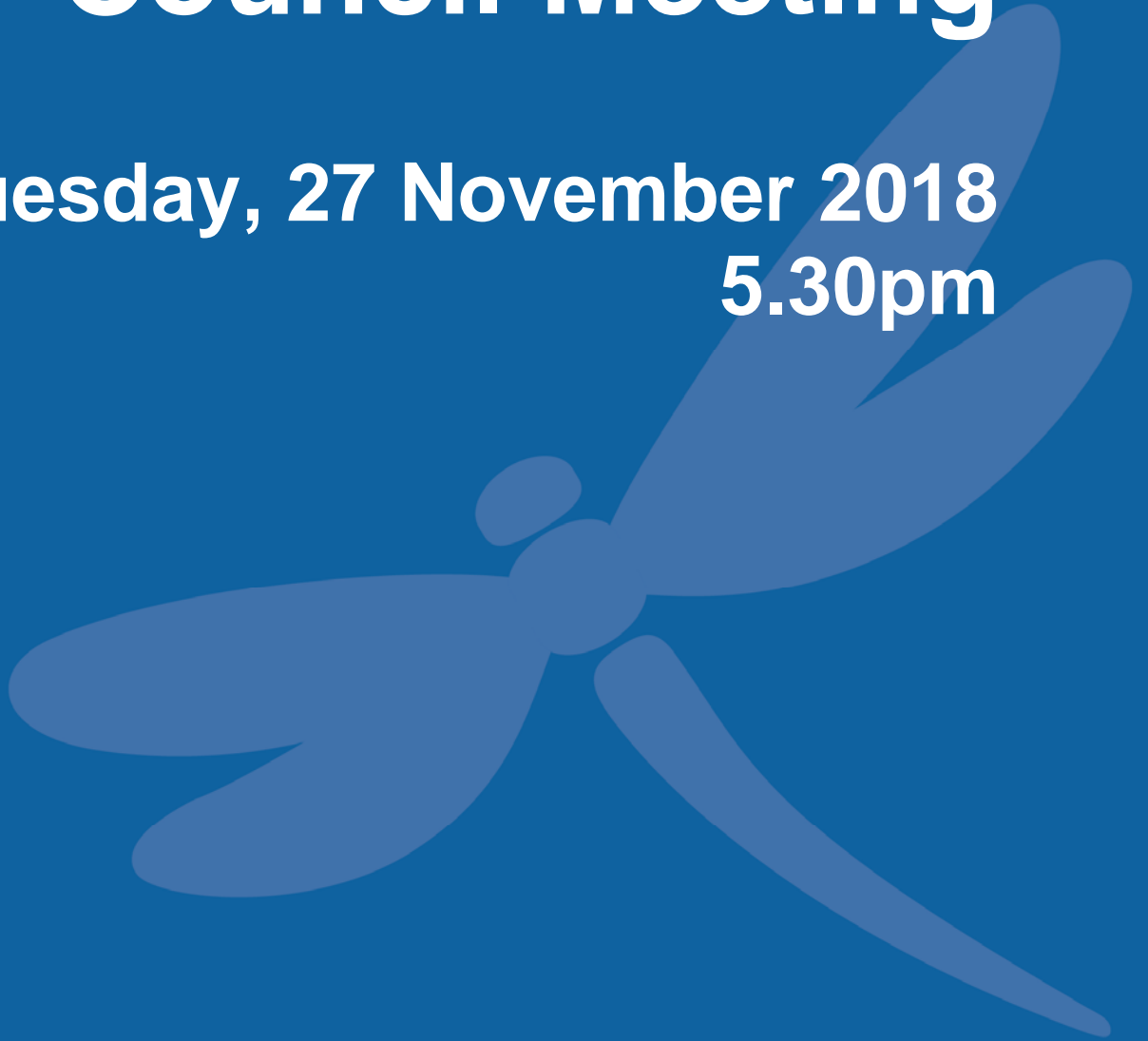


# Business Papers

## Ordinary Council Meeting

Tuesday, 27 November 2018  
5.30pm





## **Notice of Meeting**

To the Lord Mayor and Aldermen

You are invited to attend an Ordinary Council Meeting to be held in the Council Chambers, Level 1, Civic Centre, Harry Chan Avenue, Darwin, on Tuesday, 27 November 2018, commencing at 5.30pm.

A handwritten signature in dark ink, appearing to read 'S. Waters', is positioned above the printed name.

**SCOTT WATERS**  
**CHIEF EXECUTIVE OFFICER**



TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/3

**CITY OF DARWIN**

**TWENTY-EIGHTH ORDINARY MEETING OF THE TWENTY-SECOND COUNCIL**

**TUESDAY, 27 NOVEMBER 2018**

MEMBERS: The Right Worshipful, Lord Mayor, K Vatskalis, (Chair); Member A J Arthur; Member J Bouhoris; Member S Cullen; Member J A Glover; Member G J Haslett; Member R M Knox; Member G Lambrinidis; Member S J Niblock; Member M Palmer; Member P Pangquee; Member R Want de Rowe; Member E L Young.

OFFICERS: Chief Executive Officer, Mr S Waters; Chief Operating Officer, Mr C Potter; General Manager Government Relations and External Affairs, Ms M Reiter; General Manager Innovation, Growth and Development Services, Mr J Sattler; General Manager Engineering and City Services, Mr B Smith; General Manager Community and Regulatory Services, Ms P Banks; Committee Administrator, Mrs P Hart.

Enquiries and/or Apologies: Penny Hart  
E-mail: [p.hart@darwin.nt.gov.au](mailto:p.hart@darwin.nt.gov.au)  
PH: 8930 0670

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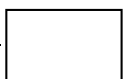
**WEBCASTING DISCLAIMER**

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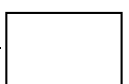
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TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/6

**1. ACKNOWLEDGEMENT OF COUNTRY**

**2. THE LORD'S PRAYER**

**3. MEETING DECLARED OPEN**

**4. APOLOGIES AND LEAVE OF ABSENCE**  
Common No. 2695036

**4.1 Apologies**

**4.2 Leave of Absence Granted**

THAT it be noted the Lord Mayor is an apology due to a Leave of Absence previously granted on 13 November 2018 for the period 26 to 28 November 2018.

**4.3 Leave of Absence Requested**

**5. ELECTRONIC MEETING ATTENDANCE**  
Common No. 2221428

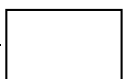
**5.1 Electronic Meeting Attendance Granted**

**5.2 Electronic Meeting Attendance Requested**

**6. DECLARATION OF INTEREST OF MEMBERS AND STAFF**  
Common No. 2752228

**6.1 Declaration of Interest by Members**

**6.2 Declaration of Interest by Staff**



TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/7

**7. CONFIRMATION OF MINUTES OF PREVIOUS MEETING/S**  
Common No. 1955119

**7.1 Confirmation of the Previous Ordinary Council Meeting**

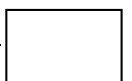
HAT the tabled minutes of the previous Ordinary Council Meeting held on Tuesday, 13 November 2018, be received and confirmed as a true and correct record of the proceedings of that meeting.

**7.2 Business Arising**

**8. MATTERS OF PUBLIC IMPORTANCE**

**9. DEPUTATIONS AND BRIEFINGS**

**10. PUBLIC QUESTION TIME**



TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/8

## 11. CONFIDENTIAL ITEMS

Common No. 1944604

### 11.1 Closure to the Public for Confidential Items

THAT pursuant to Section 65 (2) of the Local Government Act and Regulation 8 of the Local Government (Administration) Regulations the meeting be closed to the public to consider the following Confidential Items:-

<u>Item</u>	<u>Regulation</u>	<u>Reason</u>
C23	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.1.1	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.1.2	8(c)(i)	information that would, if publicly disclosed, be likely to cause commercial prejudice to, or confer an unfair commercial advantage on, any person
C24.1.3	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.1.4	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.1.5	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.2.1	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person
C24.2.2	8(c)(iv)	information that would, if publicly disclosed, be likely to prejudice the interests of the council or some other person



TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/9

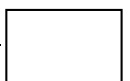
**11.2 Moving Open Items Into Confidential**

**11.3 Moving Confidential Items Into Open**

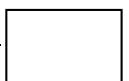
**12. PETITIONS**

**13. NOTICE(S) OF MOTION**

Nil



## 14.1 OFFICERS REPORTS (ACTION REQUIRED)



ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.1.1  
 YES

**PROPOSED PERMANENT PLACEMENT OF SPEED-CHECK SIGNS  
 AT SCHOOL CROSSINGS**

REPORT No.: 18CO0046 DL:rm COMMON No.: 3873914 DATE: 27/11/2018

**Presenter:** Manager Design, Development and Projects, Drosso Lelekis

**Approved:** General Manager Engineering and City Services,  
 Brendan Smith

**PURPOSE**

The purpose of this report is to present to Council for endorsement, a proposal to permanently install speed-check signs at 25 school crossings throughout the Darwin Municipality over two years.

**LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

**Goal**

2 Vibrant, Flexible and Tropical Lifestyle

**Outcome**

2.1 Improved access and connectivity

**Key Strategies**

2.1.3 Manage the road network to meet community needs

**KEY ISSUES**

- Council currently owns 14 moveable speed-check signs.
- The Northern Territory Government (NTG) has sought a partnership with the City of Darwin to fund the permanent installation of speed-check signs at one existing school crossing at every school in the Darwin municipality.
- The NTG has entered into an agreement with the City of Palmerston to install speed-check signs permanently at school crossings.
- The City of Darwin entering into a similar arrangement would provide a consistent approach across the Darwin and Palmerston region.
- There are 25 existing school crossing sites included in the two-year permanent speed-check sign proposal recommended to Council and 50 signs would be required to cover these sites.
- It is also considered that Council should purchase a further four trailer-mounted speed-check signs to continue address miscellaneous speeding issues outside of existing school crossing locations on an as-required basis.

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 SUBJECT: PROPOSED PERMANENT PLACEMENT OF SPEED-CHECK SIGNS AT SCHOOL CROSSINGS

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- Council will need to provide additional funding for the ongoing maintenance cost (including battery replacement and sign re-programming, when required) of the 54 signs.
- The electronic sign components of the speed-check signs will need replacement approximately every eight years and the replacement cost will need to be accommodated in future budgets and Council's Long Term Financial Plan.

### **RECOMMENDATIONS**

- A. THAT Report Number 18CO0046 DL:rm entitled Proposed Permanent Placement of Speed-Check Signs at School Crossings, be received and noted.
- B. THAT Council endorse the placement of permanent speed-check signs at 25 school crossing locations throughout the Darwin municipality, with one crossing at each school.
- C. THAT Council make application to the Northern Territory Government, through the Local Government Special Purpose Grants program of the Department of Housing and Community Development for a total of \$258,000 in funding (50% contribution) for this project in the February/March 2019 round of funding to undertake the project over the 2019/20 and 2020/21 financial years.
- D. THAT pending the approval of Northern Territory Government funding, the remainder of funding required, a total of \$258,000 over two years be referred the 2019/20 and 2020/21 budget processes as Council's contribution towards the permanent placement of speed-check signs at the 25 school crossings.
- E. THAT Council provide an additional \$30,000 per annum for the ongoing maintenance of the speed-check signs in its Operational Budgets.

### **BACKGROUND**

Council has purchased 14 moveable speed-check signs since 2012, which have been deployed in school zones under a program managed by staff and miscellaneous roads throughout Council's road network on an as-required basis.

The Northern Territory Government (NTG) recently granted \$100,000 to the City of Palmerston towards the permanent installation of speed-check signs in school zones across the Palmerston municipality. The NTG has since approached Council to enter into a similar partnership (**Attachment A**). Council responded that it is happy to enter into discussions to explore the possibilities (**Attachment B**).

A meeting was subsequently held, involving staff from the City of Darwin, City of Palmerston and Department of Infrastructure, Planning and Logistics (DIPL) staff to further discuss this partnership opportunity. During this meeting, Council was

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encouraged to seek part-funding through the Local Government Special Purpose Grants programme of the Department of Housing and Community Development and it was stated that DIPL would support this application. The NTG has advised that applications for the next round of this funding will open in February/March 2019.

## **DISCUSSION**

Speed-check signs are electronic devices that measure and display the speed at which vehicles are travelling. They can also be programmed to flash a “slow down” message at a set speed. As the signs are currently moveable, they operate under battery power. If the devices are placed permanently, it is appropriate they are either solar or direct mains connected to the electricity supply. It is possible to modify the existing 14 signs such that they are solar-powered so they can be placed permanently. The solar-powered option is preferred from an environmental sustainability and practicality perspective.

To ensure structural integrity, including during high winds, the solar-powered speed-check signs need to be structurally certified if the signs are to remain in place permanently. Appropriately designed concrete foundations will be required.

It is recommended that Council place permanent speed-check signs at 25 school crossing locations throughout the Darwin Municipality (at one crossing per school), with two signs deployed at each of these locations (total of 50 signs).

Furthermore, given that there are any number of sites in the Darwin Municipality with speeding issues that would benefit from driver-education and the temporary deployment of speed-check signs, it is considered necessary to purchase a further four trailer-mounted speed-check signs for temporary deployment at these locations on an as-required basis.

The Department of Housing and Community Development have confirmed that applications for the next round of Local Government Special Purpose Grants funding will open in February/March 2019 and that recipients will have two years from receipt of funding to expend it (refer **Attachment C**).

It is recommended that Council make application to the NTG, through the Local Government Special Purpose Grants programme of the Department of Housing and Community Development for a total of \$258,000 in funding (50% contribution) for this project in the February/March 2019 round of funding to undertake the project over the 2019/20 and 2020/21 financial years.

It is also recommended that Council refer a total of \$258,000 over two years to the 2019/20 and 2020/21 budget processes as Council’s contribution towards the permanent placement of speed-check signs at school crossings.

The above costings allow for the conversion of the 14 existing speed-check signs to solar power, the purchase of 36 new solar-powered speed-check signs and the permanent installation of all 50 signs to a structurally-certifiable standard.

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It is intended that over the first year of this project, the number of speed-check signs secured under the co-funding agreement, will be installed at known sites where measured speeds significantly exceed the 40 km/hr School Zone speed limit. These sites may include school crossings along Alawa Crescent, Leanyer Drive and any other sites meeting this criterion. Eventually, all schools will have speed-check signs permanently deployed at one crossing location over a two-year period under this proposal.

The proposed two-year installation schedule is shown below.

Financial Year	Street and Suburb	School
2019/20	Alawa Crescent, Alawa*	Alawa Primary School
	Chapman Road, Nightcliff	The Essington School
	Henbury Avenue, Wanguri*	Henbury School
	Jingili Terrace, Jingili*	Jingili Primary School
	Koolinda Crescent, Karama	Karama Primary School
	Leanyer Drive, Leanyer*	Leanyer Primary School
	Manunda Terrace, Karama	Manunda Terrace Primary School
	Moil Crescent, Moil*	Moil Primary School
	Nudl Street, Stuart Park	Stuart Park Primary School
	Pandanus Street, Nightcliff	Nightcliff Primary School
	Ross Smith Avenue, Parap	Parap Primary School
	Wulagi Crescent, Wulagi*	Wulagi Primary School
Yanyula Drive, Anula*	Anula Primary School	
2020/21	Calytrix Road, Malak	Holy Family Catholic Primary School
	Cummins Street, Rapid Creek	St Paul's Catholic Primary School
	Dalwood Crescent, Malak	The Brat Pack (Outside School Hours Care)
	Gsell Street, Wanguri	Holy Spirit Catholic Primary School
	Leanyer Drive, Leanyer	St Andrew Lutheran School
	Malak Crescent, Malak	Malak Primary School
	Mueller Road, Malak	O'Loughlin Catholic College
	Nakara Terrace, Nakara	Nakara Primary School
	Robinson Road, Millner	Millner Preschool
	Sabine Road, Millner	Millner Primary School
	Wagaman Terrace, Wagaman	Wagaman Primary School
Wanguri Terrace, Wanguri	Wanguri Primary School	

\*School zones with previously identified speeding concerns

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The City of Darwin's 2017/18 Community Satisfaction Survey revealed that road safety was an area in need of addressing as it is seen as having high importance but low satisfaction by the community.

### **CONSULTATION PROCESS**

In preparing this report, the following City of Darwin officers were consulted:

- Design Team Leader
- Senior Technical Officer
- Civil Engineering Officer
- Executive Manager Waster and Capital Works
- Coordinator Civil Infrastructure
- Manager Infrastructure Maintenance
- Fleet Manager

In preparing this report, the following External Parties were consulted:

- Department of Infrastructure, Planning and Logistics
- City of Palmerston

### **POLICY IMPLICATIONS**

Communication engagement will be undertaken in accordance with City of Darwin Policy No. 025 - Community Engagement, after funding is secured.

### **BUDGET AND RESOURCE IMPLICATIONS**

The cost to convert Council's existing speed-check signs to solar power, upgrade them so that they are structurally-certifiable and permanently install them is estimated at \$6,000 per sign, totalling \$84,000 for the 14 signs.

The cost of the new solar-powered speed-check signs, installed such that they are structurally certifiable and on a permanent basis, is estimated at \$12,000 per sign, totalling \$432,000 for the 36 signs.

The total cost to deploy the 50 speed-check signs at the 25 school crossings (two signs per crossing) is \$516,000. This includes the cost of installation and certification.

Council's 50% co-funding for the project could be taken from existing budgets, over a two-year period, as shown in the table following.

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Financial Year	Programme	Budget Allocation
2018/19	NTG Department of Housing and Community Development Special Purpose Grant programme*	\$ 258,000
2019/20	Local Area Traffic Management	\$ 60,000
	Traffic Signal Upgrade	\$ 30,000
	Road Maintenance	\$ 39,000
2020/21	Local Area Traffic Management	\$ 60,000
	Traffic Signal Upgrade	\$ 22,640
	Road Works Signage - Regulatory, Warning & Info**	\$ 46,360

\*Pending successful application in February/March 2019

\*\*This assumes the funding in the current Long Term Financial Plan is approved for 2019/20 and 2020/21.

The Council funding has been split over two years as to retain some Local Area Traffic Management (LATM) funding for priority LATM projects.

The estimated cost to purchase four trailer-mounted speed-check signs is \$53,400. Should operational savings be realised within 2018/19 Council budgets, these signs will be purchased this financial year. If this is not the case, the signs will be purchased with Local Area Traffic Management monies in 2019/20.

The estimated ongoing cost (including batteries and maintenance) of the 54 signs is \$30,000 per annum which does not include unforeseen circumstances (e.g. vandalised signs). This is additional to the supply and installation costs for the speed-check signs above.

In Council's Long Term Financial Plan (LTFP), there is currently \$15,000 allocated for the purchase of new speed-check signs in the 2019/20, 2021/22, 2023/24, 2025/26 financial years. These funds could be transferred to Operational Budgets and utilised for the speed-check sign maintenance costs in those years.

The life expectancy of the electronic sign components of the speed-check signs is approximately eight years. Therefore funding for the replacement of the 54 sign components will need to be allocated in future budgets and included in Council's Long Term Financial Plan. This replacement requirement will be ongoing.

The permanent installation and conversion to solar power of Council's existing 14 speed-check signs would result in Council staff not having to deploy these signs on a temporary basis, which represents a saving of approximately 30 hours per week in Design staff time, which can then be allocated to the section's core duties.



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### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

There may be various workplace health and safety risks associated with the temporary deployment of the speed-check signs in their current form. Purchasing new trailer-mounted signs would alleviate this concern.

Council is responsible for all infrastructure within its road network.

### **ENVIRONMENTAL IMPLICATIONS**

The installation of speed-check signs will likely be an effective educational tool and reduce the operating speeds of vehicles at school crossing locations, thereby improving the safety of the road environment.

Utilising solar-powered speed-check will have environmental benefits (i.e. including using fewer batteries).

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**DROSSO LELEKIS**  
**MANAGER DESIGN,**  
**DEVELOPMENT AND PROJECTS**

**BRENDAN SMITH**  
**GENERAL MANAGER**  
**ENGINEERING AND CITY**  
**SERVICES**

For enquiries, please contact Drosso Lelekis on 8930 0585 or email: darwin@darwin.nt.gov.au.

#### **Attachments:**

- Attachment A:** Incoming correspondence from the NTG to Council requesting Partnering in Permanent Speed Signs in Darwin
- Attachment B:** Outgoing correspondence from Council to the NTG expressing willingness to explore possibilities
- Attachment C:** NTG Local Government Special Purpose Grant Funding Guidelines



# Michael GUNNER MLA

## Member for Fannie Bay



The Right Worshipful The Lord Mayor of Darwin  
Kon Vatskalis JP  
City of Darwin  
GPO Box 84  
DARWIN NT 0801

Dear Lord Mayor

I know that like me, you want our kids to be as safe as possible around school traffic zones.

Recently the Northern Territory Government and The City of Palmerston formed a partnership to fund Electronic Speed Limit Signs outside schools across Palmerston.

Research shows these signs have a strong and long-lasting influence on driver behaviour.

It would be great if the Northern Territory Government could also form a partnership with the City of Darwin to fund this program for all Darwin schools as well.

I have spoken to all Darwin based MLA's and we all support pursuing this initiative.

Yours sincerely

MICHAEL GUNNER  
Member for Fannie Bay

NICOLE MANISON  
Member for Wanguri

NATASHA FYLES  
Member for Nightcliff

KEN VOWLES  
Member for Johnston

LAUREN MOSS  
Member for Casuarina

JEFF COLLINS  
Member for Fong Lim

KATE WORDEN  
Member for Sanderson

NGAREE AH KIT  
Member for Karama

PAUL KIRBY  
Member for Port Darwin

Working for Fannie Bay | Parap | Ludmilla | Coconut Grove | The Gardens

**Michael Gunner MLA | Member for Fannie Bay**

Shop 5/36, Parap Shopping Village, Parap NT | PO Box 11, Parap NT 0804 | P 08 8999 6437 | F 08 8941 2661 | E electorate.fanniebay@nt.gov.au

24 August 2018

Please quote: 3873914 DL:dc

The Hon. Michael Gunner MLA  
Chief Minister  
Northern Territory Government  
GPO Box 3146  
DARWIN NT 0801

Email: [chief.minister@nt.gov.au](mailto:chief.minister@nt.gov.au)

Dear Chief Minister



**Partnership to Fund Electronic Speed Limit Signs Outside Darwin Schools**

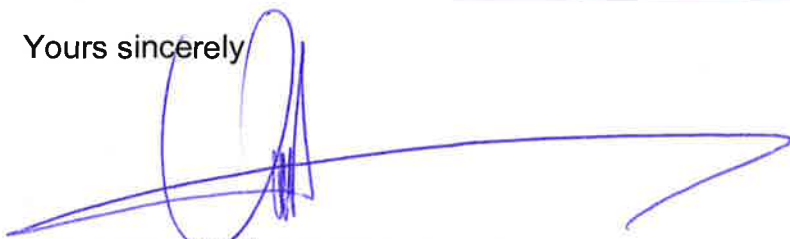
Thank you for your correspondence regarding a possible partnership between the City of Darwin and the Northern Government to fund electronic speed signs within Darwin School Zones.

As you rightfully state, Council shares the Northern Territory Government's concerns about road safety, particular where the most vulnerable road users are concerned, such as roads around Schools.

We would be happy to explore a partnership with the Northern Territory Government to implement electronic speed signs within Darwin School Zones.

To commence a dialogue to this end, I ask that you have the relevant Northern Territory Government officer contact our General Manager City Operations, Nik Kleine on 89 300 581 or email [n.kleine@darwin.nt.gov.au](mailto:n.kleine@darwin.nt.gov.au) at your convenience.

Yours sincerely



**THE HON. KON VATSKALIS JP**  
**LORD MAYOR**

## Local Government Special Purpose Grant - funding guidelines

### 1. Purpose

The local government Special Purpose Grant (SPG) is managed by the Department of Housing and Community Development (Department). The purpose of the SPG program is to allow recognised local governing bodies and other incorporated organisations providing local government services the opportunity to apply for funding to improve community infrastructure and local government service delivery outcomes.

### 2. Objectives

The objectives of the program are to:

- Support the implementation of key Northern Territory Government policy platforms
- Assist in the delivery of key outcomes outlined in the council's plans
- Assist in developing local government capacity to provide legitimate representation, effective governance, improved service delivery and sustainable development
- Assist local governing bodies and the constituent communities they represent to become stronger and self-sustaining
- Assist in the delivery of essential council infrastructure and services
- Provide a potential source of additional funding to those non local government bodies that provide local government/municipal services (e.g. trustees of reserves, cemetery trusts and the Local Government Association of the NT)

### 3. Eligibility

To be eligible for a special purpose grant, the organisation must:

- Be a recognised local governing body established under the *Local Government Act* or an incorporated organisation delivering local government/municipal services that are currently funded through the Local Government Division of the Department
- Have a current business, strategic or operational plan
- Have acquitted all previous grants relevant to this Department and complied with all other accountability requirements
- Have adequately demonstrated that the grant will not duplicate funding already provided under this or other funding sources for the purpose intended
- Have demonstrated that the grant application supports relevant Northern Territory Government strategies and policies
- The application pro-forma must be accompanied with supporting documentation including:
  - a. Quotes (screen dumps from web sites are not acceptable)
  - b. Project plans; and
  - c. Budgets.

#### 4. Funding pool

There are two funding rounds per year with approximately 50% of the pool being allocated to each round. Organisations should be cognisant of the quantum of funds available when considering both the number and value of applications it intends to submit. Up to three applications can be submitted, and should be prioritised to assist the Department in the assessment process.

#### 5. Purposes for which grants will be considered favourably

- Purchase of plant and equipment that will improve local government service delivery
- Staff housing on remote communities and general renovations/upgrades
- Upgrades for parks, sporting and recreational areas
- Supporting community infrastructure projects
- Addressing issues around anti-social behaviour and discourage acts of vandalism and graffiti in council park lands and open spaces
- Animal management programs

If the proposed project relies on pre-conditions (such as the acquisition of a section 19 lease under the *Aboriginal Land Rights (Northern Territory) Act*), then the application should not be submitted until there is conclusive evidence that the condition will not hinder or delay the progress of the project funding being applied for.

#### 6. Purposes for which grants have not been approved

Given the limited funding pool, it is unlikely that grants for the purposes outlined below will be successful.

- Purchase of vehicles (passenger carrying/recreational vehicles – 4WDs, troop carriers, buses, quad bikes etc.)
- Establishment of 'new' community dumps or remediation of existing dumps
- Payment of sitting fees, travel costs, accommodation or hospitality items for meetings
- Purposes that are of a recurrent nature and outside council budget (e.g. staff salaries)
- Road construction and/or repairs and maintenance
- Construction of swimming pools
- Purposes that are not related to local government services and that should be addressed by another government agency.

#### 7. Application processes & timelines

The SPG Program is subject to two rounds of funding per financial year.

Round 1 – August / September

Round 2 – February / March

Organisations will be given approximately four weeks to develop and submit applications. Incomplete or late applications will not be considered by the assessment panel.

A maximum of three (3) prioritised applications will be accepted per round. All applications must be accompanied by a least one recent quote. Screen dumps from web sites are not acceptable.

The grant application must not include administration/project management fees. These are expected to be covered by the grant applicant.

All applications from local government councils must exclude any GST component.

Councils are strongly encouraged to discuss proposed applications with their relevant Department of Housing and Community Development regional office prior to submission. Other organisations can contact the Local Government Division (contact details provided below) to discuss their proposed applications prior to submission.

## **8. Assessment considerations**

The assessment of applications will include consideration of the following:

- Community acceptance and benefit of the project
- Alignment to Northern Territory Government strategies and policies
- Alignment with the applicant's strategic priorities as outlined in annual plans
- Relative importance to the delivery of local government services
- Recognition will be given to issues of geographical and regional equity of proposed projects

## **9. Assessment process**

Assessment of grant applications will only be undertaken after the closing date.

Grant applications are assessed by the Local Government Division of the Department taking into account the above assessment considerations and prioritised on an NT wide basis. Recommendations are then forwarded to the Minister for Housing and Community Development to make a final decision on successful projects.

The minister will advise applicants on the successful projects whilst the Department will advise of the unsuccessful projects.

## **10. Unsuccessful / late applications**

No applications will be held over for future assessment by the Department.

If an organisation wishes for an unsuccessful or late application to be considered for the next round, then it is up to that organisation to re-submit its application within the required time-frame of the next grant round.

## 11. Process for payment

Once the minister has approved the successful projects, applicants will receive:

- a letter from the minister advising of the project and grant amount that has been approved; and
- a letter of offer, acceptance and acquittal form from the Department.

Prior to grant payments being processed, successful applicants must ensure they have no outstanding grant acquittals relevant to the Local Government Division of this Department. All outstanding acquittals will need to be submitted to the Department before payment will be made.

Successful organisations must sign the acceptance form with appropriate authorisation and return back to the Department.

## 11. Funds Management

- The purpose for which grant funding was applied for must be fully expended within two years of the receipt of funding. Failure to do so may result in the Department requesting the funds to be repaid
- Acquit all, partial or nil expenditure of the SPG as at 30 June by 31 July each year.
- All approved projects are required to be procured in accordance with the *Local Government Act* and the Northern Territory Government “Bought from a Territory Enterprise” policy if applicable.
- The purpose for which grant funding is provided cannot be changed following the Minister for Housing and Community Development’s approval. All funded projects must be completed according to the purpose on the grant application. Minor changes to the purpose of the approved project may be approved by the Department on application.
- Unspent funds will be required to be returned unless approved otherwise in writing by the Department.
- The Department reserves the right to request the full value of the grant to be returned if the organisation disposes of the asset acquired with the grant within four (4) years of the payment of the grant.

## 12. Contact details and Completed Submissions

If you require further information please contact:

Donna Hadfield  
A/Manager Grants Program  
(w) 08 8999 8820

Omor Robin  
Grants and Compliance Officer  
(w) 08 8999 8576

Completed applications are to be emailed to: [lg.grants@nt.gov.au](mailto:lg.grants@nt.gov.au)

<b>ENCL:</b> <b>YES</b>	<b>2ND ORDINARY COUNCIL MEETING /OPEN</b>	<b>AGENDA ITEM:</b>	<b>14.1.2</b>
<b>BAGOT OVAL LIGHTS</b>			
<b>REPORT No.:</b>	<b>18CL0096 CB:kl</b>	<b>COMMON No.:</b>	<b>3246533</b>
			<b>DATE:</b> 27/11/2018

**Presenter:** Recreation and Leisure Coordinator, Clare Beacham

**Approved:** General Manager Community and Regulatory Services,  
Polly Banks

### **PURPOSE**

The purpose of this report is to present to Council the detailed design for the proposed lights at Bagot Oval and the responses to key concerns raised during community consultation.

### **LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

#### **Goal**

2 Vibrant, Flexible and Tropical Lifestyle

#### **Outcome**

2.3 Increased sport, recreation and leisure experiences

#### **Key Strategies**

2.3.2 Position Darwin as a host centre for local, national and international sport and other events

### **KEY ISSUES**

- Northern Territory Government has committed \$3.5M for City of Darwin to light sporting ovals under the NT Government Urban and Regional Oval Lights Program.
- In December 2017 Football Federation NT (FFNT) submitted a proposal to Council to install lighting at Bagot Oval to a maximum lumen capacity of 200 lux.
- Council undertook a community engagement process for the proposal, with the outcomes to inform a detailed design and documentation.
- In June 2018 Council engaged Harris Kmon Solutions Pty Ltd (HK Solutions) to develop the detailed design and documentation for the Bagot Oval lights.
- HK Solution's electrical and lighting design for Bagot Oval has been reviewed by Council Officers and deemed appropriate for the application.
- Council Officers have engaged with local residents and stakeholders to address the concerns raised in the community consultation process.



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- In response to concerns raised by residents, Council Officers have prepared a concept design to improve landscaping and formalisation of the Bagot Oval car park for budget consideration.

## **RECOMMENDATIONS**

- A. THAT Report Number 18CL0096 CB:kl entitled Bagot Oval Lights, be received and noted.
- B. THAT Council proceed with installation of lighting at Bagot Oval as per the specifications detailed at **Attachment A** of Report Number 18CL0096 CB:kl entitled Bagot Oval Lights, subject to available funding.
- C. THAT tenders be invited on a Construct basis and assessed on value for money, whole of life costs and warranties provided, and that consideration also be given to solutions that demonstrate the least impact on surrounding residential neighbours providing innovation in design.
- D. THAT the hours of use of lights at Bagot Oval be restricted to no later than 9.15pm Monday to Sunday.
- E. THAT agreements with sporting associations detail the following lighting operational parameters, to be reviewed on an annual basis:

Day	Time	Lux Level
Monday	6:00-9:15pm	100 lux (training)
Tuesday	6:00-9:15pm	100 lux (training)
Wednesday	6:00-9:15pm	100 lux (training)
Thursday	6:00-9:15pm	100 lux (training)
Friday	6:00-9:15pm	200 lux (matches)
Saturday	Not in use	
Sunday	5:45-7:00pm	200 lux (matches)

- F. THAT projects arising from the landscaping and formalisation of the car park at Bagot Oval be considered for funding during the 2019/2020 budget process.

## **BACKGROUND**

DECISION NO.22\0668 (24/04/18)

### **Nightcliff & Bagot Oval Lights - Consultation Outcomes**

Report No. 18CL0037 MG:kl (24/04/18) Common No. 32346533

- B. *THAT based on the outcomes of the community consultation, Council provide in-principle support for the lighting of Nightcliff and Bagot Ovals to a maximum lumen capacity of 200LUX to enable the development of detailed design, documentation and cost estimates inclusive of whole of life costs.*

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- C. *THAT the concerns of the community as identified in Report Number 18CL0037 MG:kl Nightcliff & Bagot Oval Lights - Consultation Outcomes be taken into consideration in the planning and design of lighting for Nightcliff and Bagot Ovals.*
- D. *THAT a further report be presented to Council for project endorsement for Nightcliff and Bagot Oval lights based on the finalised design and cost.*

DECISION NO. 22\0309 (12/12/17)

**Nightcliff and Bagot Oval Lights**

Report No. 17CL0044 MG:es (12/12/17) Common No. 3246533

- B. *THAT Council undertake a Level "Consult" community engagement process regarding the proposals to install lighting to a maximum lumen capacity of 200 lux at Nightcliff and Bagot Ovals.*
- C. *THAT a further report be presented to Council following the community engagement process.*

DECISION NO. 21\5490 (13/06/17)

**Northern Territory Government's Urban and Regional Oval Lights Program**

Report No. 17C0043 AM:kl (13/06/17) Common No. 3246533

- B. *THAT Council accept the Northern Territory Government's offer of \$3.5 million (plus GST) over the 2017-18 and 2018-19 financial years for the purposes of lighting urban sporting ovals, including Gardens Oval 1.*
- C. *THAT Council write to the Northern Territory Government indicating its acceptance of the funding offer for lighting urban sporting ovals, including Gardens Oval 1, and that decisions to light other urban sporting ovals are subject to budget and a needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation process.*

**DISCUSSION**

At the 1st Ordinary meeting on 13 June 2017, Council accepted the Northern Territory Government (NTG) offer of \$3.5 million (plus GST) over the 2017-18 and 2018-19 financial years for the purpose of lighting urban sporting ovals, including Gardens Oval One. Council also wrote to the NTG to advise that decisions to light other urban sporting ovals would be subject to budget and needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation process.

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In December 2017, Football Federation NT (FFNT) submitted a proposal to Council for lighting at Bagot Oval to a maximum lumen capacity of 200 lux. Council then undertook a community engagement process for the proposal.

In April 2018, following the community consultation, Council provided in-principle support to develop a detailed design for the lighting of Bagot Oval to a maximum lumen capacity of 200 lux.

In June 2018 HK Solutions were engaged to develop the detailed design and documentation for the lights, taking into consideration the concerns of the community identified in the consultation process.

HK Solutions has provided a Lighting Design, Summary Report and Geotechnical Report for Bagot Oval at **Attachment A**. The consultant's investigations considered both HID and LED lighting systems and while both were found to provide the required 200 lux field of play illuminance, LED lighting was unable to achieve obtrusive lighting compliance on adjacent residential areas. HK Solutions recommend that a HID system be used to achieve the field of play lighting configuration whilst complying with obtrusive lighting requirements.

### Design

To achieve the required 200 lux field of play lighting, the design specifies 6 x 28.5m lighting poles with a total of 47 luminaires.

### Lighting Controls

Lighting will be operated by a user pay controller with remote configuration, monitoring and control.

The system will be configured to only operate between designated times and the control system will allow users to select from 3 different levels of lux as detailed below:

Switch Mode	Lux Level	Activity
Level 1	50 lux	Training Level 1
Level 2	100 lux	Training Level 2
Level 3	200 lux	Football Competition

The system will allow for remote SMS user activation/de-activation, removing the need for a swipe card.

### Site limitations

It was identified in the Electrical and Lighting Summary Report that one large significant tree to the west of the site may cause shadowing on Field 4. HK Solutions have proposed this tree would require trimming to 'hatched portion' of tree canopy to allow lighting Field 4. No trees will need to be removed.

Any contractor undertaking tree pruning will be required to confirm the level of tree pruning required with Council's Parks team prior to commencement of works.

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Trenching for electrical cables is proposed to be done around the perimeter of the oval. Contractors will be required to liaise with Council's Parks Team prior to trenching and if there is potential for damage to tree roots there is an option to run electrical cables across the oval to avoid root damage as much as possible.

### **Department of Defence Approval**

Due to the proximity to RAAF Base Darwin, the proposed light poles at Bagot Oval require approval by the Department of Defence. The application for approval of light pole construction and associated use of cranes adjacent to RAAF Base Darwin was submitted to Department of Defence by HK Solutions on behalf of City of Darwin on 20 September 2018. Council is currently awaiting notification of the outcome of the application.

### **Electrical Upgrade**

Due to the increased electrical demand for the proposed HID lighting system and any future lighting proposed for the Velodrome a new and upgraded incoming power supply and metering panel will be required.

The site single point of supply will be configured to have two metered load centres:

1. Velodrome
2. Bagot Park Soccer Fields

Power and Water Corporation assessed the impact of a 200 kVA peak demand at the site location and have advised that PWC's ground mounted substation 2920 will require upgrading and replacement with a new 750kVA ground mounted substation. The cost for this upgrade is required to be met by Council as part of the project costs.

### **Ongoing operational and maintenance costs**

The operating costs of the lights will be met by a user pay system. Operating costs have been calculated for each switch mode:

<b>Switch mode</b>	<b>Lux Level</b>	<b>Run Cost per hour</b>
Training 1	50 lux	\$6.32
Training 2	100 lux	\$11.74
Match	200 lux	\$21.22

Ongoing maintenance of the lights will be undertaken by Council. This will be detailed as part of Council's Asset Management Plan.

The expected lifespan of the system is 25 years, regular maintenance of luminaires and control gear is recommended to maintain lighting levels on the oval. The Metal Halide lamps have a rated life of 6000 hours, based on usage profiles servicing is suggested on a 3-year cycle at an estimated cost of \$4,420 per year.

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### **Community Consultation**

There was strong support for the installation of lights at Bagot Oval, with 94% support from survey respondents. Only 1 written submission opposed to the lights. During community consultation there were a number of concerns raised by both people that supported and opposed the project. Stakeholders have provided details of how they will address these community concerns at **Attachment B**.

#### Traffic management

The majority of concerns raised were centred on existing issues regarding parking and traffic. Residents reported that:

- poor condition of the car park surface created noise,
- vehicles drive over the verge and kerb to exit rather than using the driveways,
- drivers speed on Old McMillan's Road.

Council Officers have liaised with stakeholders and local residents to prepare a design to formalise the Bagot Oval Car Park at **Attachment C**. The design includes re-developing the shared path on Old McMillans Road, installing bollards between the car park and shared path and formalising half the existing car park.

FFNT and Mindil Aces Football Club have also indicated they will direct oval user's vehicles to reverse park into car parks that run closest to the road to decrease headlight intrusion into the neighbouring properties.

Council officers presented the concept designs to residents who believe the measures will go a long way in addressing their concerns, particularly the issue of vehicles parking and driving over the verge. Residents were informed during the consultation that the improvements to the car park area were subject to funding being secured for the works.

#### Local amenity

Concerns were expressed during consultation regarding the lighting and subsequent later use of the oval changing amenity of the area, such as rubbish, noise and anti-social behaviour.

Stakeholders have signed a user agreement that requires them to remove all rubbish from the site after use and have stated they will monitor anti-social behaviour around the oval and report any issues to the appropriate authorities.

#### Operational Hours

During community consultation there was concern raised regarding the proposed usage time being until 10.00pm. In response to this concern FFNT and Mindil Aces have reduced operational hours and have requested the lights be in operation to 9.15pm.

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Day	Time	Lux Level
Monday	6-9.15pm	100 lux
Tuesday	6-9.15pm	100 lux
Wednesday	6-9.15pm	100 lux
Thursday	6-9.15pm	100 lux
Friday	6-9.15pm	200 lux (matches)
Saturday	Not in use	
Sunday	5.45 – 7pm	200 lux (matches)

The recommendation in this report is for operational hours in line with the stakeholder request. Council may however wish to consider 9.00pm as the standard curfew for all oval lighting, as per its decision regarding the operational parameters of lights at Gardens Oval.

The design has incorporated a lighting control system that will automatically switch off lighting at the designated time. Use of the facility by sporting groups is subject to seasonal allocation agreements, the agreements will be revised to include conditions regarding the operational use of the lights. It is recommended that operational hours are defined by Council decision. However, it is foreseeable that there may be special one-off events or competitions and Council should reserve the right to approve the use of lights for these events on case by case basis.

### **Conclusion**

Based on the specifications and information provided in the Summary Report and the responses from FFNT and Mindil Aces FC to the key concerns from community consultation it is recommended that Council proceed with installation of lighting at Bagot Oval, subject to funding availability.

### **Next Steps**

If Council endorses the installation of lights at Bagot Oval the following steps are required:

1. Obtain approval by the Department of Defence.
2. Prepare and lodge an application for a development permit to construct 6 x light towers. It is anticipated application will be considered at the Development Consent Authority (DCA) hearing in March 2019.
3. Finalise the Urban & Regional Oval Lights Funding Agreement to determine funding availability.
4. Issue a tender for construction of the lighting.

### **CONSULTATION PROCESS**

This report was considered by the Executive Leadership Team on 12 November 2018 and is now referred to Council for consideration.

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In preparing this report, the following City of Darwin officers were consulted:

- Executive Manager Leisure and Regulatory Services
- Manager Engagement and Participation
- Executive Manager Waste and Capital Works
- Senior Capital Works Coordinator
- Coordinator Parks and Reserves

In preparing this report, the following External Parties were consulted:

- Football Federation NT
- Mindil Aces Football Club
- Harris Kmon Solutions Pty Ltd
- Friends of Bagot Park
- Director Asset Management, Community Participation, Sport and the Arts, Department of Tourism and Culture

### **POLICY IMPLICATIONS**

City of Darwin Policy No. 046 - *Recreation and Healthy Lifestyle* provides a framework to support equitable and inclusive use and management of Council's network of active reserves and recreation facilities.

This report is also consistent with the strategy and actions outlined in the *Sports Field Plan 2016 – 2026*, specifically to “in partnership with relevant Peak Sporting Bodies and clubs, support the provision of training lights on a case-by-case basis, having regard to site conditions, constraints and demonstrated demand.”

### **BUDGET AND RESOURCE IMPLICATIONS**

NTG has committed \$3.5M to City of Darwin for the lighting of sports ovals in 2017/18 and 2018/19 under the Urban and Regional Oval Lights Program. An amount of \$250,000 has been provided to City of Darwin from this commitment through a funding agreement to develop detailed design, documentation and cost estimates for sporting oval lighting projects.

Council indicated acceptance of the funding offer for lighting sporting ovals, including Gardens Oval One, and informed NTG that decisions to light other sporting ovals would be subject to budget, a needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation.

Council engaged Rider Levett Bucknall to provide an independent Quantity Surveyor cost estimate for the construction and installation of lights at Bagot Oval. The estimate is a detailed document with costings for all construction items and is based on 100% design review drawings. As Council may proceed to tender the estimate has not been included in this report.

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Council Officers have prepared a concept design for the Bagot Oval Car Park. Cost estimates for this design are listed below and have been obtained using rates from Council's Civil Works contract.

<b>Item</b>	<b>Estimate (Inc GST)</b>
Clearing/Rehabilitation	\$35,396
Spray Sealing	\$41,850
Footpaths	\$3,457
Cycleway	\$136,525
Driveways extension	\$760
Concrete Kerb	\$85,988
Bollards	\$18,000
Line Marking	\$11,110
Contingency	\$30,000
<b>TOTAL</b>	<b>\$363,086</b>

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

This report details how the key concerns of the respondents opposing the project can be mitigated, however it should be expected that there will always be a cohort of individuals dissatisfied with the decision to proceed with the proposal.

### **ENVIRONMENTAL IMPLICATIONS**

If approved by Council the lighting proposal will also need Development Consent which would require further assessment of any environmental impacts.

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**CLARE BEACHAM**  
**RECREATION & LEISURE**  
**COORDINATOR**

**POLLY BANKS**  
**GENERAL MANAGER**  
**COMMUNITY AND REGULATORY**  
**SERVICES**

For enquiries, please contact Polly Banks on 89300633 or email:  
 p.banks@darwin.nt.gov.au.

### **Attachments:**

- Attachment A:** Lighting Summary Report and Geotechnical Report – Bagot Oval
- Attachment B:** Stakeholder responses to community consultation findings
- Attachment C:** Car Park Design – Bagot Oval





**City of Darwin**  
**Bagot Park**

**Electrical and Lighting  
Summary**

**November 2018**

[www.hksolutions.com.au](http://www.hksolutions.com.au)

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Appendix A Reference Documentation

Appendix B Proposed Lighting Plan

Appendix C Luminaire Datasheets

# 1. Overview

## 1.1 Introduction

Bagot Park is managed and maintained by the City of Darwin and is located 55 McMillans Road Milner. The Park is predominantly used for soccer training and competition with its main users being Mindil Aces Football club during the Dry Season and it is also used by the public and various community groups.

The Park is a natural turf ground and comprises of 8 designated soccer fields with 6 small fields predominantly used for junior training and 2 fields used for junior and senior competition. City of Darwin propose to provide lighting to the soccer fields of play with performance levels of 50lux and 100 lux for the junior training grounds and an additional 200 lux for the 2 competition grounds. with consideration of the light spill and obtrusive lighting to the surrounding area.

This electrical and lighting summary assessment will provide a summary of the existing site electrical and lighting infrastructure, its current performance and provide HID (High-Intensity Discharge Metal Halide) and LED (Light Emitting Diode) lighting recommendations for the proposed works. In addition a comparison life cycle assessment will be undertaken of metal halide versus LED lighting systems.

The information provided below is a feasibility summary for proposed lighting upgrade works and based on an inspection by Harris Kmon Solutions Pty Ltd engineer on the 1<sup>st</sup> of June 2018. This Summary Report has been prepared by Harris Kmon Solutions Pty Ltd for City of Darwin and is not to be relied upon by anyone other than City of Darwin. It is provided for the purpose of information only and is not to be used for any other purpose. It is subject to the limitations and assumptions as set out in the report and generally as listed below:

- Assessment is based on visual inspection only and no testing of any kind was undertaken
- Inspection was undertaken of visible, safely accessible areas only

Harris Kmon Solutions Pty Ltd takes no responsibility for errors caused as a result of the limitations and assumptions.

The opinions, conclusions and any recommendations in this report are based on conditions encountered at the date of inspection. Harris Kmon Solutions Pty Ltd has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the inspection was undertaken.

## 1.2 Reference Documentation

The following is a summary of reference documentation provided by City of Darwin relating to the electrical and lighting systems for Bagot Park. See Appendix A for a copy of all reference documentation.

Document Number	Document Type	Date	Title/Description
-	Sketch Drawing	June 1993	Bagot Park electrical sketch

## 2. Existing Installation

### 2.1 Site Electrical Supply

The site electrical supply is sourced from the electrical authority, Power and Water Corporation's (PWC) ground mounted substation 2920 located on the North Eastern Section of the site. The substation supplies power to an adjacent metering panel, which forms the point of supply to the site. The metering panel provides metered three phase power to the velodrome main switchboard, which provides downstream power to the adjacent toilet block and kiosk.



Figure 1 – PWC Substation and Metering Panel

Reference documentation provided by City of Darwin indicate that the main supply from site metering panel to the Velodrome main switchboard is an aerial three phase LV 25mm<sup>2</sup> Cu insulated cable. This aerial cable has an estimated three phase supply capacity of 100A. It is likely that the supply and metering to the site will need to be reconfigured and upgraded to three phase as part of the proposed sports lighting works. It is proposed as part of the upgraded supply to site is to provide a new metered power supply to the Bagot Park Soccer lighting whilst integrating the existing metered power supply to the velodrome.

## 3. Sportslighting System

### 3.1 General

There is currently no sports lighting to any of the designated soccer fields at Bagot Park. The fields have varying sizes and dimensions. The following is a general summary based on a site survey of the park:

- Field 1 (Competition)            100m x 58m
- Field 2 (Competition)            100m x 62m
- Field 3 (Training)                60m x 40m
- Field 4 (Training)                30m x 20m

- Field 5 (Training)                      40m x 25m
- Field 6 (Training)                      40m x 25m
- Field 7 (Training)                      30m x 20m
- Field 8 (Training)                      30m x 20m

During the site inspection there were a number of obstacles identified that would provide a challenge when undertaking the sports lighting design and how they were overcome, this includes:

<b>Obstacle</b>	<b>Mitigation</b>
Large area with multiple sports fields with varying dimensions and orientation	Software calculations will require more poles (minimum 6) than single field of play design. Design to map out each field of play to assess compliance.
Significant tree to the west of the site that may cause shadowing	Refine placement of poles to avoid shadowing. Recommend minor tree trimming.
Nearby residential properties to the North and East of the site.	Undertake obtrusive lighting analysis on all adjacent residential boundaries. May require taller poles with minimum luminaire uplift to reduce obtrusive lighting.

An overview of the proposed lighting plan is shown in Appendix B.

Software lighting calculations were undertaken using AGI32 version 18.3.2 to develop the principal playing area lighting design and assessment of obtrusive lighting.

There are two main Australian Standards that apply to the lighting performance of Australian Rules playing areas and the assessment of obtrusive lighting to adjacent areas, which include:

- AS 2560.2.3-2007 Sports Lighting - Specific applications - Lighting for football (all codes)
- AS 4282-1997 Control of the obtrusive effects of outdoor lighting

Table 1 and 2 below summarise the key LTP performance criteria that apply to the software design calculations for the lighting of the PPA and the obtrusive lighting to adjacent areas.

**Table 1 – AS2560.2.3 Summary of key LTP Criteria**

<b>Level of Play</b>	<b>Maintained Average horizontal Illuminance Eav (lux)</b>	<b>Uniformity Ratio U<sub>1</sub>, Min/Avg</b>	<b>Uniformity Ratio U<sub>2</sub>, Min/Max</b>
Physical Training	>50	>0.3	N/A
Match practice	>100	>0.5	>0.3
Ball training, junior and minor grade competition	>200	>0.6	>0.4

**Table 2 – AS4282 Summary of key LTP Criteria (pre-curfew only)**

LTP	Calculation condition	Commercial boundaries	Residential boundaries* <sup>1</sup>
Illuminance in vertical plane (Ev)	Pre-Curfew* <sup>2</sup>	25 lux	10 lux
Luminous Intensity (I)	Pre-Curfew* <sup>2</sup>	7,500 cd	7,500 cd
Threshold Increment (TI)	Applies to all users of transport system	20% based on adaptation luminance of 10 cd/m <sup>2</sup>	20% based on adaptation luminance of 1 cd/m <sup>2</sup>

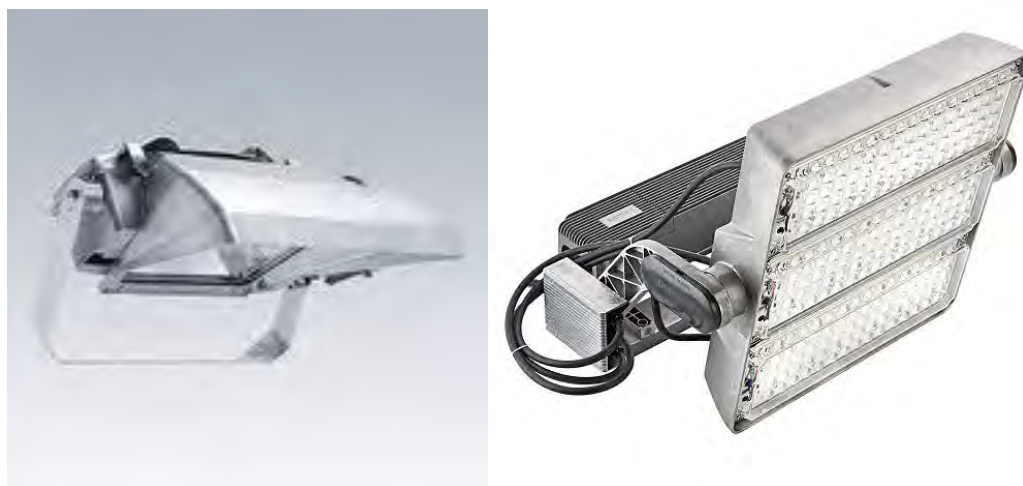
\*<sup>1</sup> Maximum values are based on residential light surrounds where street lighting is adjacent property.

\*<sup>2</sup> Pre-curfew condition is the operation of the lighting system up until a designated curfew time only (typically 10pm to 11pm).

Two lighting systems options will be assessed, which include one HID lighting solution and one LED lighting solution. The selection of each light fitting will be based on its availability, local support, suitability for the installed environment, range of lighting optical modifiers and compliance with LTP criteria. As such the following light fittings have been selected for the assessment (See Appendix C for datasheets):

**Table 3 – Light fitting selections**

Manufacturer and model	Type	Rating (W)	Luminaire luminous flux (lm)	IP Rating
Thorn Champion	HID	2kW	160,600	IP66
Philips Optivision LED gen2 BVP525	LED	1.39kW	150,000	IP66

**Figure 2 – (L) Thorn Champion (R) Philips Optivision**

### 3.2 Field of Play Lighting Results

The lighting desktop calculations were calculated for each soccer field with the following design basis:

- Principal Playing Area (PPA) surface reflectance 0.24
- HID maintenance factor of 0.8
- LED maintenance factor of 0.85

- Calculation points on a 5m x 5m grid across PPA

To achieve compliance with the AS2560.2.63 50 lux, 100 lux and 200 lux LTP's 6 x 28.5m lighting poles will be required.

A consolidated summary of the HID and LED lighting system PPA LTP is shown in the Tables 4 and 5 below and accompanying lighting calculation PPA and light spill plans are shown in Figure 3 to Figure 14.

**Table 4 – Summary of PPA 200 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Field	Eav (lux)	U1	U2	AS2560.2.3 Compliant
Thorn Champion HID	6 x 28.5m	37	1	221	0.60	0.43	Yes
			2	238	0.62	0.43	Yes
			3	227	0.58	0.42	Yes
			4	207	0.75	0.58	Yes
			5	166	0.63	0.49	Yes
			6	211	0.61	0.49	Yes
			7	106	0.50	0.36	Yes
			8	121	0.65	0.44	Yes
Philips Optivision LED	6 x 28.5m	38	1	226	0.67	0.49	Yes
			2	233	0.67	0.52	Yes
			3	216	0.63	0.49	Yes
			4	217	0.80	0.61	Yes
			5	245	0.50	0.39	Yes
			6	241	0.54	0.44	Yes
			7	103	0.61	0.46	Yes
			8	128	0.73	0.49	Yes

**Table 5 – Summary of PPA 100 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Field	Eav (lux)	U1	U2	AS2560.2.3 Compliant
Thorn Champion HID	6 x 28.5m	26	1	116	0.50	0.31	Yes
			2	121	0.54	0.36	Yes
			3	109	0.58	0.43	Yes
			4	120	0.78	0.62	Yes
			5	125	0.69	0.57	Yes
			6	115	0.71	0.59	Yes
			7	100	0.53	0.38	Yes
			8	116	0.67	0.45	Yes
Philips Optivision LED	6 x 28.5m	41 (50% dim level) 7 (100%)	1	152	0.63	0.49	Yes
			2	118	0.66	0.48	Yes
			3	108	0.63	0.49	Yes
			4	108	0.80	0.61	Yes
			5	123	0.50	0.40	Yes
			6	130	0.50	0.39	Yes
			7	100	0.63	0.47	Yes



Manufacturer and model	Total no. of Poles	Total No. of lights	Field	Eav (lux)	U1	U2	AS2560.2.3 Compliant
			8	117	0.75	0.61	Yes

**Table 6 – Summary of PPA 50 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Field	Eav (lux)	U1	U2	AS2560.2.3 Compliant
Thorn	6 x 28.5m	14	1	58	0.50	n/a	Yes
Champion			2	60	0.61	n/a	Yes
HID			3	61	0.59	n/a	Yes
			4	73	0.78	n/a	Yes
			5	65	0.65	n/a	Yes
			6	57	0.76	n/a	Yes
			7	57	0.70	n/a	Yes
			8	74	0.64	n/a	Yes
Philips	6 x 28.5m	43 (25% dim level) 5 (100%)	1	77	0.61	n/a	Yes
Optivision			2	58	0.66	n/a	Yes
LED			3	54	0.63	n/a	Yes
			4	54	0.80	n/a	Yes
			5	61	0.50	n/a	Yes
			6	65	0.50	n/a	Yes
			7	56	0.66	n/a	Yes
			8	61	0.72	n/a	Yes

Figure 3 – Thorn Champion HID – 200 Lux PPA

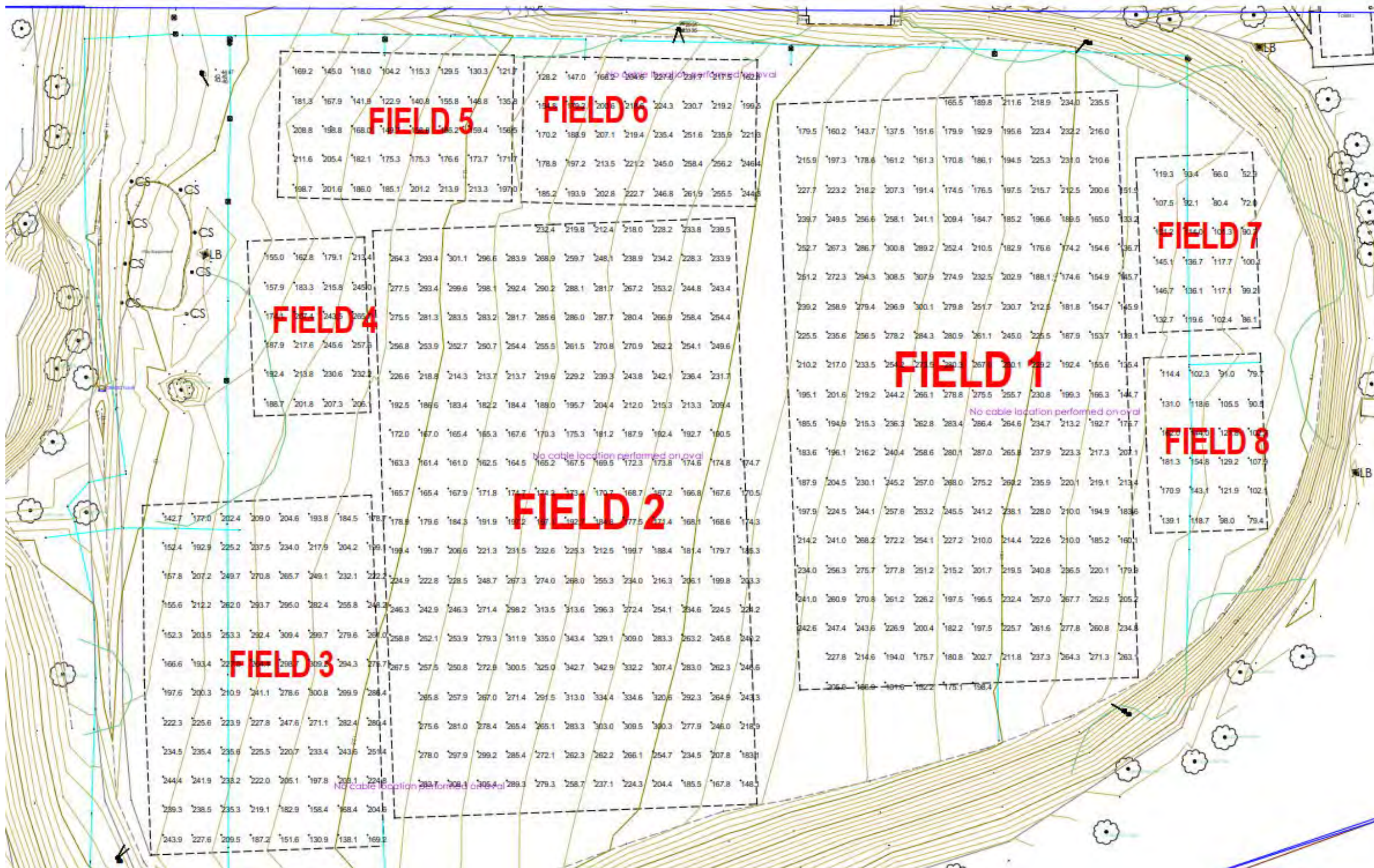


Figure 4 – Thorn Champion HID – 200 Lux Light Spill

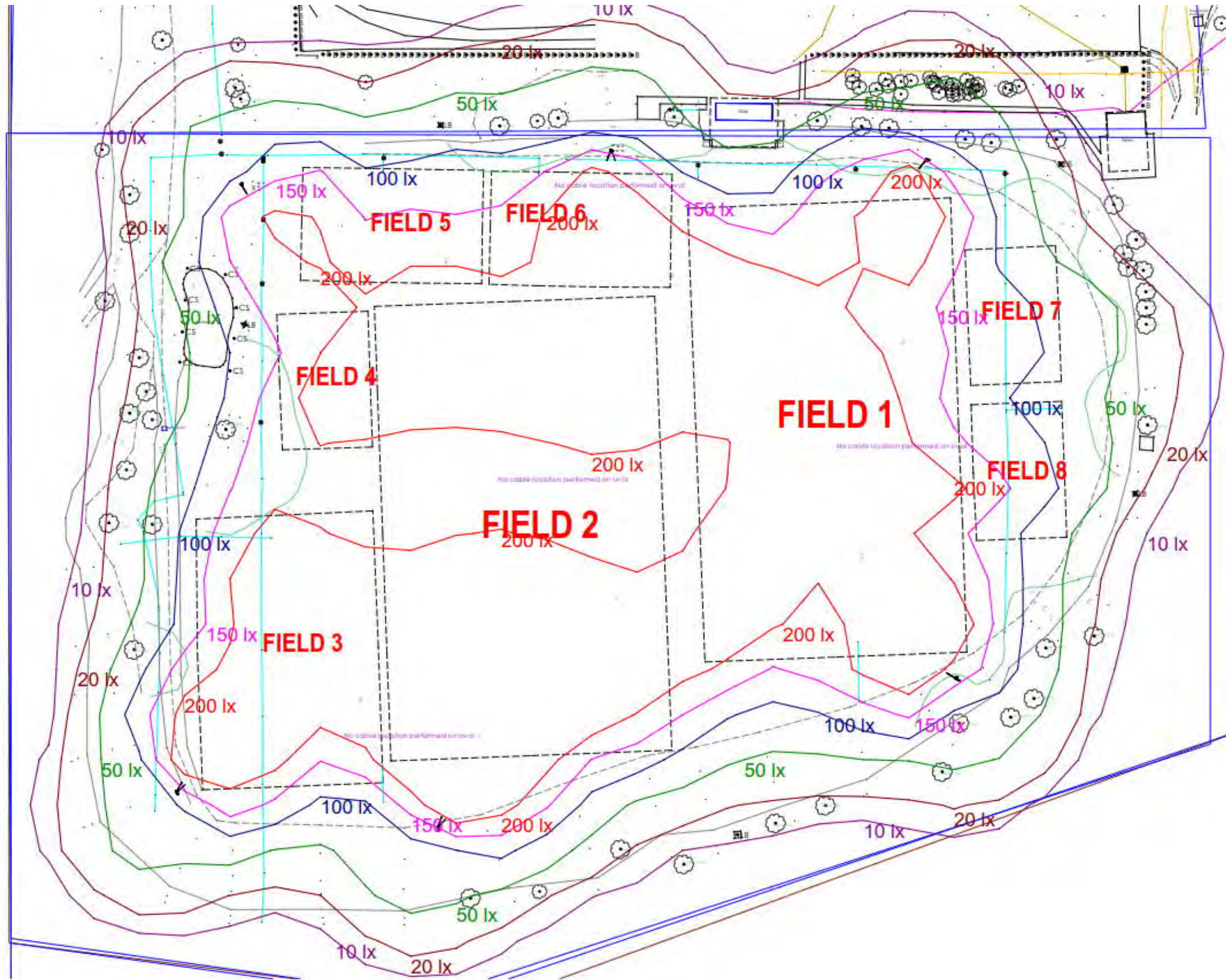


Figure 5 – Thorn Champion HID – 100 Lux PPA

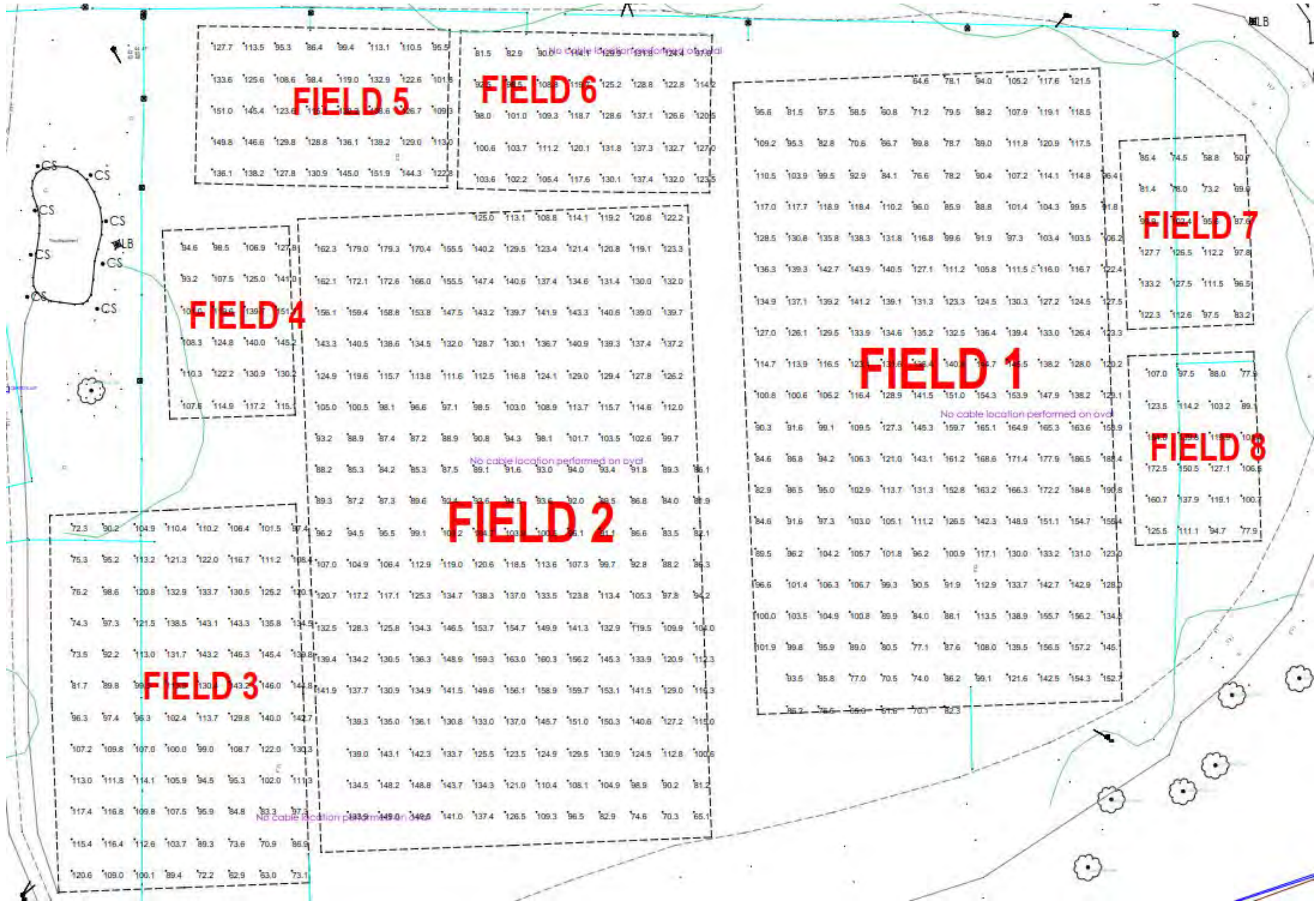


Figure 6 – Thorn Champion HID – 100 Lux Light Spill

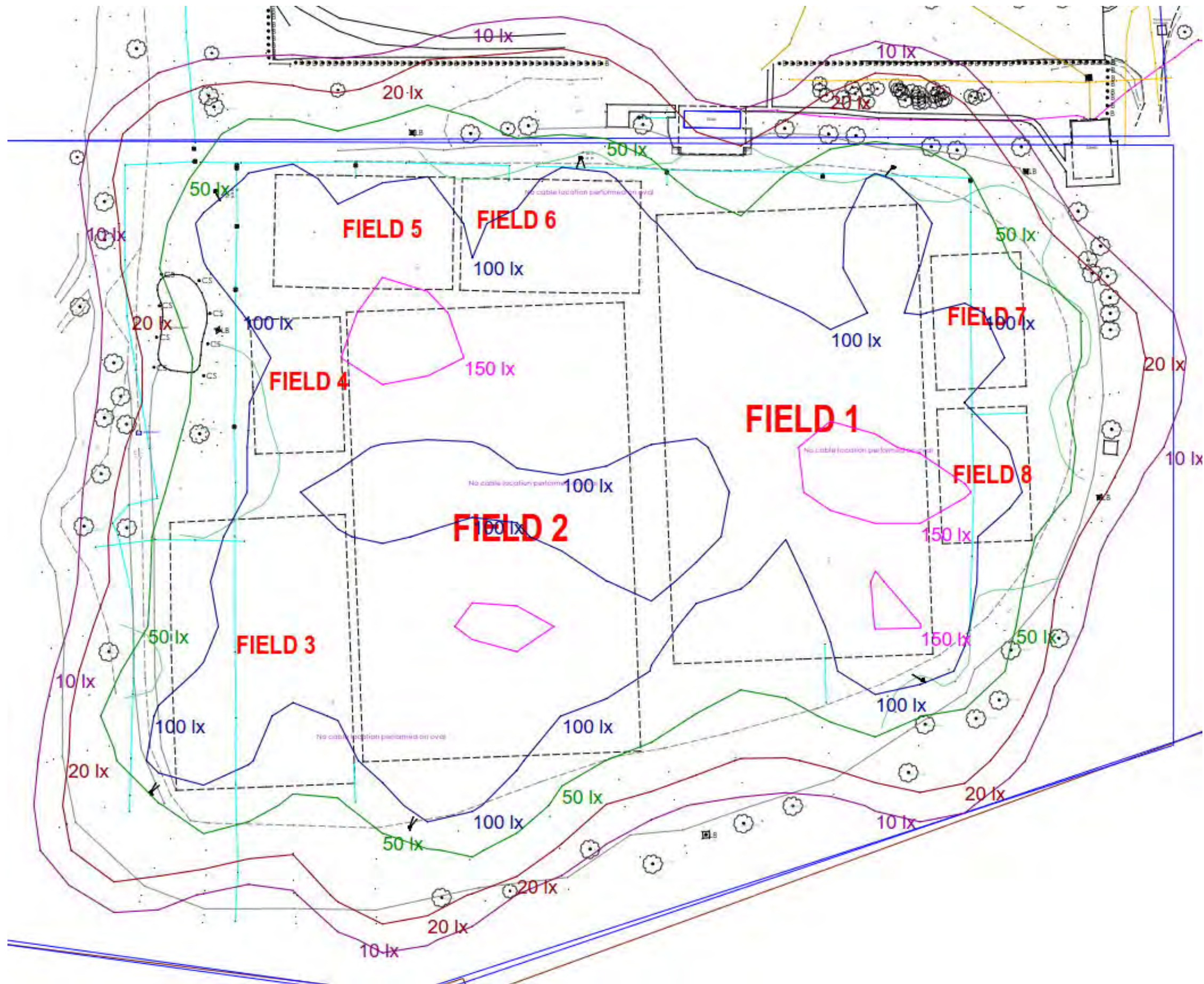


Figure 7 – Thorn Champion HID – 50 Lux PPA

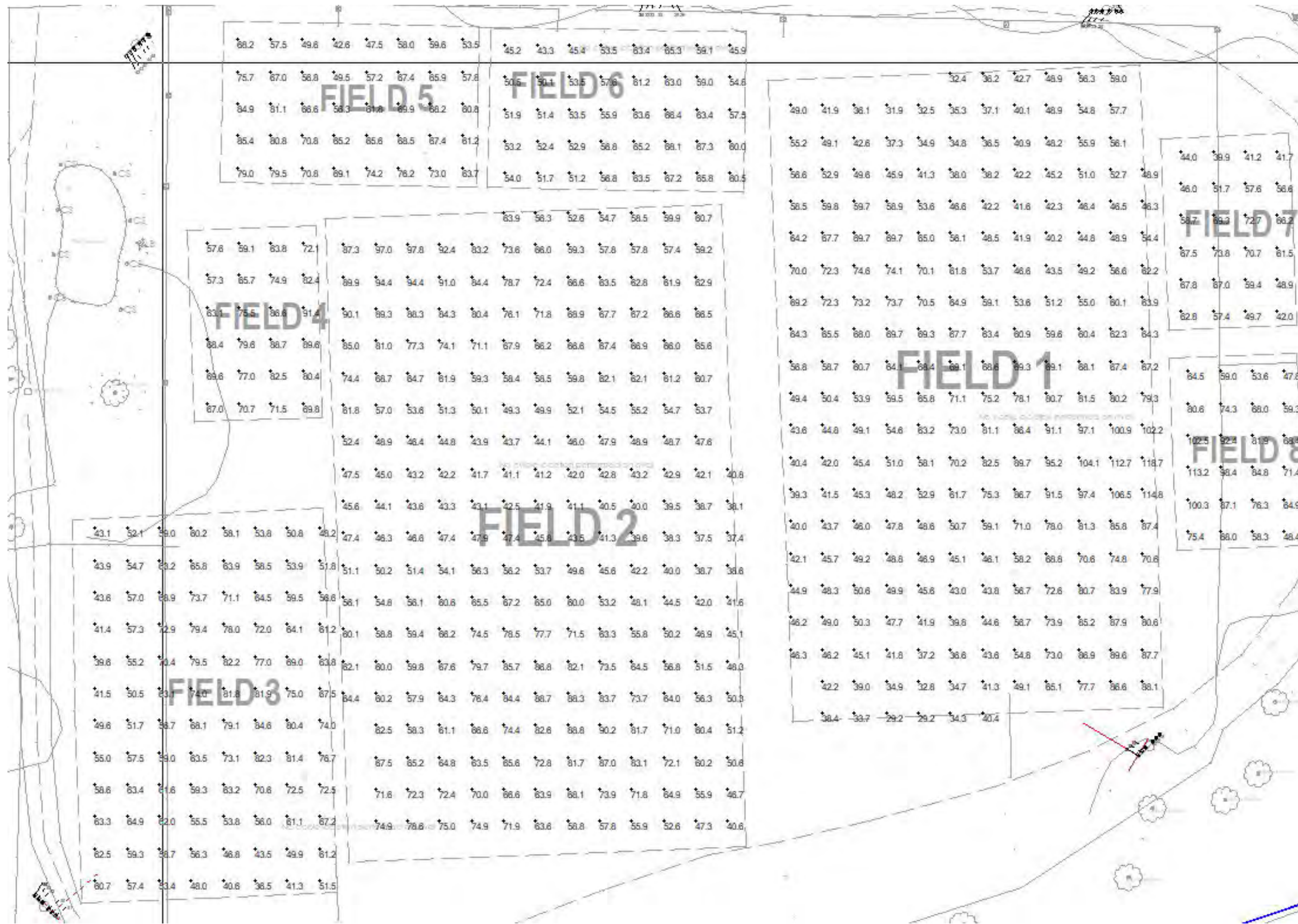


Figure 8 – Thorn Champion HID – 50 Lux Light Spill

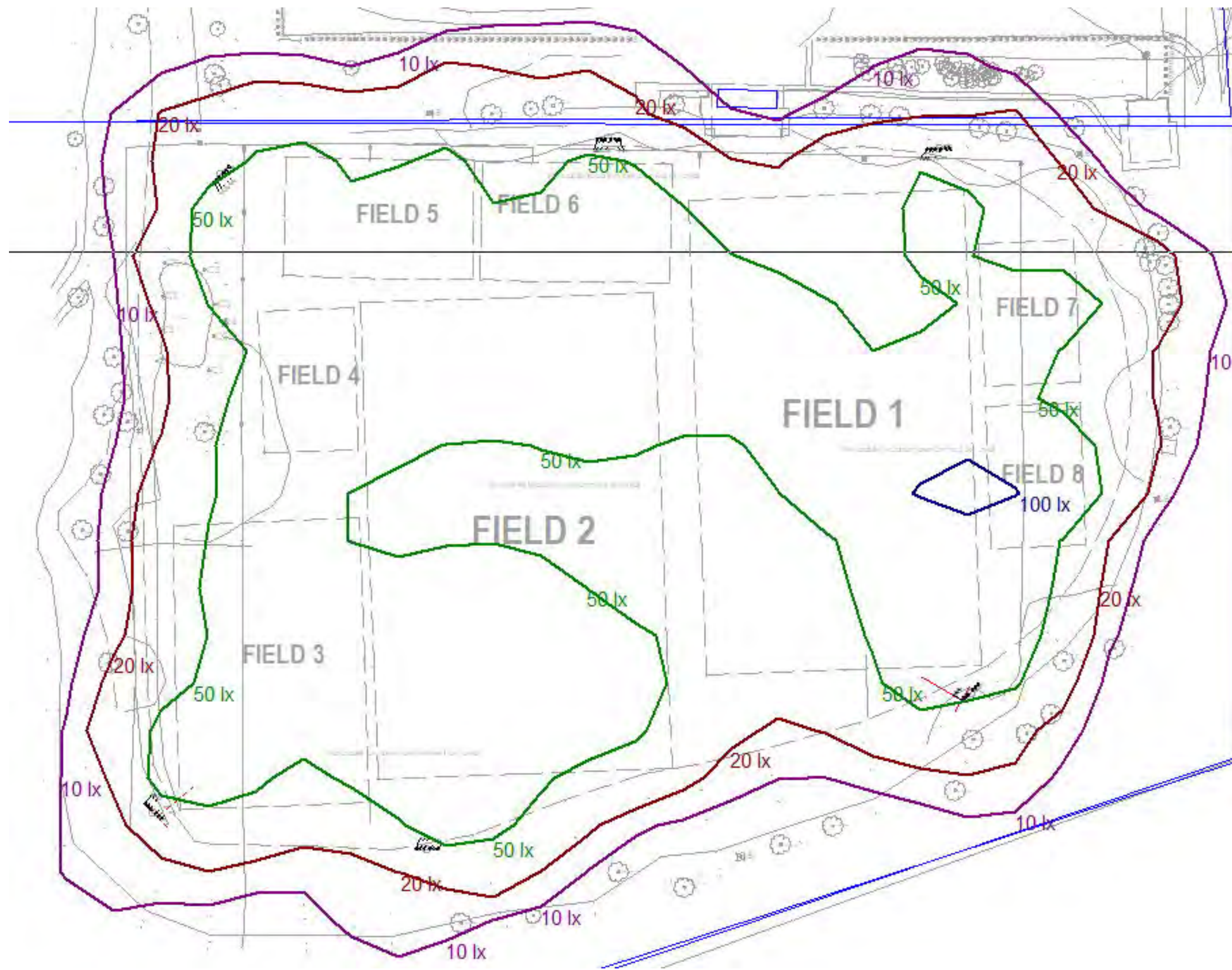


Figure 9 – Philips Optivision LED – 200 Lux PPA

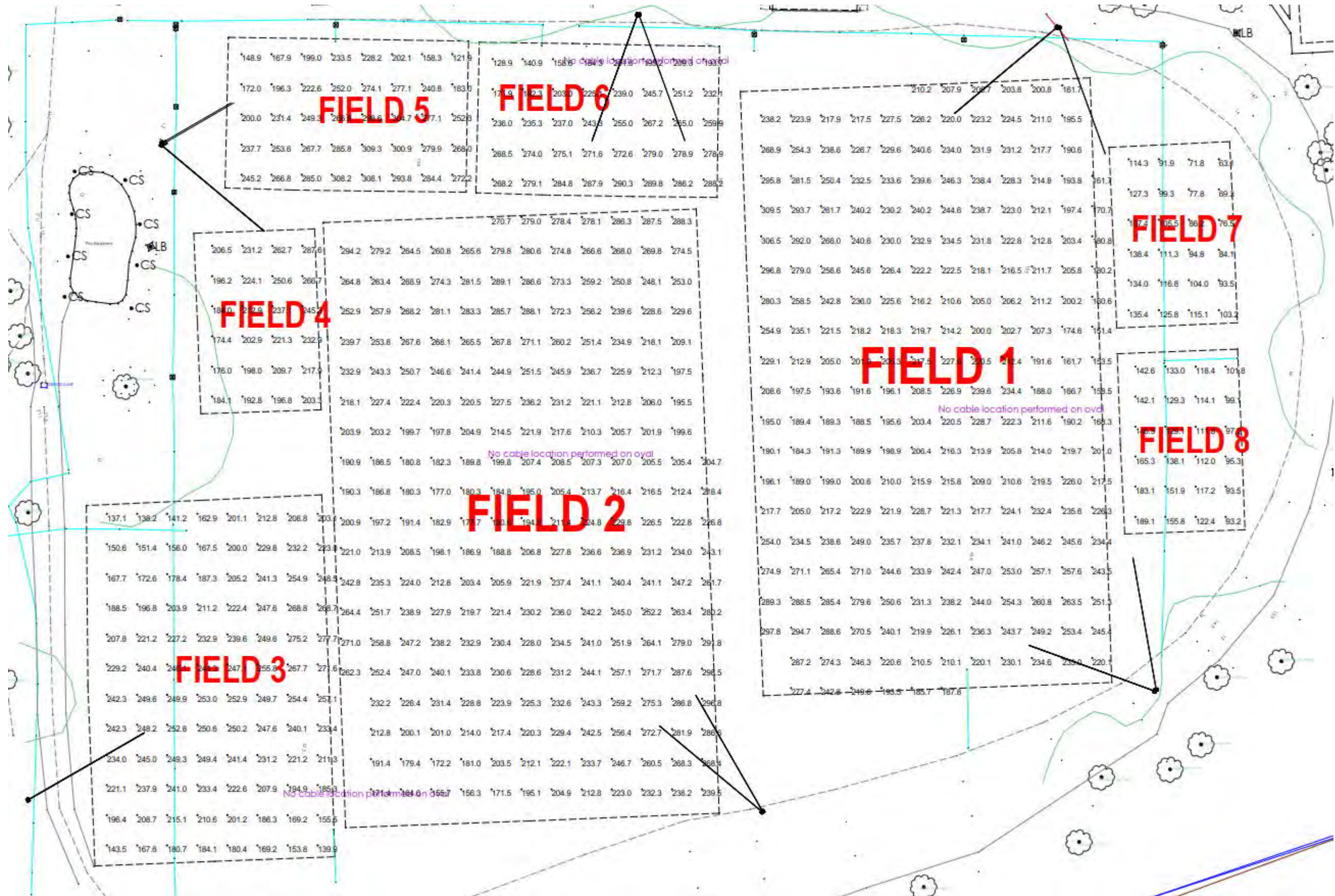




Figure 10 – Philips Optivision LED – 200 Lux Light Spill

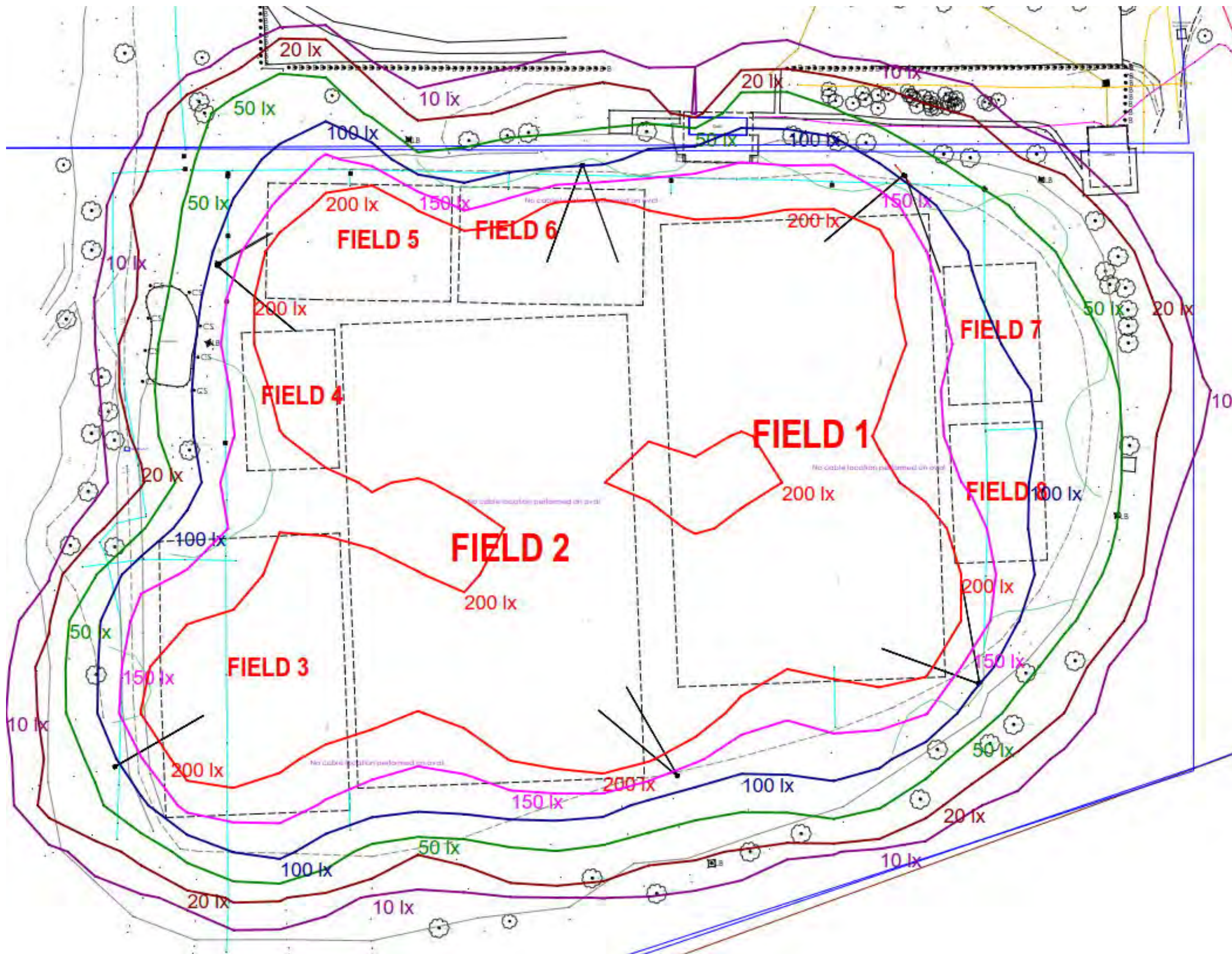


Figure 11 – Philips Optivision LED – 100 Lux PPA

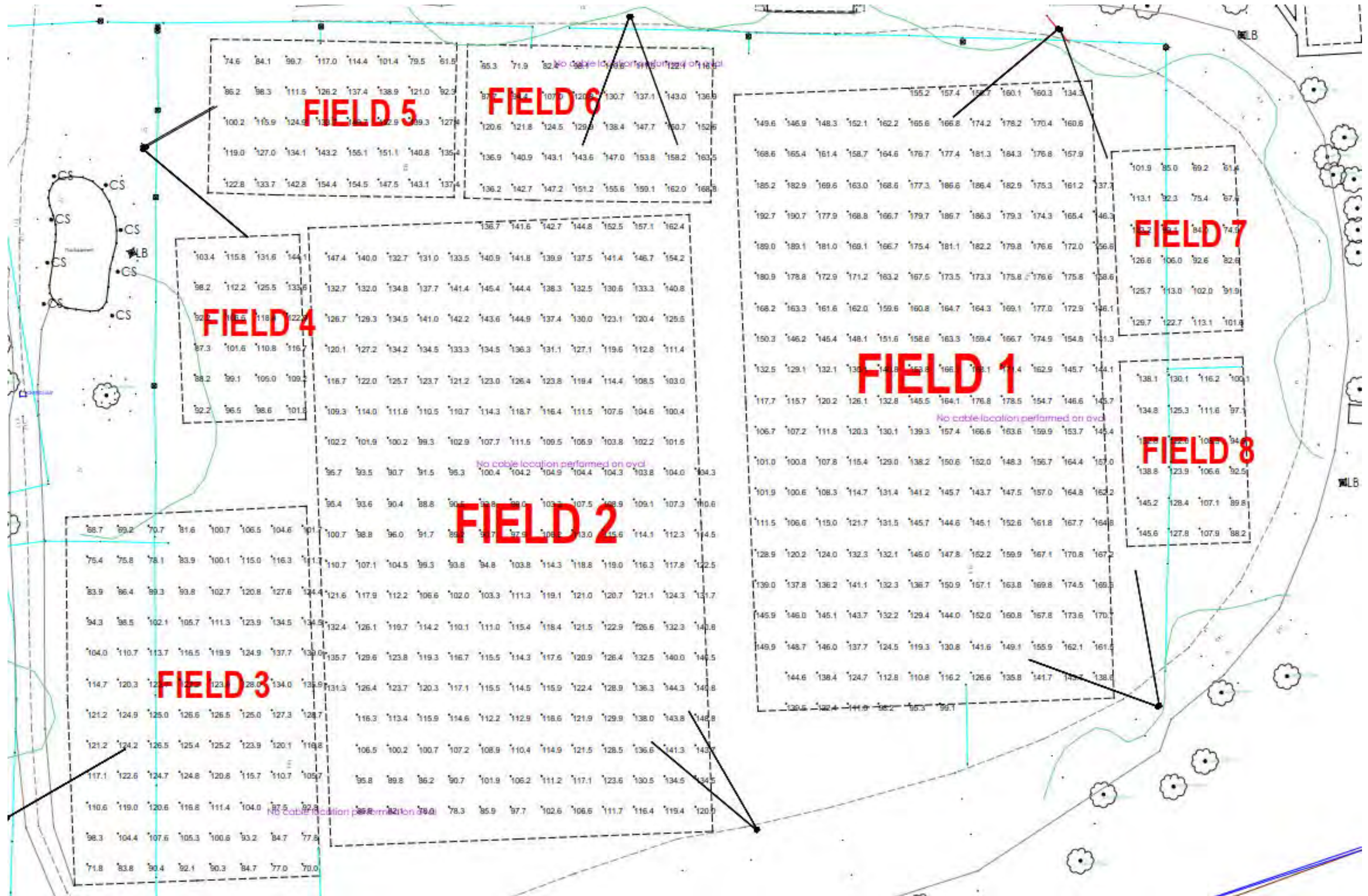


Figure 12 – Philips Optivision LED – 100 Lux Light Spill

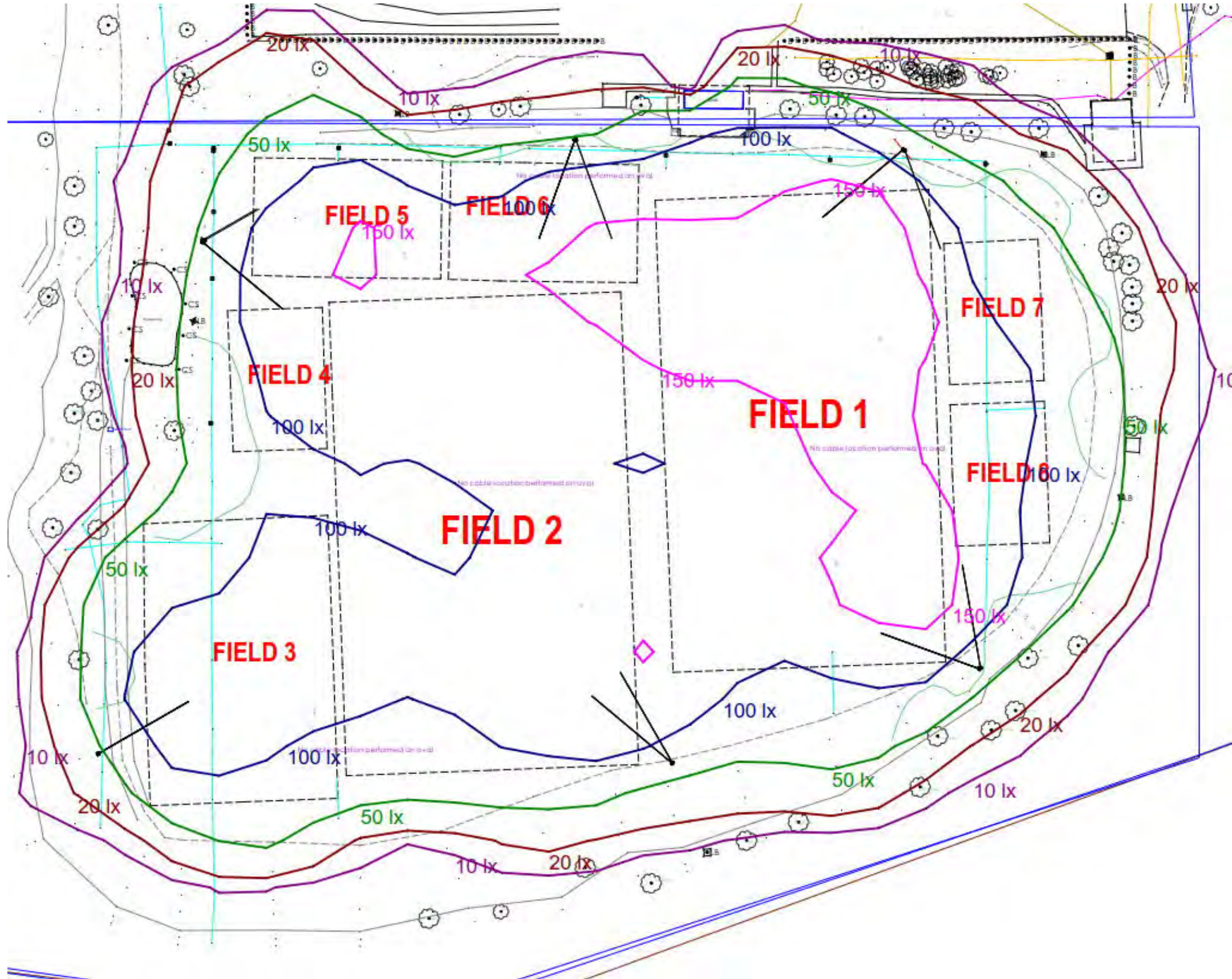


Figure 13 – Philips Optivision LED – 50 Lux PPA

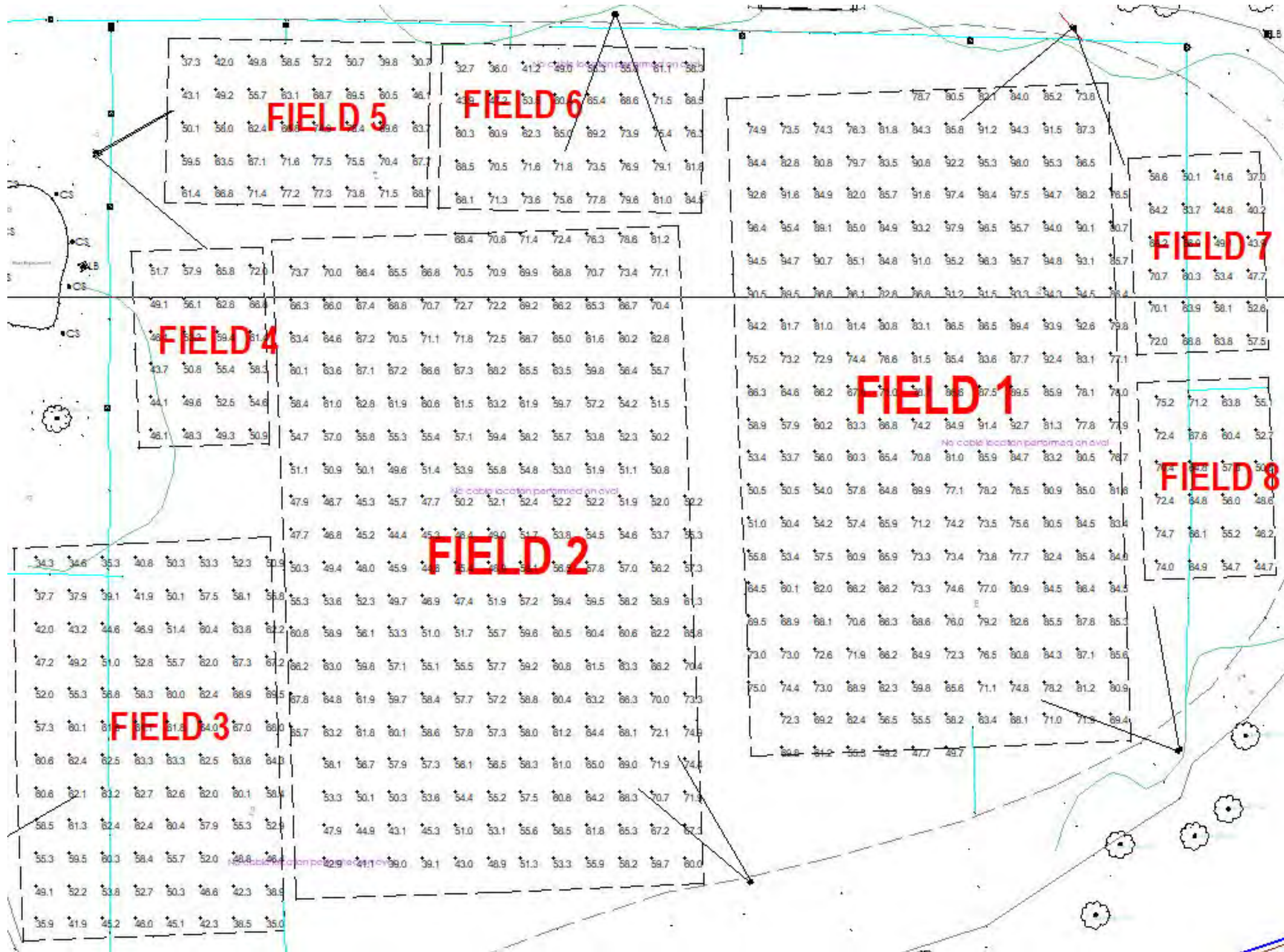
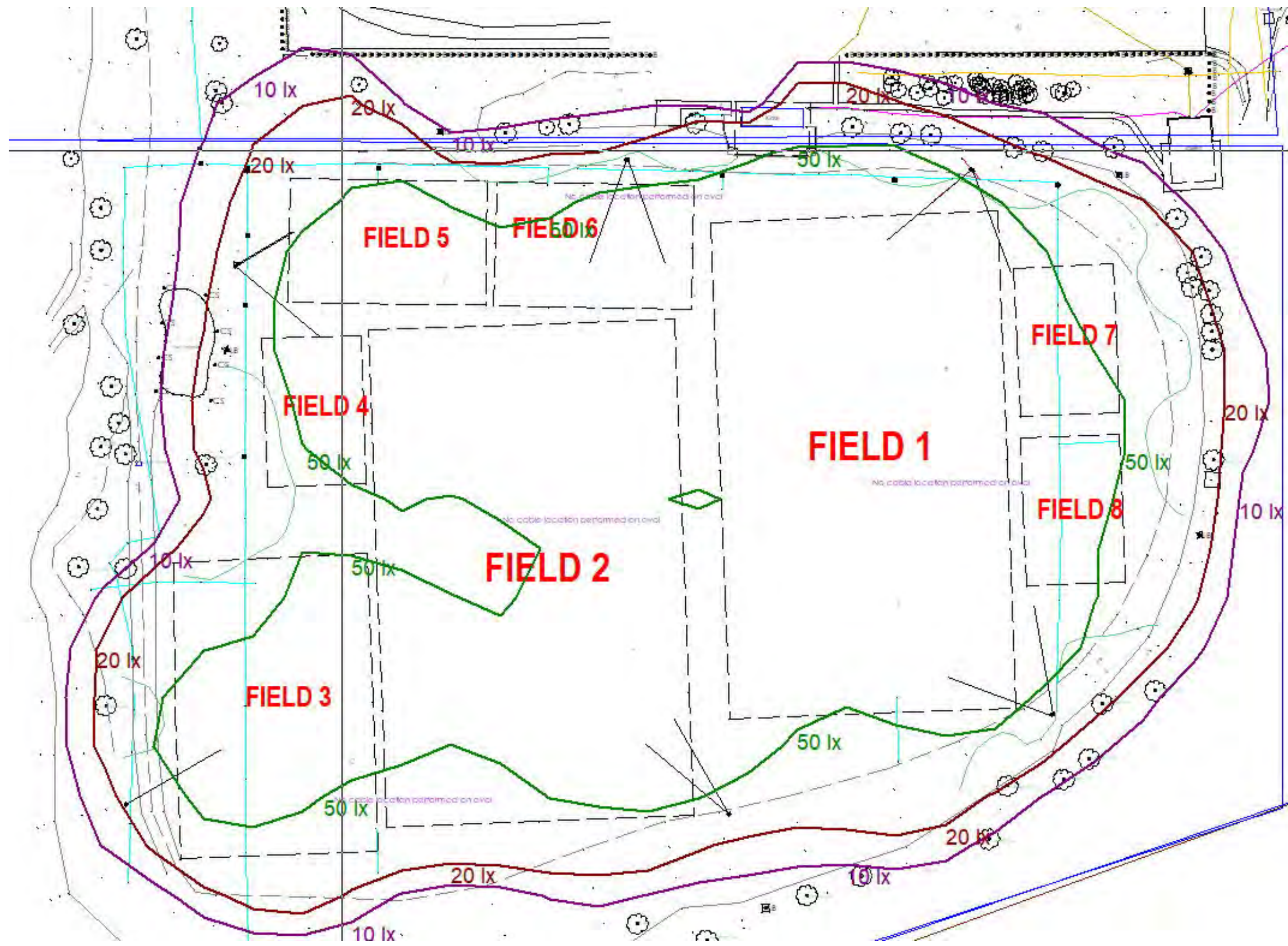


Figure 14 – Philips Optivision LED – 50 Lux Light Spill



### 3.2.1 Obtrusive Lighting Results

AS4282 provides the LTP required to calculate the obtrusive light onto adjacent properties and transport users. As detailed in Table 2 the key LTP's that are required to be calculated at adjacent properties are the illuminance in the vertical plane (Ev) and the luminous intensity (I). The key LTP required for adjacent transport users is threshold increment (TI).

The obtrusive lighting desktop calculations were calculated using the following design basis:

- Adjacent residential property boundaries assessed include Old McMillans Road and Bagot Road.
- Shade and vegetation excluded from the assessment (worst case scenario)
- Luminous intensity and vertical illuminance calculation points measured at property boundary on a 5m (wide) x 4m (high) grid located 1m above ground level.
- Luminous intensity and vertical illuminance points measured to comply with AS4282 residential light surrounds requirements.
- Luminous intensity per luminaire calculated for 7,500 Cd – Large area, Level 1 (83 degrees controlling angle).
- Obtrusive lighting calculations undertaken on PPA 200 lux lighting levels only.
- Threshold increment observer height 1.5m AGL along the path of travel with a windshield control angle of 90 degrees above horizontal and adaptation luminance of 10 Cd/SqM.

A consolidated summary of the HID and LED lighting system obtrusive lighting LTP's are detailed in the Tables 7 and 8.

Figures 15 to 22 accompany the results in Table 7 & 8 and provide representative display outputs from the software calculation detailing boundaries of compliance and non-compliance in accordance with AS4282. Note: No display summary has been developed for Threshold Increment as all adjacent roadways (Refer Table 8) returned compliant values well below the maximum of 10% for Threshold Increment.

**Table 7 – Summary of Obtrusive lighting Luminous Intensity and Vertical Illuminance results**

Manufacturer and model	Property Boundary Assessed	Vertical Illuminance (max)	Luminous Intensity (max)	Applicable Figures	AS4282 Compliant
Thorn Champion HID	Old McMillans Rd Bagot Road	1.4 lux 1.7 lux	5141 Cd 5138 Cd	12 & 13 14 & 15	Yes Yes
Philips Optivision LED	Old McMillans Rd Bagot Road	3.2 lux 3.1 lux	9394 Cd 9253 Cd	16 & 17 18 & 19	Yes – Vertical Illuminance No – Luminous Intensity Yes – Vertical Illuminance No – Luminous Intensity

**Table 8 – Summary of Obtrusive lighting Threshold Increment results**

<b>Manufacturer and model</b>	<b>Adjacent Roadways Assessed</b>	<b>Threshold Increment (Max)</b>	<b>AS4282 Compliant</b>
Thorn	Old McMillans Rd	1%	Yes
Champion	Bagot Road	1%	Yes
HID	McMillans Road	2%	Yes
Philips	Old McMillans Rd	0%	Yes
Optivision	Bagot Road	1%	Yes
LED	McMillans Road	0%	Yes

The following legend provides a colour summary regarding the degrees of compliance with obtrusive lighting in Figures 15 to 22:






<b>Luminous Intensity (I)</b>	 Green (Compliant)	0 – 5000 Cd
	 Orange (Compliant)	5000 – 7500 Cd
	 Red (Not Compliant)	> 7500 Cd
<b>Vertical Illuminance (Ev)</b>	 Green (Compliant)	0 – 10 lux
	 Red (Not Compliant)	> 10 lux

Figure 15 – Thorn Champion HID – Luminous Intensity Compliance– Old McMillans Rd (East left of page)

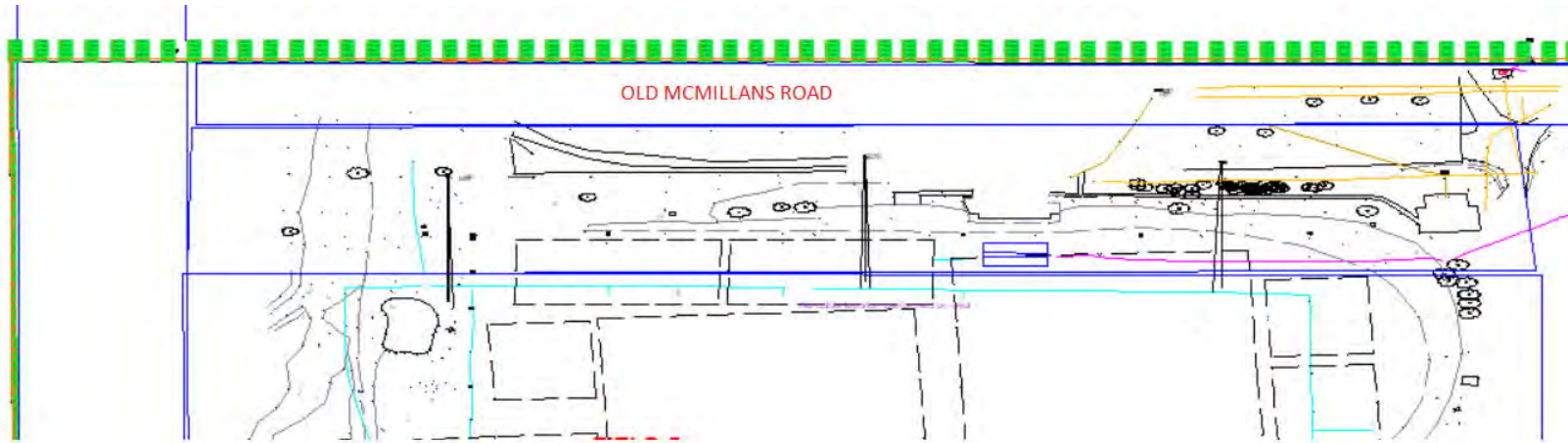
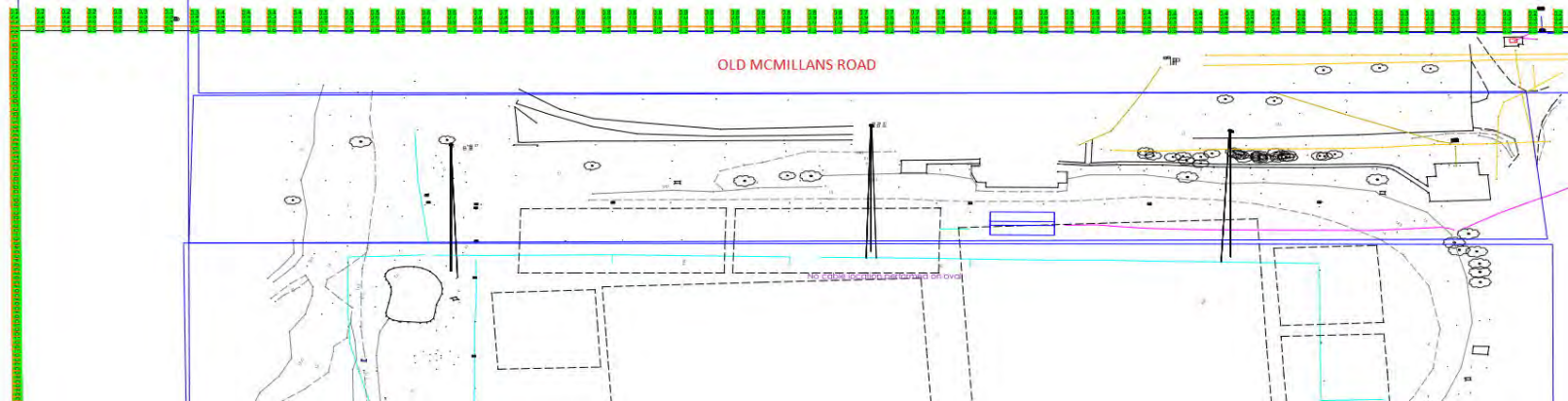


Figure 16 – Thorn Champion HID – Vertical Illuminance Compliance – Old McMillans Rd (East left of page)



Luminous Intensity (I)	Green (Compliant)	0 – 5000 Cd
	Orange (Compliant)	5000 – 7500 Cd
	Red (Not Compliant)	> 7500 Cd
Vertical Illuminance (Ev)	Green (Compliant)	0 – 10 lux
	Red (Not Compliant)	> 10 lux



Figure 17 – Thorn Champion HID – Luminous Intensity Compliance – Bagot Road (South left of page)

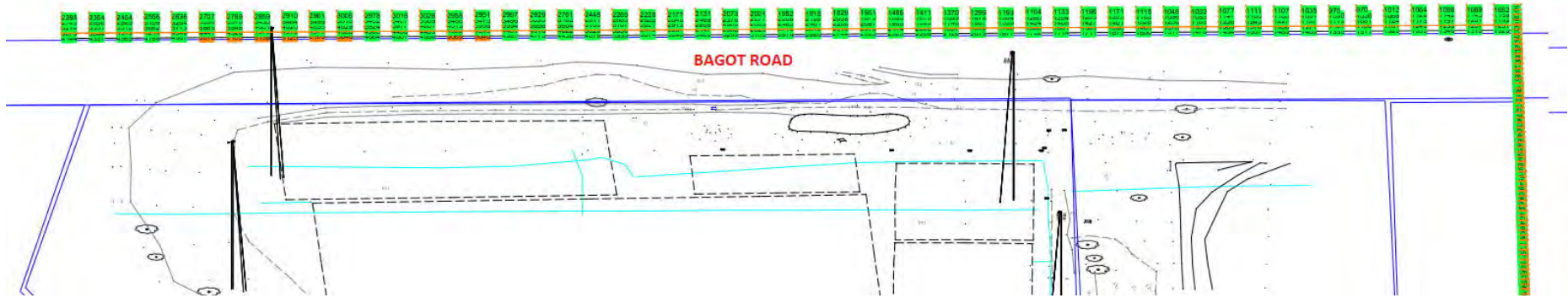
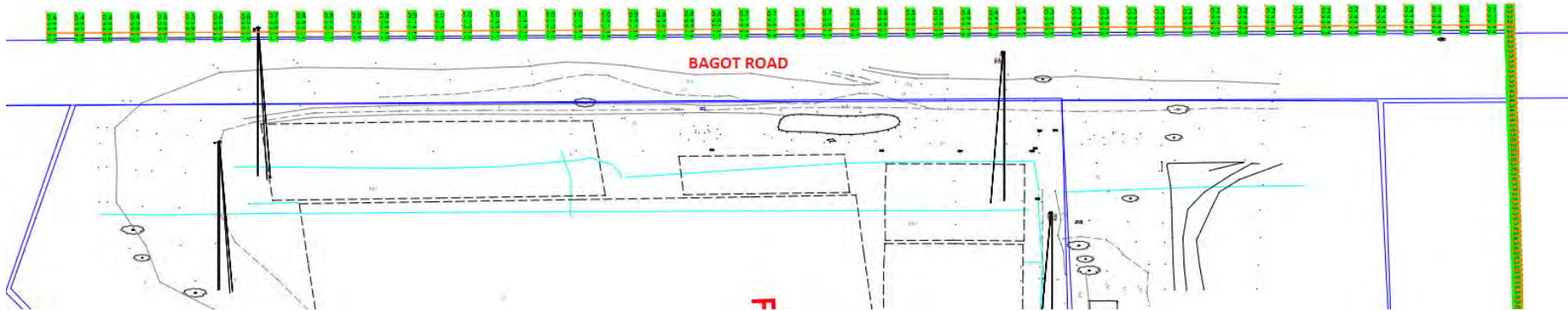


Figure 18 – Thorn Champion HID – Vertical Illuminance Compliance – Bagot Road (South left of page)



Luminous Intensity (I)	<span style="color: green;">■</span> Green (Compliant)	0 – 5000 Cd
	<span style="color: orange;">■</span> Orange (Compliant)	5000 – 7500 Cd
	<span style="color: red;">■</span> Red (Not Compliant)	> 7500 Cd
Vertical Illuminance (Ev)	<span style="color: green;">■</span> Green (Compliant)	0 – 10 lux
	<span style="color: red;">■</span> Red (Not Compliant)	> 10 lux

Figure 19 – Philips Optivision LED – Luminous Intensity Non Compliance– Old McMillans Rd (East left of page)

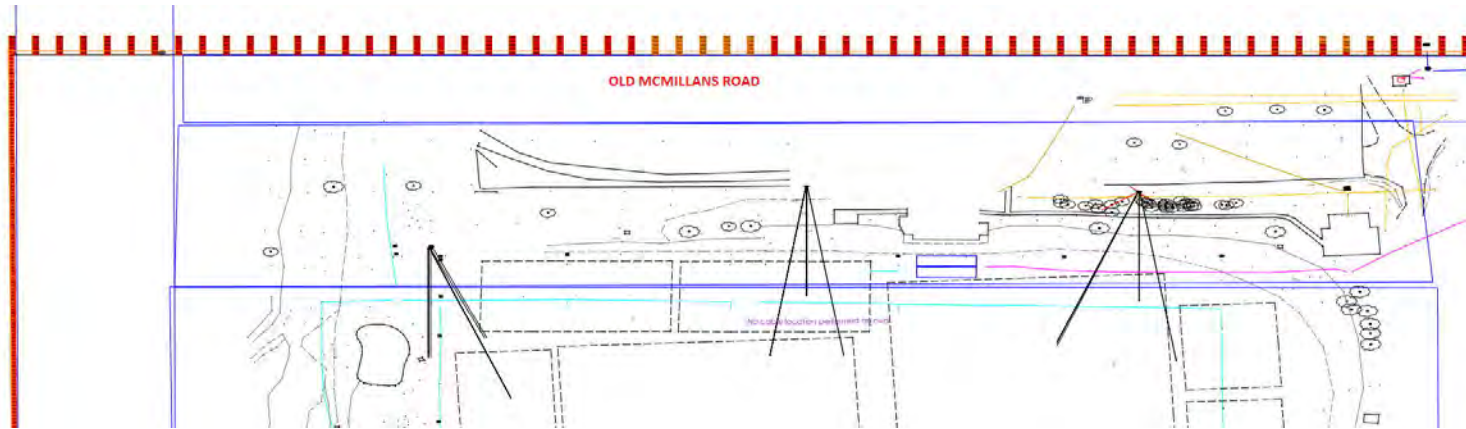
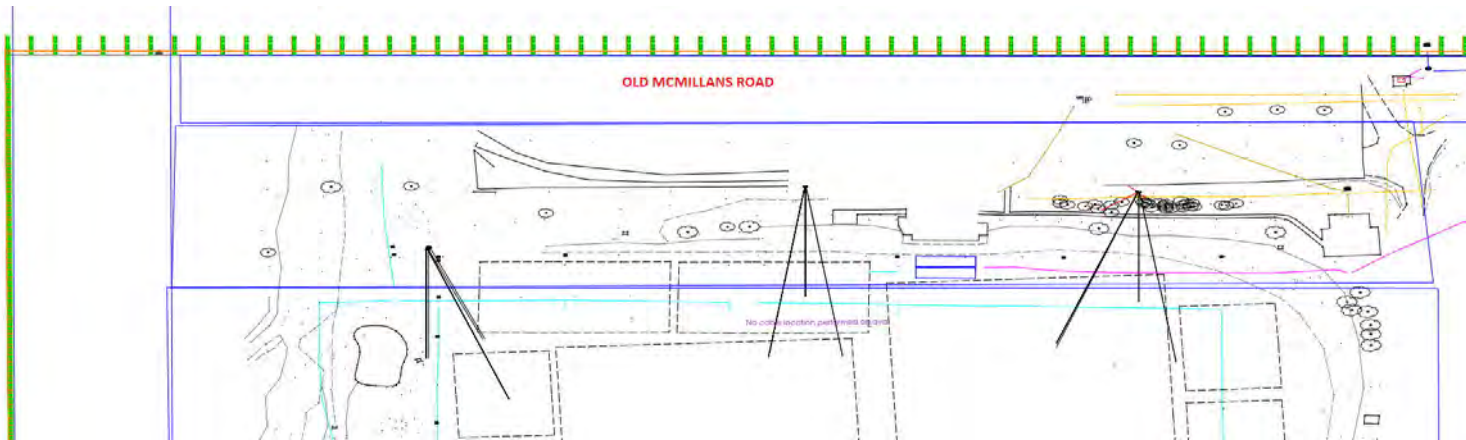


Figure 20 – Philips Optivision LED – Vertical Illuminance Compliance – Old McMillans Rd (East left of page)



Luminous Intensity (I)	Green (Compliant)	0 – 5000 Cd
	Orange (Compliant)	5000 – 7500 Cd
	Red (Not Compliant)	> 7500 Cd
Vertical Illuminance (Ev)	Green (Compliant)	0 – 10 lux
	Red (Not Compliant)	> 10 lux

Figure 21 – Philips Optivision LED – Luminous Intensity Non Compliance – Bagot Road (South left of page)

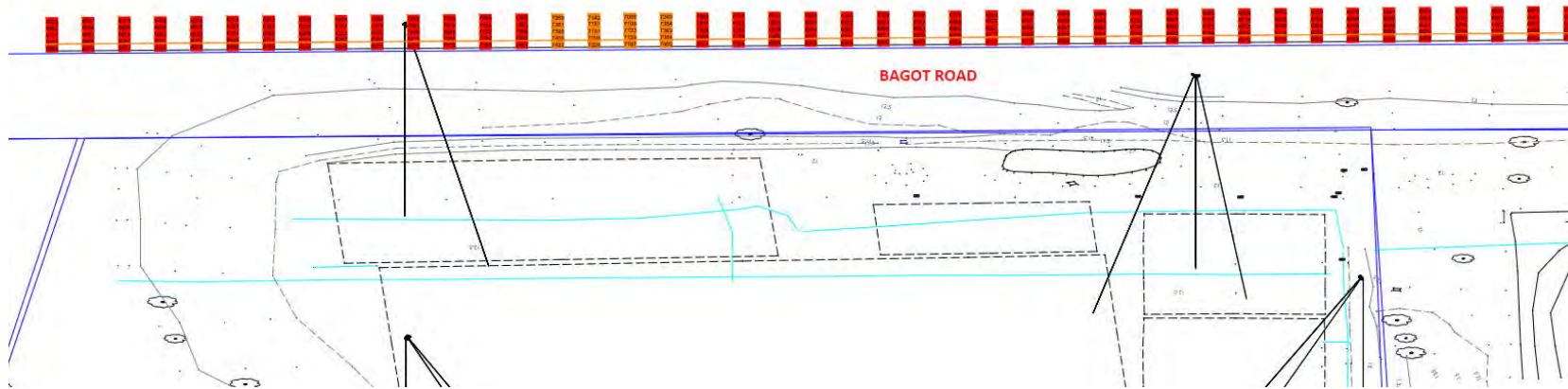
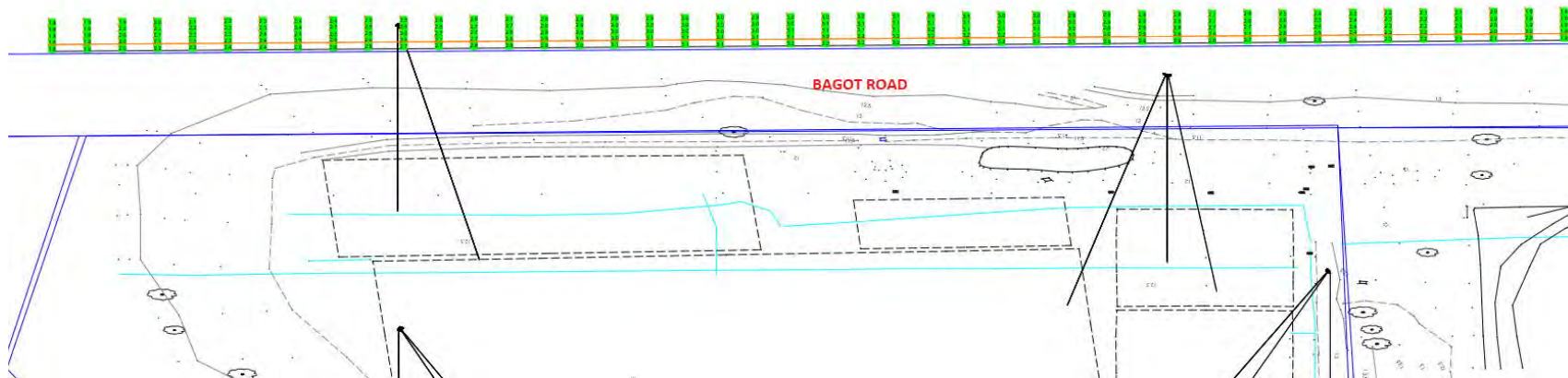


Figure 22 – Philips Optivision LED – Vertical Illuminance Compliance – Bagot Road (South left of page)



Luminous Intensity (I)	Green (Compliant)	0 – 5000 Cd
	Orange (Compliant)	5000 – 7500 Cd
	Red (Not Compliant)	> 7500 Cd
Vertical Illuminance (Ev)	Green (Compliant)	0 – 10 lux
	Red (Not Compliant)	> 10 lux

### 3.2.2 Summary of Lighting Results

Both HID and LED lighting systems provided 200 lux, 100 lux and 50 lux compliant field of play lighting levels. The HID achieved the 200 lux field of play illuminance with a total of 47 luminaires, whereas the LED achieved the same feat with a total of 48 luminaires.

However when considering the lighting systems obtrusive lighting affects onto adjacent residential areas the HID lighting system was generally compliant when assessed at adjacent property boundaries and roadways. In contrast the LED lighting system could not achieve compliance with luminous intensity. Note the obtrusive lighting assessment did not consider surrounding trees and structures (eg. power poles) in its analysis and is considered worst case scenario.

This is due to the inherent design of LED sports luminaires the LED's are a direct type of light and the light emitting source is typically mounted on the face of the fitting which can produce a higher luminous intensity for an observer at the property boundary. Whereas asymmetric HID luminaires often are constructed with more concealed light emitting source contained within the luminaire fitting (improved glare control).

Therefore to achieve a field of play lighting configuration with compliance with the obtrusive lighting requirements it is recommended that the HID system be adopted.

## 4. Electrical Supply Upgrade

Due to the increased electrical demand for the proposed HID lighting system a new and upgraded incoming power supply and metering panel will be required. As mentioned in Section 1, the site single point of supply will be configured to have two metered load centres:

1. Velodrome
2. Bagot Park Soccer Fields

A summary of the site electrical demand assessment is as per below:

**Table 9 – Summary of Site Electrical Maximum Demand**

Item	3Ph Maximum Demand	Description
Velodrome Lighting	60kVA (83A)	Provided by velodrome electrical review report provided by City of Darwin.
Velodrome additional 20% allowance	12kVA (17A)	City of Darwin requirement
New HID field lighting	117kVA (163A)	New Oval HID Sports Lighting
10% field lighting provision for ancillaries and amenities	11.7kVA (16.3A)	Provision for system ancillaries and amenities
<b>TOTAL</b>	<b>200.7kVA (3ph 279.3A balanced)</b>	

The electrical utility PWC assessed the impact of an additional 200 kVA site peak demand on its network and advised that PWC's ground mounted substation (2920) will require upgrade and replacement to a new 750kVA ground mounted substation.

## 5. User Pay System

A user pay system has been implemented as part of the sports lighting design to provide City of Darwin a way to financially manage the facilities various user groups usage of the sports lighting system.

A number of user pay systems were evaluated based on the following requirements:

- To operate remotely in an autonomous manner
- Comprise of a control system to switch the field lighting illuminance levels to 50 Lux (training level 1), 100 lux (training level 2) and 200 lux (matches);
- Can be settable to restrict operation during Council approved hours;
- Comprise of a user pay facility (pre or post pay).
- Have a relatively simple and intuitive management interface and be able for City of Darwin to remotely configure usage rates and user groups.
- Consider vandal resistant components or configuration
- Cost effective and minimal operational costs

The User Pay System selected for the project is the illuminator by Halytech. Halytech Illuminator is an Australian control and monitoring system designed specifically for the control and financial management of lighting sports fields, parks and other public places. The illuminator simply comprises of the main controller (Figure 23) with integrated mobile SIM card and an optional battery back, which has been provided as part of this project to allow continuous operation during mains power “brown outs” or short term outages.



**Figure 23 – Halytech Illuminator**

The advantage of the illuminator is its operational simplicity. On initial configuration the illuminator controller can be set to operate the sports lighting system in the three scenes (50/100/200 lux) required and register user groups and SMS PIN Codes. In operation the illuminator communicates with remote administrators and registered users via the integrated mobile sim facility.

Registered users will be provided with unique SMS PIN codes which allow the remote activation, de-activation and required lighting level of the sports lighting by sending its issued PIN codes by mobile SMS to the illuminator. User groups will require a mobile phone in order to remotely operate the sports lighting system.

An additional benefit to this type of user control is that there is no exposed equipment that can be exposed to vandalism. The illuminator controller is typically installed within the locked main switchboard on site. The switchboard is only accessible by City of Darwin maintenance personnel. As there is no other equipment such as a user interface (ie. swipe card or card reader), this removes the risk of vandalism to the user pay system.

Finally the illuminator also has an in-built webserver allowing administrators (ie. Council representative) to remotely access and configure the illuminator through a simple web interface. This can be done remotely on a PC or mobile device via the web interface allowing configuration of settings such as:

- Managing registered users and their PIN codes
- Setting of curfew hours (restrict operational times)
- Manually operate lights
- Retrieve stored data
- Setting operational usage rates

The Illuminator records every command, identifying the user that issued it, the level of lighting level and the time of use. The recorded data is used to fault find, prepare billing information and usage reports accurate to one second. Reports are provided in a excel type format and can be automatically e-mailed to administrations on a continuous basis (ie. once a day) allowing management of post payment and billing of its registered users.

## 6. Ongoing Cost Summary

The following is a summary of the expected on-going costs summary for the HID system over 25 years.

### **Assumptions:**

The on-going costs are based on the following assumptions:

1. City of Darwin anticipate the following lighting operating times for Bagot Park

DAY	TIME	LUX LEVEL
Monday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Tuesday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Wednesday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Thursday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Friday	6:00pm – 9:00pm (3 hrs)	200 lux (Junior Soccer Matches)
Saturday	N/A	-
Sunday	5:45pm – 7:00 pm (1.25 hrs)	200 lux (Soccer Matches)

2. It is assumed that the park lighting will operate in the above conditions for 8 months of the year. In addition the 50 lux and 100 lux training usage levels will be assessed as a 50/50 percent distribution. Therefore the yearly lighting operating times for the facility can approximate to:
  - 50 lux lighting                      192 hours/year
  - 100 lux lighting                      192 hours/year
  - 200 lux lighting                      136 hours/year
3. An electricity time of use meter commercial tariff rate of \$0.2175 per kWh will be used for analysis. This is reflective of Power and Water Corporations current power tariff rate. There has been no allowance for inflation and fixed daily charges.

### **On-going Cost Summary:**

Table 10 below is a minimum 25 year life cycle operating cost to include general maintenance, replacement of parts and re-lamping as required. Note no inflationary costs have been applied.

**Table 10 – 25 Year Life Cycle on-going cost**

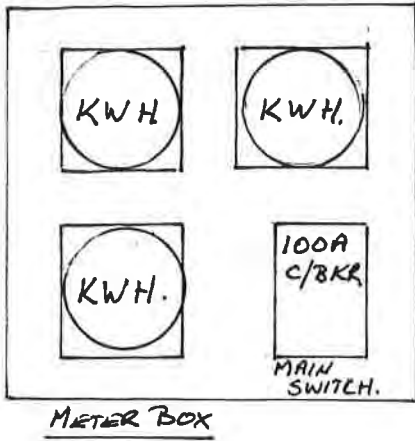
Description	Unit	HID
Number of luminaires (50 lux)	Qty	14
Number of luminaires (100 lux)	Qty	26
Number of luminaires (200 lux)	Qty	47
Power Demand per luminaire	kW	2.075
Energy Rate (inflated rate)	\$/kWh	0.2175
Usage cost per hour	\$/hr	\$6.32/hr (50 lux) \$11.74/hr (100 lux) \$21.22/hr (200 lux)



Description	Unit	HID
Total usage hours over 25 years	hrs	4,800 (50 lux) 4,800 (100 lux) 3,400 (200 lux)
Energy Consumption Cost over 25 years (excludes supply availability charge)	\$	\$30,328.20 (50 lux) \$56,323.80 (100 lux) \$72,119.74 (200 lux)
		<b>Total \$158,771.74</b>
Spot re-lamping and maintenance over 25 years. Assume one service every 3 year interval (8 total) at \$5000 each	\$	<b>\$40,000.00</b>
Group Re-lamping every 6,000 hours	Qty	3
Re-lamping and labour cost per luminaire	\$	\$500.00
Number of luminaires	Qty	47
Cost for relamping over 25 years	\$	<b>\$70,500.00</b>
<b>Total 25 year life cycle operating cost</b>		<b>\$269,271.74</b>

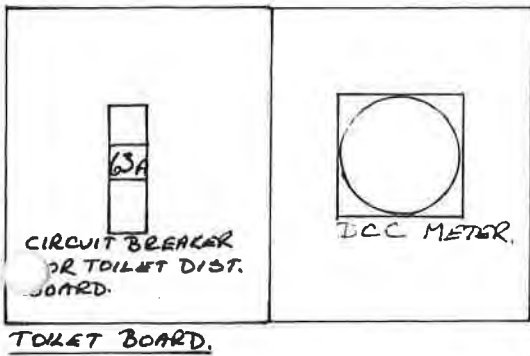
## Appendix A Reference Documentation

OLD McMILLANS ROAD.



METER BOX.

OVERHEAD.



VELODROME.

MAIN BOARD.

32 mm<sup>2</sup> CONDUIT.

25 mm<sup>2</sup>

MAIN SWITCH.

MAIN BOARD (VELODROME)

DCC TOILET.

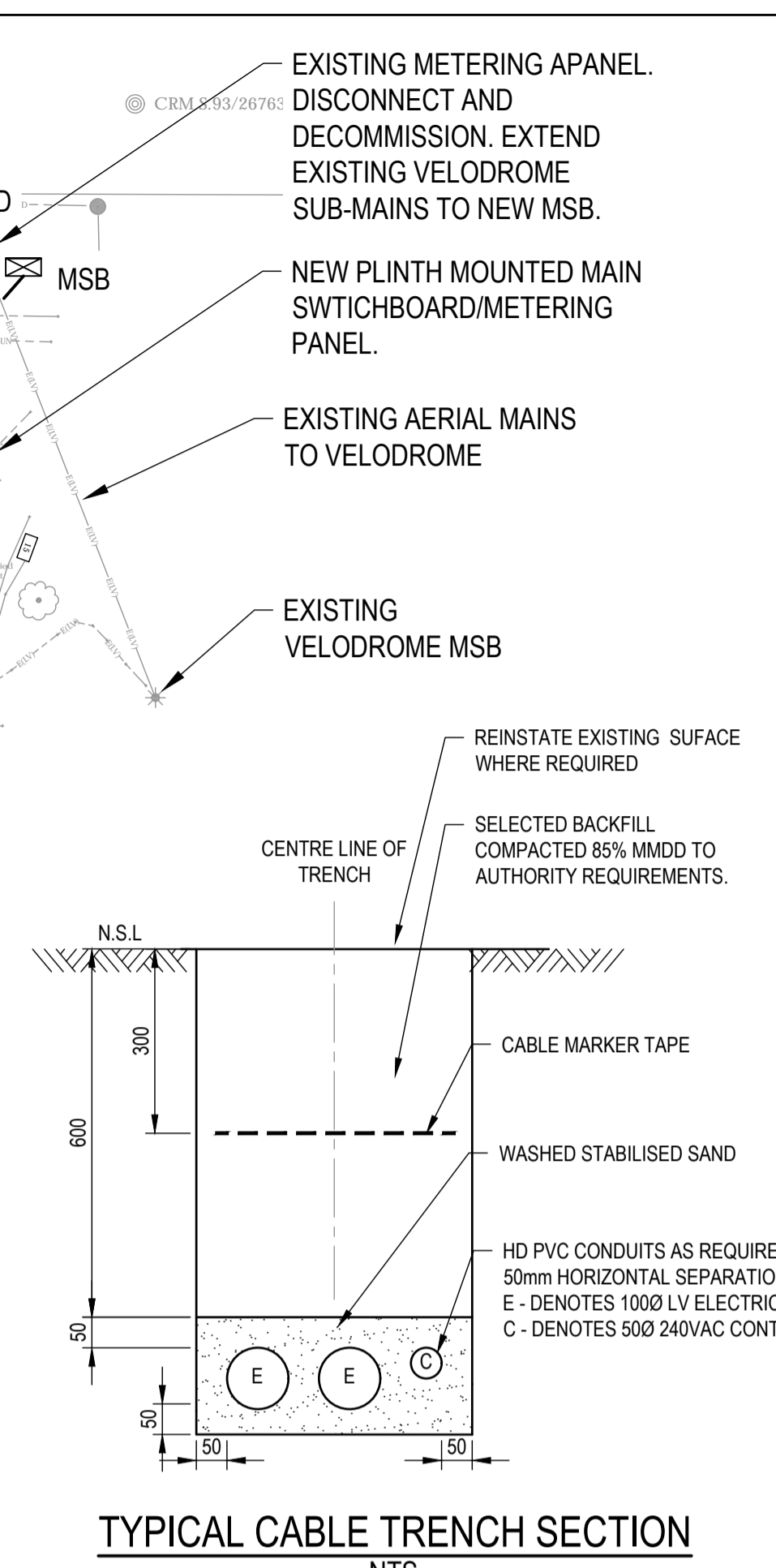
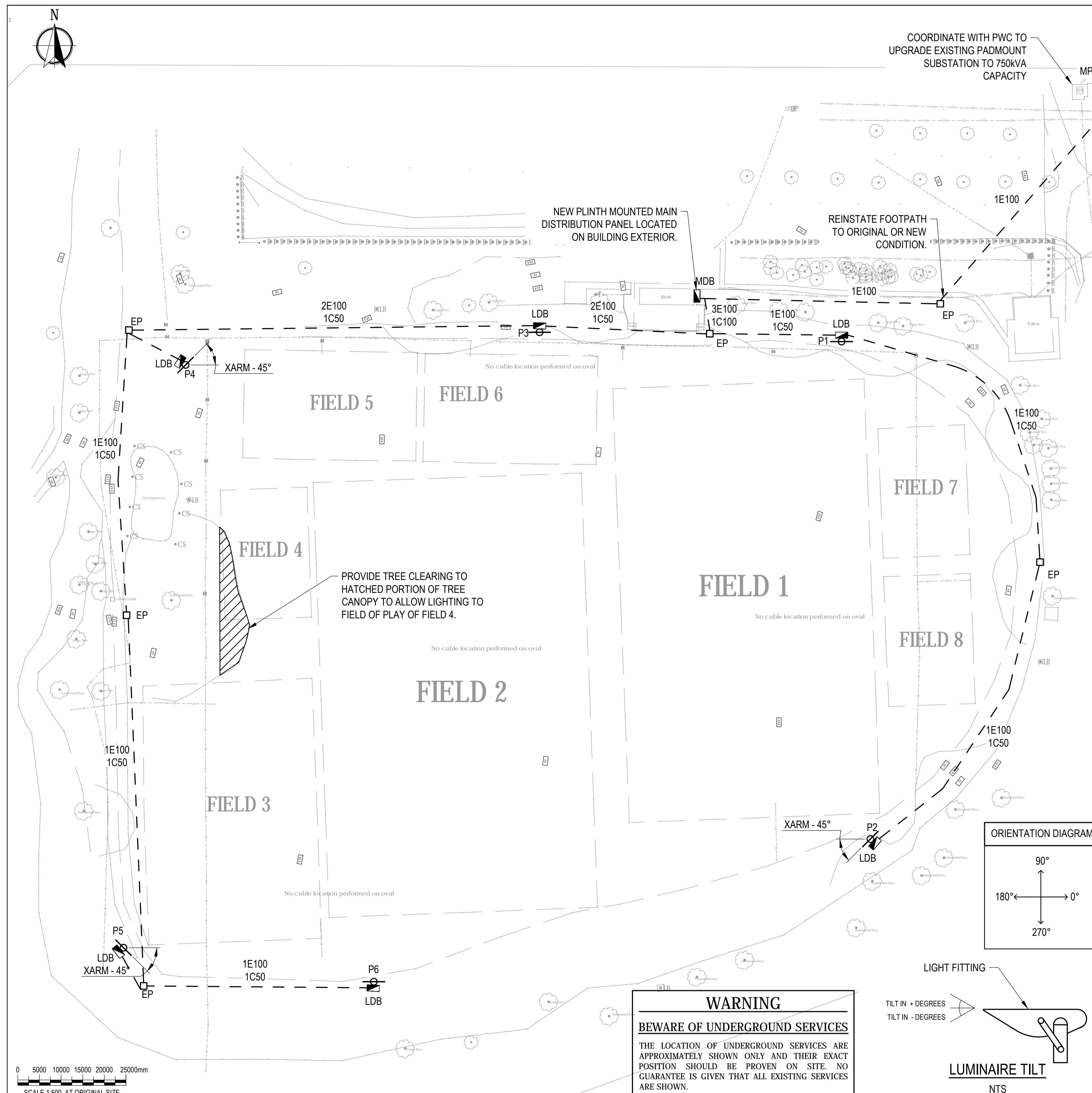
6 mm<sup>2</sup>

DCC METER.

TOILET BOARD.

DIST. BOARD.

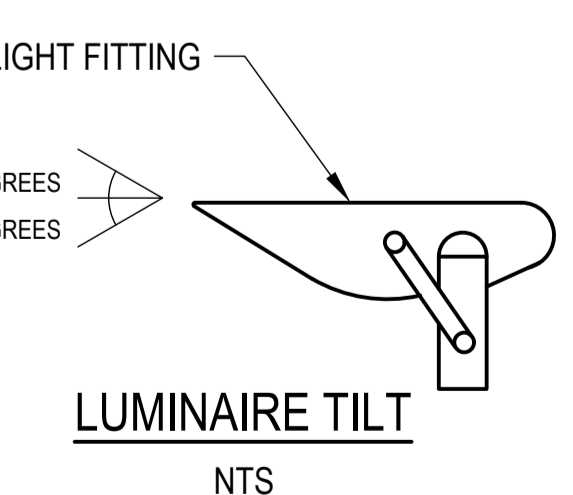
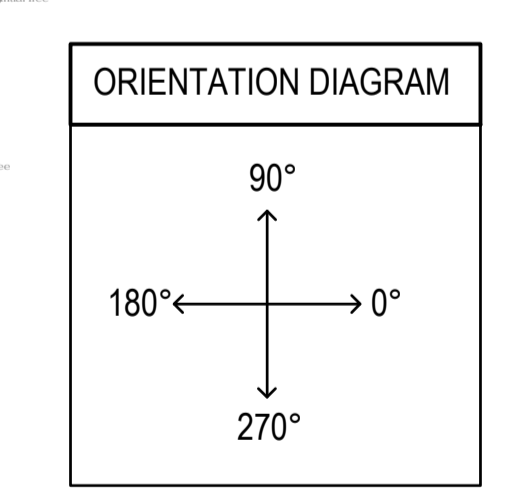
## Appendix B Proposed Lighting Plan



- ### LEGEND
- Px ○ 28.5m LIGHTING POLES WITH 2kW LUMINAIRES. LIGHTING POLE TO BE DESIGNED, INSTALLED AND CERTIFIED SYSTEM (INGAL OR APPROVED EQUIV/LANENT) INCLUDING POLE, SINGLE CROSSARM (ALLOW MOUNTING TOP AND BOTTOM 2 ROWS OF 6 LUMINAIRES) AND MOUNTING TABS TO AVOID SHADOWING. REFER STRUCTURAL DRAWING AND LUMINAIRES LOCATION SUMMARY FOR TYPE, QUANTITY, AIMING AND SPECIFICATION.
  - EP □ 715Lx465Wx635D POLYETHYLENE ELECTRICAL CABLE PIT WITH AS3996 CLASS B PIT LID. ACO TYPE 5 OR APPROVED EQUIVALENT.
  - nE0 - - - BURIED ELECTRICAL AND CONTROL CABLE ALIGNMENT. REFER TO TYPICAL CABLE TRENCH SECTION DETAIL. 'n' DENOTES QUANTITY OF CONDUITS, 'E/C' DENOTES ELECTRICAL OR CONTROL HD PVC 'Ø' DENOTES CONDUIT DIAMETER FOR EXAMPLE: 2E100 - 2 x 100 DIA ELECTRICAL HD PVC CONDUITS
  - ELECTRICAL SWITCHBOARD 'MDB' DENOTES MAIN DISTRIBUTION BOARD 'LDB' DENOTES LIGHTING DISTRIBUTION BOARD
  - E-E- EXISTING UG ELECTRICAL
  - H-H- EXISTING UG HYDRAULIC
- ### NOTES
- LUMINAIRE LOCATION SUMMARY POLE LOCATIONS ARE BASED ON HORIZONTAL DATUM OF MGA94
  - CONTRACTOR TO ALLOW FOR MIN. 3m RADIUS OF TREE CLEARING AROUND EACH LIGHTING POLE. CONTRACTOR TO CONFIRM LEVEL OF TREE CLEARING WITH CITY OF DARWIN PRIOR TO COMMENCEMENT OF WORK.
  - CONTRACTOR TO NOTIFY CITY OF DARWIN OF ANY DAMAGE TO TREE ROOTS DURING POLE AND CABLE INSTALLATION. CONTRACTOR TO PROVIDE ROOT PROTECTION TO ALL DAMAGED/DISTURBED ROOTS.

LUMINAIRE LOCATION SUMMARY														
POLE ID	POLE DETAILS				LUMINAIRE DETAILS				LUMINAIRE AIMING			CONTROL GROUP		
	EASTING	NORTHING	HEIGHT	ID	DESCRIPTION	OPTICS	ORIENT	TILT	50 LUX	100 LUX	200 LUX	50 LUX	100 LUX	200 LUX
P1	701999.40	8628955.00	28.5	P1L01	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	x	x	x			
P1	701999.40	8628955.00	28.5	P1L02	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	-	-	-	x	x	x
P1	701999.40	8628955.00	28.5	P1L03	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	-	-	-	-	-	-
P1	701999.40	8628955.00	28.5	P1L04	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	-	-	-	x	x	x
P1	701999.40	8628955.00	28.5	P1L05	THORN CHAMPION MHN-LA CL2 WI	V2	298	-2.5	-	-	-	x	x	x
P1	701999.40	8628955.00	28.5	P1L06	THORN CHAMPION MHN-LA CL2 WI	V2	298	-2.5	x	x	x			
P1	701999.40	8628955.00	28.5	P1L07	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	-	-	-	-	-	-
P1	701999.40	8628955.00	28.5	P1L08	THORN CHAMPION MHN-LA CL2 WI	V2	230	5	-	-	-	-	-	-
P2	702006.00	8628840.00	28.5	P2L01	THORN CHAMPION MHN-LA CL2 WI	V2	90	0	x	x	x			
P2	702006.00	8628840.00	28.5	P2L02	THORN CHAMPION MHN-LA CL2 WI	V2	90	0	x	x	x			
P2	702006.00	8628840.00	28.5	P2L03	THORN CHAMPION MHN-LA CL2 WI	V2	90	0	-	-	-	x	x	x
P2	702006.00	8628840.00	28.5	P2L04	THORN CHAMPION MHN-LA CL2 WI	V2	150	5	-	-	-	-	-	-
P2	702006.00	8628840.00	28.5	P2L05	THORN CHAMPION MHN-LA CL2 WI	V2	150	5	-	-	-	x	x	x
P2	702006.00	8628840.00	28.5	P2L06	THORN CHAMPION MHN-LA CL2 WI	V2	150	5	x	x	x			
P2	702006.00	8628840.00	28.5	P2L07	THORN CHAMPION MHN-LA CL2 WI	V2	150	5	-	-	-	-	-	-
P2	702006.00	8628840.00	28.5	P2L08	THORN CHAMPION MHN-LA CL2 WI	V2	150	5	-	-	-	-	-	-
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P3	701929.60	8628957.00	28.5	P3L01	THORN CHAMPION MHN-LA CL2 WI	V2	250	5	x	x	x			
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P3	701929.60	8628957.00	28.5	P3L03	THORN CHAMPION MHN-LA CL2 WI	V2	250	5	-	-	-	-	-	-
P3	701929.60	8628957.00	28.5	P3L04	THORN CHAMPION MHN-LA CL2 WI	V2	250	5	-	-	-	-	-	-
P3	701929.60	8628957.00	28.5	P3L05	THORN CHAMPION MHN-LA CL2 WI	V2	290	5	-	-	-	x	x	x
P3	701929.60	8628957.00	28.5	P3L06	THORN CHAMPION MHN-LA CL2 WI	V2	290	5	x	x	x			
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P4	701847.80	8628949.00	28.5	P4L01	THORN CHAMPION MHN-LA CL2 WI	V2	300	5	x	x	x			
P4	701847.80	8628949.00	28.5	P4L02	THORN CHAMPION MHN-LA CL2 WI	V2	300	5	x	x	x			
P4	701847.80	8628949.00	28.5	P4L03	THORN CHAMPION MHN-LA CL2 WI	V2	300	5	-	-	-	x	x	x
P4	701847.80	8628949.00	28.5	P4L04	THORN CHAMPION MHN-LA CL2 WI	V2	300	5	-	-	-	-	-	-
P4	701847.80	8628949.00	28.5	P4L05	THORN CHAMPION MHN-LA CL2 WI	V2	300	5	-	-	-	-	-	-
P4	701847.80	8628949.00	28.5	P4L06	THORN CHAMPION MHN-LA CL2 WI	V2	350	0	x	x	x			
P4	701847.80	8628949.00	28.5	P4L07	THORN CHAMPION MHN-LA CL2 WI	V2	350	0	-	-	-	x	x	x
P5	701833.40	8628815.00	28.5	P5L01	THORN CHAMPION MHN-LA CL2 WI	V2	40	0	x	x	x			
P5	701833.40	8628815.00	28.5	P5L02	THORN CHAMPION MHN-LA CL2 WI	V2	40	0	-	-	-	x	x	x
P5	701833.40	8628815.00	28.5	P5L03	THORN CHAMPION MHN-LA CL2 WI	V2	40	5	-	-	-	-	-	-
P5	701833.40	8628815.00	28.5	P5L04	THORN CHAMPION MHN-LA CL2 WI	V2	60	5	-	-	-	-	-	-
P5	701833.40	8628815.00	28.5	P5L05	THORN CHAMPION MHN-LA CL2 WI	V2	60	5	-	-	-	x	x	x
P5	701833.40	8628815.00	28.5	P5L06	THORN CHAMPION MHN-LA CL2 WI	V2	60	5	x	x	x			
P5	701833.40	8628815.00	28.5	P5L07	THORN CHAMPION MHN-LA CL2 WI	V2	40	5	-	-	-	-	-	-
P5	701833.40	8628815.00	28.5	P5L08	THORN CHAMPION MHN-LA CL2 WI	V2	60	0	-	-	-	-	-	-
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P6	701891.30	8628807.00	28.5	P6L03	THORN CHAMPION MHN-LA CL2 WI	V2	50	5	-	-	-	-	-	-
P6	701891.30	8628807.00	28.5	P6L04	THORN CHAMPION MHN-LA CL2 WI	V2	70	5	-	-	-	-	-	-
P6	701891.30	8628807.00	28.5	P6L05	THORN CHAMPION MHN-LA CL2 WI	V2	70	5	-	-	-	x	x	x
P6	701891.30	8628807.00	28.5	P6L06	THORN CHAMPION MHN-LA CL2 WI	V2	70	5	x	x	x			
P6	701891.30	8628807.00	28.5	P6L07	THORN CHAMPION MHN-LA CL2 WI	V2	50	5	-	-	-	-	-	-
P6	701891.30	8628807.00	28.5	P6L08	THORN CHAMPION MHN-LA CL2 WI	V2	70	5	-	-	-	-	-	-

**WARNING**  
**BEWARE OF UNDERGROUND SERVICES**  
 THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATELY SHOWN ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.



AMENDMENTS			
No.	DESCRIPTION	DATE	INITIAL
E			
D			
C	TENDER DESIGN	10.18	RO
B	100% DESIGN	09.18	RO
A	50% DESIGN	08.18	RO

**WARNING**  
 ALL REASONABLE CARE HAS BEEN TAKEN TO ACCURATELY SHOW THE POSITION OF EXISTING SERVICES. HOWEVER, THE POSITION OF SUCH SERVICES SHOULD BE PROVEN ON SITE AND NO GUARANTEE CAN BE GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

**HK solutions**  
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DRAWN	DESIGNED
C. CHAI	R. OPPUSUNGGU
SCALE	CHECKED
AS SHOWN	
APPROVED	DATE JULY 18
	SHEET 1 OF ?

**BAGOT PARK**  
**SPORTS LIGHTING – HID**  
**LAYOUT PLAN**

SHEET SIZE **A1**  
 DRAWING No. **18069-E101** AMENDT. **C**



## Appendix C Luminaire Datasheets

## Champion

### 96261230 CHAMPION 2KW MHN-LA CL2 WI

Cable	 2000W HIT-DE PHL	IP66	IK08		
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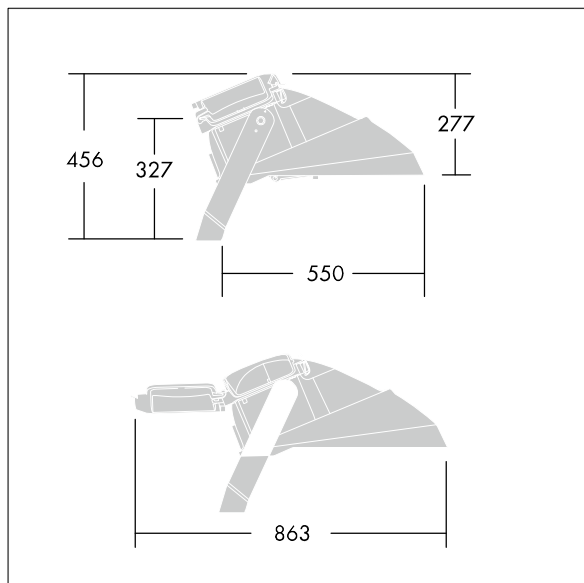
## Champion

A high performance asymmetrical discharge floodlight for 1 x 2000W HIT-DE PHL lamp. magnetic. Class II electrical, IP66 optical and gear compartment, IK08. Body: unpainted die-cast aluminium. Enclosure: 4mm toughened flat glass. Luminaire fixed by single bolt through Ø22mm central hole, or twins bolts through Ø15mm holes at 100mm centres. Cable gland for Ø7.5 to 13mm cable. Aiming via integrated sights. Ideal for sports field and stadium lighting. Complete with ignitor. Gear tray to be ordered separately. Lamp to be ordered separately.

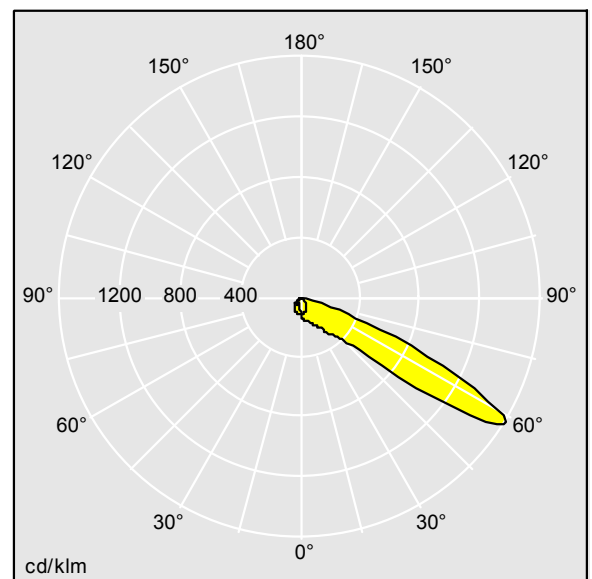
Total power: 2075 W  
 Dimensions: 598 x 720 x 448 mm  
 Weight: 19.3 kg  
 Scx: 0.185 m<sup>2</sup>



TLG\_CHMP\_F\_PDB.jpg



TLG\_CHMP\_M\_U1.wmf



TLLA\_C22A2B.ltd

Lamp position: V2  
 Light Source: 1 x HIT-DE PHL / 2040W  
 Luminaire luminous flux\*: 160600 lm  
 Lamp luminous flux: 1 x 220000 lm  
 Luminaire efficacy\*: 77 lm/W  
 LOR: 0,73 ULOR: 0,00 DLOR: 0,73

Lamp efficacy: 106 lm/W  
 Colour Rendering Index min.: 80  
 Correlated colour temperature\*: 4200 Kelvin  
 Ballast: 1x MAG  
 Luminaire input power\*: 2075 W Lambda = 0.93

All values marked with an \* are rated values. Unless stated otherwise, the values apply to an ambient temperature of 25°C.



## OptiVision LED gen2

BVP525 1800/740 230V HGB DX50 D9 T25 100

OptiVision LED gen2 - LED High Brightness - 740 neutral white - 230 V - Asymmetrical wide beam

The Philips OptiVision LED gen2 floodlighting system provides a complete lighting solution for the simplest through to the most complex area and recreational sports lighting applications. The high-efficiency floodlights come with three or two LED light modules, which function with an external driver box – separate for use at a distance from the floodlight (BV), or pre-fixed onto the mounting bracket of the floodlight (HGB) for ease of installation and lower initial cost. They meet the highest performance standards, provide outstanding light quality, and ensure safety and visual comfort. OptiVision LED gen2 offers new possibilities to reduce energy consumption and increase flexibility (instant start, programmable lighting levels) when used in conjunction with Philips' advanced system controls and sensors. The floodlights are also compatible with other external control systems via DALI protocol.

### Product data

General Information		Protection class IEC	Safety class I
Lamp family code	LED-HB [ LED High Brightness]	Flammability mark	-
Light source color	740 neutral white	CE mark	CE mark
Light source replaceable	Yes	ENEC mark	ENEC mark
Number of gear units	1 unit	Warranty period	5 years
Driver/power unit/transformer	Power supply unit with DALI interface external	Optic type outdoor	Asymmetrical wide beam
Driver included	Yes	Remarks	*-Per Lighting Europe guidance paper "Evaluating performance of LED based luminaires - January 2018": statistically there is no relevant difference in lumen maintenance between B50 and for example B10. Therefore the median useful life (B50) value also represents the B10 value.
Optical cover/lens type	Polycarbonate bowl/cover	Constant light output	No
Luminaire light beam spread	90° x 136°		
Control interface	DALI		
Connection	Push-in connector and pull relief		
Cable	-		



## OptiVision LED gen2

Number of products on MCB of 16 A type B	-
RoHS mark	RoHS mark
Light source engine type	LED
Serviceability class	Class A, luminaire is equipped with serviceable parts (when applicable): LED board, driver, control units, surge protection device, optics, front cover and mechanical parts
Product family code	BVP525 [ OptiVision LED gen2]

**Light Technical**

Upward light output ratio	0
Standard tilt angle posttop	-
Standard tilt angle side entry	-

**Operating and Electrical**

Input Voltage	230 V
Input Frequency	50 Hz
Inrush current	30 A
Inrush time	16 ms
Power Factor (Min)	0.95

**Controls and Dimming**

Dimmable	Yes
----------	-----

**Mechanical and Housing**

Housing Material	Aluminum
Reflector material	Polycarbonate
Optic material	Polycarbonate
Optical cover/lens material	Polycarbonate
Fixation material	Aluminum
Mounting device	Mounting bracket adjustable
Optical cover/lens shape	Flat
Optical cover/lens finish	Clear
Overall length	750 mm
Overall width	616 mm
Overall height	600 mm
Effective projected area	0.39 m <sup>2</sup>

**Approval and Application**

Ingress protection code	IP66 [ Dust penetration-protected, jet-proof]
-------------------------	---

Mech. impact protection code	IK08 [ 5 J vandal-protected]
Surge Protection (Common/Differential)	Luminaire surge protection level until 6 kV differential mode and 10 kV common mode

**Initial Performance (IEC Compliant)**

Initial luminous flux (system flux)	180000 lm
Luminous flux tolerance	+/-7%
Initial LED luminaire efficacy	109 lm/W
Init. Corr. Color Temperature	4000 K
Init. Color Rendering Index	≥70
Initial chromaticity	(0.367, 0.358) SDCM <5
Initial input power	1314 W
Power consumption tolerance	+/-10%

**Over Time Performance (IEC Compliant)**

Control gear failure rate at median useful life	10 %
100000 h	
Lumen maintenance at median useful life*	L80
100000 h	

**Application Conditions**

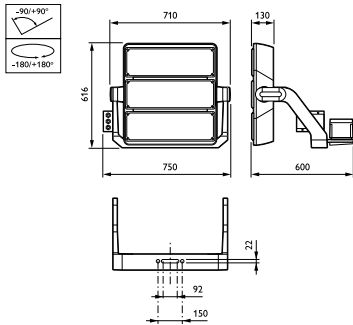
Ambient temperature range	-40 to +45 °C
Performance ambient temperature Tq	25 °C
Maximum dim level	10%

**Product Data**

Full product code	871869911612500
Order product name	BVP525 1800/740 230V HGB DX50 D9 T25 100
EAN/UPC - Product	8718699116125
Order code	912300023825
Numerator - Quantity Per Pack	1
Numerator - Packs per outer box	1
Material Nr. (12NC)	912300023825
Net Weight (Piece)	34.000 kg

## OptiVision LED gen2

### Dimensional drawing



OptiVision LED BVP500/515/520/525





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<b>Rev.</b>	<b>Description</b>	<b>Author</b>	<b>Reviewer</b>	<b>Date</b>
<b>A</b>	Initial Draft	R.Oppusunggu		09/18
<b>B</b>	50 lux control level addition	R.Oppusunggu		10/18
<b>C</b>	CoD Review Amendments	R.Oppusunggu		11/18

WANT Geotechnics  
Geotechnical Investigation Report  
For the  
Proposed Lighting Towers for  
Bagot and Nightcliff Ovals, Northern Territory  
Prepared for  
HK Solutions  
Project NTG2018760 Rev 0  
9 September 2018



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Author: Stephen Flux .....

Reviewed: Mary Flux .....

Date: 9 September 2018 .....

Distribution: HK Solutions (1 electronic) .....

# WANT Geotechnics

Serving the Territory

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# WANT Geotechnics

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## Geotechnical Investigation Report for the Proposed Lighting Towers for Bagot and Nightcliff Ovals, Northern Territory

### 1. Introduction

WANT Geotechnics were commissioned by HK Solutions, to undertake a geotechnical investigation to support the design of proposed lighting towers for the Bagot and Nightcliff Sports Ovals in the suburbs of Milner and Nightcliff in the Northern Territory. The geotechnical investigation was undertaken in general accordance with WANT Geotechnics proposal NTG2018544P. The investigation comprised the drilling of 10 boreholes (6 at Bagot Oval and 4 at Nightcliff Oval) and in-situ testing. The objectives of the investigation were to provide a report covering.

- Introduction and scope;
- Site description, including surface and sub-surface conditions;
- Details of desk review, including acid sulphate soils and liquefaction assessment;
- Investigation methodology and results, including subsurface conditions and comments on groundwater.

Engineering assessment covering:

- Site preparation;
- Suggested foundation options and design parameters, including driven or cast in situ pile options or shallow foundations, if applicable;
- Bearing pressures and shaft adhesion values for pile and shallow foundations;
- Soil and rock stiffness values. Soil design parameters, such as shear strength, angle of internal friction etc, will generally be determined using empirical relationships with insitu test results (i.e. SPT results), rather than by direct measurement;
- Groundwater and drainage;
- Anticipated geotechnical related construction difficulties and possible solutions or alternatives.

Appendices including

- Site plans indicating test locations; and
- Detailed borehole logs showing soil and rock lithology.

In our judgement, the extent of this investigation has been sufficient to correlate the observed soil conditions with the known geology and published information for this area. However, localised variations are very difficult to locate using boreholes and test pits as natural soils can vary greatly over short distances. In which case, it would be prudent to commission site inspections during construction, in order that the true site conditions are verified.

**2. Desktop Review**

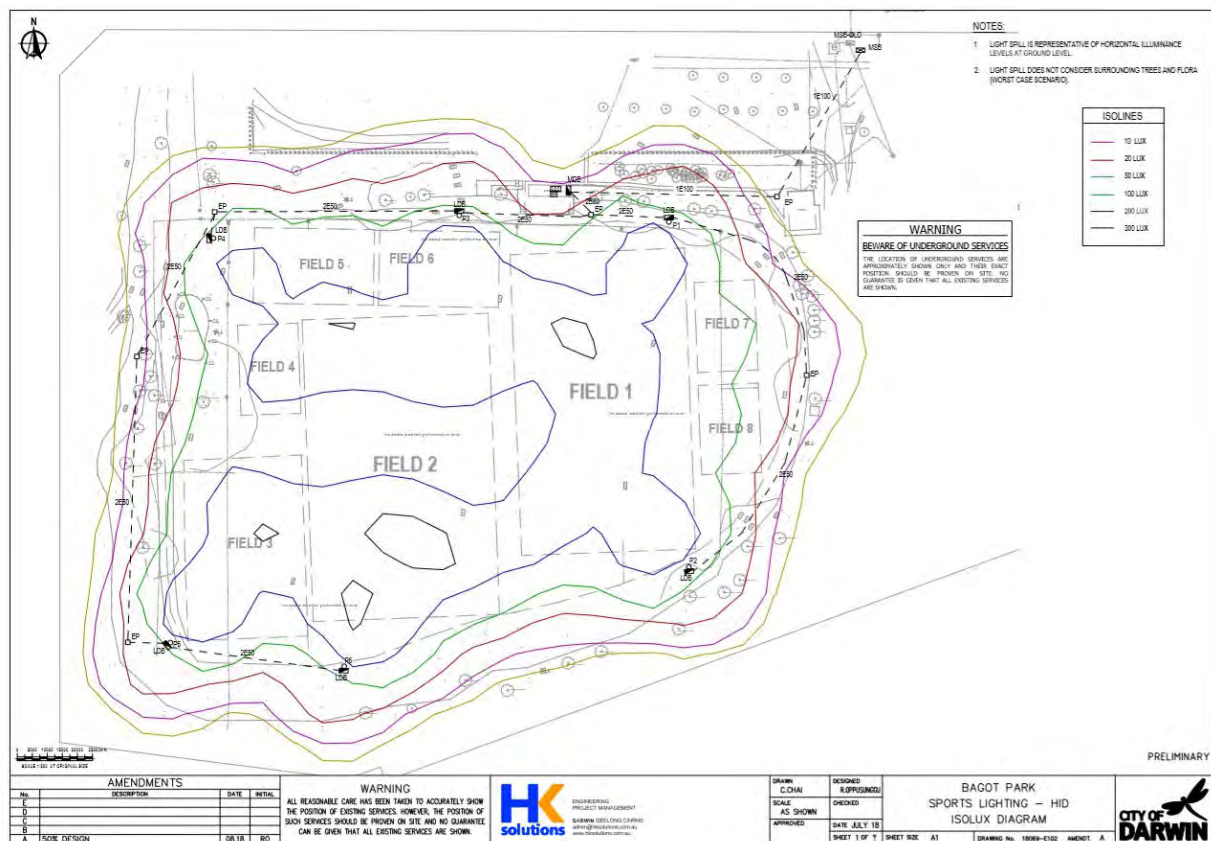
**2.1 Bagot Oval Terrain and Geology**

The site is located alongside Bagot Road and McMillans Road in Milner in the Northern Territory.

Reference to NT Government Natural Resource Maps website indicates the western third of the site is underlain by the Krans Land System (lateritic plains and rises with commonly shallow gravelly soils and lithosols with no occurrence of acid sulphate soils), the eastern two thirds of the site are underlain by the Kay Land System (lateritic plains and rises with commonly red and yellow earthy soil and no occurrence of acid sulphate soils),

Reference to the 1:100 000 scale geological map indicates the site is underlain by Tertiary age lateritic gravel.

The following plan illustrates the site and the proposed lighting tower locations.



**Figure 1: Bagot Oval**



**2.2 Nightcliff Oval Terrain and Geology**

The site is located alongside Camphor and Oleander streets in Nightcliff in the Northern Territory.

Reference to NT Government Natural Resource Maps website indicates Nightcliff Oval is underlain by the Kay Land System (lateritic plains and rises with commonly red and yellow earthy soil and no occurrence of acid sulphate soils),

Reference to the 1:100 000 scale geological map indicates the site is underlain by Tertiary age lateritic gravel.

The following plan illustrates the site and the proposed lighting tower locations.

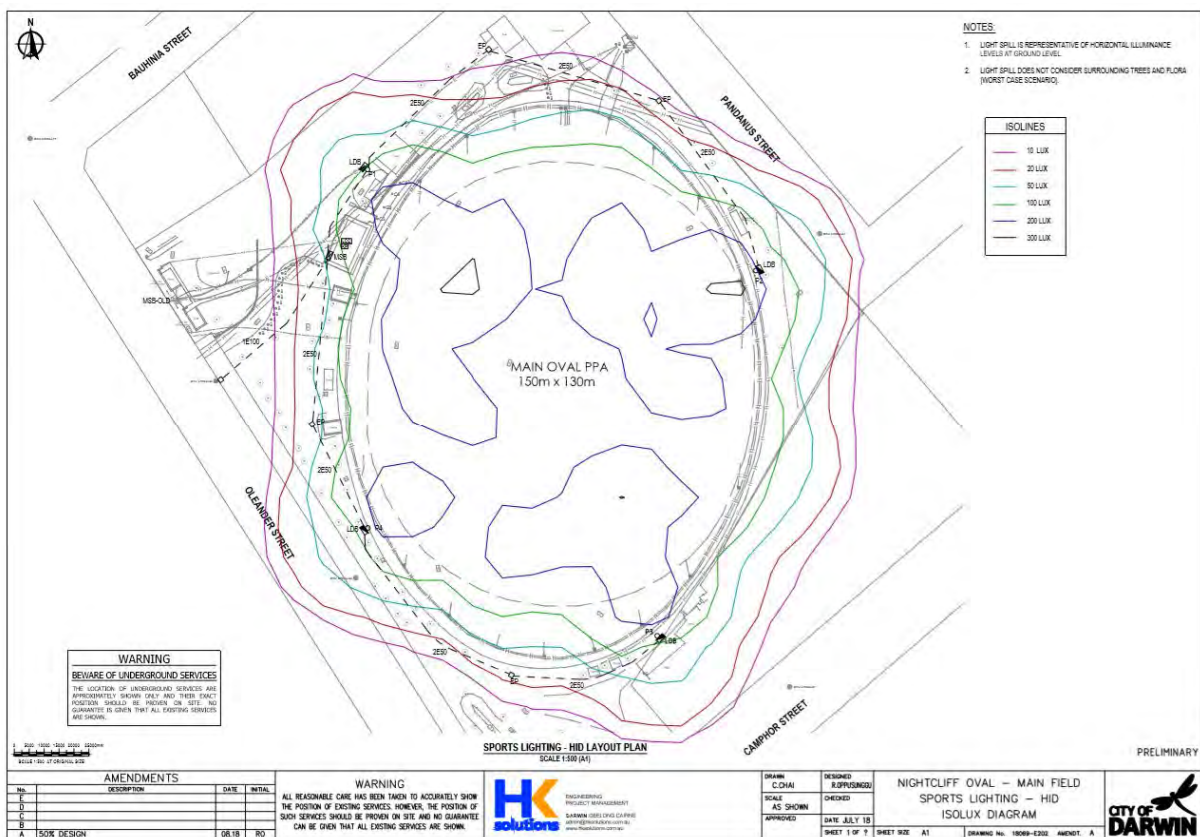


Figure 1: Nightcliff Oval

**2.3 Earthquakes**

Seismicity is generally associated with the boundaries of the Earths’ tectonic plates. However not all earthquakes occur at plate boundaries, these are termed intraplate earthquakes and generally occur because of the release of pressure that has built-up over time as the Earth’s crust deforms. In which case, the presence of faults would not be indicative of an increased risk of seismic activity. The site lies some distance from the boundaries of the Indo-Australian tectonic plate, but this does not preclude it from being subject to seismic events. In which case, there remains potential for the area to be affected by seismic activity, and it is recommended that all infrastructure should be designed for earthquake acceleration of 0.09g as indicated in Figure 3.2(E) of AS1170.4.

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## 2.4 Liquefaction

The upward propagation of shear waves through the ground in an earthquake induces repeated cycles of loading and unloading within subsoils. These repeated cycles of stress often result in progressively increasing magnitudes of excess porewater pressure within fine granular soils. If the porewater pressures build to a magnitude equal to the confining stress, the effective stress is reduced to zero, at which point the fine granular soil loses its strength and essentially flows like a liquid, hence the term liquefaction. Some potential effects of liquefaction are:

- Sand boils
- Decreased lateral soil stiffness
- Landslides
- Lateral spreading of embankments
- Settlement or tipping of shallow foundations
- Ground cracks
- Buoyancy of buried structures

The main factors affecting the liquefaction potential of a soil deposit are: intensity of ground shaking, duration of ground shaking, soil type, initial confining pressure, and relative density or void ratio. Soils with the following characteristics are more susceptible to liquefaction:

- Geological age less than 10,000 years
- Particle size distribution from medium sand to silt size
- Fines (< 0.06 mm) content less than 15%
- Average grain size less than about 0.7 mm
- Relative density less than about 70%
- Groundwater level within a few metres of the ground surface

In addition, soils must also be near saturation to experience the porewater pressure increase that leads to liquefaction. Soils most susceptible to liquefaction are saturated, loose, uniform, fine grained sands. Liquefaction potential decreases as the density or the fines content increases. Soils with plasticity are not likely to liquefy.

The published geological data reviewed as part of this study suggest it is unlikely the soils underlying the site would liquefy or undergo significant deformation during an earthquake event.

## 2.5 Acid sulphate soils

Acid sulphate soils commonly form in low-energy intertidal settings or areas that are subject to periodic tidal flooding. Such reducing environments may contain sufficient organic matter to promote the formation of iron sulphide through sulphate reduction. Most acid sulphate soils occur in coastal areas below 5 metres above sea level. The project area typically could contain acid sulphate soils. Acid sulphate soils (ASS) are generally formed where sea levels rose and inundated the land, the sulphate in the seawater mixed with land sediments containing iron oxides and organic matter. The resulting chemical reaction produced large quantities of iron sulphides in waterlogged environments.

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The following criteria are likely to determine whether ASS is likely to be present:

- Land with an elevation less than 5m Australian Height Datum (m AHD);
- Soil and sediment of recent geological age (Holocene);
- Marine or estuarine sediments and tidal lakes, low-lying coastal wetlands or back swamp areas, waterlogged, or scalded areas, stranded beach ridges and adjacent swales or coastal sand dunes, coastal alluvial valleys;
- Areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions, e.g. mangroves, saltcouch, swamp-tolerant reeds, rushes, paperbarks and swamp oak; and
- Areas identified in geological descriptions or in maps as bearing sulphide minerals, coal deposits or marine shales/sediments deep older estuarine sediments below ground surface of either Holocene or pre-Holocene age.

The potential presence of ASS has been determined by inspection of the NT Government plan titled *Greater Darwin Region Acid Sulphate Soils*, which indicates an no known occurrence of ASS.

### 3. Scope of Works and Methodology

#### 3.1 Intrusive Investigation

The intrusive investigation comprised the following scope of works.

- Undertake Dial-Before-You-Dig enquiry and on-site scanning of test locations for underground pipes and cables.
- Drilling of 10 boreholes to 5m (6 at Bagot Oval and 4 at Nightcliff Oval), or prior refusal on rock, at the approximate location of each lighting tower. Standard penetration tests to be conducted at 1.5m intervals in soil strength strata.
- All logging, sampling and in-situ testing will be undertaken/supervised by an engineering geologist with over 25 years' experience. The exploratory locations will be logged in general accordance with Australian Standards AS1726.
- Upon completion, GPS co-ordinates taken of each borehole location.

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## 4. Investigation Results

Ground conditions encountered in the boreholes are summarised below and detailed on the logs along with the DCP test results in Appendix B. The following table summarises the main strata as encountered in each of the boreholes.

Location	Borehole	Fill	Loose gravel/ firm clay	Stiff to very stiff clay	Medium dense or better sand or gravel	Extremely Low Strength Rock	Very Low Strength Rock		
Bagot Oval	BH1	0.00-0.50m	Not encountered	0.50-1.00m	1.00-2.50m	2.50-2.65m	>2.65m		
	BH2	0.00-0.75m	Not encountered		0.75-1.50m	1.50-2.20m	>2.20m		
	BH3	0.00-0.50m	1.50-2.50m	0.50-1.50m 2.50-2.75m	Not encountered	2.75-3.50m	>3.50m		
	BH4	0.00-0.25m	1.50-2.00m	0.25-0.75m 2.00-2.50m	0.75-1.50	2.50-3.40m	>3.40m		
	BH5	0.00-0.75m	Not encountered	Not encountered	0.75-2.50m	Not encountered	2.50-3.50m	>3.50m	
	BH6	0.00-0.50m			1.00-2.50m	0.50-1.00m	2.50-2.70m	>2.70m	
Nightcliff Oval	BH1	Not encountered			Not encountered	1.00-3.00m	0.00-1.00m	3.00-3.65m	>3.65m
	BH2					0.25-3.00m	0.00-0.25m	3.00-4.05m	>4.05m
	BH3					0.50-1.50m	0.00-0.50m	1.50-3.70m	>3.70m
	BH4					0.75-3.00m	0.00-0.75m	3.00-3.75m	>3.75m

**Table 1: Summary of Ground Conditions**

No free groundwater was encountered in any of the boreholes, either at Bagot Oval or Nightcliff Oval. The investigation was undertaken in September 2018, groundwater levels will fluctuate due to seasonal variations and other factors.

# WANT Geotechnics

Serving the Territory

## 5. Engineering Comments

### 5.1 Site Preparation

All earthworks should be carried out in general accordance with the relevant Department of Infrastructure, Planning and Logistics (DIPL) specification.

Prior to construction, uncontrolled fill, topsoil or material containing organic matter should be stripped from the footprint of any surface slab/construction. This material is not considered suitable for use as selected fill but can be stockpiled for later use as non-structural fill purposes.

If required, additional fill should comprise granular material that is placed in 250mm thick layers, and then compacted to 98% SMDD, within  $\pm 2\%$  of OMC. Placement of additional fill should be subject to Level 1 Inspection and Testing, as required by AS 3798.

### 5.2 Excavation characteristics

Based on the subsurface conditions encountered during the fieldwork at proposed tower locations, it is expected that excavations will predominantly encounter clay, sand and gravel, in which case it is expected that the materials can readily be excavated using conventional earthmoving equipment.

### 5.3 Excavated slopes / trenches

Temporary cut slopes to a maximum depth of 1.5m should not be steeper than 1V:3H in fill, 1V:2H in unsaturated sand and gravel soils, and near vertical in clay/silt soils and rock, provided that:

- They are barricaded when not in use
- They are not left open for more than 24 hours
- No surcharge loading is applied within 2.5m of the edge of the excavation
- No groundwater inflows are encountered

Where access for a worker or deeper excavations are required, the temporary excavation batters should be regraded to no steeper than 1.5H: 1V or supported by properly designed shoring.

It is assumed permanent batters are not a part of the development.

### 5.4 General Soil Parameters for Design

The following table details general design parameters for soil strength materials as encountered during the drilling investigation or may potentially be present. The values are based on in situ testing, laboratory test results, correlation with published data and our experience of similar soils.

Soil	Consistency	Bulk Unit Weight (kN/m <sup>3</sup> )	Undrained Shear Strength (kPa)	Effective Friction Angle (°)	Effective Cohesion (kPa)	Youngs' Modulus (MPa)
Fine-grained cohesive	Firm	16	25	15	10	8 <sup>1</sup>
	Stiff to very stiff	18	100	20	20	15 <sup>1</sup>
	Hard	20	200	25	50	30 <sup>1</sup>
Non-cohesive	Very loose to loose	17	n/a	28	n/a	3
	Medium dense	20	n/a	30	n/a	50
	Dense or better	21	n/a	40	n/a	100
Extremely weathered soil strength rock	Extremely low strength	20	300	35	150	50

**Table 2: General Soil Design Parameters**

<sup>1</sup>Long-term, drained value

Proposed Lighting Towers  
 Bagot and Nightcliff Ovals, Northern Territory

## 5.5 Foundations

### 5.5.1 Bored Piers

It is understood that each tower will be founded on a 1200mm diameter bored pier, design of concrete bored piers should be carried out in accordance with AS 2159 and it is recommended that design in compression and uplift be based on the parameters given below.

Strata Description	Angle of Internal Friction	Ultimate Skin Friction (kPa)	Ultimate End Bearing (KPa)
Uncontrolled fill	30°	ignore	n/a
Medium dense or better sand	34°	30	n/a
Stiff or better clay soils	n/a	30	n/a
Extremely low strength siltstone	36°	100	2500
Very low strength or better siltstone	38°	150	3500

**Table 3: Bored Pier Design Parameters**

During the wet season the groundwater level may rise and be encountered near the ground surface. If pier construction is carried out during the wet season, casing, dewatering of pier excavations or tremie construction techniques may be required. With the above points in mind, it is suggested that pier construction be carried out during the dry season if possible.

### 5.5.2 Foundation Inspections

All foundation excavations should be inspected by a suitably experienced engineering geologist to confirm that founding conditions are as anticipated and suitable for the proposed loads. If, during construction, it is apparent that the foundation conditions are different from those described in this report then further geotechnical advice should be sought from WANT Geotechnics.

### 5.5.3 Bored Pile Construction Considerations

Steel casing will be required to support the subsoils down to the weathered rock as well as to seal the pier against groundwater inflow (if construction is undertaken during the wet season). There will, however, remain the potential for groundwater inflow through the bedding and discontinuities within the rock. Such groundwater inflows can be expected to be controlled with conventional pumping techniques. If conventional pumps are unable to be used to remove water from the base of pile excavations prior to concreting, then the concrete will need to be placed using tremie pipes and filling the sockets from the bottom up under water (this is considered unlikely).

The rock encountered in the boreholes is at least of very low strength and appropriate rock drilling equipment will be needed to drill the piers through such materials. Based on the available strength data, augers and coring buckets with conventional tungsten carbide bullet teeth should be suitable.

In addition to the above the following will need consideration prior to construction:

- Management of spoil generated from drilling the piles and environmental management of spoil.

#### 5.5.4 Geotechnical Strength Reduction Factor

Ultimate pile capacities provided in the previous section should be multiplied by an appropriate geotechnical strength reduction factor (GSRF) in accordance with AS2159 *Piling Design and Installation*.

The GSRF is a function of site, design, investigation, installation methods procedures when piling, and the level of testing undertaken on the piles during their construction.

Based on the above and on the assumption that no in situ pile testing is undertaken but the actual installation of the piles and rock sockets is observed and certified by a suitably qualified and experienced geotechnical engineer/ engineering geologist, then a GSRF of 0.56 is appropriate.

#### 5.5.5 Estimated Pile Ultimate Capacity

Based on the individual borehole logs and in situ tests, the relationship proposed by Zhang and Einstein and assuming 1200mm diameter bored piles 5m deep and founded in very low strength or better rock, then a preliminary assessment of pile ultimate capacities has been made and is summarised in the following table. Pile uplift and lateral capacity is beyond the scope of our assessment.

Location	Borehole	Approximate depth of very low strength or better rock	Ultimate Skin Friction	Ultimate End-Bearing	Ultimate Capacity	Pile Length
Bagot Oval	BH1	2.65m	1208kN	4205kN	5413kN	5m
	BH2	2.20m	1517kN	4205kN	5722kN	
	BH3	3.50m	1168kN	4205kN	5373kN	
	BH4	3.40m	1142kN	4205kN	5347kN	
	BH5	3.50m	1232kN	4205kN	5437kN	
	BH6	2.70m	1224kN	4205kN	5429kN	
Nightcliff Oval	BH1	3.65m	1517kN	4205kN	5722kN	
	BH2	4.05m	1517kN	4205kN	5722kN	
	BH3	3.70m	1517kN	4205kN	5722kN	
	BH4	3.75m	1066kN	4205kN	5270kN	

Table 4: Preliminary Pile Capacities



## 5.6 Groundwater and Drainage

The fieldwork was undertaken in September 2018, and no groundwater was encountered in any of the boreholes during the investigation. Given the subsoils encountered, it is expected that groundwater (if encountered at depth) can be managed by a conventional pump placed within the excavation.

## 5.7 Geotechnical Related Construction Issues and Potential Solutions.

Based on the materials encountered and the aims of the project, then it is not expected that there will be any significant geotechnical related construction issues.

## 6. References

1. Australian Standard AS 1170.4 *Structural Design Actions Part4: Earthquake Actions in Australia*
2. Australian Standard AS 1726 *Geotechnical site investigations*
3. Australian Standard AS 2159 *Pile Design and Installation*
4. Australian Standard AS 2870 *Residential Slabs and Footings*
5. Australian Standard AS 3798 *Guidelines on Earthworks for Commercial and Residential Developments*
6. Look B (2007) *Handbook of Geotechnical Investigation and Design Tables*
7. Das BM (2014) *Principles of Geotechnical Engineering*

## 7. Limitations

### SCOPE OF SERVICES

This geotechnical report has been prepared in accordance with the scope of services set out in the agreement between WANT Geotechnics and their client and is subject to any qualifications and assumptions set out in the report. In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

### RELIANCE ON DATA

In preparing the report, WANT Geotechnics has relied upon data, surveys, and plans provided by the client. WANT Geotechnics has not verified the accuracy or completeness of the data, to the extent that the any statements, opinions, facts, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WANT Geotechnics will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have not been fully disclosed to WANT Geotechnics.

### GEOTECHNICAL INVESTIGATION

Geotechnical engineering reports are prepared to meet the specific scope of the client and may not necessarily be adequate for a construction contractor. This report was prepared expressly for the client and expressly for purposes indicated by the client or his representative. Use by any other persons for any purpose, or by the client for a different purpose, is not recommended. The client should not use this report for other than its intended purpose without seeking additional geotechnical advice.

### LIMITATIONS OF SITE INVESTIGATION

In making an assessment of a structure from a single exploratory location there is the possibility that variations may occur that were not encountered. Site exploration identifies specific subsurface conditions only at those points from which samples have been taken. The risk that variations will not be detected can be reduced by increasing the frequency of test locations; however, this often does not result in any overall cost savings for the project. The data derived from the investigation and subsequent laboratory testing have been extrapolated to form an inferred model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the structure. Actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The exploratory test records are the subjective interpretation of subsurface conditions at a particular location, made by trained personnel. The interpretation may be limited by the method of investigation and cannot always be definitive. For example, inspection of an excavation or test pit allows a greater area of the subsurface profile to be inspected than borehole investigation; however, such methods are limited by depth and site disturbance restrictions. In borehole investigation, the actual interface between materials may be more gradual or abrupt than a report indicates

### SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions may be modified by changing natural forces or man-made influences. A geotechnical engineering report is based on conditions which existed at the time of subsurface exploration. Construction operations, at or adjacent to the site, and natural events, such as floods or groundwater fluctuations may also affect subsurface conditions and thus the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

**EXPLORATORY LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT**

Final exploratory logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final exploratory logs are included in geotechnical engineering reports. These logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings. To minimise the likelihood of exploratory log misinterpretation, contractors should be given access to the complete geotechnical engineering report prepared or authorised for their use. Providing the best available information to contractors helps prevent costly construction problems. For further information on this matter reference should be made to 'Guidelines for the Provision of Geotechnical Information in Construction Contracts' published by the Institution of Engineers Australia, National Headquarters, Canberra 1987.

**OTHER LIMITATIONS**

WANT Geotechnics will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

WANT Geotechnics

## Appendix A

Test Hole Location Plan (Bagot Oval)  
Test Hole Location Plan (Nightcliff Oval)



<b>WANT Geotechnics</b> <i>Serving the Territory</i>	Client: HKSolutions		Borehole Locations Proposed Lighting Towers Bagot Oval, Milner, Northern Territory	Project No. NTG2018760
		Drawn by: S Flux		Drawing No. 1
	Scale: NTS	Date: 9 Sep 2018		Revision: 0



<b>WANT Geotechnics</b> <i>Serving the Territory</i>	Client: HKSolutions		Borehole Locations Proposed Lighting Towers Nightcliff Oval, Nightcliff, Northern Territory	Project No. NTG2018760
		Drawn by: S Flux		Drawing No. 2
	Scale: NTS	Date: 9 Sep 2018		Revision: 0

## Appendix B

### Borehole Logs and Dynamic Cone Penetrometer Results

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628952  
Easting: 0702016  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00	1.50-1.95m 7, 6, 5 N = 11			Dense, grey brown SAND trace silt, moist (FILL)	D	M	
0.25				Medium dense, brown, silty SAND some gravel, dry (FILL)	MD	D	
0.50				Stiff, dark brown, gravelly CLAY moist	St	M	
1.00				Medium dense, red brown, GRAVEL some clay, moist	MD		
1.65				Stiff, red brown and yellow, clayey SILT some gravel, moist	St		
2.50				Extremely low strength, extremely weathered, brown mottled white and yellow SILTSTONE	Rock		
2.65				Machine refusal at 2.65m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static)                  ▼ water level (at excavation)                  ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered                  MW - Mod Weathered; HW - Highly Weathed                  XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance                  ranging to:                  4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test                  ⊥ pocket penetrometer</p> <p>○ Environmental Sample                  ■ Undisturbed tube sample                  ● Disturbed sample                  ▣ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose)                  L (loose)                  MD (medium dense)                  D (dense)                  VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa                  S (soft) 12-25                  F (firm) 25-50                  St (stiff) 50-100                  VSt (very stiff) 100-200                  H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: 1.5m high earth mound

Northing: 8628826  
Easting: 0702005  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance		Consistency / Density	Moisture Condition	
				SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components			Dynamic Cone Penetrometer Blow Counts per 100mm 5 10 15 20
0.00				Medium dense, brown, silty, gravelly SAND dry (FILL)	MD	D	
0.75				Medium dense, dark brown to red brown, clayey GRAVEL moist		M	
1.50	1.50-1.86m 10, 27, 23/60mm N = 50/210mm			Extremely low strength, extremely weathered SILTSTONE	Rock		
1.80				Extremely low strength, highly weathered, brown and white mottled orange SILTSTONE			
2.20				Machine refusal at 2.20m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

(Location moved due to stockpiles)

<p><b>GROUNDWATER</b></p> <p>▼ water level (static)                  ▼ water level (at excavation)                  ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered                  MW - Mod Weathered; HW - Highly Weathrd                  XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance                  ranging to:                  4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test                  ⊥ pocket penetrometer</p> <p>○ Environmental Sample                  ■ Undisturbed tube sample                  ● Disturbed sample                  ▣ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose)                  L (loose)                  MD (medium dense)                  D (dense)                  VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa                  S (soft) 12-25                  F (firm) 25-50                  St (stiff) 50-100                  VSt (very stiff) 100-200                  H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628959  
Easting: 0701931  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00				Very stiff to hard, brown to red brown, gravelly CLAY some sand, moist (FILL)	VSt-H	M	
0.50			Stiff, red brown, silty CLAY trace sand and gravel, moist	St			
1.50	1.50-1.95m 6, 4, 4 N = 8		Gravelly from 1.25m				
2.50			Loose, red brown spotted yellow, clayey GRAVEL moist	L			
2.75			Very stiff, red brown and yellow, clayey SILT some gravel, moist	VSt			
3.50	3.00-3.40m 13, 30, 20/50mm N = 50/250mm		Extremely low strength, extremely weathered, brown, yellow and white, clayey SILTSTONE	Rock			
				Machine refusal at 3.50m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathed  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628950  
Easting: 0701848  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00	1.50-1.95m 4, 1, 2 N = 3			Medium dense, dark brown, silty SAND trace gravel and roots, dry (FILL)	MD	D	
0.25				Stiff, red brown, silty CLAY trace gravel, moist	St	M	
0.75				Dense, red brown, clayey, gravelly SAND moist	D		
1.25				Dense, red brown, clayey, sandy GRAVEL moist			
1.50				Firm, brown to red brown, gravelly CLAY trace sand, moist	F		
2.50				Becoming stiff to very stiff at 2m with fragments of very low to low strength siltstone	St-VSt		
3.40				Extremely low strength, extremely weathered, brown to red brown, yellow and white SILTSTONE	Rock		
	3.00-3.15m 50/150mm N = 50/150mm			Machine refusal at 3.40m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathrd  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628812  
Easting: 0701833  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Medium dense to very dense, brown and grey, clayey, sandy GRAVEL moist with pockets of sand size material (FILL)	MD-VD	M	5 10 15 20
0.75				Stiff, brown, gravelly CLAY moist	St		
1.25	1.50-1.95m 8, 9, 5 N = 14			Stiff, red brown mottled yellow, silty CLAY some gravel moist			
2.50				Extremely low strength, extremely weathered, brown to red brown, yellow and white SILTSTONE			
3.50	3.00-3.25m 22, 50/100mm N = 50/100mm			Machine refusal at 3.50m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static)                  ▼ water level (at excavation)                  ◀▶ outflow / inflow</p> <p><b>Weathering</b>                  FR - Fresh; SW - Slightly Weathered                  MW - Mod Weathered; HW - Highly Weathered                  XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance                  ranging to:                  4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test                  ⊥ pocket penetrometer</p> <p>○ Environmental Sample                  ■ Undisturbed tube sample                  ● Disturbed sample                  ▣ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose)                  L (loose)                  MD (medium dense)                  D (dense)                  VD (very dense)</p> <p><b>MOISTURE CONDITION</b>                  D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa                  S (soft) 12-25                  F (firm) 25-50                  St (stiff) 50-100                  VSt (very stiff) 100-200                  H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628805  
Easting: 0701893  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Stiff, brown, sandy CLAY some gravel, moist (FILL)	St	M	5 10 15 20
0.50				Medium dense, red brown, clayey SAND trace, moist (FILL)	MD		
0.75				Medium dese, brown, sandy GRAVEL with clay, moist			
1.00				Stiff, brown to red brown mottled yellow, gravelly CLAY trace sand, moist	St		
1.50-1.95m	9, 6, 7 N = 13						
2.50				Extremely low strength, extremely weathered, yellow brown, sandy SILTSTONE	Rock		
2.70				Machine refusal at 2.70m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- ▼ water level (static)
- ▽ water level (at excavation)
- ◀▶ outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathed  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- ✕ shear vane test
- ⊥ pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- ▣ Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Bare earth

Northing: 8630471  
Easting: 0701266  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Very dense, light brown, sandy GRAVEL with silt, dry	VD	D	5 10 15 20
0.50				Very dense, light red brown to brown, sandy GRAVEL with silt, dry			
1.00				Stiff, red brown to brown, clayey SILT trace gravel, dry	St		
1.50	1.50-1.90m 13, 26, 24/100mm N = 50/250mm			Hard, brown to red brown mottled yellow, clayey SILT trace gravel, moist	H	M	
3.00	3.00-3.30m 20, 50/150mm N = 50/150mm			Extremely low strength, extremely weathered, white and brown mottled yellow SILTSTONE	Rock		
3.65				Machine refusal at 3.65m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static) ▼ water level (at excavation) ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered MW - Mod Weathered; HW - Highly Weathred XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance ranging to: 4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test ⊥ pocket penetrometer</p> <p>○ Environmental Sample ■ Undisturbed tube sample ● Disturbed sample ■ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose) L (loose) MD (medium dense) D (dense) VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa S (soft) 12-25 F (firm) 25-50 St (stiff) 50-100 VSt (very stiff) 100-200 H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Grass

Northing: 8630437  
Easting: 0701396  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Medium dense, brown, gravelly, silty SAND dry	MD	D	5 10 15 20
0.25				Stiff, red brown, sandy SILT some gravel and clay, dry	St		
0.50				Stiff to very stiff, red brown, gravelly, sandy CLAY dry	St-VSt		
1.50	1.50-1.90m 14, 24, 26/100mm N = 50/250mm			Hard, brown to red brown mottled white clayey SILT some gravel, dry	H		
3.00	3.00-3.38m 16, 24, 26/75mm N = 50/225mm			Extremely low strength, extremely weathered, white and brown mottled yellow SILTSTONE	Rock		
4.05				Machine refusal at 4.05m in very low strength or better			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathred  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Grass

Northing: 8630316  
Easting: 0701363  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Dense to very dense, brown to grey brown, silty SAND with gravel, dry	D-VD	D	5 10 15 20
0.50				Stiff to very stiff, brown to red brown spotted white, silty CLAY trace gravel dry	St-VSt		
1.50	1.50-1.91m 12, 23, 27/110mm N = 50/260mm			Extremely low strength, extremely weathered, white and brown spotted yellow and purple SILTSTONE	Rock		
3.70	3.00-3.32m 17, 31, 19/20mm N = 50/170mm			Machine refusal at 3.70m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- ▼ water level (static)
- ▽ water level (at excavation)
- ◀▶ outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathrd  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- ✕ shear vane test
- ⊥ pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- ▣ Bulk sample

DENSITY

- VL (very loose)
- L (loose)
- MD (medium dense)
- D (dense)
- VD (very dense)

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

MOISTURE CONDITION

D=dry M=moist W=wet



Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Access track

Northing: 8630353  
Easting: 0701260  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance		Consistency / Density	Moisture Condition	
				SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components			Dynamic Cone Penetrometer Blow Counts per 100mm 5 10 15 20
0.00				Very dense, brown, sandy GRAVEL with silt, dry	VD	D	
0.75				Stiff, brown to dark red brown, gravelly, sandy CLAY dry	St		
1.25	1.50-1.95m 5, 7, 5 N = 12			Stiff, red brown to brown mottled white and yellow, silty CLAY some sand and trace gravel, dry			
				Very stiff from 2m	VSt		
3.00	3.00-3.37m 20, 30, 20/70mm N = 50/220mm			Extremely low strength, extremely weathered, white mottled yellow and purple SILTSTONE	Rock		
3.75				Machine refusal at 3.75m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static) ▼ water level (at excavation) ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered MW - Mod Weathered; HW - Highly Weathed XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance ranging to: 4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test ⊥ pocket penetrometer</p> <p>○ Environmental Sample ■ Undisturbed tube sample ● Disturbed sample ■ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose) L (loose) MD (medium dense) D (dense) VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa S (soft) 12-25 F (firm) 25-50 St (stiff) 50-100 VSt (very stiff) 100-200 H (hard) &gt;200</p>
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## MINDIL ACES FOOTBALL CLUB

PO BOX 41730 CASUARINA NT 0811

ABN 55 502 598 020

### RE: PLAYING FIELD LIGHTING AT BAGOT PARK

As the current co-assignee of Bagot Park to City of Darwin, and the primary end user, Mindil Aces Football Club cannot emphasise enough, the value that lighting of the playing fields will bring to the current and future operations of the club.

Mindil Aces is likely the largest single code sporting club in the NT with 550 players registered in 39 teams. Each Sunday during the season, Bagot Park is visited by 800 to 1500 people in a festival of junior and senior football, and on weekday afternoons our teams jostle for space to train.

The club currently expends around \$6,000 per season in additional fees for other grounds to facilitate training.

The lighting of the playing fields will provide many benefits, including the following:

- Relief for parents, players, officials and volunteers who currently endure the heat of middle of the day games;
- Ability for all the club's teams to train at the home ground;
- Improve the retention of players in the later teenage years as they will be training in proximity to seniors, streamlining and improving the pathway for this age group;
- Ability for senior players to coach junior teams at the same venue;
- Junior players and their parents become more familiar with senior players, increasing support for the senior teams;
- Relief for some parents of two or more players who currently have to visit two grounds twice weekly to drop off and collect their kids for training;
- Ease the burden on volunteers with spread of competition games over evening time slots;
- Reduce the cost of running the club without the need to hire other grounds.

In addition to the above, bringing together all the teams to their home location will help merge the junior and senior arms of the club in playing, supporting and administration areas. This is something the club has strived for over past years but seniors training elsewhere has presented a significant hurdle.

Should Council require any further input regarding this issue, please contact the undersigned.

David McWilliam

President, Mindil Aces Football Club.

[dmc@gimbells.com.au](mailto:dmc@gimbells.com.au)

Ph: 0418 894 954

## Bagot Oval Operations Post the Installation of Lights

A statement from the President of Mindil Aces Football Club and the CEO of Football Federation Northern Territory.

### **Traffic management**

As demonstrated when FFNT installed traffic management barriers around the Bagot Oval car park it is clear how important that traffic barriers, like bollards, were to managing the traffic in the area. Not only the traffic within the car parks, or those entering or exiting the car park but also the traffic using Old Mc Millans rd as a thoroughfare.

It is essential that bollards be installed along the car park, parallel to the road to stop vehicles driving over the gutter as soon as possible.

Another matter raised in our extensive communications with the residents was the noise of the cars on the current car park surface. This surface is made up of loose gravel. This can be addressed with either a full resurfacing of the car park or an active policy of sweeping by truck the surface fortnightly in-season.

We strongly advocate for the installation of high visibility speed limit signage within the car park and again in Old McMillans rd.

Council parking officers patrolling the car parking in the street should be encouraged. We believe no vehicles should park on the Bagot Oval side of Old McMillans road.

FFNT and Mindil Aces FC have and will continue to ensure all members and users are aware of the traffic use policies for Bagot Oval.

For example, we advocate compulsory reversing into car parks that face the residents across the road. This would limit the glare of headlights during night training and playing. We encourage the Council to paint these particular bays and install signage that notifies drivers of the reverse only option.

Strict adherence to the internal speed limits, especially at night would be enforced by Mindil Aces and its members. Consequences for breaching these parking policies would be internal Club and FFNT fines.

Members/users will receive the traffic use policy in their registration packs and be highlighted on both organisations digital platforms. The Mindil Aces Football Club committee and FFNT staff will randomly patrol the car park to observe traffic behaviours.

### **Local Amenity**

MIndil Acees as the primary user during the football in-season months already manages the rubbish removal from Bagot Oval and general upkeep of their Club house. FFNT has commended Mindil Aces FC several times for their presentation standards...including their management of refuse. We believe it is working sufficiently well for all stakeholders. The only exceptions have been when itinerants have camped in and around the Club house and left rubbish and belongings. On these occasions Mindil has cleaned up this activity as well.

As Bagot Oval is MIndil's members home away from home for children and their families and one of Football NT's primary training and playing venues we are both always concerned with antisocial behaviour in or around the venue. We would strongly argue that our presence at Bagot Oval in fact dramatically and identifiably reduces the chance for antisocial behaviour. Of course, if such behaviour was observed both the Club members and FFNT staff would promptly report such behaviour to the relevant authorities. We would also engage with the authorities in follow up actions.

### **Operational Hours**

FFNT and Mindil Aces FC are in total agreement with regards to the reduction in operating hours as suggested by some local residents. We suggest a move from 10.00pm to a time of 9.15pm which would allow for 15 minutes of egress for player and patron safety at exit.

Thanking you

Dave McWilliam

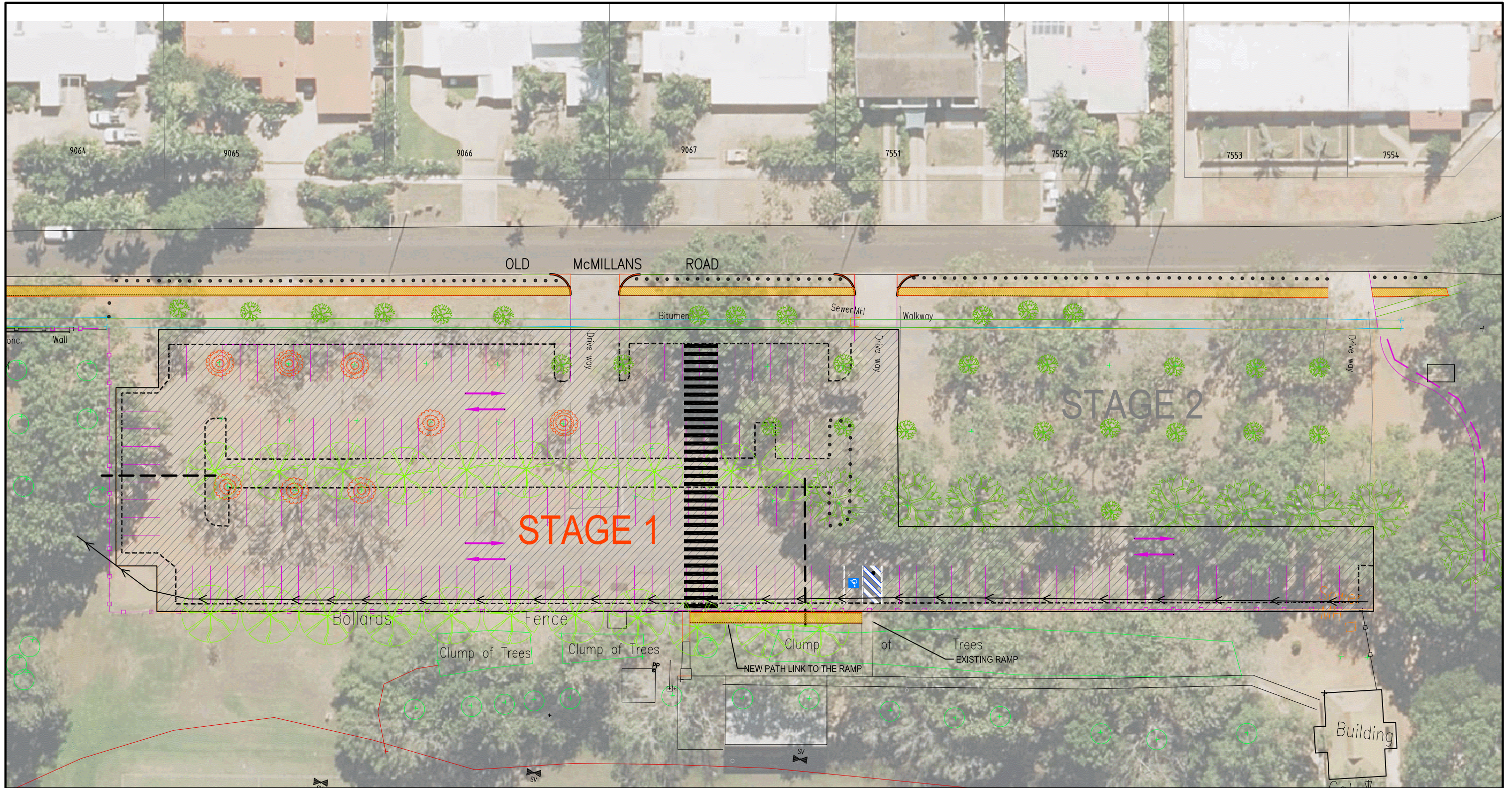
President Mindil Aces Football Club

Bruce Stalder








CEO Football Federation Northern Territory

Monday 12 November 2018.

# ATTACHMENT C



**LEGENDS :**

-  REMOVE TREES
-  NEW TREE
-  NEW RESEAL AREA
-  IRRIGATION CONDUIT
-  GAP KERB
-  PLASTIC BOLLARDS
-  NEW FOOTPATH

**INFORMATION ONLY**

DRAWN HC	DESIGNED HC	BAGOT OVAL CARPARK OPTION 4 CONCEPT PLAN
SCALE AS SHOWN	CHECKED	
APPROVED	DATE OCT'17	
SHEET OF	SHEET SIZE A1	DRAWING No.



<b>ENCL: YES</b>	<b>2ND ORDINARY COUNCIL MEETING /OPEN</b>	<b>AGENDA ITEM: 14.1.3</b>
<b>NIGHTCLIFF OVAL LIGHTS</b>		
<b>REPORT No.: 18CL0089 CB:kl</b>	<b>COMMON No.: 3246533</b>	<b>DATE: 27/11/2018</b>

**Presenter:** Recreation & Leisure Coordinator, Clare Beacham

**Approved:** General Manager Community & Regulatory Services,  
Polly Banks

### **PURPOSE**

The purpose of this report is to present to Council the detailed design for the proposed lights at Nightcliff Oval and the responses to key concerns raised during community consultation.

### **LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

#### **Goal**

2 Vibrant, Flexible and Tropical Lifestyle

#### **Outcome**

2.3 Increased sport, recreation and leisure experiences

#### **Key Strategies**

2.3.2 Position Darwin as a host centre for local, national and international sport and other events

### **KEY ISSUES**

- Northern Territory Government has committed \$3.5M for City of Darwin to light sports ovals under the NT Government Urban and Regional Oval Lights Program.
- In December 2017, Nightcliff Sports Club submitted a proposal to Council for lighting at Nightcliff Oval.
- Council undertook a community engagement process for the proposal, with the outcomes to inform a detailed design and documentation.
- In June 2018 Council engaged Harris Kmon Solutions Pty Ltd (HK Solutions) to develop the detailed design and documentation for the Nightcliff Oval lights.
- HK Solution's electrical and lighting design for Nightcliff Oval has been reviewed by Council Officers and deemed appropriate for the application.
- Council Officers have engaged with local residents and stakeholders to address the concerns raised in the community consultation process.

PAGE: 2  
 REPORT NUMBER: 18CL0089 CB:kl  
 SUBJECT: NIGHTCLIFF OVAL LIGHTS

## **RECOMMENDATIONS**

- A. THAT Report Number 18CL0089 CB:kl entitled Nightcliff Oval Lights, be received and noted.
- B. THAT Council proceed with installation of lighting at Nightcliff Oval as per the specifications detailed at **Attachment A** of Report Number 18CL0089 CB:kl entitled Nightcliff Oval Lights subject to available funding.
- C. THAT tenders be invited on a Construct basis and assessed on value for money, whole of life costs and warranties provided, and that consideration also be given to solutions that demonstrate the least impact on surrounding residential neighbours providing innovation in design.
- D. THAT the hours of use for lights at Nightcliff Oval be restricted to no later than 9.00pm Sunday to Thursday and 9.30pm Friday and Saturday.
- E. THAT agreements with sporting associations detail the following lighting operational parameters, to be reviewed on an annual basis:

Day	Time	Lux Level
Monday	6:00-9:00pm	100 lux (training)
Tuesday	6:00-9:00pm	100 lux (training)
Wednesday	6:00-9:00pm	100 lux (training)
Thursday	6:00-9:00pm	100 lux (training)
Friday	6:00-9:30pm	200 lux (matches)
Saturday	6:00-9.30pm	200 lux (matches)
Sunday	6:00-9:00pm	200 lux (junior matches)

## **BACKGROUND**

DECISION NO.22\0668 (24/04/18)

### **Nightcliff & Bagot Oval Lights - Consultation Outcomes**

Report No. 18CL0037 MG:kl (24/04/18) Common No. 32346533

- B. *THAT based on the outcomes of the community consultation, Council provide in-principle support for the lighting of Nightcliff and Bagot Ovals to a maximum lumen capacity of 200LUX to enable the development of detailed design, documentation and cost estimates inclusive of whole of life costs.*
- C. *THAT the concerns of the community as identified in Report Number 18CL0037 MG:kl Nightcliff & Bagot Oval Lights - Consultation Outcomes be taken into consideration in the planning and design of lighting for Nightcliff and Bagot Ovals.*
- D. *THAT a further report be presented to Council for project endorsement for Nightcliff and Bagot Oval lights based on the finalised design and cost.*

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 REPORT NUMBER: 18CL0089 CB:kl  
 SUBJECT: NIGHTCLIFF OVAL LIGHTS

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DECISION NO. 22\0309 (12/12/17)

**Nightcliff and Bagot Oval Lights**

Report No. 17CL0044 MG:es (12/12/17) Common No. 3246533

- B. THAT Council undertake a Level “Consult” community engagement process regarding the proposals to install lighting to a maximum lumen capacity of 200 lux at Nightcliff and Bagot Ovals.
- C. THAT a further report be presented to Council following the community engagement process.

DECISION NO. 21\5490 (13/06/17)

**Northern Territory Government’s Urban and Regional Oval Lights Program**

Report No. 17C0043 AM:kl (13/06/17) Common No. 3246533

- B. THAT Council accept the Northern Territory Government’s offer of \$3.5 million (plus GST) over the 2017-18 and 2018-19 financial years for the purposes of lighting urban sporting ovals, including Gardens Oval 1.
- C. THAT Council write to the Northern Territory Government indicating its acceptance of the funding offer for lighting urban sporting ovals, including Gardens Oval 1, and that decisions to light other urban sporting ovals are subject to budget and a needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation process.

DECISION NO.21\3813 (13/10/15)

**Nightcliff Sports Club – Nightcliff Oval Precinct Feasibility Study**

Report No. 15C0129 MG:sc (13/10/15) Common No. 3225891

- B. THAT Council endorse the letter to the Nightcliff Sports Club at Attachment C to Report No. 15C0129 MG:sc entitled Nightcliff Sports Club – Nightcliff Oval Precinct Feasibility Study.

The letter at **Attachment C** to Report No. 15C0129 provided in-principle support for Nightcliff Sports Club to seek NTG and Peak Sporting Bodies funding for ground improvements outlined in their presentation, which included sports field lighting.



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 SUBJECT: NIGHTCLIFF OVAL LIGHTS

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## **DISCUSSION**

At the 1st Ordinary meeting on 13 June 2017, Council accepted the Northern Territory Government (NTG) offer of \$3.5 million (plus GST) over the 2017-18 and 2018-19 financial years for the purpose of lighting urban sporting ovals, including Gardens Oval One. Council also wrote to the NTG to advise that decisions to light other urban sporting ovals would be subject to budget and needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation process.

In December 2017, Nightcliff Sports Club submitted a proposal to Council for lighting at Nightcliff Oval. Council then undertook a community engagement process for the proposal.

In April 2018, following the community consultation, Council provided in-principle support to develop a detailed design for the lighting of Nightcliff Oval to a maximum lumen capacity of 200 lux.

In June 2018 HK Solutions were engaged to develop the detailed design and documentation for the lights, taking into consideration the concerns of the community identified in the consultation process.

HK Solutions has provided a Lighting Design, Summary Report and Geotechnical Report for Nightcliff Oval at **Attachment A**. The consultant's investigations considered both HID and LED lighting systems and while both were found to provide the required 200 lux field of play illuminance, LED lighting was unable to achieve obtrusive lighting compliance on adjacent residential areas. HK Solutions recommend that a HID system be used in order to achieve the field of play lighting configuration whilst complying with obtrusive lighting requirements.

### **Design**

To achieve the required 200 lux field of play lighting, the design specifies 4 x 30m lighting poles with a total of 37 luminaires.

### **Lighting Controls**

Lighting will be operated by a user pay controller with remote configuration, monitoring and control.

The system will be configured to only operate between designated times and the control system will allow users to select from 3 different levels of lux as detailed below:

<b>Switch Mode</b>	<b>Lux Level</b>	<b>Activity</b>
Level 1	50 lux	Training Level 1
Level 2	100 lux	Training Level 2
Level 3	200 lux	Football Competition

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 REPORT NUMBER: 18CL0089 CB:kl  
 SUBJECT: NIGHTCLIFF OVAL LIGHTS

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The system will allow for remote SMS user activation/de-activation, removing the need for a swipe card.

### Site limitations

No trees will need to be removed or pruned to install the light poles.

Trenching for electrical cables is proposed to be done around the perimeter of the oval. Contractors will be required to liaise with Council's Parks Team prior to trenching and if there is potential for damage to tree roots there is an option to run electrical cables across the oval to avoid root damage as much as possible.

### Electrical Upgrade

Due to the increased electrical demand for the proposed HID lighting system a new and upgraded incoming power supply and metering panel will be required.

Power and Water Corporation have assessed the impact of an additional 142kVA site peak demand and advised that a new supply will be required and have recommended sourcing this from an existing PWC substation located to the North West of the site. The cost for this upgrade is required to be met by Council as part of the project costs.

### Ongoing operational and maintenance costs

The operating costs of the lights will be met by a user pay system. Operating costs have been calculated for each switch mode:

Switch mode	Lux Level	Run Cost per hour
Training 1	50 lux	\$4.52
Training 2	100 lux	\$8.58
Match	200 lux	\$16.70

Ongoing maintenance of the lights will be undertaken by Council. This will be detailed as part of Council's Asset Management Plan.

The expected lifespan of the system is 25 years, regular maintenance of luminaires and control gear is recommended to maintain lighting levels on the oval. The Metal Halide lamps have a rated life of 6000 hours, based on usage profiles servicing is suggested on a 3-year cycle at an estimated cost of \$3,500 per year.

### Community Consultation

There was overwhelming support for installation of lights at Nightcliff Oval (97% of survey respondents and 90% from door knocking). Only one written submission was opposed. During community consultation there were a number of concerns raised by both people that supported and opposed the project. Stakeholders have provided details of how they will address these community concerns at **Attachment B**.

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### Traffic Management

The primary concerns were regarding parking and traffic management, including lack of available parking, increases in night time traffic and parking on side streets.

Council has liaised with stakeholders and will consult with residents in side streets to paint yellow no parking lines close to resident driveways.

Stakeholders will implement an education campaign with members to change behaviour of parking, then monitor parking situation. Nightcliff Football Club will also increase available on-street parking by allowing officials to park inside the perimeter fence during game days.

Council and stakeholders will also consider locating a pedestrian gate in the middle of the perimeter fence on Oleander Street. This would be used as spectator entry for game days to deter people from parking in side streets close to the vehicle access gate.

### Local amenity

Other concerns included residents being negatively impacted by light spill and anti-social behaviour. The design for lighting at Nightcliff Oval has taken into account the effects of glare on players, spectators and residents in the surrounding area. The proposed design complies with Australian Standards AS4282 – Control of the Obtrusive Effects of Outdoor Lighting and Australian Standards AS2560.2.3 – Sports Lighting – Lighting for Football.

HK Solution's Summary Report provides computer modelling and illustrations to identify compliance in relation to obtrusive light and light spill. The luminaires are designed to have zero direct upward light and are supplied with glare shield and rear visor to minimise light spill.

Stakeholders have in place codes of conduct that specifically address anti-social behaviour to ensure the safety and comfort of patrons and participants. They have committed to monitoring anti-social behaviour around the oval, including reporting any issues to the appropriate authorities. Consideration will also be made to investigating night closure of the oval gates should issues of late night anti-social behaviour arise. AFL NT and Nightcliff Football Club have signed an oval user agreement with City of Darwin that requires them to remove all rubbish from the site after use.

### Operational Hours

AFL and Nightcliff Football Club have proposed lights will be in operation no later than 9.00pm Monday to Thursday for training. They have stated that Friday and Saturday night matches will cease by 9.00pm, however have requested lights be in operation at a reduced lux level until no later than 9.30pm to ensure patron and player safety as they exit the area.

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 SUBJECT: NIGHTCLIFF OVAL LIGHTS

Day	Time	Lux Level
Monday	6-9pm	100 lux
Tuesday	6-9pm	100 lux
Wednesday	6-9pm	100 lux
Thursday	6-9pm	100 lux
Friday	6-9.30pm	200 lux (matches)
Saturday	6-9.30pm	200 lux (matches)
Sunday	6-9.00pm	200 lux (junior matches)

The recommendation in this report is for operational hours in line with the stakeholder request. Council may however wish to consider 9.00pm as the standard curfew for all oval lighting, as per its decision regarding the operational parameters of lights at Gardens Oval.

The design has incorporated a lighting control system that will automatically switch off lighting at the designated time. Use of the facility by sporting groups is subject to seasonal allocation agreements, the agreements will be revised to include conditions regarding the operational use of the lights. It is recommended that operational hours are defined by Council decision. However, it is foreseeable that there may be special one-off events or competitions and Council should reserve the right to approve the use of lights for these events on case by case basis.

### **Conclusion**

Based on the specifications and information provided in the Summary Report and the responses from Nightcliff Football Club, AFL NT and Nightcliff Sports Club to the key concerns from community consultation this report recommends that Council proceed with installation of lighting at Nightcliff Oval, subject to funding availability.

### **Next Steps**

If Council endorses the installation of lights at Nightcliff Oval the following steps are required:

1. Obtain independent Quantity Surveying cost estimates for the lighting design.
2. Prepare and lodge an application for a development permit to construct 4 x light towers. It is anticipated application will be considered at the Development Consent Authority (DCA) hearing in March 2019.
3. Finalise the Urban & Regional Oval Lights Funding Agreement to determine funding availability.
4. Issue a tender for construction of the lighting.

### **CONSULTATION PROCESS**

This report was considered by the Executive Leadership Team on 12 November 2018 and is now referred to Council for consideration.

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In preparing this report, the following City of Darwin officers were consulted:

- Executive Manager Leisure and Regulatory Services
- Manager Engagement and Participation
- Executive Manager Waste and Capital Works
- Senior Capital Works Coordinator
- Coordinator Parks and Reserves

In preparing this report, the following External Parties were consulted:

- Nightcliff Sports Club
- Nightcliff Football Club
- AFL NT
- Harris Kmon Solutions Pty Ltd
- Director Asset Management, Community Participation, Sport and the Arts, Department of Tourism and Culture

### **POLICY IMPLICATIONS**

City of Darwin Policy No. 046 - *Recreation and Healthy Lifestyle* provides a framework to support equitable and inclusive use and management of Council's network of active reserves and recreation facilities.

This report is also consistent with the strategy and actions outlined in the *Sports Field Plan 2016 – 2026*, specifically to “in partnership with relevant Peak Sporting Bodies and clubs, support the provision of training lights on a case-by-case basis, having regard to site conditions, constraints and demonstrated demand.”

### **BUDGET AND RESOURCE IMPLICATIONS**

NT Government has committed \$3.5M to City of Darwin for the lighting of sports ovals in 2017/18 and 2018/19 under the Urban and Regional Oval Lights Program. An amount of \$250,000 has been provided to City of Darwin from this commitment through a funding agreement to develop detailed design, documentation and cost estimates for sporting oval lighting projects.

Council indicated acceptance of the funding offer for lighting sporting ovals, including Gardens Oval One, and informed NTG that decisions to light other sporting ovals would be subject to budget, a needs based analysis, consultation with peak sporting organisations and the outcomes of a community consultation.

HK Solutions has provided Council with cost estimates for the construction and installation of lights at Nightcliff Oval. As Council may proceed to tender the estimate has not been included in this Report. In addition Council officers are obtaining an independent Quantity Surveying cost estimate for the lighting design.

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### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

This report details how the key concerns of the respondents opposing the project can be mitigated, however it should be expected that there will always be a cohort of individuals dissatisfied with the decision to proceed with the proposal.

### **ENVIRONMENTAL IMPLICATIONS**

If approved by Council the lighting proposal will also need Development Consent, which will require further assessment of any environmental impacts.

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**CLARE BEACHAM**  
**RECREATION & LEISURE**  
**COORDINATOR**

**POLLY BANKS**  
**GENERAL MANAGER**  
**COMMUNITY AND REGULATORY**  
**SERVICES**

For enquiries, please contact Polly Banks on 89300633 or email:  
 p.banks@darwin.nt.gov.au.

#### **Attachments:**

- Attachment A:** Lighting Design Summary Report and Geotechnical Report – Nightcliff Oval  
**Attachment B:** Stakeholder responses to community consultation findings



**City of Darwin**  
**Nightcliff Oval**

**Electrical and Lighting**  
**Summary**

**November 2018**

[www.hksolutions.com.au](http://www.hksolutions.com.au)

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Appendix A Reference Documentation

Appendix B Proposed Lighting Plan

Appendix C Luminaire Datasheets



## 1. Overview

### 1.1 Introduction

Nightcliff Oval is managed and maintained by the City of Darwin and is located 20 Oleander Street Nightcliff. The Oval is nestled adjacent to urban residential housing to its east and west and commercial facilities including the Nightcliff Sports Club to its South and Nightcliff Primary School to the North. The Oval is predominantly used for sports training and competition with its main users being Nightcliff Cricket Club during the Dry Season and Nightcliff Football Club during the Wet Season.

City of Darwin propose to provide lighting to the sporting field of play for training (50lux and 100 lux) and competition (200 lux) with consideration of the light spill and obtrusive lighting to the surrounding area.

This electrical and lighting summary assessment will provide a summary of the existing site electrical and lighting infrastructure, its current performance and provide HID (High-Intensity Discharge Metal Halide) and LED (Light Emitting Diode) lighting recommendations for the proposed works. In addition a comparison life cycle assessment will be undertaken of metal halide versus LED lighting systems.

The information provided below is a feasibility summary for proposed lighting upgrade works and based on an inspection by Harris Kmon Solutions Pty Ltd engineer on the 1<sup>st</sup> of June 2018. This Summary Report has been prepared by Harris Kmon Solutions Pty Ltd for City of Darwin and is not to be relied upon by anyone other than City of Darwin. It is provided for the purpose of information only and is not to be used for any other purpose. It is subject to the limitations and assumptions as set out in the report and generally as listed below:

- Assessment is based on visual inspection only and no testing of any kind was undertaken
- Inspection was undertaken of visible, safely accessible areas only

Harris Kmon Solutions Pty Ltd takes no responsibility for errors caused as a result of the limitations and assumptions.

The opinions, conclusions and any recommendations in this report are based on conditions encountered at the date of inspection. Harris Kmon Solutions Pty Ltd has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the inspection was undertaken.

### 1.2 Reference Documentation

The following is a summary of reference documentation provided by City of Darwin relating to the electrical and lighting systems for Nightcliff Oval. See Appendix A for a copy of all reference documentation.

<b>Document Number</b>	<b>Document Type</b>	<b>Date</b>	<b>Title/Description</b>
NFC002/SK4	Drawing	May 2017	Proposed Grandstand and Club Amenities (Master Plan)
-	Sketch Drawing	June 1993	Nightcliff Oval electrical sketch

## 2. Existing Installation

### 2.1 Site Electrical Supply

The site electrical supply is sourced from the electrical authority, Power and Water Corporation's (PWC) LV Pillar "P071NC" located adjacent the Oval on Oleander Street. The LV Pillar supplies an underground single phase electrical main into the site and to a pole mounted metering panel/main switchboard. The metering panel houses two PWC single phase meter's which provide separate metered electrical supplies to the on-site Social club and Oval amenities (eg. Oval toilets, Amenities block). The Oval amenities switchboard is located pole mounted back to back with the metering panel and the Social club switchboard is in the social club.



Figure 1 – (L) PWC LV Pillar (R) Pole mounted Meter Panel and Amenities Switchboard



Figure 2 – (L) Metering Panel – Door Open (R) Amenities Switchboard – Door Open

Reference documentation provided by City of Darwin indicate that the incoming supply from PWC's network is an underground single phase LV 16mm<sup>2</sup> Cu insulated cable. This cable has an estimated single phase supply capacity of 100A, however the site electricity supply is limited by the metering panel main switch (rated at 80A) and PWC's supply protection device (fuse) located in the LV Pillar, which is unknown. In any case it is likely that the supply to the site will need to be upgraded to three phase as part of the proposed sports lighting works.

### 3. Sportslighting System

#### 3.1 General

There is currently no sports lighting to Nightcliff Oval, which is a natural grass field with an oval principal playing area (PPA) for Australian Rules of approximately 150m long (North-South) and 130m wide (East-West). The Oval is located centrally within the site and has a number of challenges with regards to the placement of lighting poles, which include:

- Existing water easement traversing through property
- Constrained area for lighting poles in South East boundary between site and Sporting Club
- Location of on-site facilities such as kiosk, viewing platforms, ablution block etc
- Location of field boundary fencing. The fencing does not follow PPA but extends further North and South of PPA.
- Tightly constrained by residential properties.

An overview of the proposed lighting plan is shown in Appendix B.

Software lighting calculations were undertaken using AGI32 version 18.3.2 to develop the principal playing area lighting design and assessment of obtrusive lighting.

There are two main Australian Standards that apply to the lighting performance of Australian Rules playing areas and the assessment of obtrusive lighting to adjacent areas, which include:

- AS 2560.2.3-2007 Sports Lighting - Specific applications - Lighting for football (all codes)
- AS 4282-1997 Control of the obtrusive effects of outdoor lighting

Table 1 and 2 below summarise the key LTP performance criteria that apply to the software design calculations for the lighting of the PPA and the obtrusive lighting to adjacent areas.

**Table 1 – AS2560.2.3 Summary of key LTP Criteria**

Level of Play	Maintained Average horizontal Illuminance Eav (lux)	Uniformity Ratio U <sub>1</sub> , Min/Avg	Uniformity Ratio U <sub>2</sub> , Min/Max
Physical training	>50	>0.3	N/A
Match practice	>100	>0.5	>0.3
Ball training, junior and minor grade competition	>200	>0.6	>0.4

**Table 2 – AS4282 Summary of key LTP Criteria (pre-curfew only)**

LTP	Calculation condition	Commercial boundaries	Residential boundaries* <sup>1</sup>
Illuminance in vertical plane (Ev)	Pre-Curfew* <sup>2</sup>	25 lux	10 lux
Luminous Intensity (I)	Pre-Curfew* <sup>2</sup>	7,500 cd	7,500 cd
Threshold Increment (TI)	Applies to all users of transport system	20% based on adaptation luminance of 10 cd/m <sup>2</sup>	20% based on adaptation luminance of 1 cd/m <sup>2</sup>

\*<sup>1</sup> Maximum values are based on residential light surrounds where street lighting is adjacent property.

\*<sup>2</sup> Pre-curfew condition is the operation of the lighting system up until a designated curfew time only (typically 10pm to 11pm).

Two lighting systems options will be assessed, which include one HID lighting solution and one LED lighting solution. The selection of each light fitting will be based on its availability, local support, suitability for the installed environment, range of lighting optical modifiers and compliance with LTP criteria. As such the following light fittings have been selected for the assessment (See Appendix B for datasheets):

**Table 3 – Light fitting selections**

Manufacturer and model	Type	Rating (W)	Luminaire luminous flux (lm)	IP Rating
Thorn Champion	HID	2kW	160,600	IP66
Philips Optivision LED gen2 BVP525	LED	1.39kW	150,000	IP66



**Figure 3 – (L) Thorn Champion (R) Philips Optivision**

### 3.2 Field of Play Lighting Results

The lighting desktop calculations were calculated on the Nightcliff Oval PPA with the following design basis:

- Principal Playing Area (PPA) oval size 150m long x 130m wide
- PPA surface reflectance 0.24
- HID maintenance factor of 0.8

- LED maintenance factor of 0.85
- Calculation points on a 5m x 5m grid across PPA

To achieve compliance with the AS2560.2.63 50 lux, 100 lux and 200 lux LTP's 4 x 30m lighting poles will be required.

A consolidated summary of the HID and LED lighting system PPA LTP's are shown in the Tables 4 to 6 below and accompanying lighting output PPA and light spill plans are shown in Figure 4 to Figure 15.

**Table 4 – Summary of PPA 200 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Eav	U1	U2	AS2560.2.3 Compliant
Thorn Champion HID	4 x 30m	37	205 lux	0.63	0.40	Yes
Philips Optivision LED	4 x 30m	38	202 lux	0.64	0.48	Yes

**Table 5 – Summary of PPA 100 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Eav	U1	U2	AS2560.2.3 Compliant
Thorn Champion HID	4 x 30m	21	117 lux	0.54	0.30	Yes
Philips Optivision LED	4 x 30m	38 (dimmed at 50%)	100 lux	0.65	0.49	Yes

**Table 6 – Summary of PPA 50 lux Lighting Results**

Manufacturer and model	Total no. of Poles	Total No. of lights	Eav	U1	U2	AS2560.2.3 Compliant
Thorn Champion HID	4 x 30m	10	55 lux	0.44	N/A	Yes
Philips Optivision LED	4 x 30m	38 (dimmed at 25%)	50 lux	0.64	N/A	Yes

Figure 4 – Thorn Champion HID – 200 Lux PPA

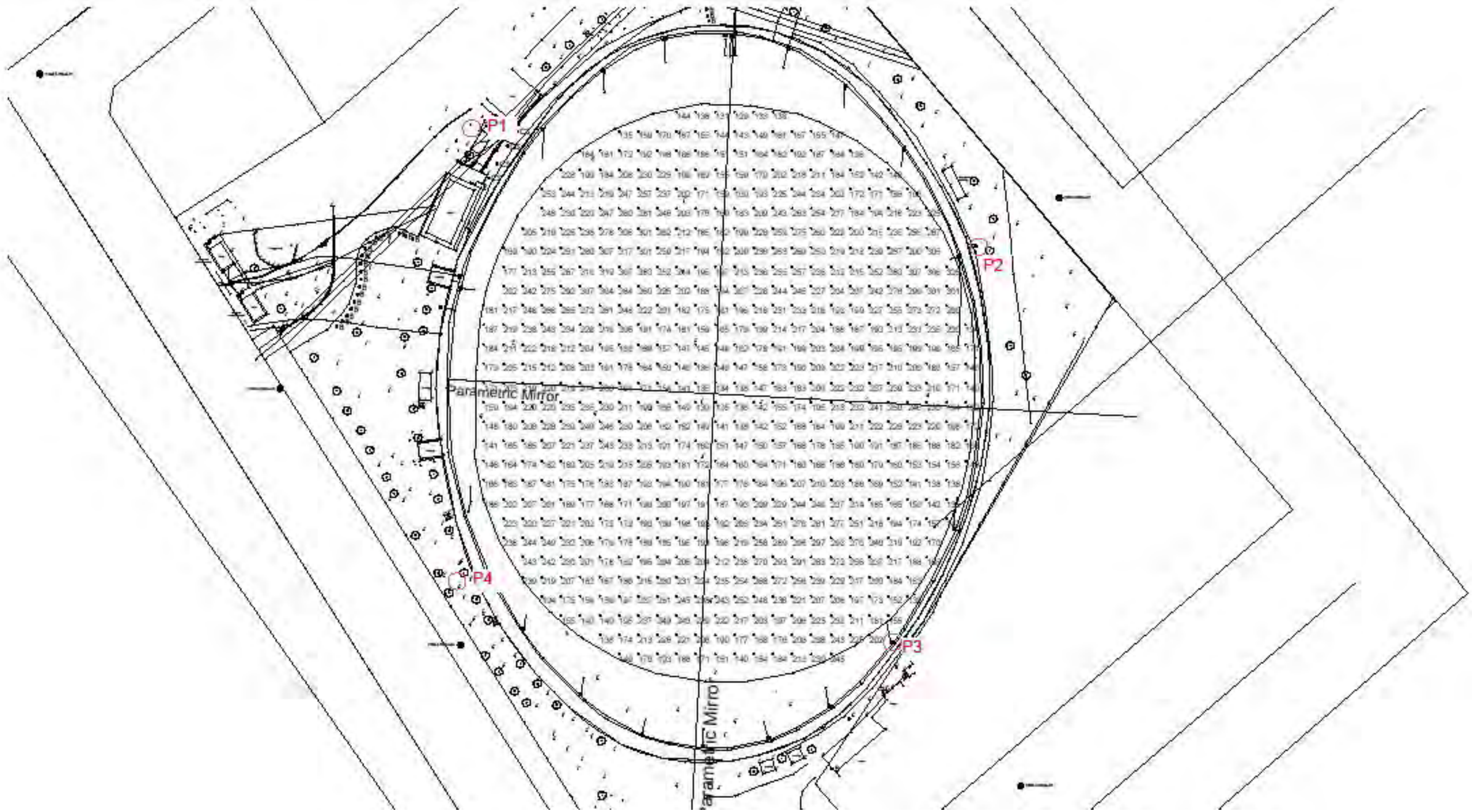


Figure 5 – Thorn Champion HID – 200 Lux Light Spill

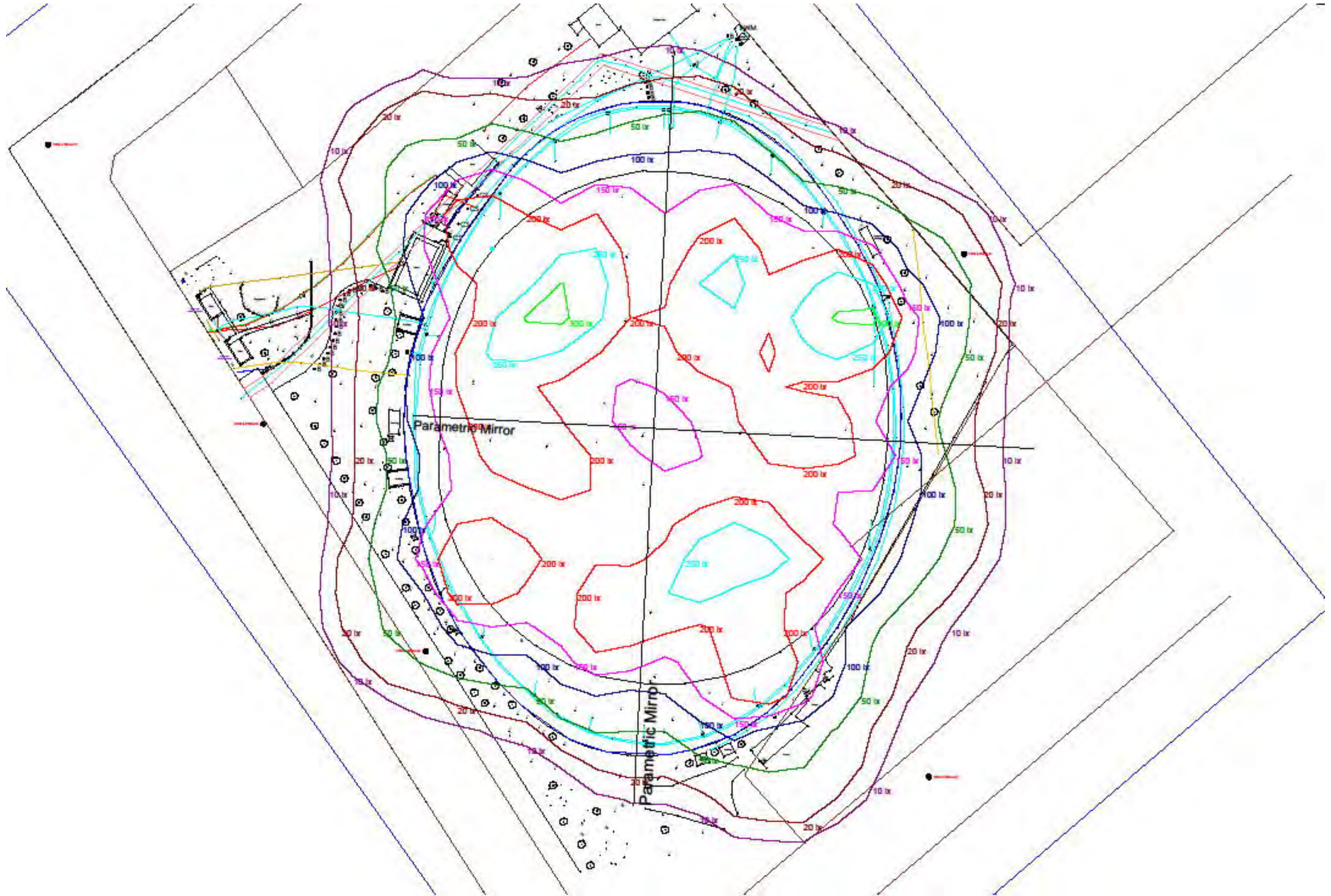




Figure 6 – Thorn Champion HID – 100 Lux PPA

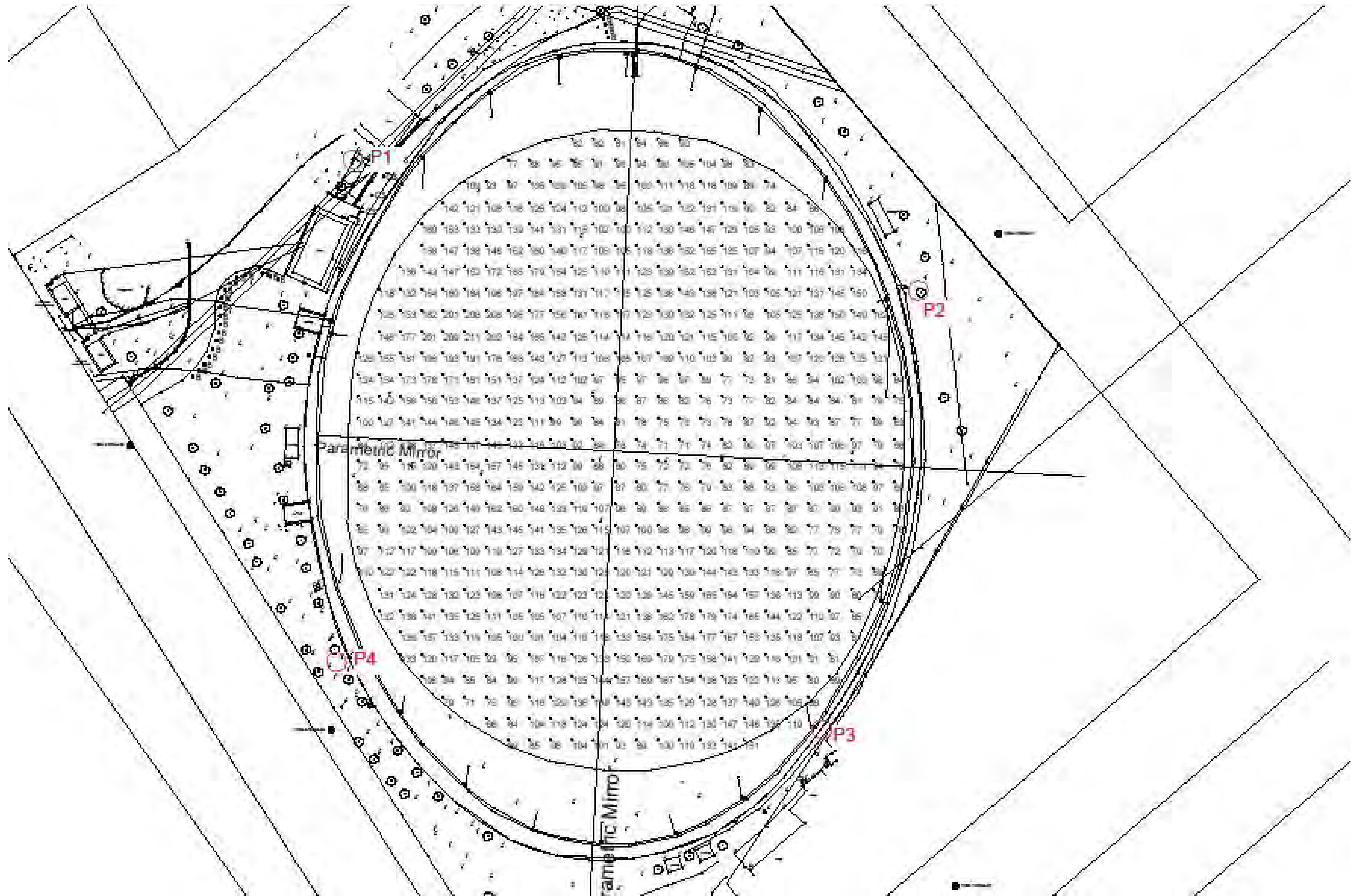


Figure 7 – Thorn Champion HID – 100 Lux Light Spill

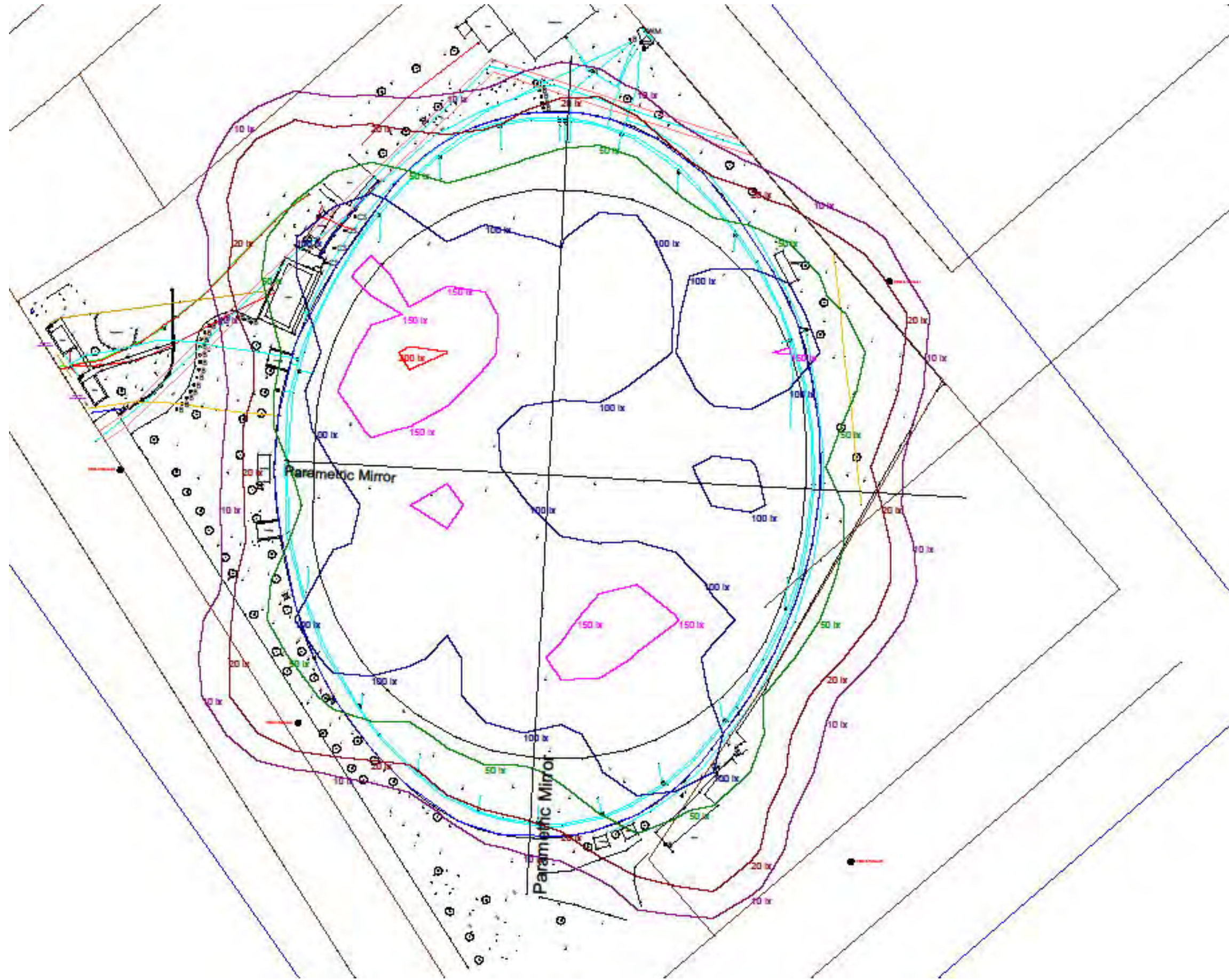


Figure 8 – Thorn Champion HID – 50 Lux PPA

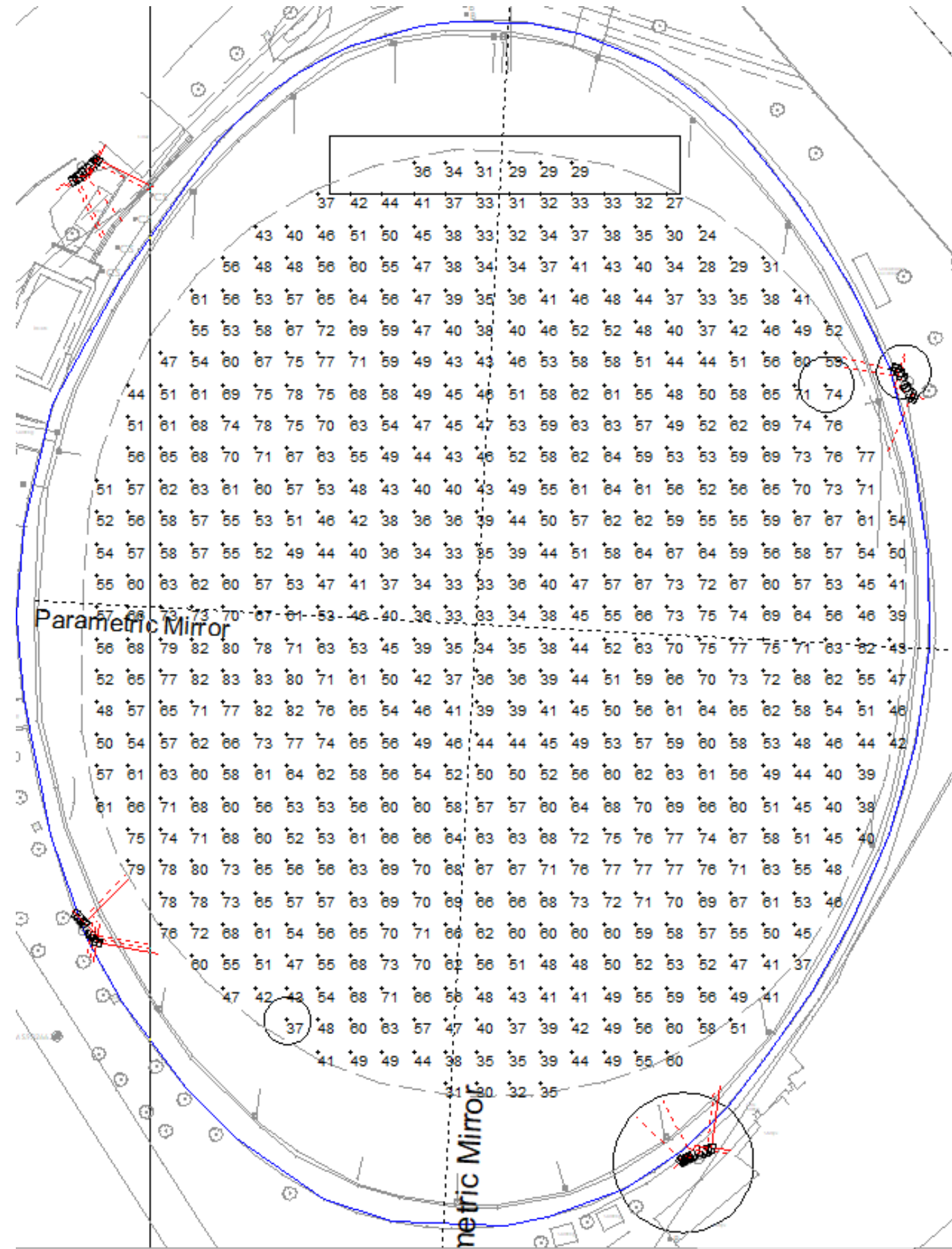


Figure 9 – Thorn Champion HID – 50 Lux Light Spill

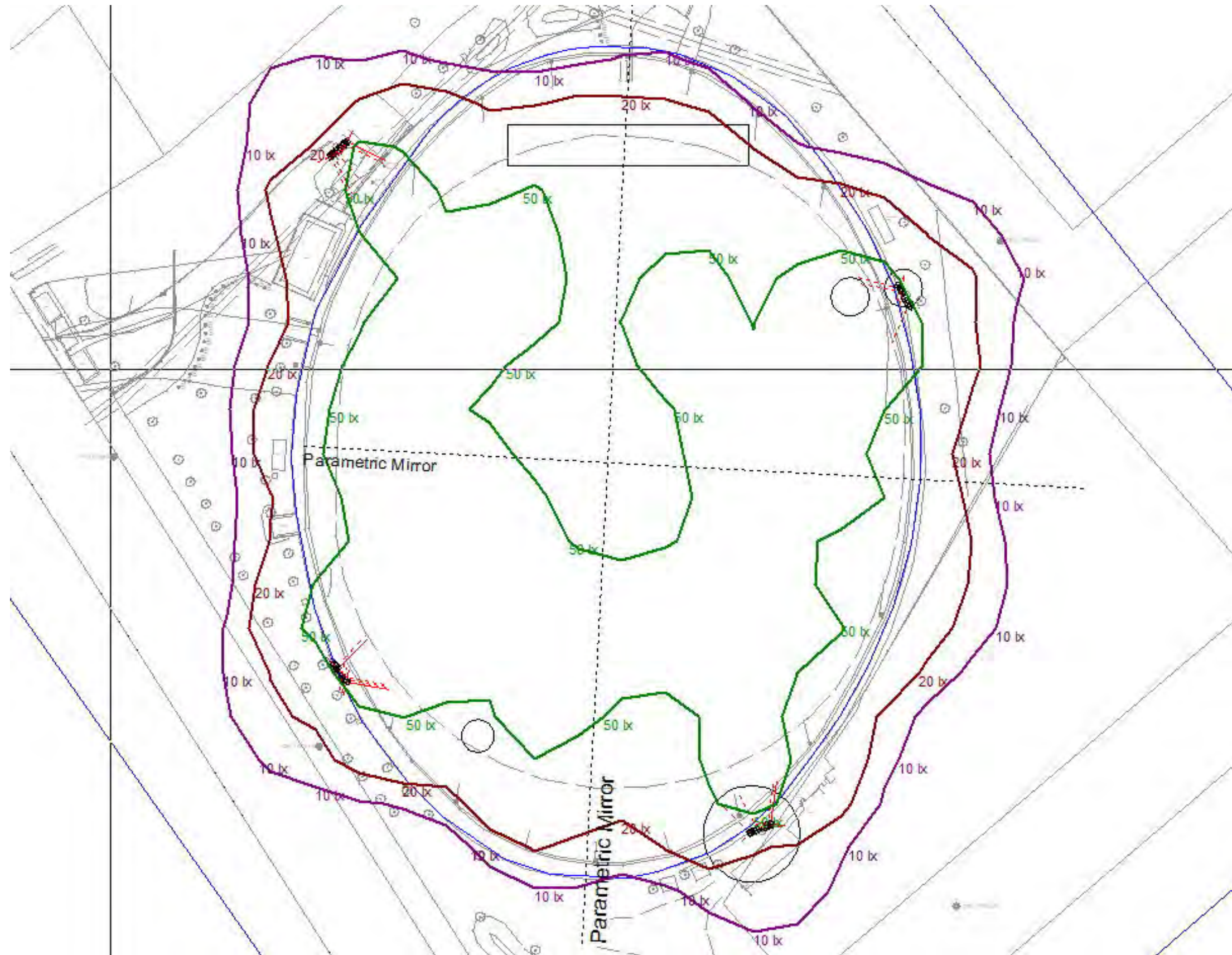


Figure 10 – Philips Optivision LED – 200 Lux PPA

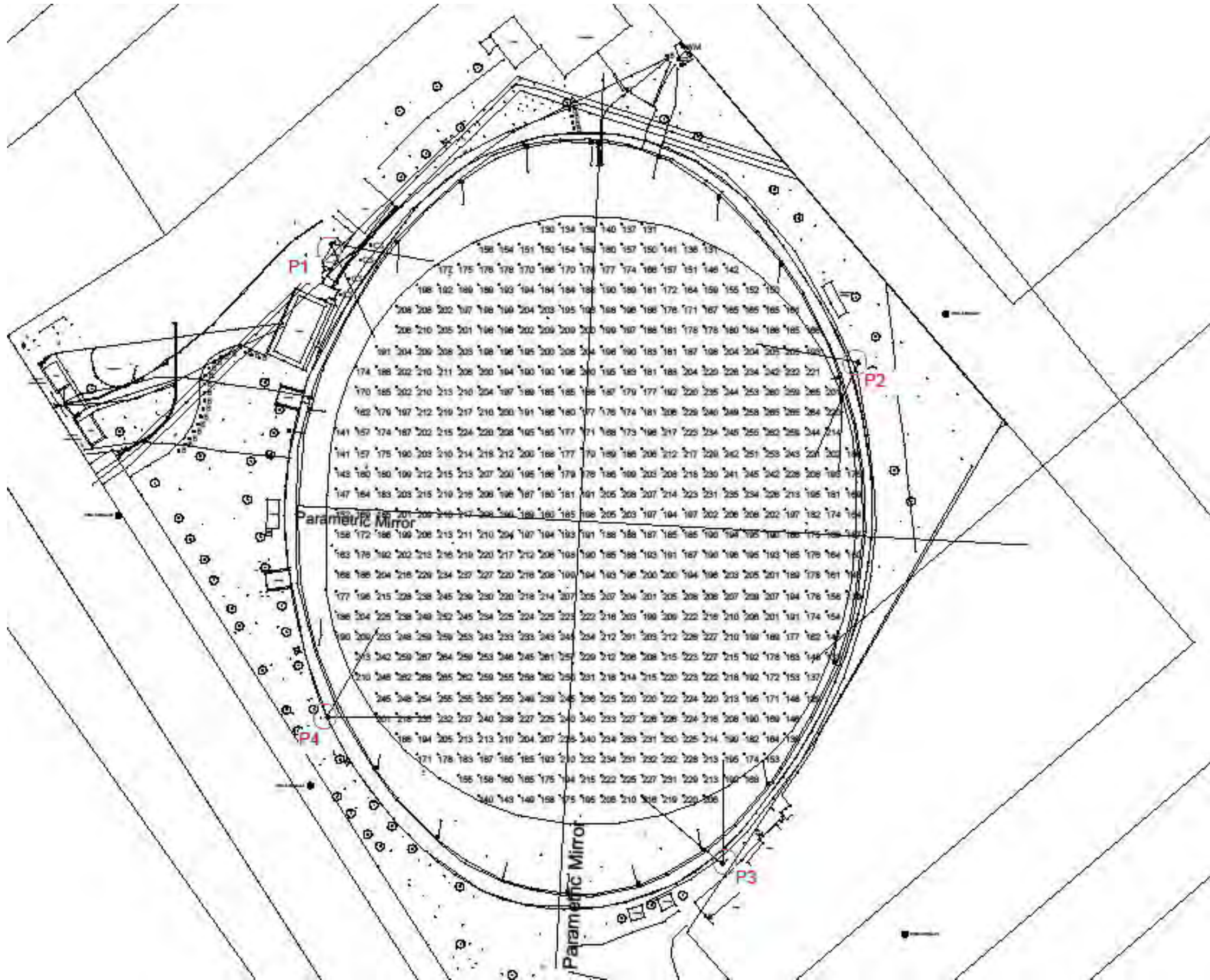


Figure 11 – Philips Optivision LED – 200 Lux Light Spill

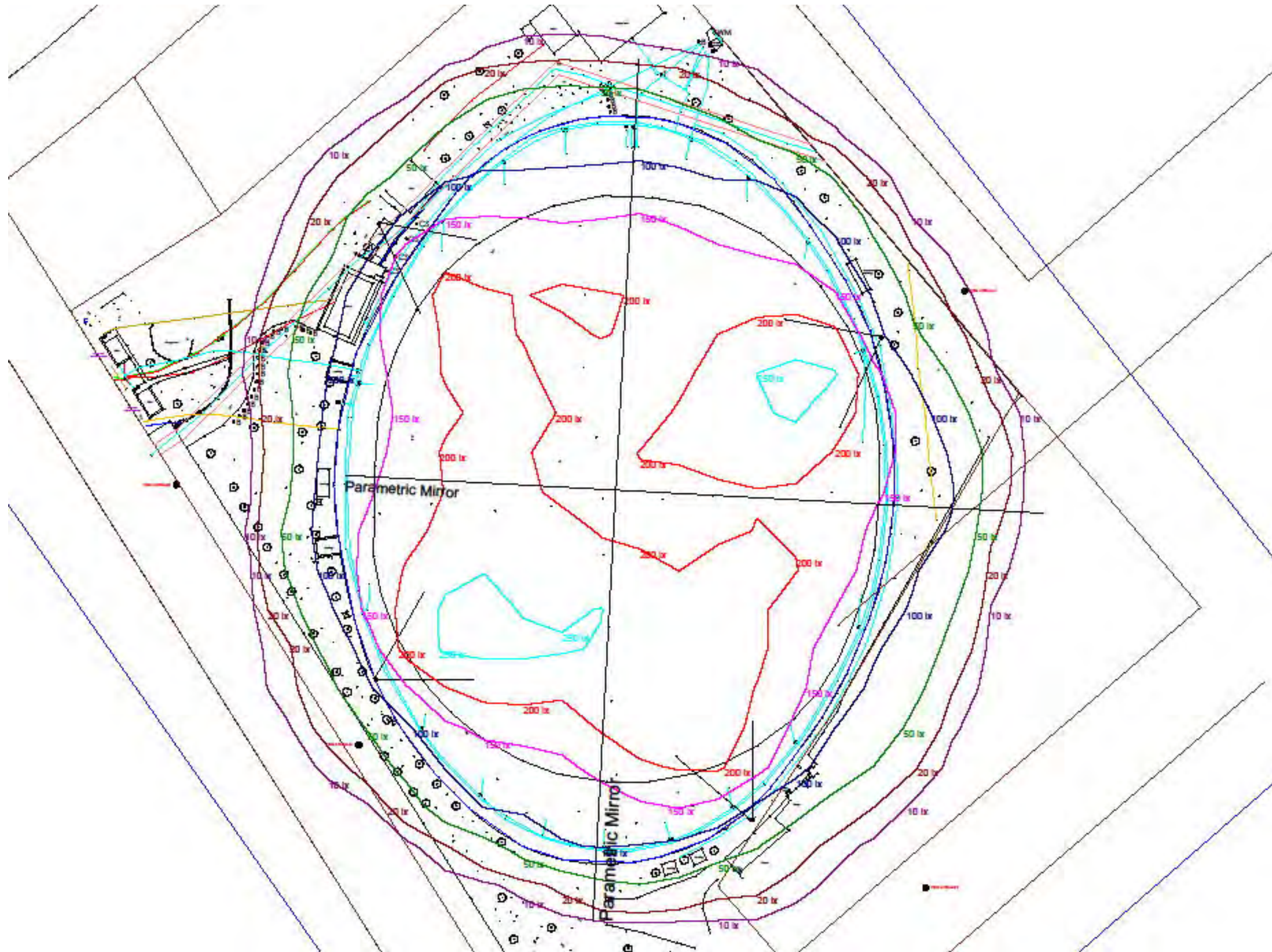


Figure 12 – Philips Optivision LED – 100 Lux PPA

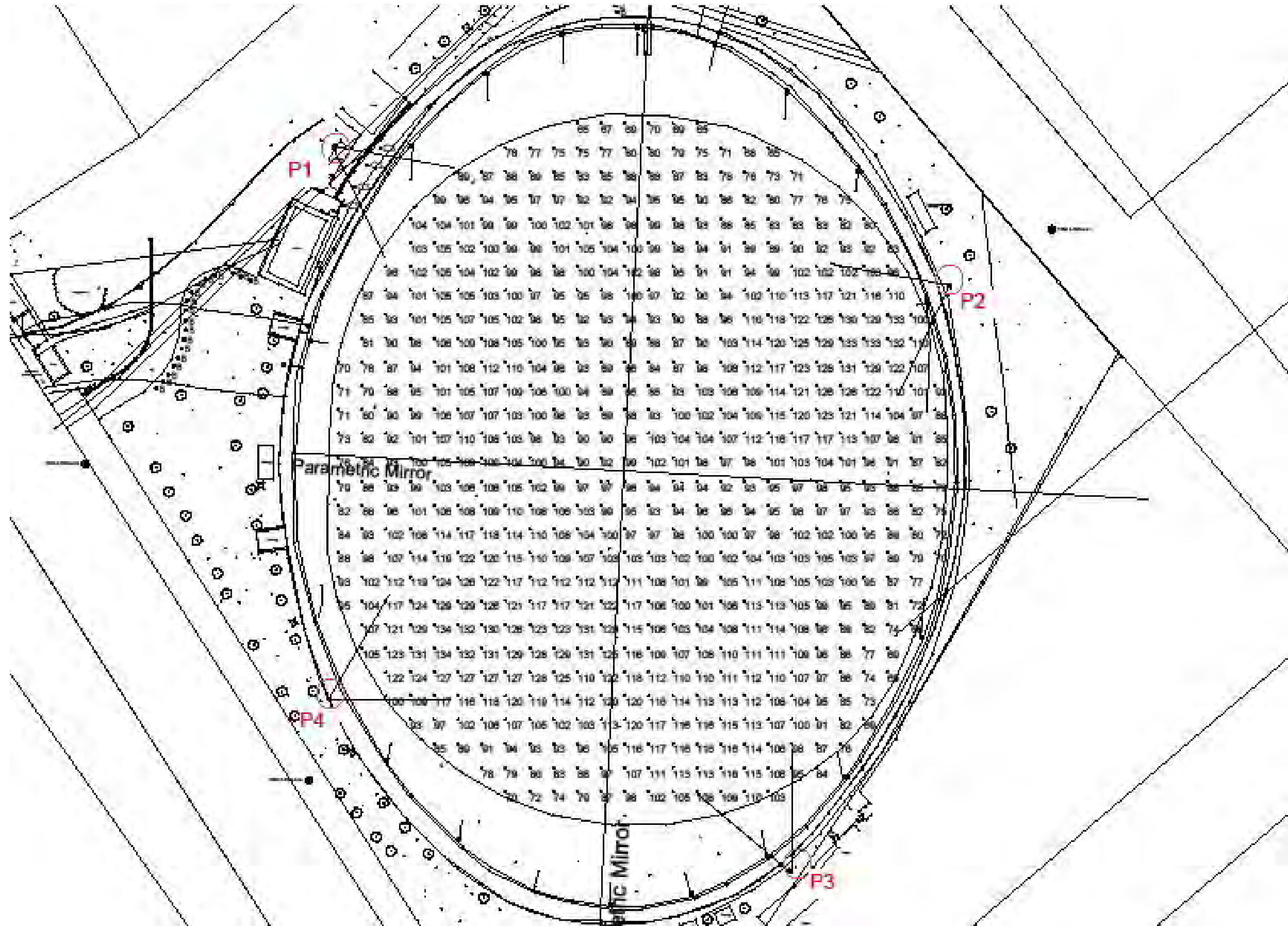


Figure 13 – Philips Optivision LED – 100 Lux Light Spill

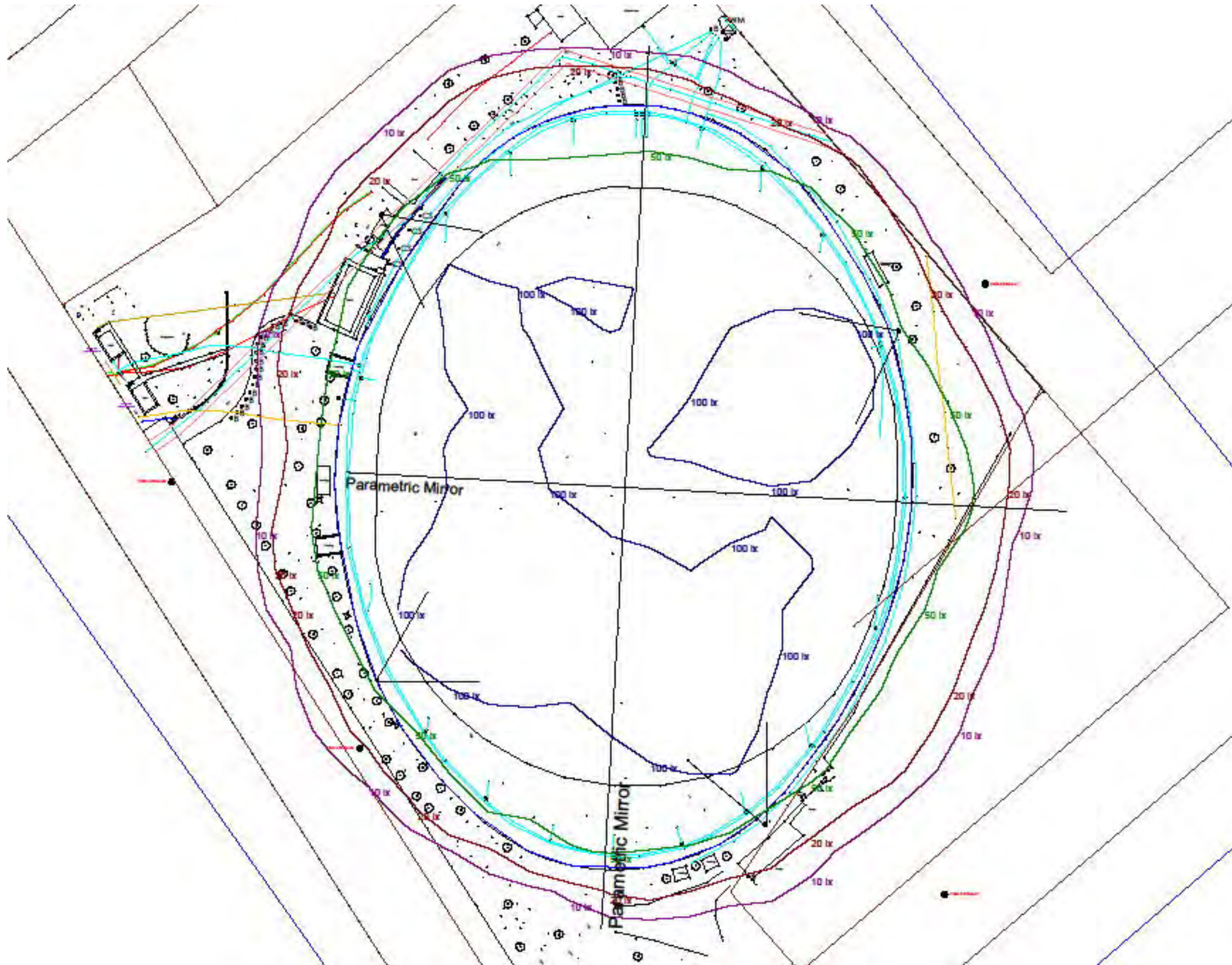




Figure 14 – Philips Optivision LED – 50 Lux PPA

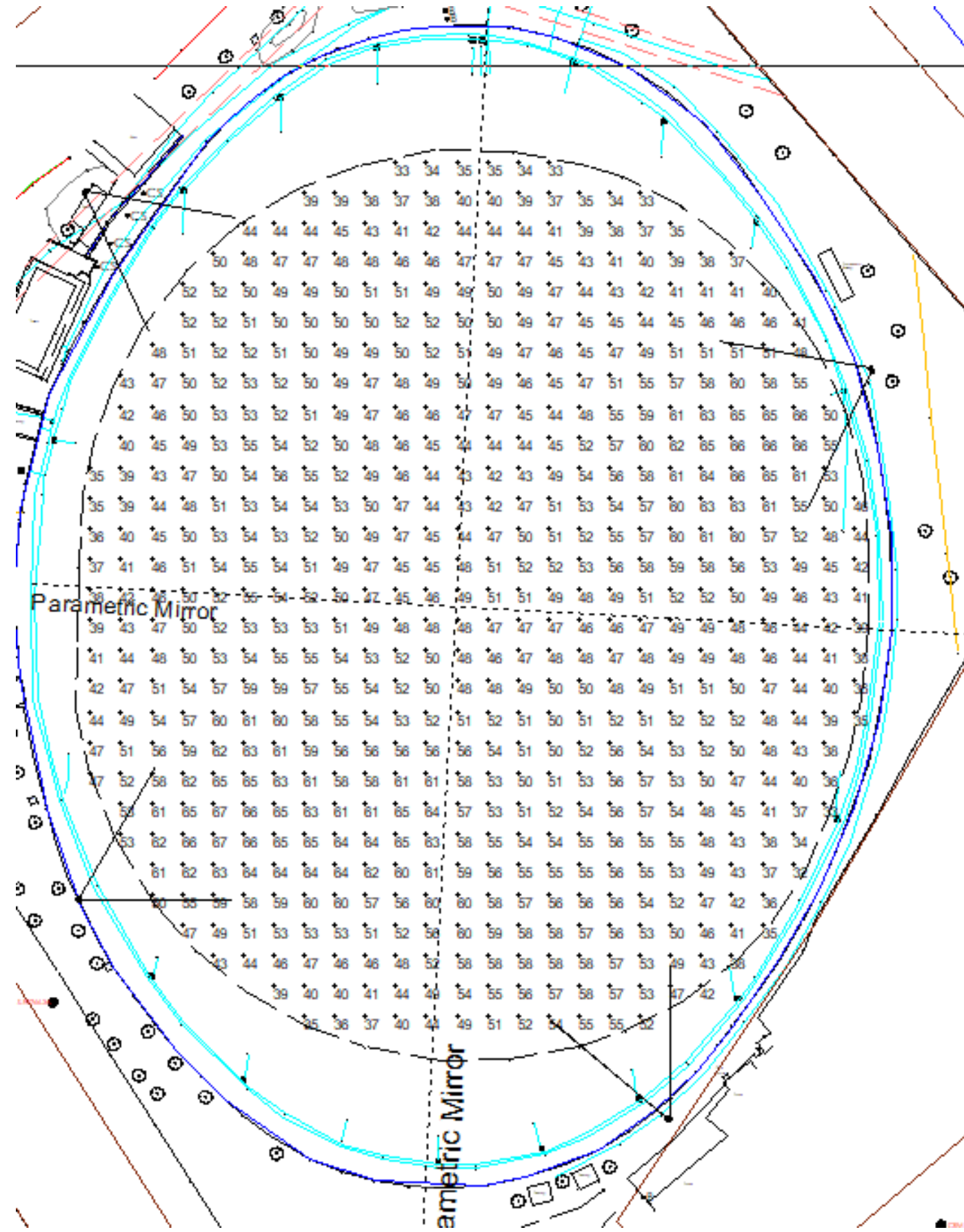
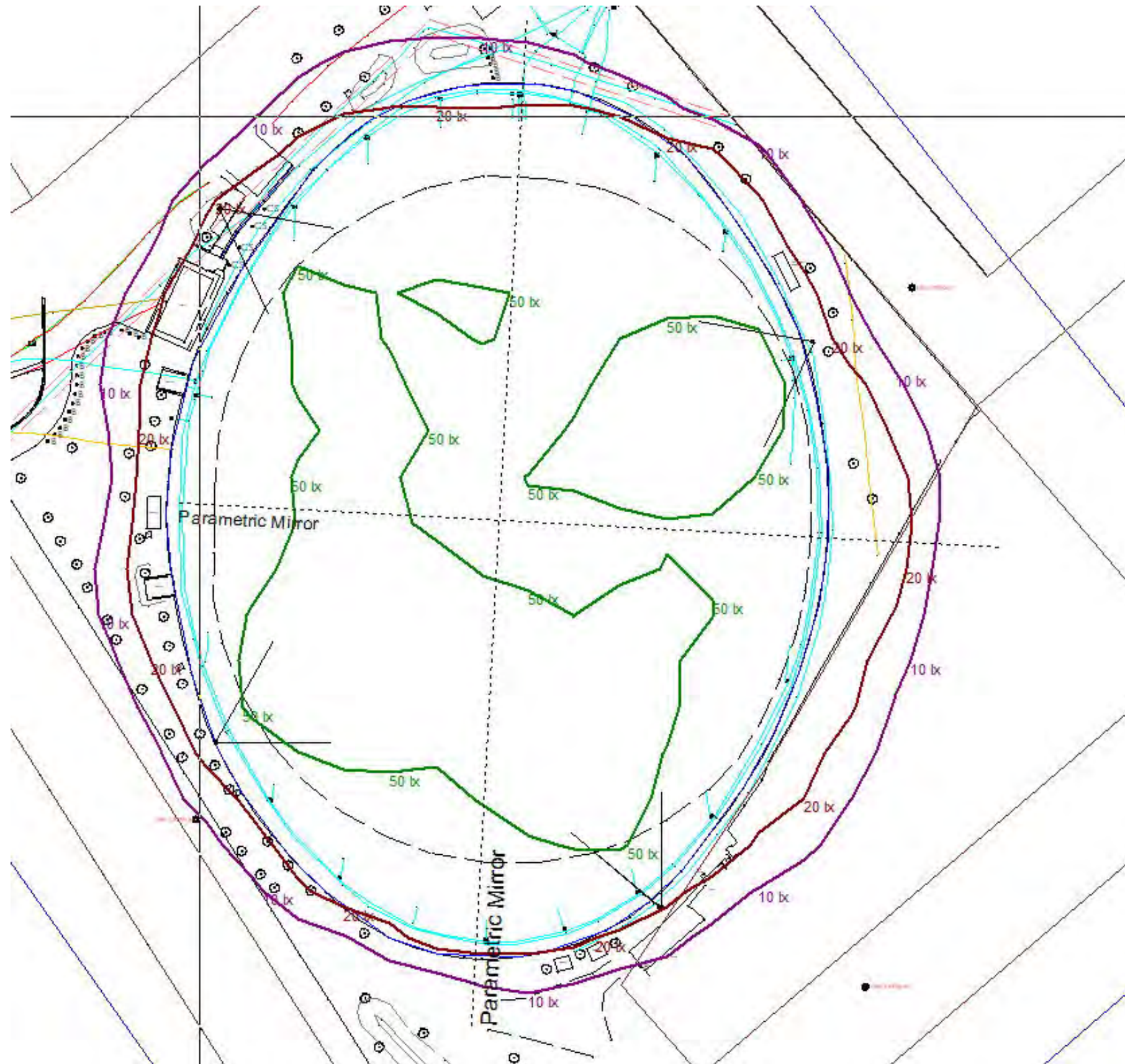


Figure 15 – Philips Optivision LED – 50 Lux Light Spill



### 3.2.1 Obtrusive Lighting Results

AS4282 provides the LTP required to calculate the obtrusive light onto adjacent properties and transport users. As detailed in Table 2 the key LTP's that are required to be calculated at adjacent properties are the illuminance in the vertical plane (Ev) and the luminous intensity (I). The key LTP required for adjacent transport users is threshold increment (TI).

The obtrusive lighting desktop calculations were calculated using the following design basis:

- Adjacent residential property boundaries assessed include Camphor Street, Bauhinia Street and Oleander Street.
- Shade and vegetation excluded from the assessment (worst case scenario)
- Luminous intensity and vertical illuminance calculation points measured at property boundary on a 5m (wide) x 4m (high) grid located 1m above ground level.
- Luminous intensity and vertical illuminance points measured to comply with AS4282 residential light surrounds requirements.
- Luminous intensity per luminaire calculated for 7,500 Cd – Large area, Level 1 (83 degrees controlling angle).
- Obtrusive lighting calculations undertaken on PPA 200 lux lighting levels only.
- Threshold increment observer height 1.5m AGL along the path of travel with a windshield control angle of 90 degrees above horizontal and adaptation luminance of 10 Cd/SqM.

A consolidated summary of the HID and LED lighting system obtrusive lighting LTP's are detailed in the Tables 7 and 8.

Figures 16 to 27 accompany the results in Table 7 and 8 and provide representative calculation display outputs from the software calculation detailing areas of compliance and non-compliance in accordance with AS4282. Note: No display figures have been developed for Threshold Increment values as all adjacent roadways (Refer Table 7) returned 0% (lowest compliant value) for Threshold Increment.

**Table 7 – Summary of Obtrusive lighting Luminous Intensity and Vertical Illuminance results**

Manufacturer and model	Property Boundary Assessed	Vertical Illuminance (max)	Luminous Intensity (max)	Applicable Figures	AS4282 Compliant
Thorn	Pandanus St	10 lux	6225 Cd	12 & 13	Yes
Champion	Bauhinia St	1 lux	6158 Cd	14 & 15	Yes
HID	Oleander St	10 lux	7167 Cd	16 & 17	Yes
Philips	Pandanus St	6.8 lux	17418 Cd	18 & 19	Yes – Vertical Illuminance No – Luminous Intensity
Optivision	Bauhinia St	2.6 lux	9789 Cd	20 & 21	Yes – Vertical Illuminance No – Luminous Intensity
LED	Oleander St	9.8 lux	24139 Cd	22 & 23	Yes – Vertical Illuminance No – Luminous Intensity

**Table 8 – Summary of Obtrusive lighting Threshold Increment results**

<b>Manufacturer and model</b>	<b>Adjacent Roadways Assessed</b>	<b>Threshold Increment (Max)</b>	<b>AS4282 Compliant</b>
Thorn	Pandanus St	0%	Yes
Champion	Bauhinia St	0%	Yes
HID	Oleander St	0%	Yes
	Camphor St	0%	Yes
Philips	Pandanus St	0%	Yes
Optivision	Bauhinia St	0%	Yes
LED	Oleander St	0%	Yes
	Camphor St	0%	Yes

The following legend provides a colour summary regarding the degrees of compliance with obtrusive lighting in Figures 16 to 27:






<b>Luminous Intensity (I)</b>	 Green (Compliant)	0 – 5000 Cd
	 Orange (Compliant)	5000 – 7500 Cd
	 Red (Not Compliant)	> 7500 Cd
<b>Vertical Illuminance (Ev)</b>	 Green (Compliant)	0 – 10 lux
	 Red (Not Compliant)	> 10 lux

Figure 16 – Thorn Champion HID – Luminous Intensity Compliance– Pandanus Street (North left of page)

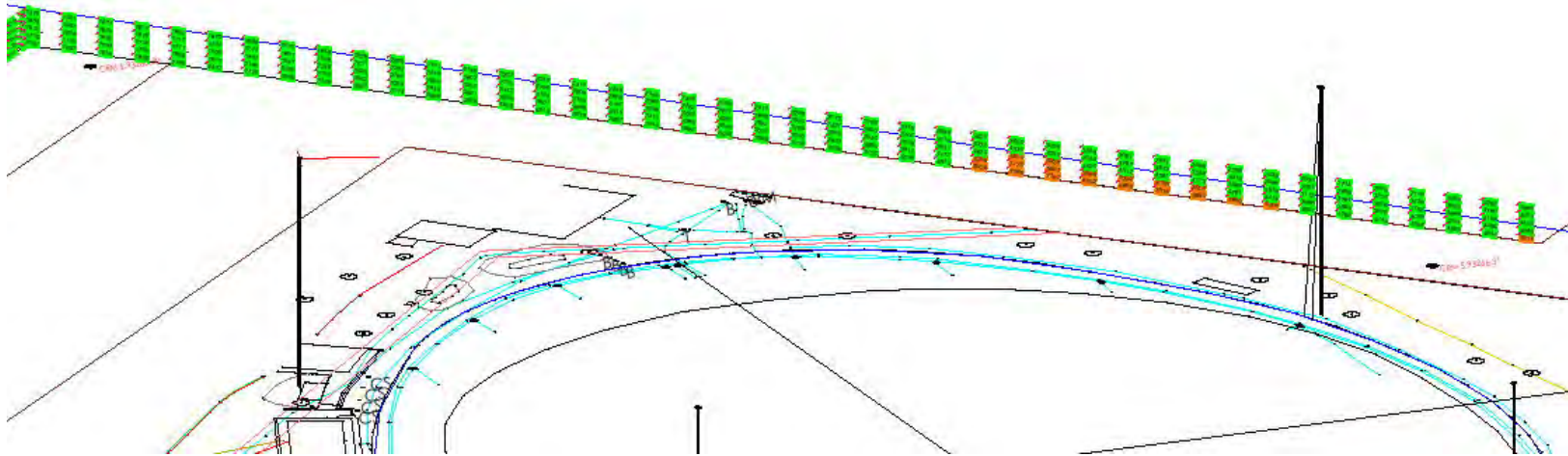


Figure 17 – Thorn Champion HID – Vertical Illuminance Compliance – Pandanus Street (North left of page)

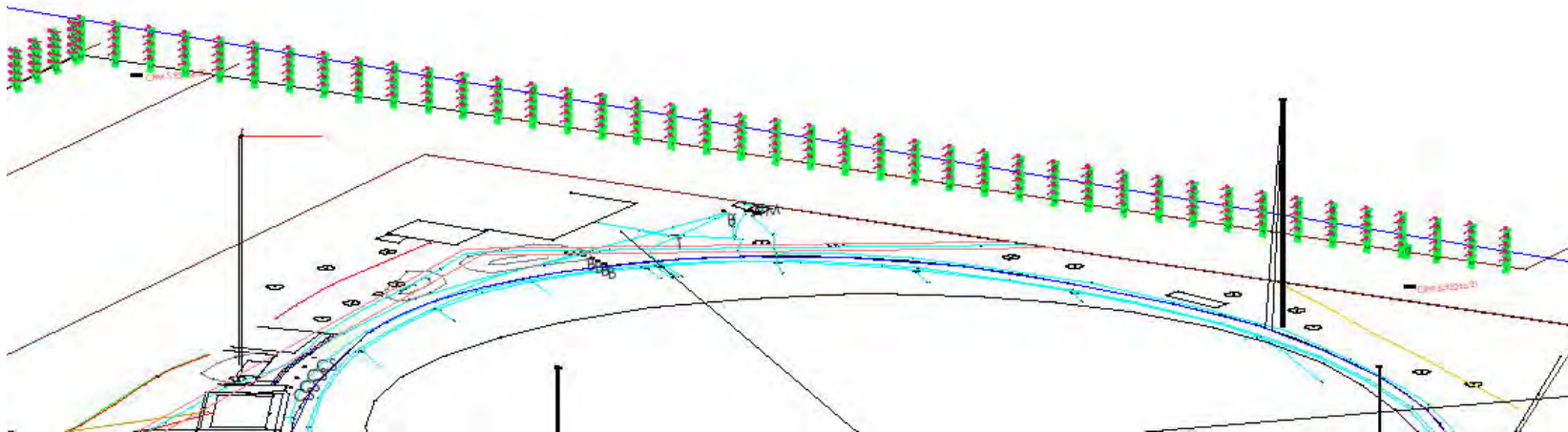


Figure 18 – Thorn Champion HID – Luminous Intensity Compliance – Bauhinia Street (West left of page)

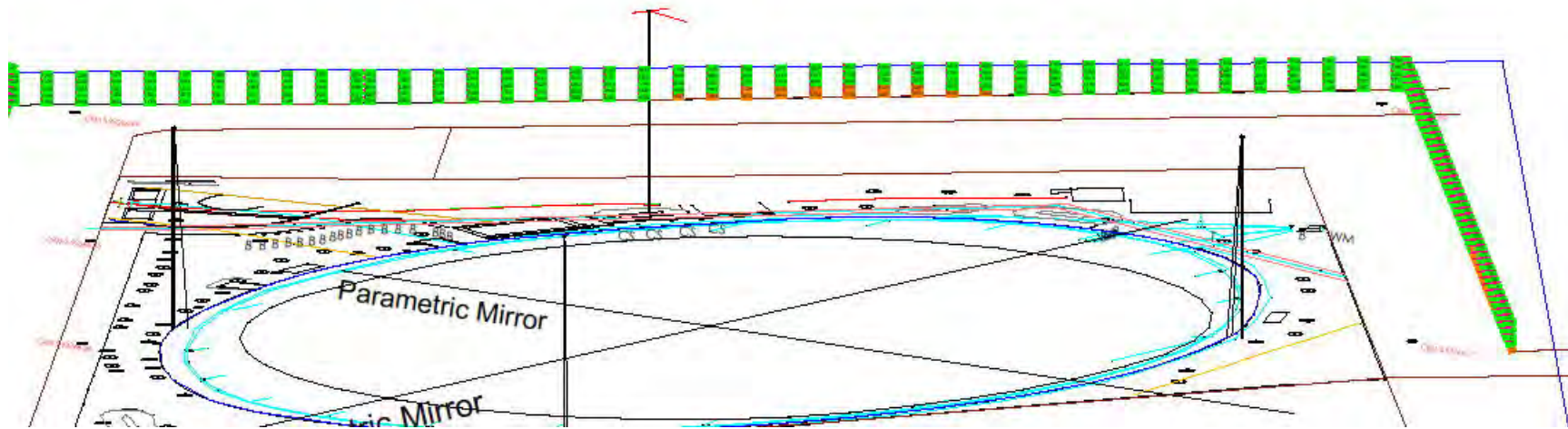


Figure 19 – Thorn Champion HID – Vertical Illuminance Compliance – Bauhinia Street (West left of page)

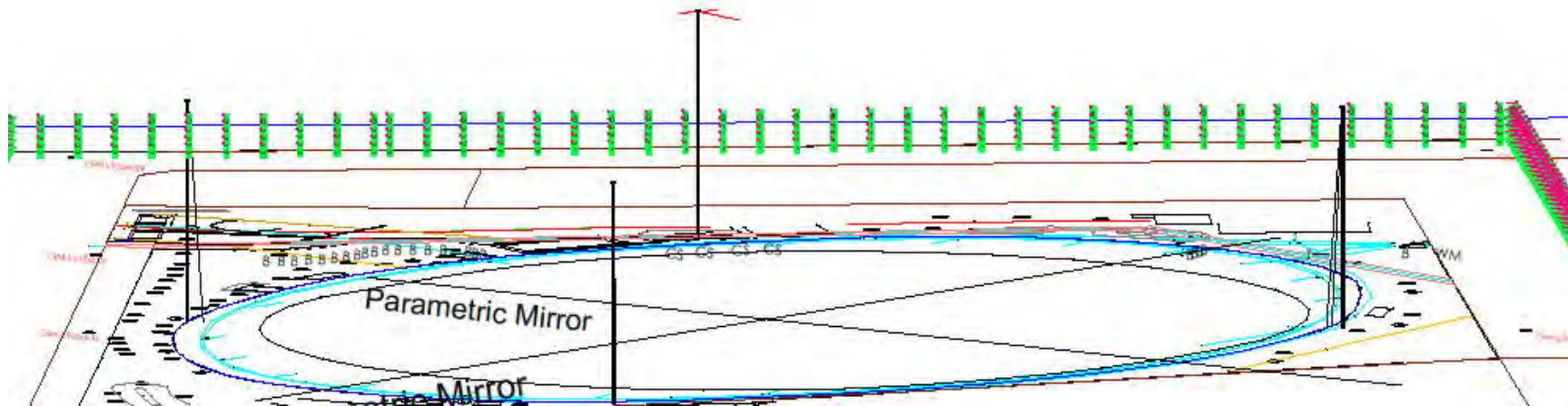


Figure 20 – Thorn Champion HID – Luminous Intensity Compliance – Oleander Street (South left of page)

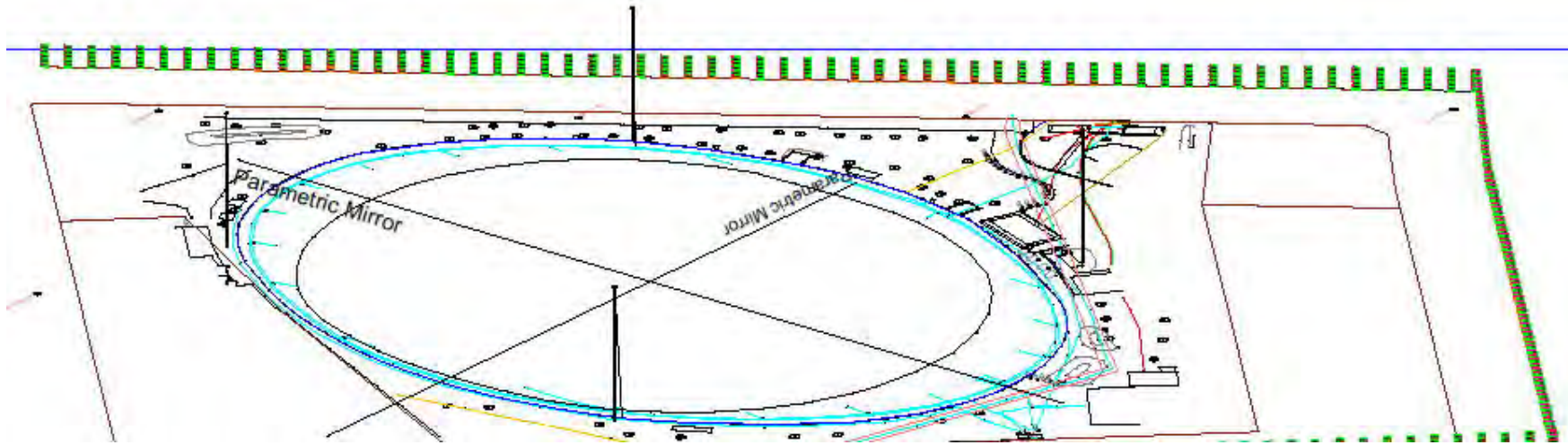


Figure 21 – Thorn Champion HID – Vertical Illuminance Compliance – Oleander Street (South left of page)



Figure 22 – Philips Optivision LED – Luminous Intensity Non Compliance – Pandanus Street (North left of page)

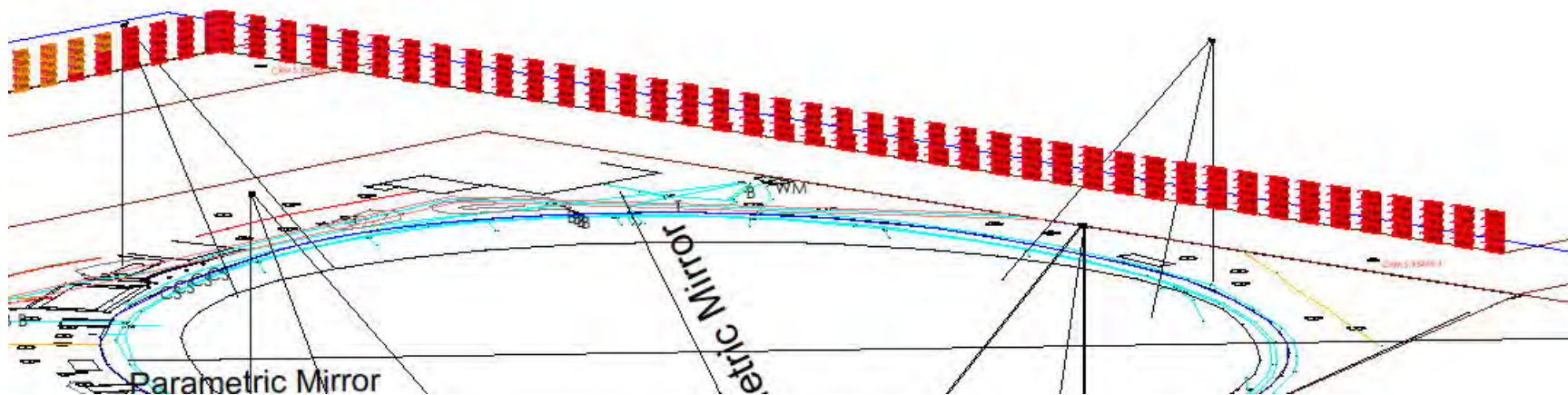


Figure 23 – Philips Optivision LED – Vertical Illuminance Compliance – Pandanus Street (North left of page)

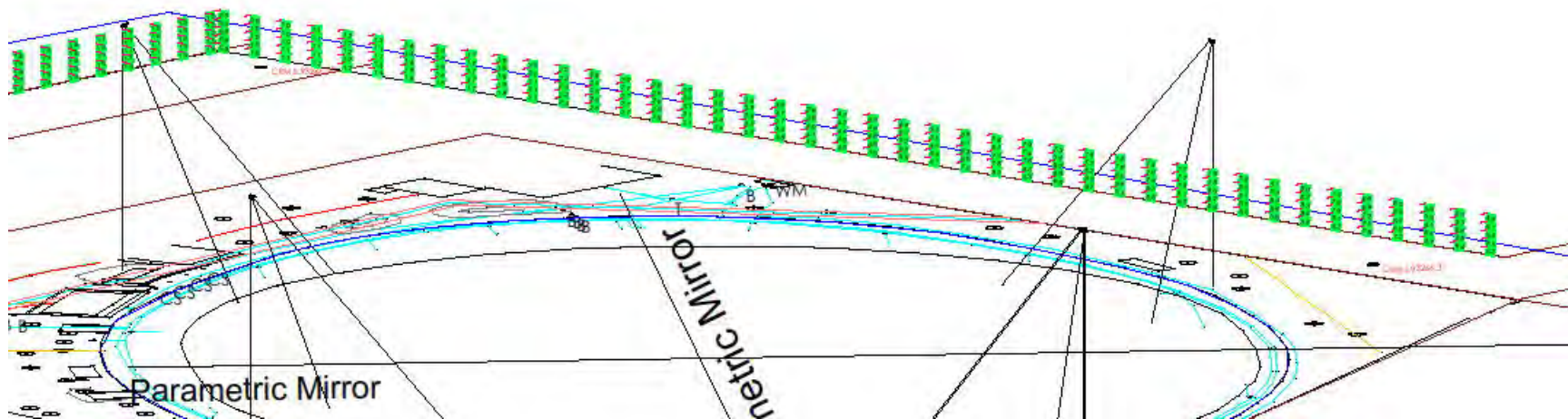




Figure 24 – Philips Optivision LED – Luminous Intensity Non Compliance – Bauhinia Street (West left of page)

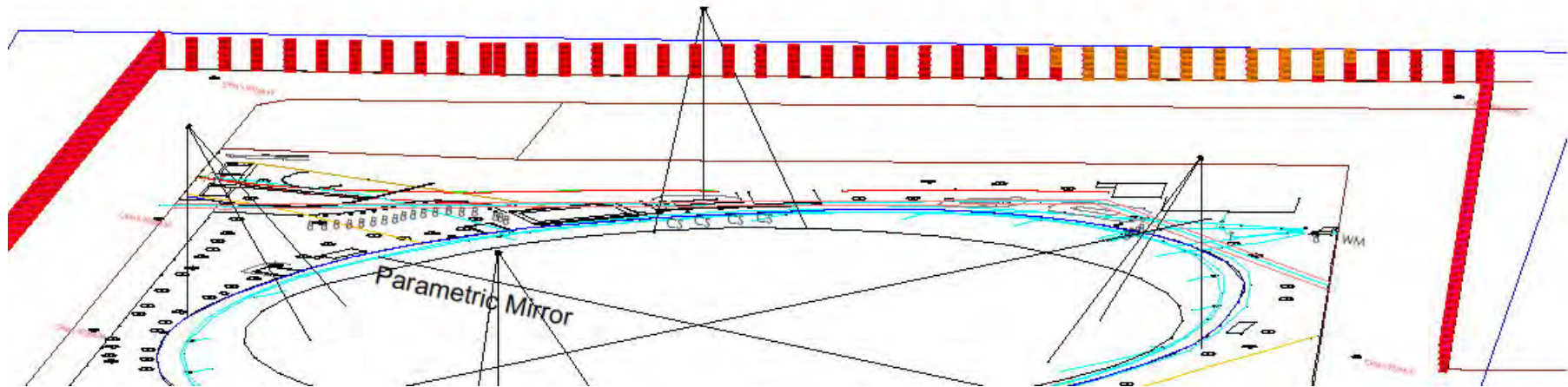


Figure 25 – Philips Optivision LED – Vertical Illuminance Compliance – Bauhinia Street (West left of page)

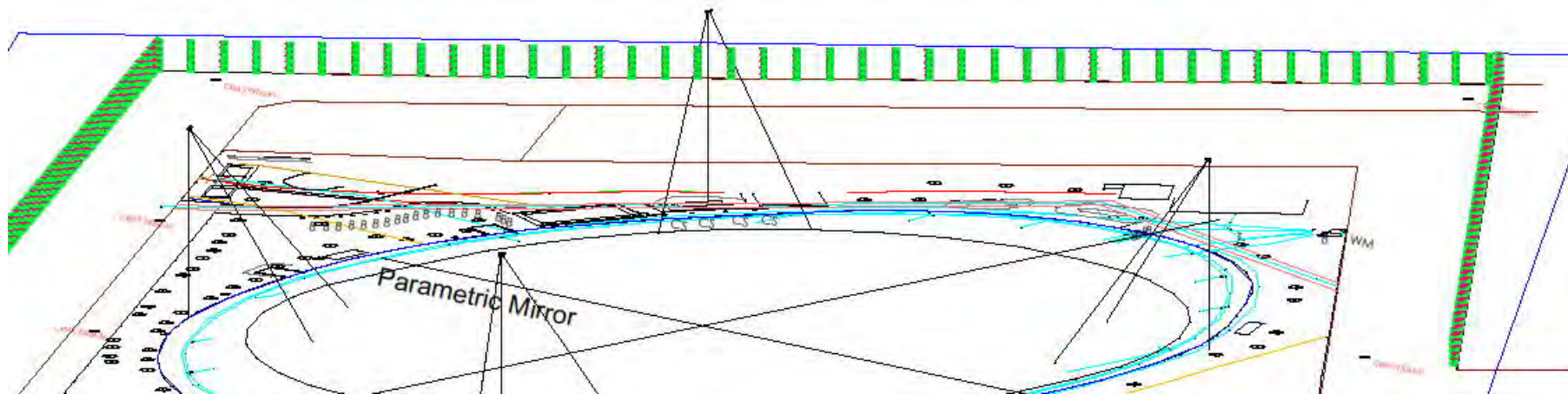


Figure 26 – Philips Optivision LED – Luminous Intensity Non Compliance – Oleander Street (South left of page)

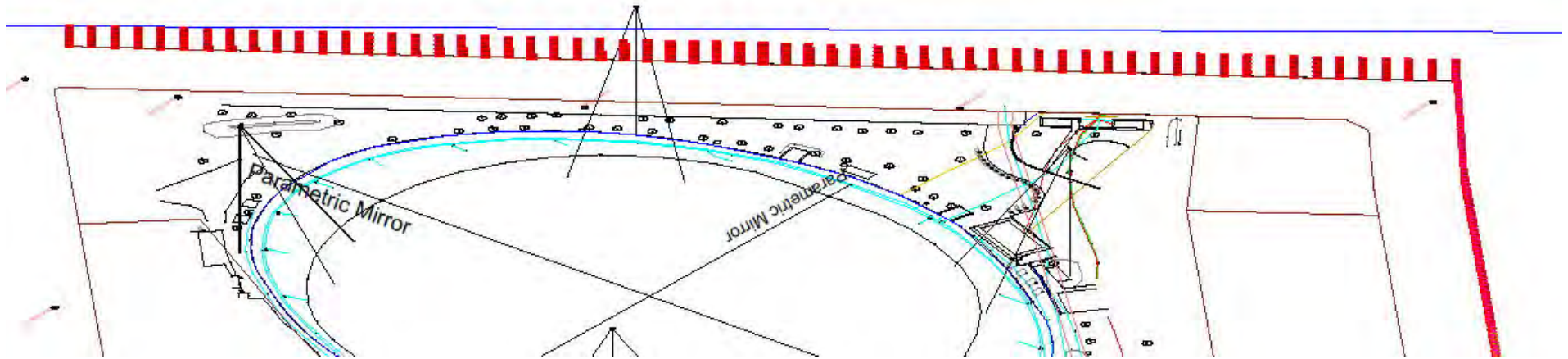
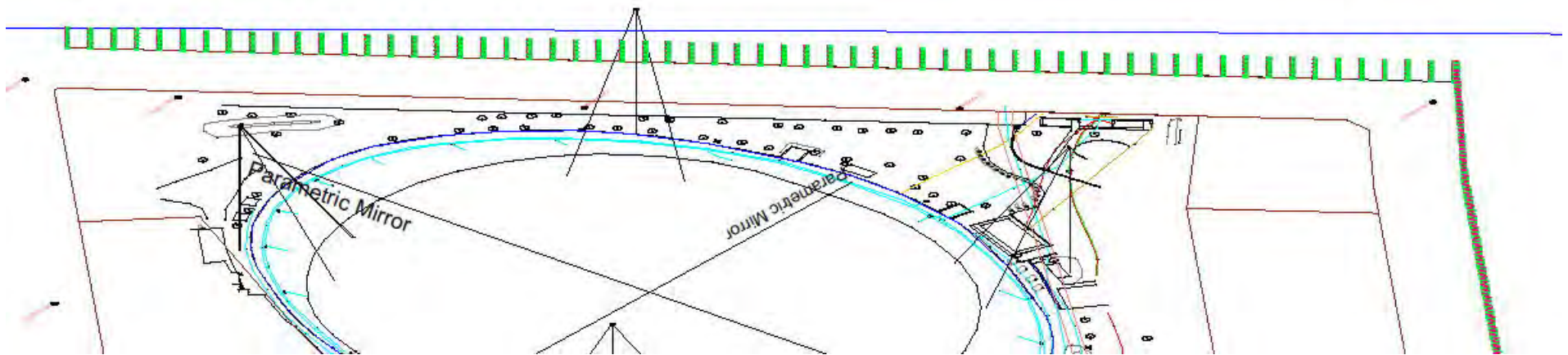


Figure 27 – Philips Optivision LED – Vertical Illuminance Compliance – Oleander Street (South left of page)



### 3.2.2 Summary of Lighting Results

Both HID and LED lighting systems provided 200 lux, 100 lux and 50 lux compliant field of play lighting levels. The HID achieved the 200 lux field of play illuminance with a total of 37 luminaires, whereas the LED achieved the same feat with a total of 38 luminaires.

However when considering the lighting systems obtrusive lighting affects onto adjacent residential areas the HID lighting system was generally compliant when assessed at adjacent property boundaries and roadways. In contrast the LED lighting system could not achieve compliance with luminous intensity. Note the obtrusive lighting assessment did not consider surrounding trees and structures (eg. power poles) in its analysis and is considered worst case scenario.

This is due to the inherent design of LED sports luminaires the LED's are a direct type of light and the light emitting source is typically mounted on the face of the fitting which can produce a higher luminous intensity for an observer at the property boundary. Whereas asymmetric HID luminaires often are constructed with more concealed light emitting source contained within the luminaire fitting (improved glare control).

Therefore to achieve a field of play lighting configuration with compliance with the obtrusive lighting requirements it is recommended that the HID system be adopted.

## 4. Electrical Supply Upgrade

Due to the increased electrical demand for the proposed HID lighting system a new and upgraded incoming power supply and metering panel will be required. In addition to the proposed lighting system City of Darwin have provided a site master plan (refer to Appendix A), which details the future provision for an open grand stand and netball courts. Allowance has been made as part of the electrical demand review for the proposed master plan facilities such that no short/medium term upgrades will be required to the point of supply when the proposed facilities come to fruition. A summary of the site electrical demand assessment is as per below:

**Table 9 – Summary of Site Electrical Maximum Demand**

Item	3Ph Maximum Demand	Description
Master Plan - Netball Courts	10kVA (14A)	Demand estimated based on 2 x competition courts with LED lighting
Master Plan – Grand Stand	15kVA (21A)	Demand based on open seating grandstand with limited office space
Social Club	15kVA (21A)	Demand estimated based on minimal social club load plus future cricket training net lighting.
New HID field lighting	92.5kVA (128A)	New Oval HID Sports Lighting
10% field lighting provision for ancillaries and amenities	9.25kVA (12.8A)	Provision for system ancillaries and amenities
<b>TOTAL</b>	<b>141.75kVA (3ph 197A balanced)</b>	

The electrical utility PWC assessed the impact of an additional 142 kVA site peak demand on its network and advised that a new LV supply to the site will be required as the existing supply and upstream connection (LV Pillar) does not have the capacity for the proposed works. As such PWC have recommended sourcing a new supply from an existing PWC substation 2688 located to the North West of the site (refer to Figure 28).



## 5. User Pay System

A user pay system has been implemented as part of the sports lighting design to provide City of Darwin a way to financially manage the facilities various user groups usage of the sports lighting system.

A number of user pay systems were evaluated based on the following requirements:

- To operate remotely in an autonomous manner
- Comprise of a control system to switch the field lighting illuminance levels to 50 Lux (training level 1), 100 lux (training level 2) and 200 lux (matches);
- Can be settable to restrict operation during Council approved hours;
- Comprise of a user pay facility (pre or post pay).
- Have a relatively simple and intuitive management interface and be able for City of Darwin to remotely configure usage rates and user groups.
- Consider vandal resistant components or configuration
- Cost effective and minimal operational costs

The User Pay System selected for the project is the illuminator by Halytech. Halytech Illuminator is an Australian control and monitoring system designed specifically for the control and financial management of lighting sports fields, parks and other public places. The illuminator simply comprises of the main controller (Figure 23) with integrated mobile SIM card and an optional battery back, which has been provided as part of this project to allow continuous operation during mains power “brown outs” or short term outages.



**Figure 29 – Halytech Illuminator**

The advantage of the illuminator is its operational simplicity. On initial configuration the illuminator controller can be set to operate the sports lighting system in the three scenes (50/100/200 lux) required and register user groups and SMS PIN Codes. In operation the illuminator communicates with remote administrators and registered users via the integrated mobile sim facility.

Registered users will be provided with unique SMS PIN codes which allow the remote activation, de-activation and required lighting level of the sports lighting by sending its issued PIN codes by mobile SMS to the illuminator. User groups will require a mobile phone in order to remotely operate the sports lighting system.

An additional benefit to this type of user control is that there is no exposed equipment that can be exposed to vandalism. The illuminator controller is typically installed within the locked main switchboard on site. The switchboard is only accessible by City of Darwin maintenance personnel. As there is no other equipment such as a user interface (ie. swipe card or card reader), this removes the risk of vandalism to the user pay system.

Finally the illuminator also has an in-built webserver allowing administrators (ie. Council representative) to remotely access and configure the illuminator through a simple web interface. This can be done remotely on a PC or mobile device via the web interface allowing configuration of settings such as:

- Managing registered users and their PIN codes
- Setting of curfew hours (restrict operational times)
- Manually operate lights
- Retrieve stored data
- Setting operational usage rates

The Illuminator records every command, identifying the user that issued it, the level of lighting level and the time of use. The recorded data is used to fault find, prepare billing information and usage reports accurate to one second. Reports are provided in a excel type format and can be automatically e-mailed to administrations on a continuous basis (ie. once a day) allowing management of post payment and billing of its registered users.

## 6. Ongoing Cost Summary

The following is a summary of the expected on-going costs summary for the HID system over 25 years.

### **Assumptions:**

The on-going costs are based on the following assumptions:

1. City of Darwin anticipate the following lighting operating times for Nightcliff Oval

DAY	TIME	LUX LEVEL
Monday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Tuesday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Wednesday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Thursday	6:00pm – 9:00pm (3 hrs)	50lux and 100 lux (training)
Friday	6:00pm – 9:00pm (3 hrs)	200 lux (Football Matches)
Saturday	6:00pm – 9:00pm (3 hrs)	200 lux (Football Matches)
Sunday	6:00pm - 9:00pm (Occasional – allow once a month over 8 months)	200 lux (Football Matches)

2. It is assumed that the park lighting will operate in the above conditions for 8 months of the year. In addition the 50 lux and 100 lux training usage levels will be assessed as a 50/50 percent distribution. Therefore the yearly lighting operating times for the facility can approximate to:
  - 50 lux lighting                      192 hours/year
  - 100 lux lighting                      192 hours/year
  - 200 lux lighting                      216 hours/year
3. An electricity time of use meter commercial tariff rate of \$0.2175 per kWh will be used for analysis. This is reflective of Power and Water Corporations current power tariff rate. There has been no allowance for inflation and fixed daily charges.

### **On-going Cost Summary:**

Table 10 below is a minimum 25 year life cycle operating cost to include general maintenance, replacement of parts and re-lamping as required. Note no inflationary costs have been applied.

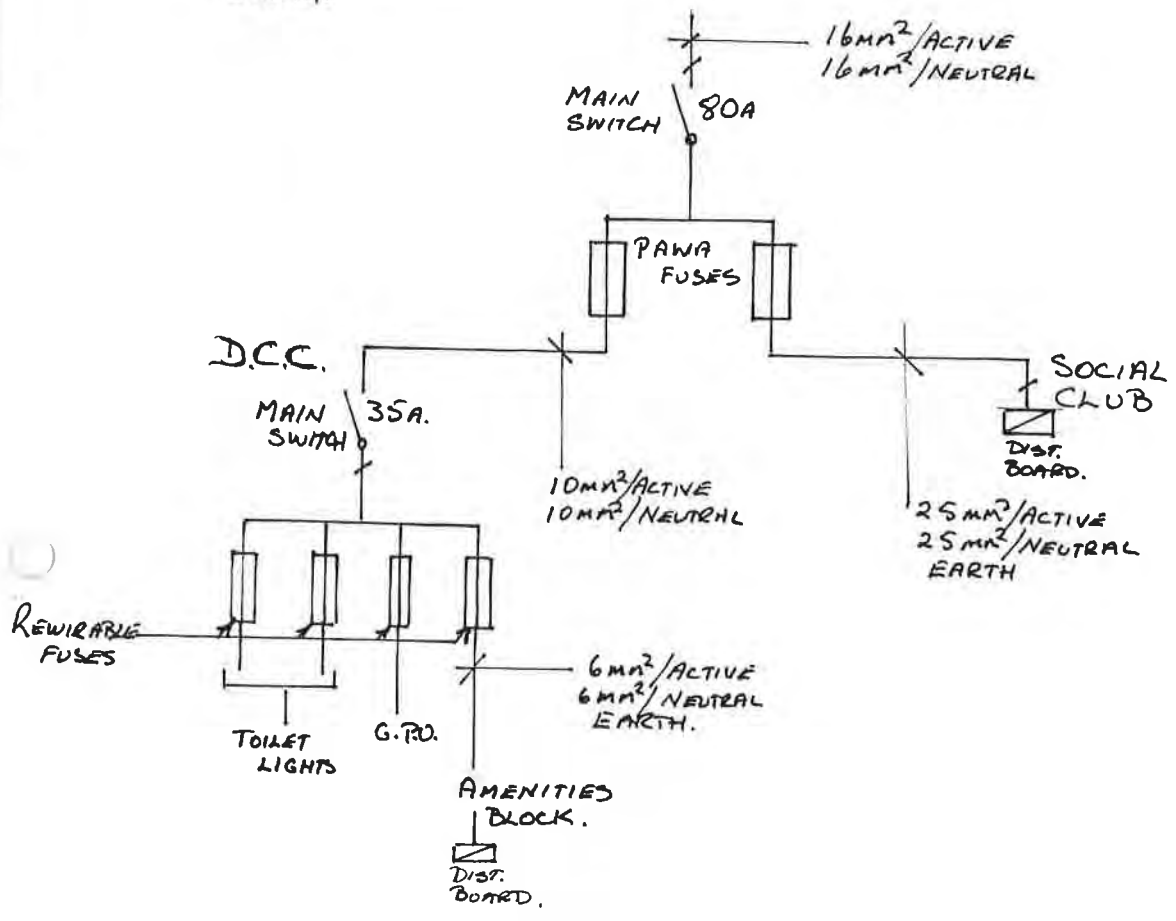
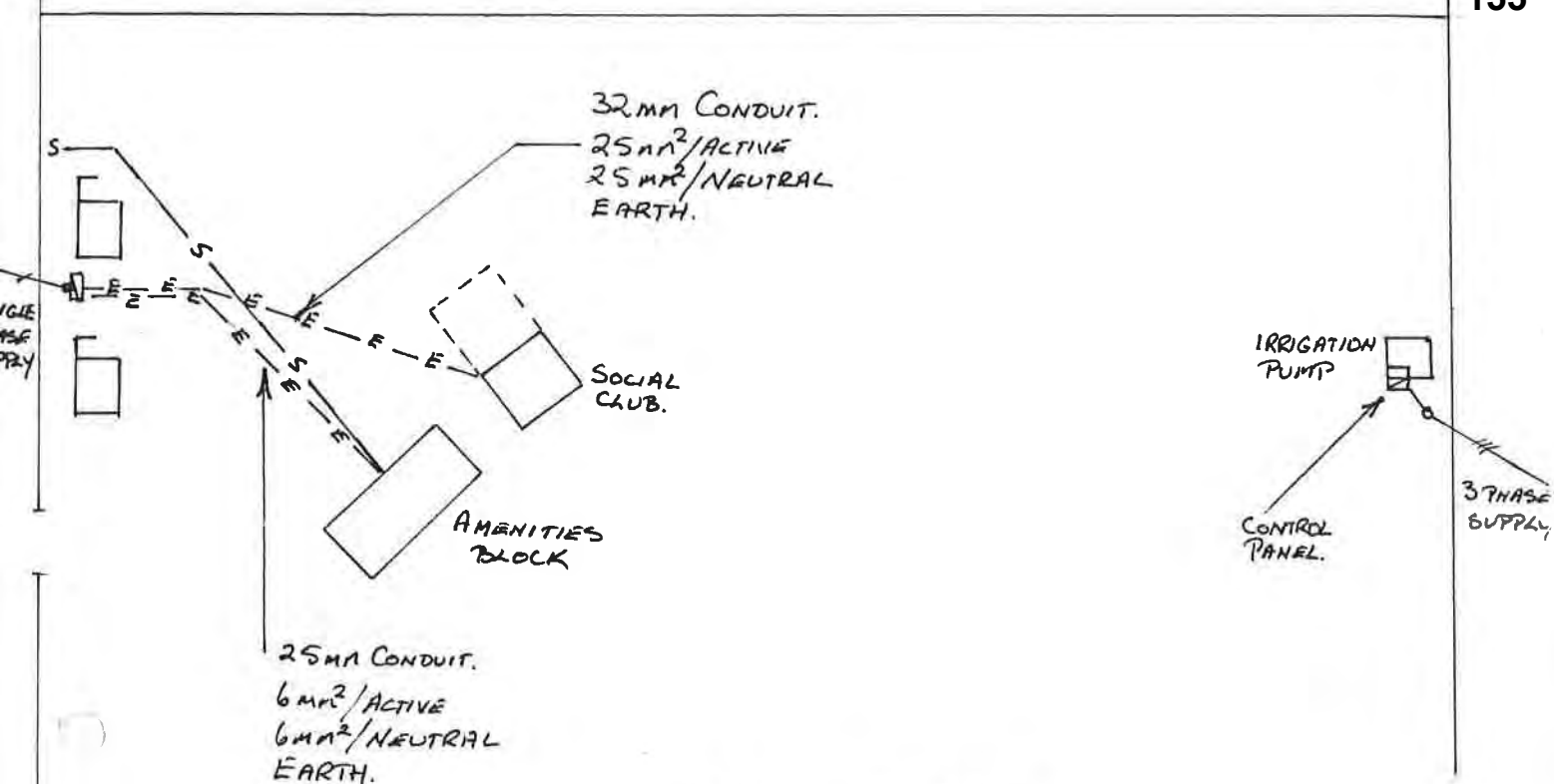
**Table 10 – 25 Year Life Cycle on-going cost**

Description	Unit	HID
Number of luminaires (50 lux)	Qty	10
Number of luminaires (100 lux)	Qty	19
Number of luminaires (200 lux)	Qty	37
Power Demand per luminaire	kW	2.075
Energy Rate (inflated rate)	\$/kWh	0.2175
Usage cost per hour	\$/hr	\$4.52/hr (50 lux) \$8.58/hr (100 lux) \$16.70/hr (200 lux)



Description	Unit	HID
Total usage hours over 25 years	hrs	4,800 (50 lux) 4,800 (100 lux) 5,400 (200 lux)
Energy Consumption Cost over 25 years (excludes supply availability charge)	\$	\$21,663.00 (50 lux) \$41,159.70 (100 lux) \$90,172.24 (200 lux)
		<b>Total \$152,994.94</b>
Spot re-lamping and maintenance over 25 years. Assume one service every 3 year interval (8 total) at \$4000 each	\$	<b>\$32,000.00</b>
Group Re-lamping every 6,000 hours	Qty	3
Re-lamping and labour cost per luminaire	\$	\$500.00
Number of luminaires	Qty	37
Cost for relamping over 25 years	\$	<b>\$55,500.00</b>
<b>Total 25 year life cycle operating cost</b>		<b>\$240,494.94</b>

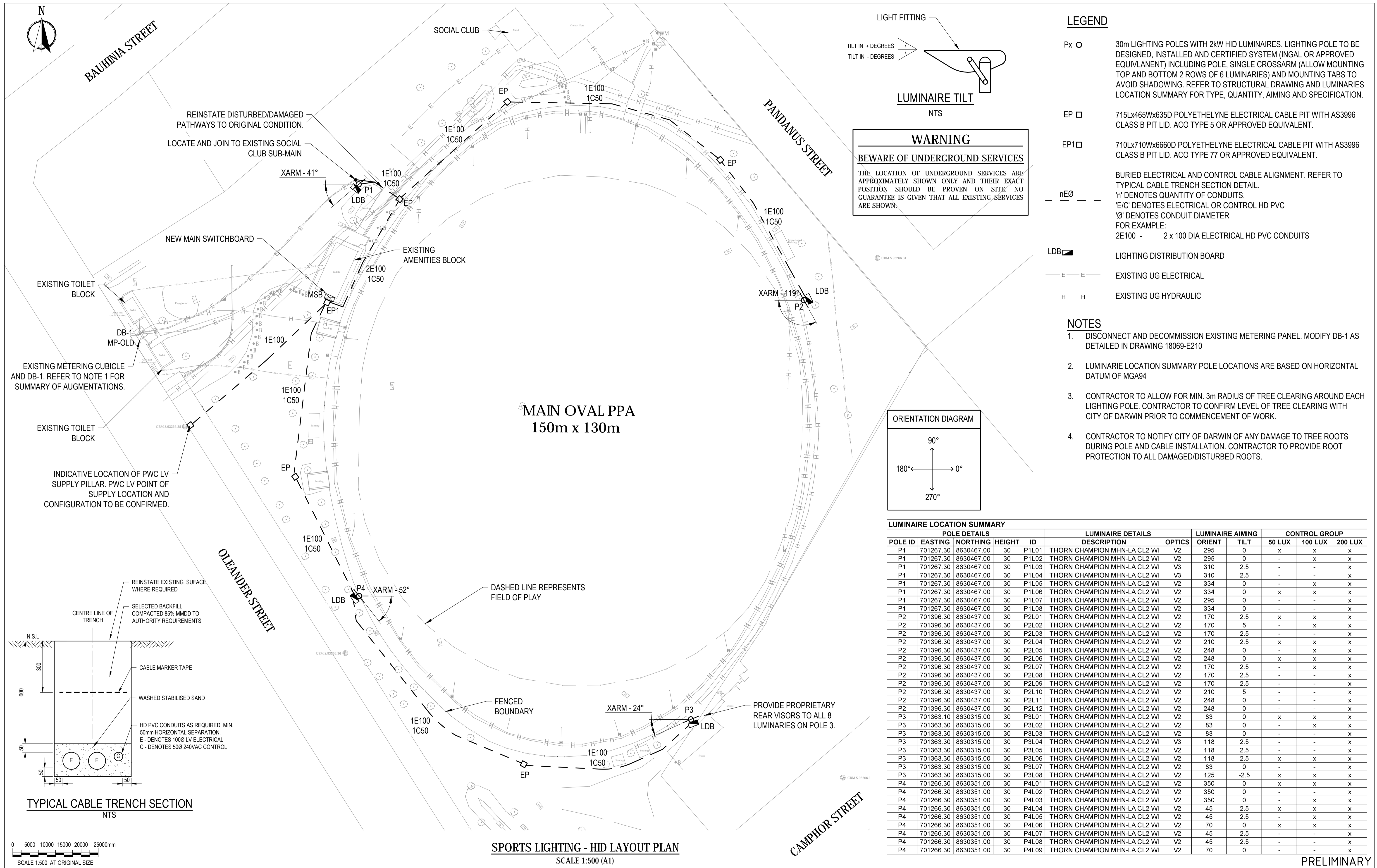
# Appendix A Reference Documentation



NOTE. ONE LOT NUMBER  
2 PANA SUPPLIES.



Appendix B Proposed Lighting Plan



**LEGEND**

- Px O 30m LIGHTING POLES WITH 2kW HID LUMINAIRES. LIGHTING POLE TO BE DESIGNED, INSTALLED AND CERTIFIED SYSTEM (INGAL OR APPROVED EQUIVLANENT) INCLUDING POLE, SINGLE CROSSARM (ALLOW MOUNTING TOP AND BOTTOM 2 ROWS OF 6 LUMINAIRES) AND MOUNTING TABS TO AVOID SHADOWING. REFER TO STRUCTURAL DRAWING AND LUMINAIRES LOCATION SUMMARY FOR TYPE, QUANTITY, AIMING AND SPECIFICATION.
- EP □ 715Lx465Wx635D POLYETHYLENE ELECTRICAL CABLE PIT WITH AS3996 CLASS B PIT LID. ACO TYPE 5 OR APPROVED EQUIVALENT.
- EP1 □ 710Lx710Wx666D POLYETHYLENE ELECTRICAL CABLE PIT WITH AS3996 CLASS B PIT LID. ACO TYPE 77 OR APPROVED EQUIVALENT.
- nEØ --- BURIED ELECTRICAL AND CONTROL CABLE ALIGNMENT. REFER TO TYPICAL CABLE TRENCH SECTION DETAIL.  
'n' DENOTES QUANTITY OF CONDUITS,  
'E/C' DENOTES ELECTRICAL OR CONTROL HD PVC  
'Ø' DENOTES CONDUIT DIAMETER  
FOR EXAMPLE:  
2E100 - 2 x 100 DIA ELECTRICAL HD PVC CONDUITS
- LDB □ LIGHTING DISTRIBUTION BOARD
- E—E— EXISTING UG ELECTRICAL
- H—H— EXISTING UG HYDRAULIC

**NOTES**

1. DISCONNECT AND DECOMMISSION EXISTING METERING PANEL. MODIFY DB-1 AS DETAILED IN DRAWING 18069-E210
2. LUMINARIE LOCATION SUMMARY POLE LOCATIONS ARE BASED ON HORIZONTAL DATUM OF MGA94
3. CONTRACTOR TO ALLOW FOR MIN. 3m RADIUS OF TREE CLEARING AROUND EACH LIGHTING POLE. CONTRACTOR TO CONFIRM LEVEL OF TREE CLEARING WITH CITY OF DARWIN PRIOR TO COMMENCEMENT OF WORK.
4. CONTRACTOR TO NOTIFY CITY OF DARWIN OF ANY DAMAGE TO TREE ROOTS DURING POLE AND CABLE INSTALLATION. CONTRACTOR TO PROVIDE ROOT PROTECTION TO ALL DAMAGED/DISTURBED ROOTS.

**LUMINAIRE LOCATION SUMMARY**

POLE ID	POLE DETAILS				LUMINAIRE DETAILS		LUMINAIRE AIMING			CONTROL GROUP		
	EASTING	NORTHING	HEIGHT	ID	DESCRIPTION	OPTICS	ORIENT	TILT	50 LUX	100 LUX	200 LUX	
P1	701267.30	8630467.00	30	P1L01	THORN CHAMPION MHN-LA CL2 WI	V2	295	0	x	x	x	
P1	701267.30	8630467.00	30	P1L02	THORN CHAMPION MHN-LA CL2 WI	V2	295	0	-	x	x	
P1	701267.30	8630467.00	30	P1L03	THORN CHAMPION MHN-LA CL2 WI	V3	310	2.5	-	-	x	
P1	701267.30	8630467.00	30	P1L04	THORN CHAMPION MHN-LA CL2 WI	V3	310	2.5	-	-	x	
P1	701267.30	8630467.00	30	P1L05	THORN CHAMPION MHN-LA CL2 WI	V2	334	0	-	x	x	
P1	701267.30	8630467.00	30	P1L06	THORN CHAMPION MHN-LA CL2 WI	V2	334	0	x	x	x	
P1	701267.30	8630467.00	30	P1L07	THORN CHAMPION MHN-LA CL2 WI	V2	295	0	-	-	x	
P1	701267.30	8630467.00	30	P1L08	THORN CHAMPION MHN-LA CL2 WI	V2	334	0	-	-	x	
P2	701396.30	8630437.00	30	P2L01	THORN CHAMPION MHN-LA CL2 WI	V2	170	2.5	x	x	x	
P2	701396.30	8630437.00	30	P2L02	THORN CHAMPION MHN-LA CL2 WI	V2	170	5	-	x	x	
P2	701396.30	8630437.00	30	P2L03	THORN CHAMPION MHN-LA CL2 WI	V2	170	2.5	-	-	x	
P2	701396.30	8630437.00	30	P2L04	THORN CHAMPION MHN-LA CL2 WI	V2	210	2.5	x	x	x	
P2	701396.30	8630437.00	30	P2L05	THORN CHAMPION MHN-LA CL2 WI	V2	248	0	-	x	x	
P2	701396.30	8630437.00	30	P2L06	THORN CHAMPION MHN-LA CL2 WI	V2	248	0	x	x	x	
P2	701396.30	8630437.00	30	P2L07	THORN CHAMPION MHN-LA CL2 WI	V2	170	2.5	-	x	x	
P2	701396.30	8630437.00	30	P2L08	THORN CHAMPION MHN-LA CL2 WI	V2	170	2.5	-	-	x	
P2	701396.30	8630437.00	30	P2L09	THORN CHAMPION MHN-LA CL2 WI	V2	170	2.5	-	-	x	
P2	701396.30	8630437.00	30	P2L10	THORN CHAMPION MHN-LA CL2 WI	V2	210	5	-	-	x	
P2	701396.30	8630437.00	30	P2L11	THORN CHAMPION MHN-LA CL2 WI	V2	248	0	-	-	x	
P2	701396.30	8630437.00	30	P2L12	THORN CHAMPION MHN-LA CL2 WI	V2	248	0	-	-	x	
P3	701363.10	8630315.00	30	P3L01	THORN CHAMPION MHN-LA CL2 WI	V2	83	0	x	x	x	
P3	701363.30	8630315.00	30	P3L02	THORN CHAMPION MHN-LA CL2 WI	V2	83	0	-	x	x	
P3	701363.30	8630315.00	30	P3L03	THORN CHAMPION MHN-LA CL2 WI	V2	83	0	-	-	x	
P3	701363.30	8630315.00	30	P3L04	THORN CHAMPION MHN-LA CL2 WI	V3	118	2.5	-	-	x	
P3	701363.30	8630315.00	30	P3L05	THORN CHAMPION MHN-LA CL2 WI	V2	118	2.5	-	-	x	
P3	701363.30	8630315.00	30	P3L06	THORN CHAMPION MHN-LA CL2 WI	V2	118	2.5	x	x	x	
P3	701363.30	8630315.00	30	P3L07	THORN CHAMPION MHN-LA CL2 WI	V2	83	0	-	-	x	
P3	701363.30	8630315.00	30	P3L08	THORN CHAMPION MHN-LA CL2 WI	V2	125	-2.5	x	x	x	
P4	701266.30	8630351.00	30	P4L01	THORN CHAMPION MHN-LA CL2 WI	V2	350	0	x	x	x	
P4	701266.30	8630351.00	30	P4L02	THORN CHAMPION MHN-LA CL2 WI	V2	350	0	-	-	x	
P4	701266.30	8630351.00	30	P4L03	THORN CHAMPION MHN-LA CL2 WI	V2	350	0	-	x	x	
P4	701266.30	8630351.00	30	P4L04	THORN CHAMPION MHN-LA CL2 WI	V2	45	2.5	x	x	x	
P4	701266.30	8630351.00	30	P4L05	THORN CHAMPION MHN-LA CL2 WI	V2	45	2.5	-	x	x	
P4	701266.30	8630351.00	30	P4L06	THORN CHAMPION MHN-LA CL2 WI	V2	70	0	x	x	x	
P4	701266.30	8630351.00	30	P4L07	THORN CHAMPION MHN-LA CL2 WI	V2	45	2.5	-	-	x	
P4	701266.30	8630351.00	30	P4L08	THORN CHAMPION MHN-LA CL2 WI	V2	45	2.5	-	-	x	
P4	701266.30	8630351.00	30	P4L09	THORN CHAMPION MHN-LA CL2 WI	V2	70	0	-	-	x	

PRELIMINARY

AMENDMENTS			
No.	DESCRIPTION	DATE	INITIAL
E			
D			
C	TENDER DESIGN	10.18	RO
B	100% DESIGN	09.18	RO
A	50% DESIGN	08.18	RO

**WARNING**  
ALL REASONABLE CARE HAS BEEN TAKEN TO ACCURATELY SHOW THE POSITION OF EXISTING SERVICES. HOWEVER, THE POSITION OF SUCH SERVICES SHOULD BE PROVEN ON SITE AND NO GUARANTEE CAN BE GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

**HK solutions**  
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DRAWN	C. CHAI	DESIGNED	R. OPPUSUNGU
SCALE	AS SHOWN	CHECKED	
APPROVED		DATE	JULY 18
		SHEET	1 OF ?

NIGHTCLIFF OVAL – MAIN FIELD  
SPORTS LIGHTING – HID  
LAYOUT PLAN

SHEET SIZE A1  
DRAWING No. 18069-E201 AMENDT. C



# Appendix C Luminaire Datasheets

## Champion

### 96261230 CHAMPION 2KW MHN-LA CL2 WI

Cable	 2000W HIT-DE PHL	IP66	IK08		
-------	--	------	------	---	---

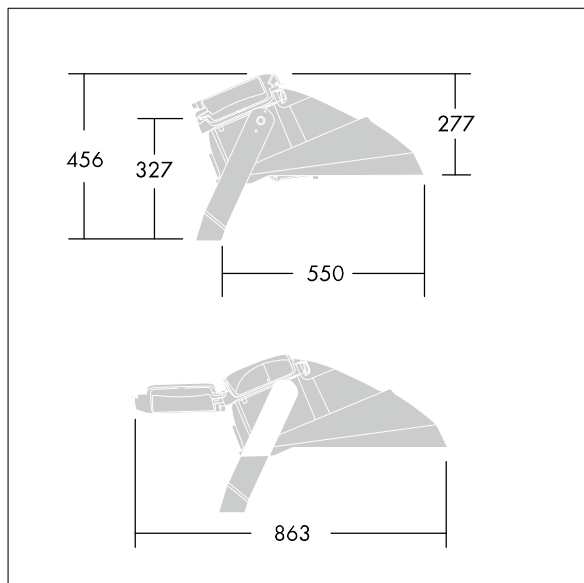
## Champion

A high performance asymmetrical discharge floodlight for 1 x 2000W HIT-DE PHL lamp. magnetic. Class II electrical, IP66 optical and gear compartment, IK08. Body: unpainted die-cast aluminium. Enclosure: 4mm toughened flat glass. Luminaire fixed by single bolt through Ø22mm central hole, or twins bolts through Ø15mm holes at 100mm centres. Cable gland for Ø7.5 to 13mm cable. Aiming via integrated sights. Ideal for sports field and stadium lighting. Complete with ignitor. Gear tray to be ordered separately. Lamp to be ordered separately.

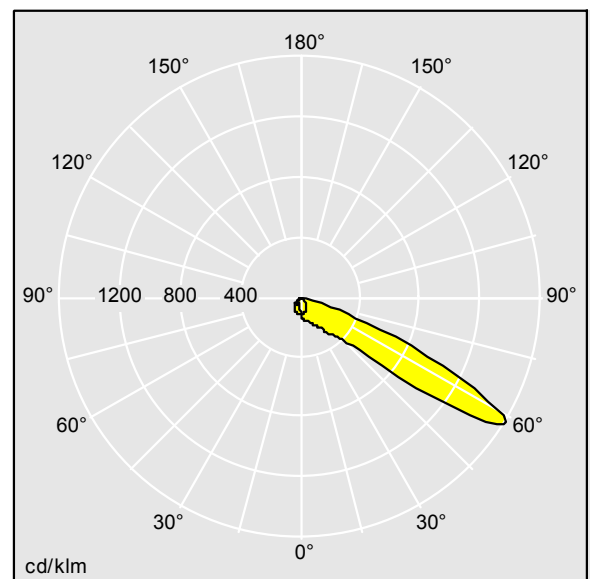
Total power: 2075 W  
 Dimensions: 598 x 720 x 448 mm  
 Weight: 19.3 kg  
 Scx: 0.185 m<sup>2</sup>



TLG\_CHMP\_F\_PDB.jpg



TLG\_CHMP\_M\_U1.wmf



TLLA\_C22A2B.ltd

Lamp position: V2  
 Light Source: 1 x HIT-DE PHL / 2040W  
 Luminaire luminous flux\*: 160600 lm  
 Lamp luminous flux: 1 x 220000 lm  
 Luminaire efficacy\*: 77 lm/W  
 LOR: 0,73 ULOR: 0,00 DLOR: 0,73

Lamp efficacy: 106 lm/W  
 Colour Rendering Index min.: 80  
 Correlated colour temperature\*: 4200 Kelvin  
 Ballast: 1x MAG  
 Luminaire input power\*: 2075 W Lambda = 0.93

All values marked with an \* are rated values. Unless stated otherwise, the values apply to an ambient temperature of 25°C.





# OptiVision LED gen2

**BVP525 1800/740 230V HGB DX50 D9 T25 100**

OptiVision LED gen2 - LED High Brightness - 740 neutral white - 230 V - Asymmetrical wide beam

The Philips OptiVision LED gen2 floodlighting system provides a complete lighting solution for the simplest through to the most complex area and recreational sports lighting applications. The high-efficiency floodlights come with three or two LED light modules, which function with an external driver box – separate for use at a distance from the floodlight (BV), or pre-fixed onto the mounting bracket of the floodlight (HGB) for ease of installation and lower initial cost. They meet the highest performance standards, provide outstanding light quality, and ensure safety and visual comfort. OptiVision LED gen2 offers new possibilities to reduce energy consumption and increase flexibility (instant start, programmable lighting levels) when used in conjunction with Philips' advanced system controls and sensors. The floodlights are also compatible with other external control systems via DALI protocol.

## Product data

General Information		Protection class IEC	Safety class I
Lamp family code	LED-HB [ LED High Brightness]	Flammability mark	-
Light source color	740 neutral white	CE mark	CE mark
Light source replaceable	Yes	ENEC mark	ENEC mark
Number of gear units	1 unit	Warranty period	5 years
Driver/power unit/transformer	Power supply unit with DALI interface external	Optic type outdoor	Asymmetrical wide beam
Driver included	Yes	Remarks	*-Per Lighting Europe guidance paper "Evaluating performance of LED based luminaires - January 2018": statistically there is no relevant difference in lumen maintenance between B50 and for example B10. Therefore the median useful life (B50) value also represents the B10 value.
Optical cover/lens type	Polycarbonate bowl/cover	Constant light output	No
Luminaire light beam spread	90° x 136°		
Control interface	DALI		
Connection	Push-in connector and pull relief		
Cable	-		

## OptiVision LED gen2

Number of products on MCB of 16 A type B	-
RoHS mark	RoHS mark
Light source engine type	LED
Serviceability class	Class A, luminaire is equipped with serviceable parts (when applicable): LED board, driver, control units, surge protection device, optics, front cover and mechanical parts
Product family code	BVP525 [ OptiVision LED gen2]

**Light Technical**

Upward light output ratio	0
Standard tilt angle posttop	-
Standard tilt angle side entry	-

**Operating and Electrical**

Input Voltage	230 V
Input Frequency	50 Hz
Inrush current	30 A
Inrush time	16 ms
Power Factor (Min)	0.95

**Controls and Dimming**

Dimmable	Yes
----------	-----

**Mechanical and Housing**

Housing Material	Aluminum
Reflector material	Polycarbonate
Optic material	Polycarbonate
Optical cover/lens material	Polycarbonate
Fixation material	Aluminum
Mounting device	Mounting bracket adjustable
Optical cover/lens shape	Flat
Optical cover/lens finish	Clear
Overall length	750 mm
Overall width	616 mm
Overall height	600 mm
Effective projected area	0.39 m <sup>2</sup>

**Approval and Application**

Ingress protection code	IP66 [ Dust penetration-protected, jet-proof]
-------------------------	---

Mech. impact protection code	IK08 [ 5 J vandal-protected]
Surge Protection (Common/Differential)	Luminaire surge protection level until 6 kV differential mode and 10 kV common mode

**Initial Performance (IEC Compliant)**

Initial luminous flux (system flux)	180000 lm
Luminous flux tolerance	+/-7%
Initial LED luminaire efficacy	109 lm/W
Init. Corr. Color Temperature	4000 K
Init. Color Rendering Index	≥70
Initial chromaticity	(0.367, 0.358) SDCM <5
Initial input power	1314 W
Power consumption tolerance	+/-10%

**Over Time Performance (IEC Compliant)**

Control gear failure rate at median useful life	10 %
100000 h	
Lumen maintenance at median useful life*	L80
100000 h	

**Application Conditions**

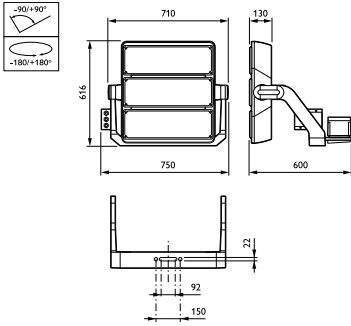
Ambient temperature range	-40 to +45 °C
Performance ambient temperature Tq	25 °C
Maximum dim level	10%

**Product Data**

Full product code	871869911612500
Order product name	BVP525 1800/740 230V HGB DX50 D9 T25 100
EAN/UPC - Product	8718699116125
Order code	912300023825
Numerator - Quantity Per Pack	1
Numerator - Packs per outer box	1
Material Nr. (12NC)	912300023825
Net Weight (Piece)	34.000 kg

# OptiVision LED gen2

## Dimensional drawing



OptiVision LED BVP500/515/520/525





[www.hksolutions.com.au](http://www.hksolutions.com.au)

<b>Rev.</b>	<b>Description</b>	<b>Author</b>	<b>Reviewer</b>	<b>Date</b>
<b>A</b>	Draft	R.Oppusunggu	-	09/18
<b>B</b>	50 lux control added	R.Oppusunggu	-	10/18
<b>C</b>	CoD Review Amendments	R.Oppusunggu		11/18

WANT Geotechnics  
Geotechnical Investigation Report  
For the  
Proposed Lighting Towers for  
Bagot and Nightcliff Ovals, Northern Territory  
Prepared for  
HK Solutions  
Project NTG2018760 Rev 0  
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Author: Stephen Flux .....

Reviewed: Mary Flux .....

Date: 9 September 2018 .....

Distribution: HK Solutions (1 electronic) .....

# WANT Geotechnics

Serving the Territory

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# WANT Geotechnics

Serving the Territory

## Geotechnical Investigation Report for the Proposed Lighting Towers for Bagot and Nightcliff Ovals, Northern Territory

### 1. Introduction

WANT Geotechnics were commissioned by HK Solutions, to undertake a geotechnical investigation to support the design of proposed lighting towers for the Bagot and Nightcliff Sports Ovals in the suburbs of Milner and Nightcliff in the Northern Territory. The geotechnical investigation was undertaken in general accordance with WANT Geotechnics proposal NTG2018544P. The investigation comprised the drilling of 10 boreholes (6 at Bagot Oval and 4 at Nightcliff Oval) and in-situ testing. The objectives of the investigation were to provide a report covering.

- Introduction and scope;
- Site description, including surface and sub-surface conditions;
- Details of desk review, including acid sulphate soils and liquefaction assessment;
- Investigation methodology and results, including subsurface conditions and comments on groundwater.

Engineering assessment covering:

- Site preparation;
- Suggested foundation options and design parameters, including driven or cast in situ pile options or shallow foundations, if applicable;
- Bearing pressures and shaft adhesion values for pile and shallow foundations;
- Soil and rock stiffness values. Soil design parameters, such as shear strength, angle of internal friction etc, will generally be determined using empirical relationships with insitu test results (i.e. SPT results), rather than by direct measurement;
- Groundwater and drainage;
- Anticipated geotechnical related construction difficulties and possible solutions or alternatives.

Appendices including

- Site plans indicating test locations; and
- Detailed borehole logs showing soil and rock lithology.

In our judgement, the extent of this investigation has been sufficient to correlate the observed soil conditions with the known geology and published information for this area. However, localised variations are very difficult to locate using boreholes and test pits as natural soils can vary greatly over short distances. In which case, it would be prudent to commission site inspections during construction, in order that the true site conditions are verified.



**2. Desktop Review**

**2.1 Bagot Oval Terrain and Geology**

The site is located alongside Bagot Road and McMillans Road in Milner in the Northern Territory.

Reference to NT Government Natural Resource Maps website indicates the western third of the site is underlain by the Krans Land System (lateritic plains and rises with commonly shallow gravelly soils and lithosols with no occurrence of acid sulphate soils), the eastern two thirds of the site are underlain by the Kay Land System (lateritic plains and rises with commonly red and yellow earthy soil and no occurrence of acid sulphate soils),

Reference to the 1:100 000 scale geological map indicates the site is underlain by Tertiary age lateritic gravel.

The following plan illustrates the site and the proposed lighting tower locations.

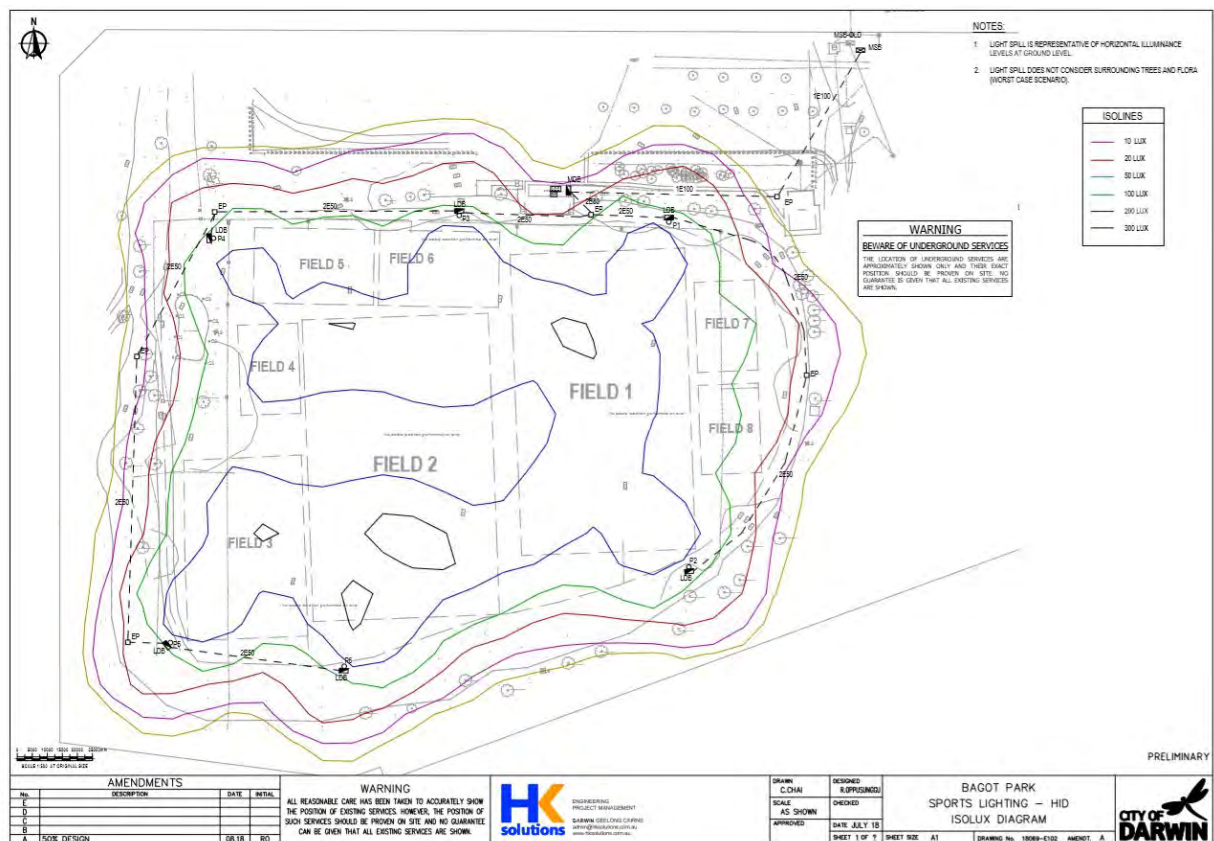


Figure 1: Bagot Oval

**2.2 Nightcliff Oval Terrain and Geology**

The site is located alongside Camphor and Oleander streets in Nightcliff in the Northern Territory.

Reference to NT Government Natural Resource Maps website indicates Nightcliff Oval is underlain by the Kay Land System (lateritic plains and rises with commonly red and yellow earthy soil and no occurrence of acid sulphate soils),

Reference to the 1:100 000 scale geological map indicates the site is underlain by Tertiary age lateritic gravel.

The following plan illustrates the site and the proposed lighting tower locations.

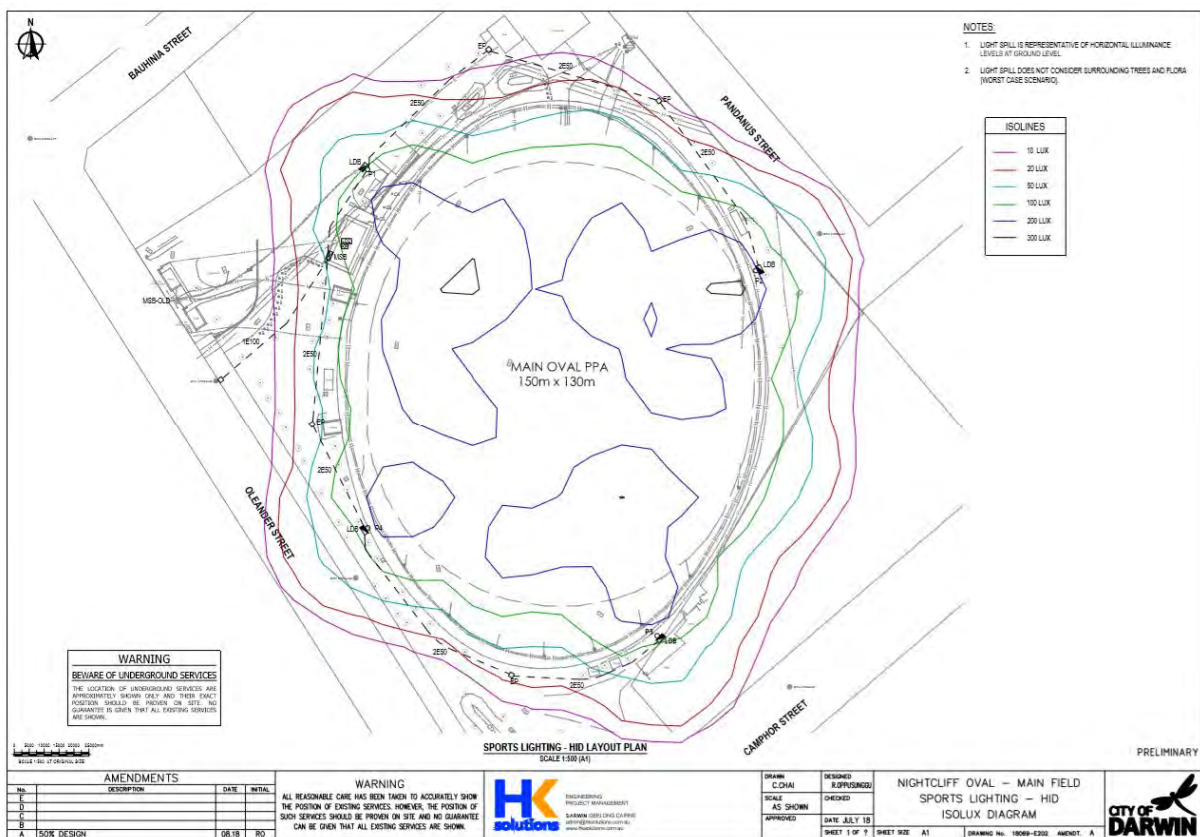


Figure 1: Nightcliff Oval

**2.3 Earthquakes**

Seismicity is generally associated with the boundaries of the Earths’ tectonic plates. However not all earthquakes occur at plate boundaries, these are termed intraplate earthquakes and generally occur because of the release of pressure that has built-up over time as the Earth’s crust deforms. In which case, the presence of faults would not be indicative of an increased risk of seismic activity. The site lies some distance from the boundaries of the Indo-Australian tectonic plate, but this does not preclude it from being subject to seismic events. In which case, there remains potential for the area to be affected by seismic activity, and it is recommended that all infrastructure should be designed for earthquake acceleration of 0.09g as indicated in Figure 3.2(E) of AS1170.4.

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## 2.4 Liquefaction

The upward propagation of shear waves through the ground in an earthquake induces repeated cycles of loading and unloading within subsoils. These repeated cycles of stress often result in progressively increasing magnitudes of excess porewater pressure within fine granular soils. If the porewater pressures build to a magnitude equal to the confining stress, the effective stress is reduced to zero, at which point the fine granular soil loses its strength and essentially flows like a liquid, hence the term liquefaction. Some potential effects of liquefaction are:

- Sand boils
- Decreased lateral soil stiffness
- Landslides
- Lateral spreading of embankments
- Settlement or tipping of shallow foundations
- Ground cracks
- Buoyancy of buried structures

The main factors affecting the liquefaction potential of a soil deposit are: intensity of ground shaking, duration of ground shaking, soil type, initial confining pressure, and relative density or void ratio. Soils with the following characteristics are more susceptible to liquefaction:

- Geological age less than 10,000 years
- Particle size distribution from medium sand to silt size
- Fines (< 0.06 mm) content less than 15%
- Average grain size less than about 0.7 mm
- Relative density less than about 70%
- Groundwater level within a few metres of the ground surface

In addition, soils must also be near saturation to experience the porewater pressure increase that leads to liquefaction. Soils most susceptible to liquefaction are saturated, loose, uniform, fine grained sands. Liquefaction potential decreases as the density or the fines content increases. Soils with plasticity are not likely to liquefy.

The published geological data reviewed as part of this study suggest it is unlikely the soils underlying the site would liquefy or undergo significant deformation during an earthquake event.

## 2.5 Acid sulphate soils

Acid sulphate soils commonly form in low-energy intertidal settings or areas that are subject to periodic tidal flooding. Such reducing environments may contain sufficient organic matter to promote the formation of iron sulphide through sulphate reduction. Most acid sulphate soils occur in coastal areas below 5 metres above sea level. The project area typically could contain acid sulphate soils. Acid sulphate soils (ASS) are generally formed where sea levels rose and inundated the land, the sulphate in the seawater mixed with land sediments containing iron oxides and organic matter. The resulting chemical reaction produced large quantities of iron sulphides in waterlogged environments.

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The following criteria are likely to determine whether ASS is likely to be present:

- Land with an elevation less than 5m Australian Height Datum (m AHD);
- Soil and sediment of recent geological age (Holocene);
- Marine or estuarine sediments and tidal lakes, low-lying coastal wetlands or back swamp areas, waterlogged, or scalded areas, stranded beach ridges and adjacent swales or coastal sand dunes, coastal alluvial valleys;
- Areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions, e.g. mangroves, saltcouch, swamp-tolerant reeds, rushes, paperbarks and swamp oak; and
- Areas identified in geological descriptions or in maps as bearing sulphide minerals, coal deposits or marine shales/sediments deep older estuarine sediments below ground surface of either Holocene or pre-Holocene age.

The potential presence of ASS has been determined by inspection of the NT Government plan titled *Greater Darwin Region Acid Sulphate Soils*, which indicates an no known occurrence of ASS.

### 3. Scope of Works and Methodology

#### 3.1 Intrusive Investigation

The intrusive investigation comprised the following scope of works.

- Undertake Dial-Before-You-Dig enquiry and on-site scanning of test locations for underground pipes and cables.
- Drilling of 10 boreholes to 5m (6 at Bagot Oval and 4 at Nightcliff Oval), or prior refusal on rock, at the approximate location of each lighting tower. Standard penetration tests to be conducted at 1.5m intervals in soil strength strata.
- All logging, sampling and in-situ testing will be undertaken/supervised by an engineering geologist with over 25 years' experience. The exploratory locations will be logged in general accordance with Australian Standards AS1726.
- Upon completion, GPS co-ordinates taken of each borehole location.

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## 4. Investigation Results

Ground conditions encountered in the boreholes are summarised below and detailed on the logs along with the DCP test results in Appendix B. The following table summarises the main strata as encountered in each of the boreholes.

Location	Borehole	Fill	Loose gravel/ firm clay	Stiff to very stiff clay	Medium dense or better sand or gravel	Extremely Low Strength Rock	Very Low Strength Rock		
Bagot Oval	BH1	0.00-0.50m	Not encountered	0.50-1.00m	1.00-2.50m	2.50-2.65m	>2.65m		
	BH2	0.00-0.75m	Not encountered		0.75-1.50m	1.50-2.20m	>2.20m		
	BH3	0.00-0.50m	1.50-2.50m	0.50-1.50m 2.50-2.75m	Not encountered	2.75-3.50m	>3.50m		
	BH4	0.00-0.25m	1.50-2.00m	0.25-0.75m 2.00-2.50m	0.75-1.50	2.50-3.40m	>3.40m		
	BH5	0.00-0.75m	Not encountered	Not encountered	0.75-2.50m	Not encountered	2.50-3.50m	>3.50m	
	BH6	0.00-0.50m			1.00-2.50m	0.50-1.00m	2.50-2.70m	>2.70m	
Nightcliff Oval	BH1	Not encountered			Not encountered	1.00-3.00m	0.00-1.00m	3.00-3.65m	>3.65m
	BH2					0.25-3.00m	0.00-0.25m	3.00-4.05m	>4.05m
	BH3					0.50-1.50m	0.00-0.50m	1.50-3.70m	>3.70m
	BH4					0.75-3.00m	0.00-0.75m	3.00-3.75m	>3.75m

**Table 1: Summary of Ground Conditions**

No free groundwater was encountered in any of the boreholes, either at Bagot Oval or Nightcliff Oval. The investigation was undertaken in September 2018, groundwater levels will fluctuate due to seasonal variations and other factors.

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## 5. Engineering Comments

### 5.1 Site Preparation

All earthworks should be carried out in general accordance with the relevant Department of Infrastructure, Planning and Logistics (DIPL) specification.

Prior to construction, uncontrolled fill, topsoil or material containing organic matter should be stripped from the footprint of any surface slab/construction. This material is not considered suitable for use as selected fill but can be stockpiled for later use as non-structural fill purposes.

If required, additional fill should comprise granular material that is placed in 250mm thick layers, and then compacted to 98% SMDD, within  $\pm 2\%$  of OMC. Placement of additional fill should be subject to Level 1 Inspection and Testing, as required by AS 3798.

### 5.2 Excavation characteristics

Based on the subsurface conditions encountered during the fieldwork at proposed tower locations, it is expected that excavations will predominantly encounter clay, sand and gravel, in which case it is expected that the materials can readily be excavated using conventional earthmoving equipment.

### 5.3 Excavated slopes / trenches

Temporary cut slopes to a maximum depth of 1.5m should not be steeper than 1V:3H in fill, 1V:2H in unsaturated sand and gravel soils, and near vertical in clay/silt soils and rock, provided that:

- They are barricaded when not in use
- They are not left open for more than 24 hours
- No surcharge loading is applied within 2.5m of the edge of the excavation
- No groundwater inflows are encountered

Where access for a worker or deeper excavations are required, the temporary excavation batters should be regraded to no steeper than 1.5H: 1V or supported by properly designed shoring.

It is assumed permanent batters are not a part of the development.

### 5.4 General Soil Parameters for Design

The following table details general design parameters for soil strength materials as encountered during the drilling investigation or may potentially be present. The values are based on in situ testing, laboratory test results, correlation with published data and our experience of similar soils.

Soil	Consistency	Bulk Unit Weight (kN/m <sup>3</sup> )	Undrained Shear Strength (kPa)	Effective Friction Angle (°)	Effective Cohesion (kPa)	Youngs' Modulus (MPa)
Fine-grained cohesive	Firm	16	25	15	10	8 <sup>1</sup>
	Stiff to very stiff	18	100	20	20	15 <sup>1</sup>
	Hard	20	200	25	50	30 <sup>1</sup>
Non-cohesive	Very loose to loose	17	n/a	28	n/a	3
	Medium dense	20	n/a	30	n/a	50
	Dense or better	21	n/a	40	n/a	100
Extremely weathered soil strength rock	Extremely low strength	20	300	35	150	50

**Table 2: General Soil Design Parameters**

<sup>1</sup>Long-term, drained value

Proposed Lighting Towers  
 Bagot and Nightcliff Ovals, Northern Territory

## 5.5 Foundations

### 5.5.1 Bored Piers

It is understood that each tower will be founded on a 1200mm diameter bored pier, design of concrete bored piers should be carried out in accordance with AS 2159 and it is recommended that design in compression and uplift be based on the parameters given below.

Strata Description	Angle of Internal Friction	Ultimate Skin Friction (kPa)	Ultimate End Bearing (KPa)
Uncontrolled fill	30°	ignore	n/a
Medium dense or better sand	34°	30	n/a
Stiff or better clay soils	n/a	30	n/a
Extremely low strength siltstone	36°	100	2500
Very low strength or better siltstone	38°	150	3500

**Table 3: Bored Pier Design Parameters**

During the wet season the groundwater level may rise and be encountered near the ground surface. If pier construction is carried out during the wet season, casing, dewatering of pier excavations or tremie construction techniques may be required. With the above points in mind, it is suggested that pier construction be carried out during the dry season if possible.

### 5.5.2 Foundation Inspections

All foundation excavations should be inspected by a suitably experienced engineering geologist to confirm that founding conditions are as anticipated and suitable for the proposed loads. If, during construction, it is apparent that the foundation conditions are different from those described in this report then further geotechnical advice should be sought from WANT Geotechnics.

### 5.5.3 Bored Pile Construction Considerations

Steel casing will be required to support the subsoils down to the weathered rock as well as to seal the pier against groundwater inflow (if construction is undertaken during the wet season). There will, however, remain the potential for groundwater inflow through the bedding and discontinuities within the rock. Such groundwater inflows can be expected to be controlled with conventional pumping techniques. If conventional pumps are unable to be used to remove water from the base of pile excavations prior to concreting, then the concrete will need to be placed using tremie pipes and filling the sockets from the bottom up under water (this is considered unlikely).

The rock encountered in the boreholes is at least of very low strength and appropriate rock drilling equipment will be needed to drill the piers through such materials. Based on the available strength data, augers and coring buckets with conventional tungsten carbide bullet teeth should be suitable.

In addition to the above the following will need consideration prior to construction:



- Management of spoil generated from drilling the piles and environmental management of spoil.

#### 5.5.4 Geotechnical Strength Reduction Factor

Ultimate pile capacities provided in the previous section should be multiplied by an appropriate geotechnical strength reduction factor (GSRF) in accordance with AS2159 *Piling Design and Installation*.

The GSRF is a function of site, design, investigation, installation methods procedures when piling, and the level of testing undertaken on the piles during their construction.

Based on the above and on the assumption that no in situ pile testing is undertaken but the actual installation of the piles and rock sockets is observed and certified by a suitably qualified and experienced geotechnical engineer/ engineering geologist, then a GSRF of 0.56 is appropriate.

#### 5.5.5 Estimated Pile Ultimate Capacity

Based on the individual borehole logs and in situ tests, the relationship proposed by Zhang and Einstein and assuming 1200mm diameter bored piles 5m deep and founded in very low strength or better rock, then a preliminary assessment of pile ultimate capacities has been made and is summarised in the following table. Pile uplift and lateral capacity is beyond the scope of our assessment.

Location	Borehole	Approximate depth of very low strength or better rock	Ultimate Skin Friction	Ultimate End-Bearing	Ultimate Capacity	Pile Length
Bagot Oval	BH1	2.65m	1208kN	4205kN	5413kN	5m
	BH2	2.20m	1517kN	4205kN	5722kN	
	BH3	3.50m	1168kN	4205kN	5373kN	
	BH4	3.40m	1142kn	4205kN	5347kN	
	BH5	3.50m	1232kN	4205kN	5437kN	
	BH6	2.70m	1224kN	4205kN	5429kN	
Nightcliff Oval	BH1	3.65m	1517kN	4205kN	5722kN	
	BH2	4.05m	1517kN	4205kN	5722kN	
	BH3	3.70m	1517kN	4205kN	5722kN	
	BH4	3.75m	1066kN	4205kN	5270kN	

Table 4: Preliminary Pile Capacities

## 5.6 Groundwater and Drainage

The fieldwork was undertaken in September 2018, and no groundwater was encountered in any of the boreholes during the investigation. Given the subsoils encountered, it is expected that groundwater (if encountered at depth) can be managed by a conventional pump placed within the excavation.

## 5.7 Geotechnical Related Construction Issues and Potential Solutions.

Based on the materials encountered and the aims of the project, then it is not expected that there will be any significant geotechnical related construction issues.

## 6. References

1. Australian Standard AS 1170.4 *Structural Design Actions Part4: Earthquake Actions in Australia*
2. Australian Standard AS 1726 *Geotechnical site investigations*
3. Australian Standard AS 2159 *Pile Design and Installation*
4. Australian Standard AS 2870 *Residential Slabs and Footings*
5. Australian Standard AS 3798 *Guidelines on Earthworks for Commercial and Residential Developments*
6. Look B (2007) *Handbook of Geotechnical Investigation and Design Tables*
7. Das BM (2014) *Principles of Geotechnical Engineering*

## 7. Limitations

### SCOPE OF SERVICES

This geotechnical report has been prepared in accordance with the scope of services set out in the agreement between WANT Geotechnics and their client and is subject to any qualifications and assumptions set out in the report. In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

### RELIANCE ON DATA

In preparing the report, WANT Geotechnics has relied upon data, surveys, and plans provided by the client. WANT Geotechnics has not verified the accuracy or completeness of the data, to the extent that the any statements, opinions, facts, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WANT Geotechnics will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have not been fully disclosed to WANT Geotechnics.

### GEOTECHNICAL INVESTIGATION

Geotechnical engineering reports are prepared to meet the specific scope of the client and may not necessarily be adequate for a construction contractor. This report was prepared expressly for the client and expressly for purposes indicated by the client or his representative. Use by any other persons for any purpose, or by the client for a different purpose, is not recommended. The client should not use this report for other than its intended purpose without seeking additional geotechnical advice.

### LIMITATIONS OF SITE INVESTIGATION

In making an assessment of a structure from a single exploratory location there is the possibility that variations may occur that were not encountered. Site exploration identifies specific subsurface conditions only at those points from which samples have been taken. The risk that variations will not be detected can be reduced by increasing the frequency of test locations; however, this often does not result in any overall cost savings for the project. The data derived from the investigation and subsequent laboratory testing have been extrapolated to form an inferred model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the structure. Actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. The exploratory test records are the subjective interpretation of subsurface conditions at a particular location, made by trained personnel. The interpretation may be limited by the method of investigation and cannot always be definitive. For example, inspection of an excavation or test pit allows a greater area of the subsurface profile to be inspected than borehole investigation; however, such methods are limited by depth and site disturbance restrictions. In borehole investigation, the actual interface between materials may be more gradual or abrupt than a report indicates

### SUBSURFACE CONDITIONS ARE TIME DEPENDENT

Subsurface conditions may be modified by changing natural forces or man-made influences. A geotechnical engineering report is based on conditions which existed at the time of subsurface exploration. Construction operations, at or adjacent to the site, and natural events, such as floods or groundwater fluctuations may also affect subsurface conditions and thus the continuing adequacy of a geotechnical report. The geotechnical engineer should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

**EXPLORATORY LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT**

Final exploratory logs are developed by geotechnical engineers based upon their interpretation of field logs and laboratory evaluation of field samples. Customarily, only the final exploratory logs are included in geotechnical engineering reports. These logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings. To minimise the likelihood of exploratory log misinterpretation, contractors should be given access to the complete geotechnical engineering report prepared or authorised for their use. Providing the best available information to contractors helps prevent costly construction problems. For further information on this matter reference should be made to 'Guidelines for the Provision of Geotechnical Information in Construction Contracts' published by the Institution of Engineers Australia, National Headquarters, Canberra 1987.

**OTHER LIMITATIONS**

WANT Geotechnics will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

WANT Geotechnics

**Appendix A**

Test Hole Location Plan (Bagot Oval)  
Test Hole Location Plan (Nightcliff Oval)



<b>WANT Geotechnics</b> <i>Serving the Territory</i>	Client: HKSolutions		Borehole Locations Proposed Lighting Towers Bagot Oval, Milner, Northern Territory	Project No. NTG2018760
		Drawn by: S Flux		Drawing No. 1
	Scale: NTS	Date: 9 Sep 2018		Revision: 0



<b>WANT Geotechnics</b> <i>Serving the Territory</i>	Client: HKSolutions		Borehole Locations Proposed Lighting Towers Nightcliff Oval, Nightcliff, Northern Territory	Project No. NTG2018760
		Drawn by: S Flux		Drawing No. 2
	Scale: NTS	Date: 9 Sep 2018		Revision: 0

## Appendix B

### Borehole Logs and Dynamic Cone Penetrometer Results



Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628952  
Easting: 0702016  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00	1.50-1.95m 7, 6, 5 N = 11			Dense, grey brown SAND trace silt, moist (FILL)	D	M	
0.25				Medium dense, brown, silty SAND some gravel, dry (FILL)	MD	D	
0.50				Stiff, dark brown, gravelly CLAY moist	St	M	
1.00				Medium dense, red brown, GRAVEL some clay, moist	MD		
1.65				Stiff, red brown and yellow, clayey SILT some gravel, moist	St		
2.50				Extremely low strength, extremely weathered, brown mottled white and yellow SILTSTONE	Rock		
2.65				Machine refusal at 2.65m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

- FR - Fresh; SW - Slightly Weathered
- MW - Mod Weathered; HW - Highly Weathrd
- XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: 1.5m high earth mound

Northing: 8628826  
Easting: 0702005  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance		Consistency / Density	Moisture Condition	
				SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components			Dynamic Cone Penetrometer Blow Counts per 100mm 5 10 15 20
0.00				Medium dense, brown, silty, gravelly SAND dry (FILL)	MD	D	
0.75				Medium dense, dark brown to red brown, clayey GRAVEL moist		M	
1.50	1.50-1.86m 10, 27, 23/60mm N = 50/210mm			Extremely low strength, extremely weathered SILTSTONE	Rock		
1.80				Extremely low strength, highly weathered, brown and white mottled orange SILTSTONE			
2.20				Machine refusal at 2.20m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

(Location moved due to stockpiles)

<p><b>GROUNDWATER</b></p> <p>▼ water level (static) ▼ water level (at excavation) ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered MW - Mod Weathered; HW - Highly Weathrd XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance ranging to: 4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test ⊥ pocket penetrometer</p> <p>○ Environmental Sample ■ Undisturbed tube sample ● Disturbed sample ■ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose) L (loose) MD (medium dense) D (dense) VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa S (soft) 12-25 F (firm) 25-50 St (stiff) 50-100 VSt (very stiff) 100-200 H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628959  
Easting: 0701931  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00				Very stiff to hard, brown to red brown, gravelly CLAY some sand, moist (FILL)	VSt-H	M	
0.50			Stiff, red brown, silty CLAY trace sand and gravel, moist	St			
1.50	1.50-1.95m 6, 4, 4 N = 8		Gravelly from 1.25m				
2.50			Loose, red brown spotted yellow, clayey GRAVEL moist	L			
2.75			Very stiff, red brown and yellow, clayey SILT some gravel, moist	VSt			
3.50	3.00-3.40m 13, 30, 20/50mm N = 50/250mm		Extremely low strength, extremely weathered, brown, yellow and white, clayey SILTSTONE	Rock			
			Machine refusal at 3.50m in very low strength or better rock				

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathered  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
- L (loose)
- MD (medium dense)
- D (dense)
- VD (very dense)

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

MOISTURE CONDITION

D=dry M=moist W=wet

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628950  
Easting: 0701848  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00	1.50-1.95m 4, 1, 2 N = 3			Medium dense, dark brown, silty SAND trace gravel and roots, dry (FILL)	MD	D	
0.25				Stiff, red brown, silty CLAY trace gravel, moist	St	M	
0.75				Dense, red brown, clayey, gravelly SAND moist	D		
1.25				Dense, red brown, clayey, sandy GRAVEL moist			
1.50				Firm, brown to red brown, gravelly CLAY trace sand, moist	F		
2.50				Becoming stiff to very stiff at 2m with fragments of very low to low strength siltstone	St-VSt		
3.40				Extremely low strength, extremely weathered, brown to red brown, yellow and white SILTSTONE	Rock		
	3.00-3.15m 50/150mm N = 50/150mm			Machine refusal at 3.40m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathered  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
- L (loose)
- MD (medium dense)
- D (dense)
- VD (very dense)

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

MOISTURE CONDITION

D=dry M=moist W=wet

Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628812  
Easting: 0701833  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Medium dense to very dense, brown and grey, clayey, sandy GRAVEL moist with pockets of sand size material (FILL)	MD-VD	M	5 10 15 20
0.75				Stiff, brown, gravelly CLAY moist	St		
1.25	1.50-1.95m 8, 9, 5 N = 14			Stiff, red brown mottled yellow, silty CLAY some gravel moist			
2.50				Extremely low strength, extremely weathered, brown to red brown, yellow and white SILTSTONE			
3.50	3.00-3.25m 22, 50/100mm N = 50/100mm			Machine refusal at 3.50m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static)                  ▼ water level (at excavation)                  ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered                  MW - Mod Weathered; HW - Highly Weathred                  XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance                  ranging to:                  4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test                  ⊥ pocket penetrometer</p> <p>○ Environmental Sample                  ■ Undisturbed tube sample                  ● Disturbed sample                  ▣ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose)                  L (loose)                  MD (medium dense)                  D (dense)                  VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa                  S (soft) 12-25                  F (firm) 25-50                  St (stiff) 50-100                  VSt (very stiff) 100-200                  H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Bagot Oval, Milner, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Low earth mound

Northing: 8628805  
Easting: 0701893  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Stiff, brown, sandy CLAY some gravel, moist (FILL)	St	M	5 10 15 20
0.50				Medium dense, red brown, clayey SAND trace, moist (FILL)	MD		
0.75				Medium dese, brown, sandy GRAVEL with clay, moist			
1.00				Stiff, brown to red brown mottled yellow, gravelly CLAY trace sand, moist	St		
2.50	1.50-1.95m 9, 6, 7 N = 13			Extremely low strength, extremely weathered, yellow brown, sandy SILTSTONE	Rock		
2.70				Machine refusal at 2.70m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static) ▼ water level (at excavation) ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered MW - Mod Weathered; HW - Highly Weathred XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance ranging to: 4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test ⊥ pocket penetrometer</p> <p>○ Environmental Sample ■ Undisturbed tube sample ● Disturbed sample ▣ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose) L (loose) MD (medium dense) D (dense) VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa S (soft) 12-25 F (firm) 25-50 St (stiff) 50-100 VSt (very stiff) 100-200 H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Bare earth

Northing: 8630471  
Easting: 0701266  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance		Consistency / Density	Moisture Condition	
				SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components			Dynamic Cone Penetrometer Blow Counts per 100mm 5 10 15 20
0.00				Very dense, light brown, sandy GRAVEL with silt, dry	VD	D	
0.50				Very dense, light red brown to brown, sandy GRAVEL with silt, dry			
1.00				Stiff, red brown to brown, clayey SILT trace gravel, dry	St		
1.50	1.50-1.90m 13, 26, 24/100mm N = 50/250mm			Hard, brown to red brown mottled yellow, clayey SILT trace gravel, moist	H	M	
3.00	3.00-3.30m 20, 50/150mm N = 50/150mm			Extremely low strength, extremely weathered, white and brown mottled yellow SILTSTONE	Rock		
3.65				Machine refusal at 3.65m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathed  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
- L (loose)
- MD (medium dense)
- D (dense)
- VD (very dense)

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

MOISTURE CONDITION

D=dry M=moist W=wet

Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Grass

Northing: 8630437  
Easting: 0701396  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
							5 10 15 20
0.00				Medium dense, brown, gravelly, silty SAND dry	MD	D	
0.25				Stiff, red brown, sandy SILT some gravel and clay, dry	St		
0.50				Stiff to very stiff, red brown, gravelly, sandy CLAY dry	St-VSt		
1.50	1.50-1.90m 14, 24, 26/100mm N = 50/250mm			Hard, brown to red brown mottled white clayey SILT some gravel, dry	H		
3.00	3.00-3.38m 16, 24, 26/75mm N = 50/225mm			Extremely low strength, extremely weathered, white and brown mottled yellow SILTSTONE	Rock		
4.05				Machine refusal at 4.05m in very low strength or better			

PHOTOGRAPHS



Samples



Location

<p><b>GROUNDWATER</b></p> <p>▼ water level (static) ▼ water level (at excavation) ◀▶ outflow / inflow</p> <p><b>Weathering</b></p> <p>FR - Fresh; SW - Slightly Weathered MW - Mod Weathered; HW - Highly Weathed XW - Xtremely Weathered; RS - Residual Soil</p>	<p><b>PENETRATION</b></p> <p>1 - no resistance ranging to: 4 - refusal</p>	<p><b>FIELD DATA SYMBOLS</b></p> <p>✕ shear vane test ⊥ pocket penetrometer</p> <p>○ Environmental Sample ■ Undisturbed tube sample ● Disturbed sample ■ Bulk sample</p>	<p><b>DENSITY</b></p> <p>VL (very loose) L (loose) MD (medium dense) D (dense) VD (very dense)</p> <p><b>MOISTURE CONDITION</b></p> <p>D=dry M=moist W=wet</p>	<p><b>CONSISTENCY</b></p> <p>VS (very soft) &lt;12kPa S (soft) 12-25 F (firm) 25-50 St (stiff) 50-100 VSt (very stiff) 100-200 H (hard) &gt;200</p>
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Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Grass

Northing: 8630316  
Easting: 0701363  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Dense to very dense, brown to grey brown, silty SAND with gravel, dry	D-VD	D	5 10 15 20
0.50				Stiff to very stiff, brown to red brown spotted white, silty CLAY trace gravel dry	St-VSt		
1.50	1.50-1.91m 12, 23, 27/110mm N = 50/260mm			Extremely low strength, extremely weathered, white and brown spotted yellow and purple SILTSTONE	Rock		
3.70	3.00-3.32m 17, 31, 19/20mm N = 50/170mm			Machine refusal at 3.70m in very low strength or better rock			

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- ▼ water level (static)
- ▽ water level (at excavation)
- ◀▶ outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathed  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- ✕ shear vane test
- ⊥ pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- ▣ Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Project: Lighting Towers  
Location: Nightcliff Oval, Nightcliff, NT  
Job No. NTG2018760

Client: HK Solutions  
Equipment: Trailer-mounted rig  
Surface Conditions: Access track

Northing: 8630353  
Easting: 0701260  
Logged: SF  
Checked: MF

FIELD DATA				MATERIAL SUBSTANCE	SOIL CONDITION		COMMENTS
Depth (m)	Standard Penetration Tests	Groundwater	Penetration Resistance	SOIL TYPE: unified soils classification, colour, structure, particle characteristics, geological origin and minor components	Consistency / Density	Moisture Condition	Dynamic Cone Penetrometer Blow Counts per 100mm
0.00				Very dense, brown, sandy GRAVEL with silt, dry	VD	D	5 10 15 20
0.75				Stiff, brown to dark red brown, gravelly, sandy CLAY dry	St		
1.25	1.50-1.95m 5, 7, 5 N = 12			Stiff, red brown to brown mottled white and yellow, silty CLAY some sand and trace gravel, dry			
3.00	3.00-3.37m 20, 30, 20/70mm N = 50/220mm			Very stiff from 2m	VSt		
3.75				Extremely low strength, extremely weathered, white mottled yellow and purple SILTSTONE  Machine refusal at 3.75m in very low strength or better rock	Rock		

PHOTOGRAPHS



Samples



Location

GROUNDWATER

- water level (static)
- water level (at excavation)
- outflow / inflow

Weathering

FR - Fresh; SW - Slightly Weathered  
MW - Mod Weathered; HW - Highly Weathed  
XW - Xtremely Weathered; RS - Residual Soil

PENETRATION

- 1 - no resistance
- ranging to:
- 4 - refusal

FIELD DATA SYMBOLS

- shear vane test
- pocket penetrometer
- Environmental Sample
- Undisturbed tube sample
- Disturbed sample
- Bulk sample

DENSITY

- VL (very loose)
  - L (loose)
  - MD (medium dense)
  - D (dense)
  - VD (very dense)
- MOISTURE CONDITION**  
D=dry M=moist W=wet

CONSISTENCY

- VS (very soft) <12kPa
- S (soft) 12-25
- F (firm) 25-50
- St (stiff) 50-100
- VSt (very stiff) 100-200
- H (hard) >200

Affiliated member of AFL Northern Territory  
Affiliate member of the Nightcliff Sports Club  
11 Camphor Street, Nightcliff, NT  
President: Jeffrey Borella  
Patron: Hon. Natasha Fyles (MLA)



All Correspondence:-  
PO Box 761 Nightcliff NT 0814  
Telephone 08 89856636  
Email: tigersfc@bigpond.net.au  
Web: www.nfctigers.com.au  
ABN 24 508 382 495



12 November 2018

Hon. Konstantine Vatskalis  
Lord Mayor  
City of Darwin  
GPO Box 84  
DARWIN NT 0801

## RE: Proposal for Sports Lighting at Nightcliff Oval

Following a meeting held at the Nightcliff oval on 7 November 2018 we now commit on behalf of AFL Northern Territory, Nightcliff Football Club and Nightcliff Sports Club to address the community concerns that were submitted to Council as a result of the Community Consultation process undertaken in December 2017 to which the City of Darwin provided in-principle support for the proposal. Please find following, how the respective community concerns will be addressed:

### 1. Anti-social behaviour

The AFLNT, Nightcliff Football Club and Nightcliff Sports Club all have extensive codes of conduct within their organisations that specifically address anti-social behaviour to ensure the comfort and safety of patrons and participants alike.

The AFLNT and Nightcliff Football Club codes of conduct are already in place and will be implemented regarding the safe and regular use of the oval in the event of light installation at the facility these codes of conduct will of course cover off on the additional game and training times. Depending on the nature of the non-compliant behaviour regarding the codes of conduct for patrons, participants and officials can all be held to account for their actions in a variety of ways including via venue security, sport match review and tribunal processes and of course regular law enforcement. The Nightcliff Sports Club has recourse under their Code of Conduct and powers under the Liquor Act to remove and ban patrons from their premises.

All parties work hard to create a safe and family friendly environment and take the breaching of Codes of Conduct and Member Protection very seriously. Residents can be assured the standard of these current processes will continue with the installation of venue lighting.

.../2

#### MAJOR SPONSORS 2018/19

##### NIGHTCLIFF SPORTS CLUB

##### MIX 104.9FM

CRYSTAL CLEAN CARWASH – PSC BM INSURANCE BROKERS - FREDBUILD  
MERIT PARTNERS – METALMASTER – ASSET SERVICES – CAZALY'S PALMERSTON  
DMG DARWIN – SEASWIFT – ENERGY ELECTRICAL – JN MOUSELLIS – VOCUS – THE ZEST GROUP

DARWIN FAMILY LAW – ARAFURA CRASH REPAIRS – UCART – JSM CIVILS – RMP ACCOUNTANTS – PERAGO COATINGS – METALMASTER  
MM ELECTRICAL – HIREWORKS – A&K MAINTENANCE – NP CIVILS – ROOF POWER – RMP CHARTERED ACCOUNTANTS – WICKED NRG

ARNHEMLAND ELECTRICAL – ACSM BUILDERS – BEACHFRONT HOTEL – BROWNS PRECISION PLASTERING – THE CRICKET & FOOTBALL SHOP  
DIANNE BORELLA CONSULTANCY – EXPRESS SIGNS – GIBBSY'S AUTOS – NP CIVIL – CENTRAL BUSINESS EQUIPMENT  
FITNESS WORKS – HIREWORKS – HOBBS BUILDERS – JEC TRANSPORT – READYCUT SCREENS AND DOORS  
KELLY FAMILY – HIRE A HUBBY – BORELLA FAMILY – NT POWERLINES AND ELECTRICAL – MMI INVESTMENTS  
PRODIGY CONSTRUCTION AND ROOFING – RHINO INDUSTRIAL – RENT 4 KEEPS – STEADMAN CONSTRUCTIONS AND ENGINEERING

In addition to the policies and procedures currently in place, the City of Darwin has a Seasonal Allocations Agreement. Both AFLNT, Nightcliff Football Club (and Nightcliff Cricket Club) have signed these documents with City of Darwin for their respective six-month per year usage of Nightcliff Oval. These agreements have several requirements to ensure the safe and proper usage of the facility including but not limited to facilities that are only allocated to sports with sound governance structures, open memberships which do not discriminate on the basis of age or gender; sports with elected committees and a demonstrated commitment to social responsibility.

Liquor licenses are in place at Nightcliff Oval and obviously within the Nightcliff Sports Club and are applied for and administered by the user group of the facility who have already been successfully vetted by the City of Darwin via the Seasonal Allocation. The Nightcliff Football Club monitors all access and egress points to the oval precinct on game days and is manned by club officials. The club officials will also be alerted to report on any forms of anti-social behaviour. Depending on the nature of the anti-social behaviour the Nightcliff Football Club may consider contacting the appropriate agency to manage the situation at hand. For example, the "Night Patrol", City of Darwin Safer Cities team or the Police may be contacted to assist with persons acting in an anti-social manner. If deemed necessary, the gates to the oval may be locked after hours to dissuade any lingering within the facility.

### **1. Rubbish**

The Nightcliff Football club has a waste management processes in place at Nightcliff Oval and commit to increasing the frequency and scope of cleaning and waste collection work should the need arise off the back of increased usage of Nightcliff Oval due to the installation of lights at the facility. Club officials and volunteers assist at the completion of games to place all rubbish in the proper receptacles for later collection.

### **2. Parking**

The issue of parking in suburban streets around Nightcliff oval on game days was considered to be one of the greater concerns expressed during the public consultation process. In particular, blocking driveways. City of Darwin has addressed the issue to a great extent by painting yellow no parking lines around driveways in side streets to the oval.

It is the intention of the Nightcliff Football Club to allow club officials to park within the bounds of the oval on game days, thus alleviating parking stress in the streets surrounding the oval.

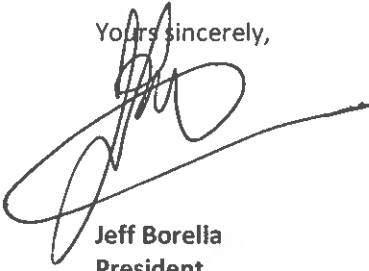
The Nightcliff Football Club is keen to work with City of Darwin and intends to liaise with City of Darwin Regulatory services to distribute information/warnings on windscreens if illegal parking is detected or continues. The Nightcliff Football Club will also educate members and oval users on appropriate locations to park and monitor parking behaviours.

Consideration may be given to the installation of a pedestrian gate to the middle of the fence on Oleander Street. This gate will allow spectator entry on game days and may deter people from parking close to the current vehicle gate.

This lighting project remains focused on creating and developing pathways for junior and female football and cricket participants at climate and family friendly times of the day, while ensuring surrounding areas and residents are not faced with any decreased quality of living.

Should you need further information or clarity on anything below please don't hesitate to contact Jeff Borella on 0408949098.

Yours sincerely,



**Jeff Borella**  
President  
Nightcliff Football Club



**Stuart Totham**  
Chief Executive Officer  
AFL Northern Territory



**Brian Thomas**  
President  
Nightcliff Sports Club

ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.1.4  
 YES

**NORTHERN TERRITORY CLIMATE CHANGE DISCUSSION PAPER**

REPORT No.: 18CL0092 SG:kl COMMON No.: 3913655 DATE: 27/11/2018

**Presenter:** Executive Manager Environment and Community,  
 Shenagh Gamble

**Approved:** General Manager Community and Regulatory Services,  
 Polly Banks

**PURPOSE**

The purpose of this report is to seek endorsement from Council on a submission to the Northern Territory Government Climate Change Discussion Paper.

**LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

**Goal**

3 Environmentally Sustainable City

**Outcome**

3.2 Darwin community's carbon footprint reduced

**Key Strategies**

3.2.3 Lobby governments, developers and industry to undertake sustainable projects and behaviours

**KEY ISSUES**

- The Northern Territory Government is developing a Climate Change Strategy.
- To develop the Strategy a Discussion Paper has been released for public comment.
- The Discussion Paper outlines the effects of climate change in the Northern Territory and the work currently being done to address it.
- The Discussion Paper is seeking feedback on what work is being done to address climate change
- The Discussion Paper also seeks feedback on an emissions target, role of business and government, Aboriginal knowledge, emerging opportunities, regulations to assist industry and willingness of community and industry to mitigate climate change.
- Comments and positions expressed in the submission provided at **Attachment A** reflect endorsed Council policies and strategies.

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 SUBJECT: NORTHERN TERRITORY CLIMATE CHANGE DISCUSSION PAPER

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## **RECOMMENDATIONS**

- A. THAT Report Number 18CL0092 SG:kl entitled Northern Territory Climate Change Discussion Paper, be received and noted.
- B. THAT Council endorse the submission document provided at **Attachment A** to Report Number 18CL0092 SG:kl entitled Northern Territory Climate Change Discussion Paper

## **BACKGROUND**

On Friday 5 October 2018 the Northern Territory Government released its Climate Change Discussion Paper – *Climate Change – Mitigation and Adaptation Opportunities in the Northern Territory*. This paper can be accessed here: <https://haveyoursay.nt.gov.au/39757/documents/88860>

Council staff attended a briefing session on Thursday 4 October prior to the release of the paper.

## **DISCUSSION**

The Northern Territory Government is developing a Climate Change Strategy. To develop the Strategy a Discussion Paper has been released for public comment.

The Discussion Paper outlines the effects of climate change in the Northern Territory and the work currently being done to address it. The paper is seeking feedback on this, as well as for informing the development of a Northern Territory Climate Change strategy.

The Paper focuses on several key areas where input is sought on how the Northern Territory should:

- manage its greenhouse gas emissions effectively
- adapt to climate change
- take opportunities for innovative approaches to mitigation and adaptation.

Meaningful emissions reductions targets should be embedded across all sectors and at all levels. In short, businesses and governments need to make emissions reductions part of everyday business to decarbonise and transition to a low-carbon economy. Early in 2018 City of Darwin adopted a position of net zero emissions from energy by 2030.

Setting an emission reduction target for the Northern Territory will provide investor certainty, drive innovation and signal to the business and broader community that the NT is open for clean and sustainable investment.

The NTG previously adopted a Climate Action Policy in 2009. This policy had an aspirational goal of 60% carbon emissions reduction by 2050, compared to 2007

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emissions. City of Darwin recommends the Northern Territory Government adopt a science-based emissions reduction target of net zero by 2050. The target should comprise interim targets to ensure the overarching target is achieved and integrate sector-specific targets (with the recognition that some sectors are more difficult to decarbonise than others).

Great opportunities exist when the Government provides clear commitment to emission reduction. This includes:

- Significant cost savings could be realised (e.g. savings realised through energy efficiency; savings realised from maximising renewable energy generation)
- Stimulate new investment in low-carbon sectors and encourage technological innovation
- Increase in energy security and water security
- New jobs and industries created (e.g. the NT could be a net renewable energy exporter)
- The NT could be established as a leading international solar/renewable energy research hub.

Further, taking action to reduce the impacts of climate change provides opportunity to improve the lives of our community by:

- Protecting and improving the health of Territorians
- Protecting the ecosystems we rely on (e.g. the NT's marine and coastal ecosystem contribute AU\$1 billion per year to the economy . Marine ecosystems are at high risk with rising temperatures )
- Cost savings for Territorians (e.g. if renewable energy generation is maximised)
- Safer and climate smart infrastructure could be established
- Making communities more sustainable
- The UN's Sustainable Development Goals could be simultaneously achieved if carefully integrated into climate action planning and implementation.

City of Darwin has a range of adopted strategies detailing a commitment to mitigate and adapt to the impacts of climate change. These include:

- City of Darwin Climate Change Action Plan – under which Council has achieved a reduction in emissions of 15% based on 2009 emissions.
- City of Darwin Energy Strategy – includes a commitment to net zero emissions by 2030
- Cities Power Partnership – a national initiative under which Council has committed to a number of climate change actions
- City of Darwin Coastal Erosion Management Plan - for which \$679K was allowed in the 2018/19 financial year.

Local government has an important leadership role in our communities, providing good governance as well as government. CoD suggests the Government strive for *better* than best practice and encourage innovation through investment in the government asset base (for example through energy efficiencies across all government owned buildings).



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## **CONSULTATION PROCESS**

In preparing this report, the following City of Darwin officers were consulted:

- Senior Managers

In preparing this report, the following External Parties were consulted:

- Department of the Chief Minister, Economic and Environment Policy
- Environment Centre NT

## **POLICY IMPLICATIONS**

The information included in **Attachment A** reflects the following City of Darwin Policies:

Climate Change Action Plan  
 City of Darwin Energy Strategy  
 City of Darwin Policy No. 068 - Green Fleet  
 City of Darwin Policy No. 006 - Environment (general)  
 City of Darwin Policy No. 077 - Green Information Technology

## **BUDGET AND RESOURCE IMPLICATIONS**

There are no direct budget implications associated with this report.

## **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

Council has endorsed a reasonable stance on climate change action. Part of Council's role in addressing climate change risks is to lead by example and advocate for other organisations to similarly address climate change risks.

## **ENVIRONMENTAL IMPLICATIONS**

Commitment to mitigate and adapt to the impact of climate change is inherently positive in terms of environmental impacts.

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### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**SHENAGH GAMBLE**  
**EXECUTIVE MANAGER**  
**ENVIRONMENT AND**  
**COMMUNITY**

**POLLY BANKS**  
**GENERAL MANAGER**  
**COMMUNITY AND REGULATORY**  
**SERVICES**

For enquiries, please contact Polly Banks on 89300633 or email:  
p.banks@darwin.nt.gov.au.

#### **Attachments:**

**Attachment A:** Submission to the Northern Territory Government Climate Change Discussion Paper

28 November 2018

Please quote: 3913655 SG:kl

Mr Ian Satchwell  
Executive Director  
Economic and Environment Policy  
Department of the Chief Minister  
GPO Box 4396  
Darwin NT 0801

DCM.EconomicEnvironmentPolicy@nt.gov.au

Dear Mr Satchwell

City of Darwin commends the initiative to develop a Territory-wide Climate Change Strategy. Feedback on the Discussion Paper is provided in the attachment to this letter.

City of Darwin recognises that meeting the challenges of climate change requires a partnership between government, business and the community as a whole. Council is committed to delivering a range of mitigation and adaptation measures to meet the adverse impacts of climate change for the organisation, for the community and for environment sustainability. Council has demonstrated leadership on climate change by:

- City of Darwin Climate Change Action Plan – under which Council has achieved a reduction in emissions of 15% based on 2009 emissions.
- Cities Power Partnership – a national initiative under which Council has committed to a number of climate change actions
- City of Darwin Coastal Erosion Management Plan - for which \$679K was allowed in the 2018/19 financial year
- City of Darwin Energy Strategy – includes a commitment to net zero emissions by 2030

Council acknowledges and respects the importance of addressing climate change and environmental priorities within its sphere of influence in a way that is beneficial to the organisation, the Darwin community, the biodiversity of the region and Australia.

Council recognises that this approach to climate change should be flexible and able to adapt to the changing political and legislative environment. Detailed comment against the Discussion Paper is provided as an attachment to this letter. Should you require any further information please don't hesitate to contact me on the details below.

Yours sincerely

**SHENAGH GAMBLE**  
**EXECUTIVE MANAGER ENVIRONMENT AND COMMUNITY**

## City of Darwin

### Submission on Northern Territory Government Climate Change Discussion Paper

City of Darwin (CoD) welcomes the opportunity to provide a response to the Northern Territory Climate Change Discussion Paper. The following response was prepared by officers and was endorsed by Council at its 2<sup>nd</sup> Ordinary Council meeting on Tuesday 27 November 2018.

The vision of Council is for Darwin to be a *tropical liveable city*. We value our natural environment, our history and culture, our outdoor lifestyle and close relationship with the ocean and coast. Our strategic vision and a number of Council policies directly align with the goals and objectives of the Coastal and Marine Management Strategy, as highlighted below.

City of Darwin is committed to lead and advocate for sustainability and the protection of our environment. Council values biodiversity, the natural environment and the green open spaces that all contribute to the tropical lifestyle of this capital city. Council will strive to continually improve on its environmental performance and to foster a culture of environmental awareness and sustainability among its staff and the community<sup>1</sup>. As a demonstration of this City of Darwin has committed to increasing its urban forest and strongly recommends others to contribute in similar ways.

City of Darwin recognises the need for clear identification of the risks associated with climate change. Without mitigation of risks the Darwin community both financially and physically will be significantly impacted. Planning for appropriate and effective mitigation measures should be a priority.

City of Darwin is committed to supporting the health and wellbeing of residents through the provision of community spaces, facilities, programs and healthy food choices that encourage healthy lifestyle behaviour, connect the community, and celebrate Darwin's unique tropical outdoor lifestyle<sup>2</sup>.

Comments contained below address the discussion questions posed in the paper and how these impact on the community, local government in general and CoD in particular.

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<sup>1</sup> City of Darwin Policy No. 006 - Environment

<sup>2</sup> City of Darwin Policy No. 045 – Recreation and Healthy Lifestyles

**1: What (if any) greenhouse gas emissions target should the Northern Territory adopt?**

Early in 2018 City of Darwin has adopted a position of net zero emissions from energy by 2030. City of Darwin recommends The Northern Territory Government adopt a science-based emissions reduction target of net zero by 2050. The target should comprise interim targets to ensure the overarching target is achieved and integrate sector-specific targets (with the recognition that some sectors are more difficult to decarbonise than others).

The NTG previously had adopted a Climate Action Policy in 2009. This policy had an aspirational goal of 60% carbon emissions reduction by 2050, compared to 2007 emissions.

**2: What should businesses and governments be doing to reduce emissions?**

Meaningful emissions reductions targets should be embedded across all sectors and at all levels. In short, businesses and governments need to make emissions reductions part of everyday business to decarbonise and transition to a low-carbon economy.

Setting an emission reduction target for the Northern Territory will provide investor certainty, drive innovation and signal to the business and broader community that the NT is open for clean and sustainable investment.

Strengthening emission targets through participating in mitigation activities such as developing the Darwin urban forest, increasing canopy cover and other initiatives will increase community support of aspirational emissions targets.

**3: How else can we apply Aboriginal knowledge and practices to help us to mitigate and adapt to climate change?**

City of Darwin has no direct response to this question.

**4: What potential opportunities can you see emerging from climate change in the Territory?**

Great opportunities exist when the Government provides clear commitment to emission reduction. This includes:

- Significant cost savings could be realised (e.g. savings realised through energy efficiency; savings realised from maximising renewable energy generation)<sup>3</sup>
- Stimulate new investment in low-carbon sectors and encourage technological innovation<sup>4</sup>
- Increase in energy security<sup>5</sup> and water security<sup>6</sup>
- New jobs and industries created (e.g. the NT could be a net renewable energy exporter)<sup>7</sup>
- The NT could be established as a leading international solar/renewable energy research hub<sup>8</sup>

Further, taking action to reduce the impacts of climate change provides opportunity to improve the lives of our community by:

- Protecting and improving the health of Territorians<sup>9</sup>
- Protecting the ecosystems we rely on (e.g. the NT's marine and coastal ecosystem contribute AU\$1 billion per year to the economy<sup>10</sup>. Marine ecosystems are at high risk with rising temperatures<sup>11</sup>)
- Cost savings for Territorians (e.g. if renewable energy generation is maximised)<sup>12</sup>
- Safer and climate smart infrastructure could be established<sup>13</sup>
- Making communities more sustainable<sup>14</sup>
- The UN's Sustainable Development Goals could be simultaneously achieved if carefully integrated into climate action planning and implementation<sup>15</sup>

### **5: How can the fossil fuel industry further reduce emissions from energy production?**

City of Darwin has no direct response on this question

<sup>3</sup> Ibid.; The Global Commission on the Economy and Climate, *Unlocking the Inclusive Growth Story of the 21st Century*.

<sup>4</sup> CSIRO, *National Hydrogen Roadmap: Pathways to an Economically Sustainable Hydrogen Industry in Australia*; Valladares, "Global Trends and Outlook for Hydrogen."

<sup>5</sup> CSIRO and Energy Networks Australia, *Electricity Network Transformation Roadmap: Final Report*.

<sup>6</sup> Intergovernmental Panel on Climate Change (IPCC), *IPCC Special Report on Global Warming of 1.5°C*.

<sup>7</sup> IRENA, *Hydrogen from Renewable Power: Technology Outlook for the Energy Transition*; Valladares, "Global Trends and Outlook for Hydrogen."

<sup>8</sup> Langworthy et al., *Roadmap to Renewables: Fifty per Cent by 2030*.

<sup>9</sup> Hanna and Ogge, *Cooked with Gas: Extreme Heat in Darwin*.

<sup>10</sup> Crossman et al., *Economic Values of the Northern Territory Marine and Coastal Environments*.

<sup>11</sup> Intergovernmental Panel on Climate Change (IPCC), *IPCC Special Report on Global Warming of 1.5°C*.

<sup>12</sup> CSIRO and Energy Networks Australia, *Electricity Network Transformation Roadmap: Final Report*.

<sup>13</sup> The Global Commission on the Economy and Climate, *Unlocking the Inclusive Growth Story of the 21st Century*.

<sup>14</sup> Intergovernmental Panel on Climate Change (IPCC), *IPCC Special Report on Global Warming of 1.5°C*.

<sup>15</sup> Intergovernmental Panel on Climate Change (IPCC), *IPCC Special Report on Global Warming of 1.5°C*.

**6: What type of regulations do you think would assist industry in being accountable for their impact on climate change?**

City of Darwin supports the setting of emissions reduction targets across all sectors. Regulations that support and enhance such measures are encouraged.

**7: What actions are you willing to take to mitigate or reduce the impact of climate change?**

City of Darwin has a range of adopted strategies detailing a commitment to mitigate and adapt to the impacts of climate change. These include:

- City of Darwin Climate Change Action Plan – under which Council has achieved a reduction in emissions of 15% based on 2009 emissions.
- City of Darwin Energy Strategy – includes a commitment to net zero emissions by 2030
- Cities Power Partnership – a national initiative under which Council has committed to a number of climate change actions
- City of Darwin Coastal Erosion Management Plan - for which \$679K was allowed in the 2018/19 financial year

**8: What support do you need to help you to mitigate or adapt to climate change?**

Council requires an emissions reduction commitment from the Northern Territory Government. Decarbonising the electricity network through investment in renewables will facilitate City of Darwin's commitment to net zero emissions.

**In conclusion**

City of Darwin welcomes the development of a Climate Change Strategy and urges the Government to be set ambitious and meaningful emissions reductions targets for the Northern Territory. Recognition of climate impacts across all Northern Territory legislation and government operations is crucial. For example, stronger criteria for addressing climate change within planning processes in the NT should be considered through the current Planning Reform process. This would include embedding a range of criteria within the Planning Act and NT Planning Scheme, so that greater consideration is given to the impacts of climate change within strategic planning and development assessment processes.

ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.1.5  
 YES

**NORTHERN TERRITORY ENVIRONMENTAL PROTECTION ACT**

REPORT No.: 18CL0093 SG:kl COMMON No.: 3932347 DATE: 27/11/2018

**Presenter:** Executive Manager Environment and Community,  
 Shenagh Gamble

**Approved:** General Manager Community and Regulatory Services,  
 Polly Banks

**PURPOSE**

The purpose of this report is to seek endorsement from Council on the draft submission on the Environmental Protection Act

**LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

**Goal**

3 Environmentally Sustainable City

**Outcome**

3.2 Darwin community's carbon footprint reduced

**Key Strategies**

3.2.3 Lobby governments, developers and industry to undertake sustainable projects and behaviours

**KEY ISSUES**

- An environmental regulatory reform process is underway
- This review addresses the recommendations of the Hawke II Review into Hydraulic Fracturing
- The draft Environment Protection Bill introduces a number of instruments that have the potential to directly impact Council facilities and operations:
  - Development of offsets, levies, environmental bonds
  - Power and enforcement tools
  - Process for judicial and merits reviews
  - Introduces environmental approvals
  - Transfers regulation role from NT EPA to the Department
  - Civil and criminal proceedings for offences
  - Environmental auditing
- A more detailed assessment of the impact of the legislation on City of Darwin operations is required to ensure full compliance at the time the bill is passed.



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## **RECOMMENDATIONS**

- A. THAT Report Number 18CL0093 SG:kl entitled Northern Territory Environmental Protection Act, be received and noted.
- B. THAT Council endorse the draft submission, provided at **Attachment A** to Report Number 18CL0093 SG:kl entitled Northern Territory Environmental Protection Act.
- C. THAT a further report be brought to Council outlining the requirements to ensure full compliance for City of Darwin operations with the ongoing environmental regulatory reforms.

## **BACKGROUND**

On 4 October 2018 the Northern Territory Government released a draft Environmental Protection Bill and draft Regulations for public consultation. The Bill and Regulations form part of a two-stage Environmental Regulatory Reform process.

The draft Bill and Regulations, and fact sheets are available online here: <https://denr.nt.gov.au/environment-information/environmental-regulatory-reform/consultation-on-new-environment-protection-legislation>.

The Frequently Asked Questions fact sheet is provided as **Attachment B**.

Council has previously provided comment in support of Environmental Regulatory Reform.

## **DISCUSSION**

The Northern Territory Government is overhauling the environmental regulatory system. A single piece of legislation is being developed to implement a best practice environmental management regulatory framework – the Environment Protection Act. The Environment Protection Act is being developed in two stages:

Stage one - reforms the environmental impact assessment system and introduces an environmental approval to be issued by the Minister for Environment and Natural Resources. This is the current stage of reform.

Stage two - will transform the Waste Management and Pollution Control Act into a fully functioning Environment Protection Act. Coming in 2019

The draft Environment Protection Bill has been developed based on feedback received through consultation with industry groups, land councils, environmental groups, government agencies and other key stakeholders.

Council has facilities and operations that will be impacted by changes to the environmental regulatory system. This includes at a minimum the Shoal Bay Waste Management Facility.

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Key elements in the draft Bill are described below.

Greater public participation will be achieved through greater publishing of records, including variations to environmental approvals. All documents will be kept in public registers, and made publically available. An increased ability for people to participate in the process, particularly through a process of appeal against the granting of an environmental approval. Note that the draft Bill includes “open standing” for judicial reviews, however this has since been changed by the Minister to only allow parties that are directly affected, and those who have made a valid and genuine submission to the decision making process. All referrals to the NT EPA will be made public.

Future reforms will amend the Environmental Protection Act, repeal and replace Waste Management and Pollution Control Act and Litter Act, as well as changes mining and water legislation. The Government will look to introduce merits review in the new environment protection legislation for operational approvals made by the Department of Environment and Natural Resources (DENR) to regulate waste and pollution and the environmental impacts of mining and other industries. This will be subject to consultation with industry.

***Note: Council requests consultation on the merits review process in the new legislation***

The draft Bill establishes environmental approvals, general environmental duty and associated offences. It also establishes powers and a suite of enforcement tools, defines offences (such as “call in” and “stop work” notices). Environmental officers established under the act will include NTG employees, and most notably Police Officers, with environmental officer directions, environmental protection notices, enforceable undertakings, civil and criminal proceedings. Environmental auditing processes will also be established as well as provisions for the development of environmental offsets, environmental bonds.

The Bill establishes two types of trigger (referral or approval), both of which can be locality based or activity based and include a risk based approach to Environmental Impact Assessment. Referrals will be open to public consultation. Post-approval monitoring and compliance will be undertaken through the Department of Environment and Natural Resources (DENR).

Environmental impacts may be significant or non-significant. A non-significant impact will be managed through operational authorisations (as opposed to an environmental approval). For example, dust from a development site that has the potential to be a source of environmental nuisance for neighbouring residents rather than a source of significant impact to threatened fauna or human health could be managed through an operational authorisation, such as a licence.

Projects may require both an environmental approval, to manage significant environmental impacts, and an operational authorisation, to manage non-significant impacts.

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When the legislation comes in, existing impacts will be managed under existing approval. Transitional provisions will be made. Non-significant impacts will be managed under existing approval legislation.

***Note: require further clarity around the determination of significant impact, referral process and self-assessment methodology. How will a site (or process) which previously did not require approval be managed when the legislation comes in***

Three clear referral pathways are established, based on activity, sensitivity and potential for significant impact. Responsibility for referral to the NT EPA is put onto the project proponent. This responsibility currently sits with government agencies, and the change to proponent responsibility requires that environmental impact needs to be considered earlier in the project. This also means that requirements for impact assessment and an environmental approval may be negated through good project design. This is enacted through a pre-referral stage is where proponent undertakes a self-assessment.

A tiered environmental impact assessment will be established and the NT EPA will determine the tier of assessment (previously it was an “all or nothing” approach):

- Assessment on referral information
- Assessment by supplementary environmental report
- Assessment by environmental impact statement
- Assessment by inquiry

The draft Bill introduces project and strategic assessments and all environmental impact assessments will now conclude with the project receiving environmental approval or being refused. This fixes a loophole in current legislation that allows a major development to proceed without close scrutiny of approval process.

Roles under the draft Bill have changed from the current situation. Under the draft Bill the Minister can make:

- Declarations to protect the environment
- Decisions about granting, refusal, transfer, revocation of approvals
- Agreements and policies
- Various declarations, and they must be reviewed every 10 years

The NT EPA has more decision making roles but no regulatory responsibilities, however is not responsible for ensuing compliance with approval. Responsibility for compliance resides with DENR .

## **CONSULTATION PROCESS**

This report was considered by the Executive Leadership Team on Monday 19 November 2018 and now referred to Council for consideration.

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In preparing this report, the following City of Darwin officers were consulted:

- Executive Manager Capital Works and Waste
- Manager Infrastructure Maintenance
- Waste Management Coordinator
- Senior Capital Works Coordinator
- Senior Climate Change and Environment Officer

In preparing this report, the following External Parties were consulted:

- Department of Environment and Natural Resources

### **POLICY IMPLICATIONS**

The information included in **Attachment A** reflects the following City of Darwin Policies:

- City of Darwin Policy No. 006 - Environment (general)
- City of Darwin Policy No. 045 - Waste Management

### **BUDGET AND RESOURCE IMPLICATIONS**

There are no immediate budget or resources implications associated with this report, however as the environmental reform process comes to full effect it is reasonable to expect that additional resources will be required to ensure Council has full compliance, if not best practice, environmental processes.

It is recommended that a further report be developed to fully explore the impacts of the changes to environmental reform on Council operations.

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

Greater responsibility for environmental impacts means possible great risk of non-compliance. This can be managed through improved internal processes. A further report outlining the requirements to ensure full compliance for City of Darwin operations with the ongoing environmental regulatory reforms.

### **ENVIRONMENTAL IMPLICATIONS**

The intent of the environmental reform process is to improve accountability, transparency and ultimately environmental protection measures.

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### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**SHENAGH GAMBLE**  
**EXECUTIVE MANAGER**  
**ENVIRONMENT AND**  
**COMMUNITY**

**POLLY BANKS**  
**GENERAL MANAGER**  
**COMMUNITY AND REGULATORY**  
**SERVICES**

For enquiries, please contact Polly Banks on 89300633 or email:  
p.banks@darwin.nt.gov.au.

#### **Attachments:**

**Attachment A:** Letter of submission on draft Environmental Protection Act  
**Attachment B:** Frequently Asked Questions

28 November 2018

Please quote: 3932347 SG:kl

Ms Jo Townsend  
CEO  
Northern Territory Department  
of Environment and Natural Resources

environment.policy@nt.gov.au

Dear Ms Townsend

City of Darwin commends the initiative to undertake significant Environmental Regulatory Reform.

Council has advocated for a more robust environmental regulatory system for a number of years. City of Darwin is a significant land owner and manager with a range of facilities and operations that will be impacted by these changes. As such, Council maintains that consistency and clarity in our approval systems is paramount for business certainty.

City of Darwin welcomes the opportunity to work with your department in the ongoing process of reform and in particular to ensure our own operations comply and indeed exceed best practice environmental management.

Detailed comment is contained in the attached document and reflects endorsed Council policies and position statements. This submission has been placed before the 2<sup>nd</sup> Ordinary Council meeting on Tuesday 27 November 2018 where it was endorsed by Council.

Should you have any questions regarding City of Darwin's comments on the draft Bill please don't hesitate to contact me.

Yours Sincerely

Shenagh Gamble  
**EXECUTIVE MANAGER ENVIRONMENT AND COMMUNITY**

## City of Darwin

### Submission on Northern Territory Government draft Environment Protection Bill and Regulations

City of Darwin (CoD) welcomes the opportunity to provide a response to the Northern Territory draft Environmental Protection Bill and Regulations. The following response was prepared by officers and was endorsed by Council at its 2nd Ordinary Council meeting on Tuesday 27 November 2018.

The vision of Council is for Darwin to be a tropical liveable city. We value our natural environment, our history and culture, our outdoor lifestyle and close relationship with the ocean and coast. Our strategic vision and a number of Council policies directly align with the goals and objectives of the Coastal and Marine Management Strategy, as highlighted below.

City of Darwin is committed to lead and advocate for sustainability and the protection of our environment. Council values biodiversity, the natural environment and the green open spaces that all contribute to the tropical lifestyle of this capital city. Council will strive to continually improve on its environmental performance and to foster a culture of environmental awareness and sustainability among its staff and the community<sup>1</sup>.

Comments contained below address the discussion questions posed in the paper and how these impact on the community, local government in general and City of Darwin in particular.

City of Darwin supports the inclusion of the principals of sustainable development in the draft Bill. This builds on previous commentary provided by Council advocating for a more robust definition of Ecologically Sustainable Development.

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<sup>1</sup> City of Darwin Policy No. 006 - Environment

City of Darwin requests further detail on the following:

**1. Council requests consultation on the merits review process in the new legislation.**

It is noted that the Government will look to introduce merits review in the new environment protection legislation for operational approvals made by the Department of Environment and Natural Resources (DENR) to regulate wastes and pollution and the environmental impacts of mining and other industries. This will be subject to consultation with industry. The Shoal Bay Waste Management Facility functions as a regional facility for Greater Darwin. As the manager of this site City of Darwin should be considered as an industry stakeholder when considering any changes to the Waste Management and Pollution Control Act.

**2. Definition of significant impact**

S10 provides that:

A **significant impact** is an impact of major consequence having regard to:

- (a) the context and intensity of the impact; and
- (b) the sensitivity, value and quality of the environment impacted on and the intensity, duration, magnitude and geographic extent of the impact.

Whilst clearly stated, these terms remain open to interpretation. CoD requests clarification by way of examples and precedence.

**3. Explanation of operational authorisations**

**Operational authorities** are not defined in the draft Bill or Regulations. CoD requests further detail on the nature of operational authorisations. Operational authorisations will be used to manage non-significant impacts. It is reasonable to think that there would be many non-significant impacts across the territory, and in fact by virtue of good project design (as advocated for through the fact sheets) significance of impact should be minimised. It is these cumulative,



non-significant impacts that will need to be closely managed. A transparent and public process for operational authority is recommended.

#### **4. Provision of templates for self-assessment**

Self-assessments will be used for proponents to determine need for referral. The provision of templates, example, guidance and advice in self-assessment is essential to ensure equitable self-assessment. Self-assessments should be made publicly available.

#### **5. Transitional provisions**

CoD questions the 12 month expiration of regulations made under S268 Transitional regulations and the use of retrospective operation of regulations. No regulations have been provided. CoD requests a timeframe for transitional regulations and seeks to work directly with DENR on determining relevant transitional provisions.

#### **6. What assistance will be made available to ensure compliance of large (and small) organisations**

Implementation of environmental regulatory reform will require engaging with affected industry stakeholders, both large and small. CoD advocates that DENR acknowledge the role of local government in leading by example and engages with local government across the territory to develop and implement best practice environmental management.

#### **In Conclusion**

The draft Environmental Protection Bill and Regulations are robust instruments to embed sustainable development in Territory processes. City of Darwin commends this approach and invites further engagement from the Department of Environment and Natural Resources with Council, staff and the community throughout the reform process.

# Frequently Asked Questions

## General questions

### What are the environmental reforms?

The Northern Territory is reviewing and reforming the current environmental regulatory system. Reforms are critical to achieving a robust regulatory system that the community will trust while encouraging industry investment and economic growth. Its ultimate goal is to deliver sustainable development in the Northern Territory.

A single piece of legislation is being developed to implement a reformed environmental management regulatory framework – the environment protection Act.

The environment protection Act is being developed in two stages:

- Stage one will address reforms to the environmental impact assessment system and introduce an environmental approval to be issued by the Minister for Environment and Natural Resources.
- Stage two will address Government's commitments to transform the *Waste Management and Pollution Control Act* into a fully functioning environment protection Act, which will also include provisions for the environmental regulation of the mining industry.

The draft environment protection Bill and supporting draft Regulations speak to stage one of the reforms.

Further information about the environmental reforms and an introduction to the new environment protection legislation can be found in [Factsheet 1](#).

### What are the timelines for the environmental reforms?

Stage one of the environment protection draft Bill and draft Regulations dealing with the proposed environmental impact assessment and approval system has been released for public comment. This Bill and regulations are due to be introduced to the Legislative Assembly in the March 2019 sittings.

Public consultation for stage two of the reforms will commence in late 2018 and will continue through to 2019. Both targeted and general consultation will be undertaken to inform the development of the regulatory frameworks and approaches to the management of wastes and pollution, land clearing and the environmental impacts of mining.

For updates on this process please visit the environmental regulatory reform website: <https://denr.nt.gov.au/environment-information/environmental-regulatory-reform>

The draft Bill to support these further reforms is likely to be released for public review and consultation in the second half of 2019.

### What are Territory environmental values and objectives?

The draft Bill empowers the Minister to declare Territory environmental objectives to support decision making in the assessment and approval process by:

1. Providing proponents with a list of matters on which to identify potential impacts associated with a project. This will inform whether a project needs to be referred to the NT EPA for consideration under the environmental assessment and approval regime.
2. Guiding the NT EPA's judgement on the potential significance of a project on the environment, determining whether it requires an environmental approval and accordingly, environmental impact assessment.
3. Providing a focus for environmental impact assessment and approval documents so that assessment documents will only need to focus on those values and objectives identified by the NT EPA as having the potential for significant impact.

The Territory environmental objectives will be communicated through a Framework of Northern Territory Environmental Values and Objectives. The draft Bill provides for the Minister to consult with the NT EPA and public before declaring and publishing a Territory environmental objective.

Refer to [Factsheet 13](#), the consultation paper providing guidance on establishing a framework of Northern Territory values and objectives for more details on how the values and objectives will underpin the assessment and approval system.

### Will information be publicly available?

All information used in the environmental impact assessment system will be made publicly available, unless there are good reasons for not releasing the information, for example because it relates to cultural matters and was provided in confidence.

Schedules 1 and 2 of the draft Bill identify that certain documents and information relating to environmental assessments, approvals, audits, notices and offsets must be made available and stored on public registers.

For further details about information that will be on the public register, refer to [Factsheet 11](#).

### Environmental impact assessment and approval process

#### Why have an environmental impact assessment process?

The purpose of an environmental impact assessment system in the Northern Territory (NT) is to ensure that proposed actions do not have an unacceptable impact on the environment, now and into the future. Proposed actions include any project, development, undertaking, activity and works and have been referred to in this document as 'projects'.

For further information about environmental impact assessments, refer to [Factsheet 7](#).

#### Who is responsible for conducting the environmental impact assessment of a project?

The NT EPA is responsible for overseeing the environmental assessment of all proposed actions and has been given powers to ensure a project with the potential for significant impact does not proceed without being subject to a review by the NT EPA. The NT EPA carries out an environmental impact assessment in accordance with the Regulations.

For further information about the NT EPA's responsibilities in conducting environmental impact assessments, refer to [Factsheet 6](#).

### What is strategic environmental assessment?

The draft Bill allows for the NT EPA to conduct strategic environmental assessments which can be used to support strategic planning (e.g. detailed community plans), development of policy or allow for assessment of cumulative impacts within a location. A strategic environmental assessment can be locality/region/catchment based, industry-specific based or issue based. The NT EPA may accept a referral for strategic assessment if it considers it appropriate to do so.

### What are the roles and responsibilities in the environmental impact assessment process?

The draft Bill sets out the following roles and responsibilities for the environmental impact assessment and approvals process:

- proponents are responsible for referring a project for consideration under the environmental impact assessment system, complying with all requirements of the assessment process and legislation and any conditions in an environmental approval
- the NT EPA is responsible for administering and conducting the environmental impact assessment process
- the Minister for Environment and Natural Resources is responsible for granting (or refusing) an environmental approval
- the Chief Executive Officer (CEO) of the Department of Environment and Natural Resources is responsible for ensuring proponents comply with the legislation and taking enforcement action where appropriate

For further information about the environmental impact assessment process, refer to [Factsheet 7](#). Refer to Factsheet 5 for further information about roles and responsibilities in environmental management and protection contained in the draft Bill.

### What are the stages of environmental impact assessment and approval?

The NT environmental impact assessment and approval system has five stages:

1. Pre-referral – proponent makes a self-assessment on whether their project requires referral
2. Referral – the NT EPA identifies whether an environmental approval is required and determines what level of assessment is required
3. Environmental Impact Assessment – there are four methods or tiers of assessment dependent on the NT EPA's information requirements, level of risks and potential impacts and complexity of the project
4. Environmental Approval – the Minister decides to issue or refuse an environmental approval with appropriate conditions
5. Post Environmental Approval – the proponent (environmental approval holder) must comply with the conditions of the environmental approval. The CEO of the Department of Environment and Natural Resources is responsible for monitoring compliance with the conditions and undertaking enforcement action where necessary.

For further information about the stages of environmental impact assessment and approval, refer to [Factsheet 7](#).

### How is a project referred to the NT EPA?

Proponents refer a project if it meets a referral trigger or an approval trigger or if it has the potential to have a significant impact on the environment. The draft Bill establishes two referral triggers, two approval triggers and provides for Territory environmental objectives to be used to make a judgement of significant impact.

The draft Regulations provides for the NT EPA to refuse to accept a referral if it contains insufficient information to enable an assessment decision, or if the NT EPA considers it does not need to be referred.

The draft Bill establishes the requirement for the NT EPA to publish the accepted referral for public comments before the NT EPA makes a decision on assessment. The draft Regulations requires the NT EPA to publish all public submissions received during an assessment process subject to any requests to withhold from publication or removal of any identifying information.

For further information about the referral pathways for the environmental impact assessment system, refer to [Factsheet 8](#).

### What are referral and approval triggers?

The draft Bill provides for the Minister for Environment and Natural Resources to establish both referral and approval triggers. The Minister will consult with the NT EPA and public on proposed activity-based and the locality-based referral and approval triggers, prior to their gazettal.

A referral trigger identifies a type of action or a locality where a project is to be referred to the NT EPA for consideration under the environmental impact assessment process. These may be activity-based and locality-based referral triggers.

An approval trigger will identify the types of actions or the localities (where an action is proposed) that must have an environmental approval in order to proceed. These may be activity-based and locality-based approval triggers. The NT EPA must accept a referral for an assessment that is based on an approval trigger.

A person must hold an environmental approval for a project if it triggers an approval trigger.

For further information about the referral and approval triggers for environmental impact assessment, refer to [Factsheet 8](#).

### What are the different methods of environmental impact assessment?

The draft Bill and Regulations introduce four different methods of assessment that reflect the NT EPA's information requirements and significance of the project:

1. Assessment on referral information. This form of assessment is where the NT EPA is able to prepare an Assessment Report (that is, a report of its findings and advice to the Minister for Environment and Natural Resources on whether to issue an environmental approval) based on the original referral and any further information provided as part of the acceptance of the referral.
2. Assessment on supplementary environmental report. This form of assessment is where the NT EPA is able to prepare an Assessment Report based on the original referral, any further information provided as part of the acceptance of the referral and a supplementary environmental report prepared by the proponent.
3. Assessment by Environmental Impact Statement (EIS). This form of assessment substantially mirrors the current impact assessment process.
4. Assessment by Inquiry – this is for high risk actions where traditional paper based approaches may not provide the necessary level of consultation or confidence.

For further information about the different methods of environmental impact assessment, refer to [Factsheet 7](#).

### How will the method of assessment be determined by the NT EPA?

Following consultation with relevant government authorities and considering submissions received during the referral's submission period, the NT EPA decides on the method of assessment. The assessment method chosen will be; commensurate with a project's complexity, risks and potential impacts on Territory environmental values; level of certainty in assessing those risk and impacts, and the quality of information provided in the referral information.

### How will significant impact be determined?

The draft Bill defines the meaning of significant impact as having regard to its context or intensity. When assessing for significance, the NT EPA would take into account the sensitivity, value and quality of the environment impacted on and the intensity, duration, magnitude and geographic extent of the impact. The NT EPA identifies where the project may have potential for significant impact on the environment applied against the Territory environmental objectives.

### What is a statement of unacceptable impact?

At the conclusion of the environmental impact assessment, the NT EPA may provide the Minister with a statement of unacceptable impact with the final assessment report, if it considers the action will have unacceptable environmental impact. If the Minister accepts the statement of unacceptable impact, the Minister will refuse to grant an environmental approval. The Minister must publish a statement of reasons for refusing an approval which may refer to the statement of unacceptable impact.

### Why is an environmental approval being introduced?

The Minister for Environment and Natural Resources is responsible for granting an environmental approval (or refusal). This decision will be based upon advice from the NT EPA at the conclusion of an environmental impact assessment process for a project and the draft environmental approval will be publicly available for review and comment.

The introduction of an environmental approval ensures that a project that has the potential for significant, irreversible impact on a Territory environmental objective does not proceed without changes being made to the project to mitigate and reduce impact. The environmental approval will incorporate conditions that are designed to deliver the best environmental outcomes which include:

- conditions to manage significant potential impacts on the environment
- conditions to require environmental bonds
- conditions to manage offsets.

Failure to comply with an environmental approval and its conditions is an offence and subject to enforcement action.

For further information about an environmental approval, refer to [Factsheet 10](#).

### How will an environmental approval sit with other approvals required for a project?

An environmental approval will be used for regulating significant environmental matters and will replace the need for environmental conditions being placed on authorising/approval instruments (such as permits) issued under project legislation.

The environmental approval will not replace project approvals. If a project requires authorisation under the *Mining Management Act* (for example) in order to operate, the environmental approval will not replace this authorisation. If a project receives an environmental approval but does not receive its project approval it cannot proceed. Similarly, if a project receives its project approval but not its environmental approval it cannot proceed.

### **What happens if a referred project changes during the environmental impact assessment process?**

A proponent who has referred a project to the NT EPA, must provide notice to the NT EPA if changes have been made to their project (a variation) that may alter the assessment of environmental impacts or risks of the project. Similar to the initial referral process, proponents are responsible for determining whether the changes to their project may trigger a 'notice of variation'. The NT EPA may also use its power to 'call-in' a project if it believes the project has changed to the extent that it may alter the environmental impacts or risks.

If an assessment decision has not been made, the amended action provided by the proponent replaces the original referral and the NT EPA continues the referral process.

If an assessment decision and method of assessment has been determined, the NT EPA will follow a similar process of publishing the notice and obtaining additional information to assist in making a decision. The NT EPA will then decide whether the variation changes the risk profile (and therefore the significant impacts) of the project, or whether an assessment is still required. If the NT EPA decides an impact assessment is still required, it may reconsider the method of assessment or any terms of reference already prepared. The NT EPA will publish all of its decisions, along with a statement of reasons.

### **What happens if a proponent submits a notice of variation after completion of the assessment report?**

If the proponent submits a notice of variation after the assessment report has been prepared, the Minister may suspend consideration of the report and draft environmental approval or statement of unacceptable impact until the NT EPA has made a decision on the variation.

The NT EPA follows a very similar process to the original assessment process following a referral.

After considering the variation information and comments made, the NT EPA may decide:

- the variation can be managed through the proposed conditions specified in the draft environmental approval provided to the Minister with the assessment report
- the variation can be managed through an amendment to the proposed approval conditions
- the environmental impact of the variation is such that further assessment is required.

If further assessment is required, the NT EPA must determine the method of assessment and then proceed through the impact assessment process again.

Refer to Division 3 of Part 7 of the draft Regulations for further details of the assessment process for a variation after the assessment report is completed.

### **What happens if a proponent submits a notice of variation after an environmental approval is granted?**

Division 4 of Part 7 of the draft Regulations identifies the process if a notice of variation is given to the NT EPA after an environmental approval is granted. The NT EPA undertakes a similar process of consultation to when it receives a referral and, based on all of the information received, may decide:

- the variation can be managed through the proposed conditions specified in the draft environmental approval provided to the Minister with the assessment report
- the variation can be managed through an amendment to the proposed approval conditions
- the environmental impact of the variation are such that further assessment is required.

If further assessment is required, the notice of variation is taken to be a new referral of the action to be assessed by the NT EPA.

## Decisions, reviews, and appeals

### What are the statutory timeframes for all decisions?

All stages of the assessment and approval process will include statutory timeframes for decision making. There will be a maximum timeframe in which the Minister or NT EPA can make a decision. These timeframes may be extended where necessary, and in consultation with the proponent.

In regards to public consultation activities, timeframes will be written in terms of minimum timeframes, with the NT EPA to decide on the appropriate timeframe for consultation based on the nature of the project, its complexity and potential environmental impacts.

For further information about the statutory timeframes that apply to the environmental impact assessment system, refer to [Factsheet 9](#).

### Can decisions be reviewed and appealed?

The draft Bill provides pathways for review of decisions made under the legislation. There are two types of processes that allow a person affected by a decision to appeal the decision and the draft Bill is broadly consistent with the approach recommended by the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory:

Any person can seek a judicial review of a decision for the following:

- environmental impact assessment decisions made by the NT EPA
- approval decisions made by the Minister for Environment and Natural Resource
- licence or permit decisions made by the Chief Executive Officer (CEO) of the Department of Environment and Natural Resources (DENR) or their delegate.

Merits review of decisions made by the Minister and for licence or permit decisions made by the CEO will be available for:

- proponents
- persons who are directly or indirectly affected by the decision
- members of an organised environmental, community or industry group
- Aboriginal Land Councils
- registered Native Title Prescribed Body Corporate or registered claimants under the *Native Title Act*
- local government bodies
- persons who have made genuine and valid objection during any assessment or approval process.

A judicial review considers whether a decision made by the Minister, the CEO, the NT EPA or environmental officer under the new Act followed correct legal procedure and whether the decision-maker had the authority to make the decision.

A merits review considers whether a decision was correct and the best that it could have been given the available information. Merit reviews are undertaken by the Northern Territory Civil and Administrative Tribunal (NTCAT).



Schedule 3 of the draft environment protection Bill lists the reviewable decisions and affected persons who have a right to seek review of a decision made under the legislation.

For further information about review provisions under the new environment protection legislation, refer to [Factsheet 11](#).

### **What happens post environmental approval?**

Once an environmental approval is issued, the approval holder must comply with the conditions of the approval. The CEO of the Department of Environment and Natural Resources has responsibility for ensuring compliance with approval conditions, and undertaking enforcement action when necessary.

Following the issue of an environmental approval, the NT EPA may review and assess the:

- effectiveness of safeguards or standards for the protection of the environment applicable to the project
- the accuracy of forecasts of the environmental impacts of the project

The NT EPA may direct an environmental audit to inform its review and may provide the findings and any comments, suggestions or recommendations in a report to the Minister.

This review process provides a mechanism of feedback on whether the predicted consequences and efficacy of mitigation measures presented in the environmental impact assessment were adequate to prevent environmental impacts.

### **Compliance and enforcement provisions**

#### **What offences relate to the EIA process?**

The NT EPA can request (or 'call-in') a proponent to refer an action if it believes a proponent is taking an action that should be referred. It is an offence if the person fails to comply with a call-in notice.

The NT EPA may issue a stop work notice if the proponent fails to comply with a call-in notice or if action has commenced prior to completion of the environmental impact assessment and approval process. It is an offence to not comply with a stop work notice.

It is also an offence under the legislation to provide false or misleading information.

#### **What is the difference between a stop work notice and a cease work requirement?**

A stop work notice is an enforcement tool that the NT EPA can use to prevent or minimise environmental impact of a project that has commenced without an environmental approval. The stop work notice serves to minimise any financial benefit to the proponent for proceeding without an environmental approval.

A cease work requirement may be incorporated into an environment protection notice issued by the CEO of the Department of Environment and Natural Resources. It is aimed at securing compliance with environmental approval conditions, regulatory requirements or the general environmental duty. The requirement to cease work may require a person to stop an activity or not commence an activity until the environment protection notice is revoked by the CEO.

### What is the difference between a closure notice and closure certificate?

A closure notice may be issued by the Minister for a site which, in the Minister's opinion, will require ongoing environmental investigation, monitoring or management as a result of the activities conducted at the site. For example, the Minister may issue a closure notice requiring the approval holder to continue to monitor a site to ensure that there are no contaminants leaching from the site into groundwater or neighbouring properties.

A closure notice can specify a number of actions that a person must comply with including preparing a management plan, taking specific actions, investigations or monitoring and arranging for an environmental audit to be carried out.

It is an offence not to comply with the requirements of a closure notice. If a person does not comply with a closure notice, the CEO may carry out any specified closure notice actions and recover the costs of taking any actions required in the closure notice.

A person who holds an environmental approval may apply for a closure certificate if the person:

- has completed the rehabilitation and remediation requirements of the environmental approval, and
- intends to sell the land or transfer the land to another person or return it to the owner of the land or to local or Territory government.

Before a closure certificate is issued, the Minister must be satisfied that the person has met the relevant closure criteria gazetted by the Minister, all rehabilitation and remediation requirements are completed in accordance with the Act and environment approval, and the person has complied with any requirements to provide financial assurance.

The effect of the closure certificate is to allow the person that holds the certificate to be relieved of future liability for contamination or environmental harm at or arising from the site.

### What is an environment protection notice?

An environment protection notice is an enforcement tool issued by the CEO to ensure compliance with:

- general environmental duty
- conditions of an environmental approval
- a requirement prescribed by regulation.

Under the draft Bill, it is an offence to not comply with the requirements of an environment protection notice.

### What is the general environmental duty?

The general environmental duty requires a person to not take any actions that may impact on the environment unless the person takes all reasonable and practicable measures to avoid or minimise any resulting environmental harm. It is a way of encouraging businesses to operate in an environmentally sound manner.

If a person causes unauthorised environmental harm, then the person must, to the greatest extent practicable:

- remediate the environmental harm, and
- restore any ecological functions impaired by the action.

A person must ensure that any residual adverse environmental impacts of an action taken by the person are appropriately mitigated and managed.

It is an offence not to comply with general environmental duty and engage in conduct that results in significant environmental harm, conduct that risks significant environmental harm or conduct not authorised under the Act.

### **How will the Minister make sure there is compliance with an environmental approval?**

The CEO of the Department of Environment and Natural Resources will be responsible for monitoring compliance with an environmental approval issued by the Minister and undertaking enforcement action if necessary.

A range of enforcement tools have been provided in the event of an offence or non-compliance with an environmental approval. Enforcement tools include:

- directions
- environment protection notices
- stop work orders
- enforceable undertakings.

For further information about compliance and enforcement provisions included in the draft environment protection legislation, refer to [Factsheet 12](#).

### **Other provisions**

#### **What are protected environmental areas and prohibited actions?**

The Minister for Environment and Natural Resources may declare an area of land with important environmental values to be a protected environmental area that should be protected from declared prohibited actions. The Minister may declare prohibited actions to not be carried out in protected environmental areas because of their potential adverse impact on the environment.

Before declaring protected environmental areas or prohibited actions, the Minister will consult with the NT EPA and publish a notice seeking comments from the public to take into consideration.

A person will not be able to seek an environmental approval for an action in a protected environmental area or for a declared prohibited action. The draft Bill establishes offences if a person conducts an action not permitted in a protected environmental area or carries out a prohibited action.

#### **Is there a duty to notify environmental incidents?**

It is important that government is advised as quickly as possible about incidents that may cause environmental harm, such as through the release of pollution, to ensure appropriate action is taken to limit environmental impacts.

The draft Bill requires the reporting of incidents that may cause 'material environmental harm'. This is harm that is not trivial or negligible in nature and the Regulations will identify a monetary limit below which material harm is not considered to occur.

The draft Bill identifies a hierarchy of reporting requirements, with primary responsibility for reporting an incident held by the approval holder. Reports can be made orally or in writing. The draft Regulations detail the relevant information to be given when providing notice of an environmental incident.

**What are the financial provisions?**

The draft Bill provides that a payment of an environmental protection bond and/or levy may be imposed as a condition of an environmental approval.

The purpose of an environmental protection bond is to ensure the approval holder meets their environmental obligations and if they do not, the bond is used to prevent, minimise or remediate environmental harm or to complete rehabilitation of the site. The amount or value of the bond considers; the environmental risk and project impacts; the level of uncertainty in assessing those risks, and impacts and management measures to deal with them.

An environment protection levy is a tax paid to government by industry. The levy can be used for a number of different reasons, including to undertake research to support an industry by identifying methods to manage their environmental impacts, and to remediate and rehabilitate the environment.

The draft Bill also identifies that the Minister may establish environment protection funds. These are the accounts that will hold the environmental bond or levy.

ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.1.6  
NO

**6 MONTH TRIAL OF NON-ENFORCED ON-STREET PARKING TIME LIMITS IN THE CBD  
ON WEEKENDS AND PUBLIC HOLIDAYS**

REPORT No.: 18CL0097 MG:rm COMMON No.: 1952026 DATE: 27/11/2018

**Presenter:** Regulatory Services Supervisor, Rachel Macrae

**Approved:** General Manager Community and Regulatory Services,  
Polly Banks

**PURPOSE**

The purpose of this report is to provide Council with the results of the 6 month trial of non-enforced on-street parking time limits in the CBD on weekends and public holidays for the period 5 May to 3 November 2018.

**LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

**Goal**

5 Effective and Responsible Governance

**Outcome**

5.1 Quality service

**Key Strategies**

5.1.1 Provide quality service outcomes by ensuring that Council's processes and systems are effective and efficient.

**KEY ISSUES**

- Free parking on weekends in the Darwin CBD was introduced in 2012, with continued enforcement of time restricted parking and illegal parking between 0800hrs and 1400hrs.
- In November 2017 Council commenced a 6 month trial for non-enforced time regulation for on-street parking on Saturdays in the CBD.
- Occupancy data was collected from 25 November 2017 to 24 March 2018 to assess the impacts of non-regulation of time restrictions on Saturdays.
- The data was reported to Council in April 2018, and Council requested the trial be extended for a further 6 months for the purposes of comparing Wet Season and Dry Season data.
- This report details the results of the data collected for the Dry Season through occupancy surveys conducted from 5 May 2018 to 3 November 2018.

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## **RECOMMENDATIONS**

- A. THAT Report Number 18CL0097 MG:rm entitled 6 Month Trial Of Non-Enforced On-street Parking Time Limits In The CBD On Weekends And Public Holidays, be received and noted.
- B. THAT the non-enforcement of on-street parking time limits in the CBD on weekends be continued until the completion of Council's CBD Car Parking Strategy.

## **BACKGROUND**

### **PREVIOUS DECISIONS**

*DECISION NO. 22\0670 (24/04/18)*

#### **6 Month Trial of Non-Enforced On-Street Parking Time Limits in the CBD on Weekends and Public Holidays**

*Report No. 18CL0031 RM:sg (24/04/18) Common No. 1952026*

- A. *THAT Report Number 18CL0031 RM:sg entitled 6 Month Trial of Non-Enforced On-Street Parking Time Limits in the CBD on Weekends and Public Holidays, be received and noted.*
- B. *THAT a further 6 month trial of non-enforced on-street parking time limits in the CBD on weekends be conducted.*
- C. *THAT a further report on the results of the extended trial be presented to Council in November 2018.*

*DECISION NO. 22\0035 (26/09/17)*

#### **6 Month Trial of Non-Enforced On-Street Parking Time Limits in the CBD on Weekends and Public Holidays**

*(Notice of Motion, Common No. 1952026)*

- A. *THAT Council undertake a 6 month trial of non-enforced on-street parking time limits in the CBD on weekends and public holidays.*
- B. *THAT a report on the results of the trial be presented to Council.*

## **DISCUSSION**

Free parking on weekends in the Darwin CBD was introduced in 2012, however regulation continued for the enforcement of time restricted parking between 0800hrs and 1400hrs and safety and access violations.

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In November 2017 Council commenced a 6 month trial for non-enforced time regulation for on-street parking in the CBD. Occupancy data was collected from 25 November 2017 to 24 March 2018 to assess the impacts of non-regulation of time restrictions on Saturdays.

The trial was reported to Council in April 2018, and Council requested an extension for a further 6 months for the purposes of comparing Wet Season and Dry Season data.

This report details the results of the data collected for the Dry Season through occupancy surveys conducted from 5 May 2018 to 3 November 2018. While data collection was consistent with the previous methodology, percentage and average results are presented to align with variations in data collection such as the number of collection days. The results of the occupancy surveys have been compared to the data collected from the Wet Season.

It must also be noted that the CBD parking availability also changed during this period with a reduction in high demand parking areas from:

- Construction works
  - Cavenagh/Bennett Street intersection upgrade
  - Cavenagh Street Heat Mitigation project
  - Barneson Boulevard road works and diversions
- Closure and loss of parking bays following the fire to the RSL in Cavenagh Street

## Results from Occupancy Surveys

### *Occupancy*

The average occupancy for 2P streets was identified as 74.9%, indicating a relatively high demand for these areas, compared to 55.4% for 1/4P areas. In comparison for the previous reporting period over the Wet Season, average occupancy was 82.2% and 58.9% for 2P and 1/4P parking respectively, representing a 7.3% reduction of occupancy for 2P areas and a 3.5% reduction for 1/4P areas in the Dry Season, **Figure 1.**

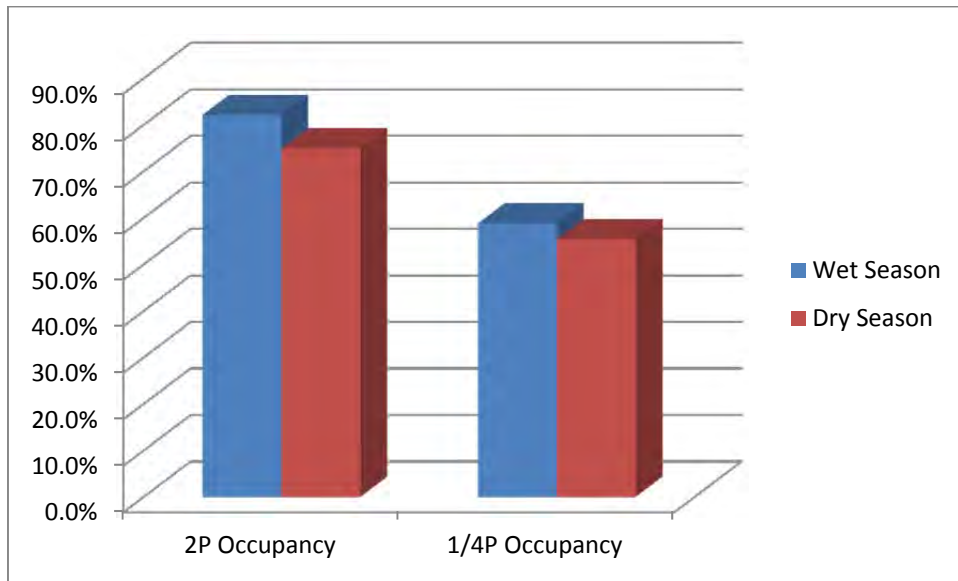


Figure 1: Average Occupancy 2P and 1/4P Time Zones

*Overstays*

The proportion of vehicles overstaying the 2P and 1/4P time zones in the Dry Season was 18.2% and 26% respectively. For the Wet Season, overstaying in 2P areas was 19.7% and 19% for 1/4P areas – see **Figure 2** below.

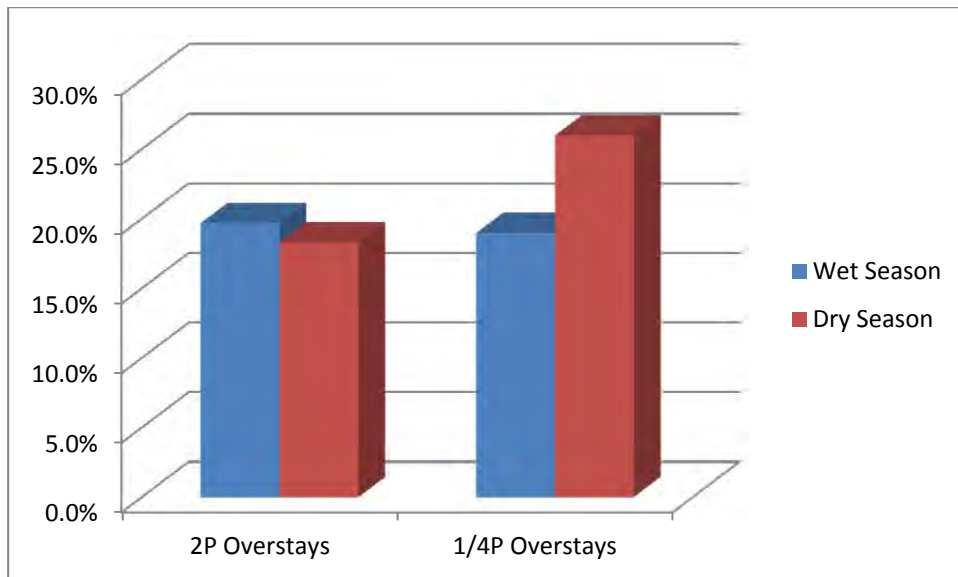


Figure 2: Average Overstays 2P and 1/4P Time Zones

There was a slight decrease in overstaying vehicles in 2P areas (1.5%) in the Dry Season compared to the Wet Season. However there was an increase in overstays in the Dry Season in 1/4P areas of 7% compared to the Wet Season.



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### *Analysis*

The occupancy data indicates that there is approximately 25% capacity for on-street parking vacancy in 2 hour zones on Saturdays, and over 40% capacity for short term 15 minute parking in the Dry Season. While patrons had the opportunity to stay for as long as they wished, the data suggests that the public had a degree of awareness and still largely complied with the stated time zones indicated on parking signage. It is clear that parking capacity is not the major factor in CBD weekend visitations; attendance is more influenced by the range of businesses, events and services on offer.

It was expected that average occupancy for both 2P and ¼ P areas would be higher in the Dry Season than for the Wet. However this was not found to be the case, there was actually a slight reduction in occupancy for both zones. This indicates that weather conditions are not a major factor in determining weekend CBD parking occupancy.

There was a 7% increase in the average overstay data for ¼ P zones for the Dry Season. In the course of conducting the trial Rangers have also been educating the public and advising of unlimited timed parking, particularly as the signage was not changed for the trial. This small increase in the Dry Season of ¼ P occupancy suggests greater awareness and recognition of unlimited timed parking in the CBD on Saturdays by the public, compared to the Wet Season trial.

The Northern Territory Government is currently undertaking a Darwin CBD Car Parking Study due in 2019. Council is awaiting this document to review its policy position and revise the City of Darwin CBD Car Parking Strategy.

In March 2018, CBD retailers were surveyed with 64% stating they believed the non-enforcement of on-street parking time limits on the weekend had a positive impact on their businesses. As such this report recommends the non-enforcement of on-street parking time limits on weekends be continued until the completion of Council's CBD Car Parking Strategy.

### **CONSULTATION PROCESS**

In preparing this report, the following City of Darwin officers were consulted:

- Regulatory Operations Supervisor
- Manager City Planning
- Manager Economic Development, Tourism & International Relations

### **POLICY IMPLICATIONS**

This report is in keeping with City of Darwin Policy No. 003 – Car Parking – General.

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### **BUDGET AND RESOURCE IMPLICATIONS**

Since November 2017 Council has conducted two 6 month trials of non-enforcement of on-street parking time limits on weekends.

The last full financial year in which infringements were issued for time regulated parking on the weekend was 2016/2017. Infringement income for overstays issued for that period was \$56,280. If Council agrees to proceed with continued non-enforcement of on-street parking time limits on weekends then this revenue would be forgone.

There would be no change staff resourcing through the continued to non-enforcement of on-street parking time limits, regulation would continue in the CBD for other road rules, safety and access and any other By-Law violations.

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

Nil

### **ENVIRONMENTAL IMPLICATIONS**

Nil

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**RACHEL MACRAE**  
**REGULATORY SERVICES**  
**SUPERVISOR**

**POLLY BANKS**  
**GENERAL MANAGER**  
**COMMUNITY AND REGULATORY**  
**SERVICES**

For enquiries, please contact Polly Banks on 89300633 or email:  
[p.banks@darwin.nt.gov.au](mailto:p.banks@darwin.nt.gov.au)

**ENCL:** 2ND ORDINARY COUNCIL MEETING/OPEN **AGENDA ITEM:** 14.1.7  
**YES**

**LOT 9370 (544) LEE POINT ROAD, LEE POINT - SUBDIVISION TO CREATE 283  
 LOTS IN FIVE STAGES PA2018/0436**

**REPORT No.: 18CF0100 DB:hd COMMON No.: PA2018/0436 DATE: 27/11/2018**

**Presenter: Manager City Planning, Cindy Robson**

**Approved: General Manager Innovation, Growth and Development Services,  
 Joshua Sattler**

### **PURPOSE**

The purpose of this report is to refer to Council for comment, pursuant to Section 48 of the *Planning Act*, the following development application: Lot 9370 (544) Lee Point Road, Lee Point - Subdivision to create 283 lots in five stages.

### **LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

#### **Goal**

1. Collaborative, Inclusive and Connected Community

#### **Outcome**

1.4 Improved relations with all levels of government and significant stakeholders

#### **Key Strategies**

1.4.2 Play an active role in strategic and statutory planning processes

### **KEY ISSUES**

- The proposal is consistent with Clause 14.1.5 (Lee Point Area Plan) of the Northern Territory Planning Scheme.
- City of Darwin raised matters regarding Traffic Management, Community Infrastructure, Landscaping and Open Space and requested additional information to address these concerns.

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## **RECOMMENDATIONS**

- A. THAT Report Number 18CF0100 DB:hd entitled Lot 9370 (544) Lee Point Road, Lee Point - Subdivision to create 283 lots in five stages PA2018/0436 be received and noted.
- B. THAT Council endorse the submission, dated 9 November 2018, to the Development Assessment Services within **Attachment A** to Report Number 18CF0100 DB:hd entitled Lot 9370 (544) Lee Point Road, Lee Point - Subdivision to create 283 lots in five stages PA2018/0436.

## **BACKGROUND**

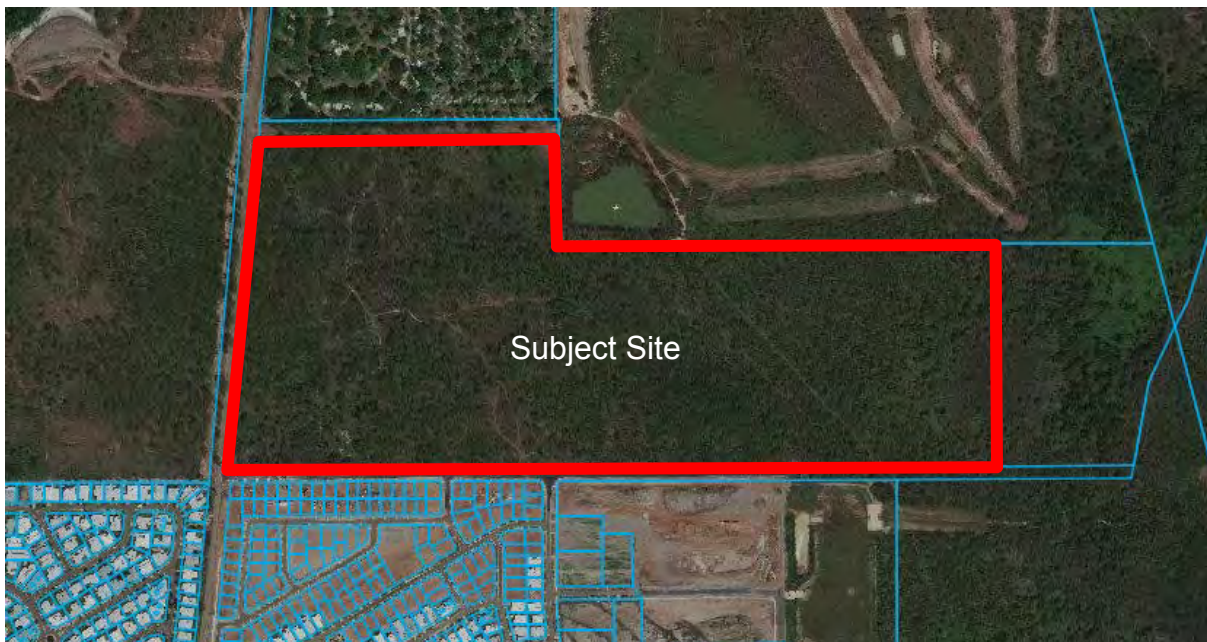


Image 1: Aerial

The subject site is located at allotment 9370 Town of Nightcliff or 544 Lee Point Road, Lee Point and has been referred to as the proposed suburb of Muirhead North. The site abuts the existing suburb of Muirhead, currently being developed and located directly south. Located to the north of the site is Lee Point Village Resort/Club Tropical Resort. The total area of the allotment is 51.17 hectares.

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Image 2: Site Context

The proposed development is included within a larger Lee Point Area Plan, pursuant to the Northern Territory Planning Scheme (NTPS), which includes the land directly adjacent the subject land on the western side of Lee Point Road. Planning application PA2017/0569 recently submitted on the land directly adjacent the subject site seeks to create 598 allotments.

Both sites within the Lee Point Area Plan have historic value for the Australian Defence Force, which has been identified by the Heritage Branch of the Northern Territory Government.

The land slopes down from west to east with water running toward Shoal Bay. The subject site's proximity to Shoal Bay means that the risk of biting insects is increased. The Lee Point Area Plan nominates the area with heightened risk by showing a 'biting insect buffer', which encompasses half of the subject site.

## **DISCUSSION**

The proposal seeks to subdivide the land to create 283 allotments in five stages. The subdivision is part of the Lee Point Master Planned Urban Development which is based on the principles and concepts depicted within Clause 14.1.5 Planning Principles of the Lee Point Area Plan of the NTPS.

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The proposal will provide:

- 'School Site': 3.25 hectares;
- 'Community Centre' Site: 0.21 hectares;
- Three allotments identified for 'child care', 'sales office' and 'café': 0.45 hectares total;
- An allotment designated 'open space/drainage': 7.02 hectares;
- An allotment encompassing a 'monsoon rainforest': 2.24 hectares;
- Three allotments designated as 'drainage easement': 2.73 hectares;
- 'Active recreation reserve': 2.46 hectares;
- 'Park': 0.55 hectares;
- 30 residential allotments >4000 square metres;
- 47 residential allotments between 600 – 800 square metres;
- 52 residential allotments between 540 – 599 square metres; and
- 141 residential allotments between 450 – 539 square metres.

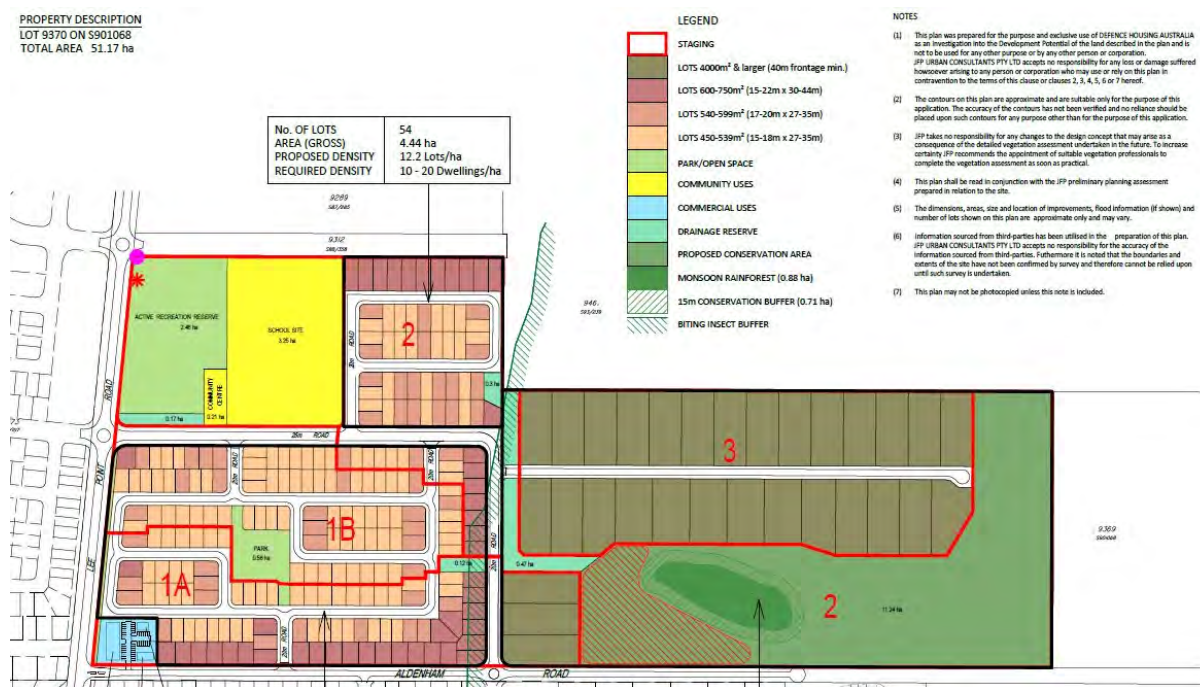


Image 3: Excerpt from subdivision application

The detailed subdivision application is available in **Attachment A**.

The site is currently zoned FD (Future Development) and rezoning is not proposed within this application. Zone FD is an interim zone identifying an area that is intended for development in accordance with an Area Plan and future rezoning.

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## Application Assessment

### *Density and configuration*

The density and configuration has been prepared in accordance with the Lee Point Area Plan, which indicates dwelling densities of between 10 – 20 dwellings per hectare in the western portion and two dwellings per hectare within the eastern portion of the subject site.

### *Transport Management*

City of Darwin have raised a number of matters regarding the management of traffic within the subject site and the proposals ability to meet the requirements of the City of Darwin Subdivision Guidelines. These, along with the below comments have been included in the response letter to the Development Assessment Services in **Attachment A**.

### *Community Centre*

The application includes a community centre site, located between the proposed school site and active recreation reserve. City of Darwin has requested further details regarding the area marked 'community centre' including but not limited to:

- Future intended ownership of the parcel and community centre;
- Design parameters for the community centre, if there is an intention to hand the centre to City Darwin;
- Timing for any development; and
- Any interim uses for the site.

## Summary

The proposal seeks to subdivide the land to create 283 allotments in five stages, based on the principles and concepts depicted within Clause 14.1.5 Planning Principles of the Lee Point Area Plan of the NTPS. As such, the proposal is generally in accordance with the NTPS. However, City of Darwin has requested additional information regarding, traffic management, community infrastructure, open space and landscaping.

## **CONSULTATION PROCESS**

In preparing this report, the following City of Darwin officers were consulted:

- Town Planner
- Team Leader Development
- Civil Engineering Officer

## **POLICY IMPLICATIONS**

Specific policy matters are addressed throughout this report and will be referenced throughout the development process.

PAGE: 6  
 REPORT NUMBER: 18CF0100 DB:hd  
 SUBJECT: LOT 9370 (544) LEE POINT ROAD, LEE POINT - SUBDIVISION TO  
 CREATE 283 LOTS IN FIVE STAGES PA2018/0436

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### **BUDGET AND RESOURCE IMPLICATIONS**

If the subdivision is approved, Council will expect to receive a contribution in accordance with the Development Contribution Plan for Roadwork – Lee Point Road November 2012.

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

Not assessed.

### **ENVIRONMENTAL IMPLICATIONS**

An Environmental Impact Statement has been submitted to the Northern Territory Environment Protection Authority, pursuant to the Environmental Impact Assessment Act to address concerns regarding the impact on any flora and fauna within the area.

Environmental impacts resulting from future Council infrastructure will be mitigated through designing and constructing this infrastructure to City of Darwin standards.

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**CINDY ROBSON**  
**MANAGER CITY PLANNING**

**JOSHUA SATTLER**  
**GENERAL MANAGER INNOVATION,**  
**GROWTH AND DEVELOPMENT**  
**SERVICES**

For enquiries, please contact Cindy Robson on 8930 0528 or email:  
 c.robson@darwin.nt.gov.au.

#### **Attachments:**

**Attachment A:** City of Darwin, Letter of Response to Development Assessment Services, dated 9 November 2018

**Attachment B:** Development Application, Lot 9370 (544) Lee Point Road, Lee Point - Subdivision to create 283 lots in five stages PA2018/0436

*Attachment B submitted electronically on the City of Darwin website:*

<https://www.darwin.nt.gov.au/sites/default/files/file/agendas-minutes/attachments/18cf0100 - attachments a b.pdf>



9 November 2018

Reference: PA2018/0436 DB:hd

Ms Dawn Parkes  
Manager Urban Planning  
Department of Infrastructure, Planning & Logistics  
GPO Box 1680  
DARWIN NT 0801

Dear Ms Parkes

**Parcel Description:**                    **Lot 9370 - Town of Nightcliff  
544 Lee Point Road, Lee Point**

**Proposed Development:**    **Subdivision to create 283 lots in five stages**

Thank you for the development application referred to this office 25 October 2018, concerning the above. This letter may be placed before City of Darwin's Ordinary Council Meeting. Should this letter be varied or not endorsed by Council, you will be advised accordingly.

The following issues are raised for consideration by the Authority:

a). **Transport networks – Public transport, vehicle, cyclist and pedestrian**

City of Darwin requires all transport infrastructure and networks to be in accordance with City of Darwin Subdivision and Development Guidelines. The following matters do not meet City of Darwin Subdivision and Development Guidelines:

- Modified 'Y-intersections' are not supported. Standard 'T-intersections' are preferred, pursuant to 3.5.4 Intersections and Separation Distances of the City of Darwin Subdivision and Development Guidelines.
- The proposed secondary and primary collector streets indicate a minimum carriageway width of seven metres. All collector streets must have a minimum carriageway width of eight metres, pursuant to 3.6.2 Road Widths of the City of Darwin Subdivision and

Development Guidelines. Alternatively, City of Darwin may consider other options upon receipt of sufficient justification.

Subsequently, City of Darwin will require an amended Traffic Impact Assessment to the satisfaction of City of Darwin. Council encourages the applicant to engage further with Council, however, the matter may be resolved as a condition precedent on any subsequent development permit.

b). **Community Centre**

City of Darwin requests further clarification regarding the intended future development of the 0.21 hectare site marked as 'Community Centre', including but not limited to:

- Future intended ownership of the parcel and community centre;
- Design parameters for the community centre, if there is an intention to hand the centre to City Darwin;
- Timing for any development; and
- Any interim uses for the site.

**City of Darwin requests that should a development permit be issued, that the following be provided as a condition precedent:**

a). **Traffic Management**

Prior to the endorsement of plans and prior to the commencement of works (including site preparation), City of Darwin requires amendments to the proposed road configurations to meet the requirements of City of Darwin Subdivision and Development Guidelines.

a). **Open Space Areas and Landscaping**

Prior to the endorsement of plans and prior to the commencement of works (including site preparation), City of Darwin requires a detailed landscaping plan for all proposed road reserves and public areas. Approval by Council is required for any recreational/community infrastructure that is intended to be handed over to City of Darwin.

b). **Site Construction**

**City of Darwin requests that an Environmental and Construction Management Plan (ECMP) be required.**

The ECMP should specifically address the following:

- waste management,
- traffic control,
- haulage routes,
- storm water drainage,
- use of City of Darwin land, and
- how this land will be managed during the construction phase;

to the satisfaction of City of Darwin.

**Note:** Sediment control measures are to be established and maintained, to prevent silt and sediment escaping the site or producing erosion.

Building rubbish or debris must not be placed, or be permitted to be placed, on any adjoining public reserve, footway, road or private land, without first obtaining a works approval from City of Darwin.

**In addition, City of Darwin requests that should a development permit be issued, that the following be provided as general condition requiring Council notification and/or clearance:**

a). **Street Trees, Verge Plantings and Footpaths**

The proposal includes plantings, new concrete footpaths and other works within existing and proposed City of Darwin verges. Verge plantings, footpaths and all other works are required to be constructed in accordance with City of Darwin policies and are subject to a separate approval from City of Darwin. City of Darwin requests that the applicant first seek all required approvals from City of Darwin for any proposed works within the road reserve.

b). **Street Trees**

Any proposed street tree/s to be planted within Council's proposed or existing road reserve shall be carried out at full cost to the developer.

Species selection will be in sequence with Council's strategy and policies.

Council is to be notified of any contractor prior to the commencement of any works.

As street trees will become an asset of City of Darwin, the developer shall provide Council specification for the purchasing of quality tree stock prior to construction. Specification for quality tree stock shall be submitted for approval to the satisfaction of City of Darwin.

The developer shall provide Council a Plant Schedule for street trees indicating;

- root-ball container volume (litres),
- height of species (metres),
- calliper (mm); and
- details identifying the nursery supplying the tree stock.

Street trees shall be of advanced size to provide greater impact to the road reserve and the development.

Prior to the establishment of street trees within the road reserve contact shall be made with City of Darwin's Department of Parks and Reserves to ensure appropriate planting locations are defined.

A 12 month maintenance and 24 week establishment period shall comply with the proposed street tree planting fronting the development. During this period, the developer will be responsible for the ongoing establishment and maintenance to ensure a 100% survival rate.

- c). **City of Darwin requests that the Authority require a monetary contribution is paid to City of Darwin in accordance with its *Developer Contribution Plan for Roadwork: Lee Point Road: Vanderlin Drive to Lee Point Reserve (November 2012)* to upgrade Lee Point Road as a result of this development.** The applicant will be required to pay City of Darwin a contribution towards roadworks in accordance with the above plan.

Should this application be approved, the following conditions pursuant to the *Planning Act* and City of Darwin's responsibilities under the *Local Government Act* are also recommended for inclusion in the development permit issued by the Development Consent Authority.

- Prior to the commencement of work (excluding site preparation), designs and specifications for landscaping of any proposed road verges or public areas shall be submitted for approval by City of Darwin and all approved works shall be constructed at the applicant's expense, to the requirements of City of Darwin.
- Prior to the commencement of work (excluding site preparation), engineering designs and specifications for the proposed and affected roads, and public spaces, including:
  - street lighting,
  - stormwater drainage,
  - vehicular access,
  - traffic management
  - pedestrian/cycle corridors,

shall be submitted for approval by City of Darwin; with all approved works constructed at the applicant's expense to the requirements of City of Darwin.

- Any proposed stormwater connections to City of Darwin stormwater system or proposed works on/over City of Darwin property shall be subject to separate application to City of Darwin and shall be carried out to the requirements and satisfaction of City of Darwin.
- Any easements or reserves required for the purposes of stormwater drainage, roads, access or for any other purpose, shall be made available free of cost to City of Darwin and/or neighbouring property owners.
- Any proposed signage for the site shall be subject to a separate assessment in accordance with City of Darwin Policy Number 42 – Outdoor Advertising Signs Code.

In considering this application, the Development Consent Authority is requested to take into account any implications of the *Disability Discrimination Act* (Cth) or the *Anti-Discrimination Act* (NT) with regard to access for the disabled.

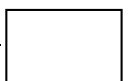
If you require any further discussion in relation to this application, please feel free to contact me on 8930 0528.

Yours faithfully



**CINDY ROBSON**  
**MANAGER CITY PLANNING**

## 14.2 OFFICERS REPORTS (RECEIVE & NOTE)



ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.2.1  
 YES

**MONTHLY FINANCIAL REPORT – OCTOBER 2018**

REPORT No.: 18CP0128 RH:dr COMMON No.: 2476534 DATE: 27/11/2018

**Presenter:** Finance Manager, Russell Holden

**Approved:** Chief Operating Officer, Chris Potter

**PURPOSE**

The purpose of this report is to provide a comparison of income and expenditure against the budget for the period ended 31 October 2018 in accordance with the Local Government (Accounting) Regulations.

**LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the ‘Evolving Darwin Towards 2020 Strategic Plan’:-

**Goal**

5 Effective and Responsible Governance

**Outcome**

5.5 Responsible financial and asset management

**Key Strategies**

5.5.1 Manage Council’s business based on a sustainable financial and asset management strategy

**KEY ISSUES**

- The monthly financial report meets Council’s statutory requirements.
- The 1st Quarter Budget Review will provide additional accountability information to supplement the monthly financial reports.
- There are no overall concerns with this month’s report.

**RECOMMENDATIONS**

THAT Report Number 18CP0128 RH:dr entitled Monthly Financial Report – October 2018, be received and noted.

**BACKGROUND**

Council has endorsed the format of the Monthly Financial Report. It is in compliance with the Local Government (Accounting) Regulations in respect of monthly financial reporting.

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SUBJECT: MONTHLY FINANCIAL REPORT – OCTOBER 2018

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## **DISCUSSION**

The following statements are included at **Attachment A**.

### Overall Income Statement

The Overall Income Statement contains all sources of Council's income (revenue) and operating expenses. Items of note include;

- Income streams are ahead of the year to date budget.
- Capital Grants & Contributions are behind budget due to the timing of receiving Grants.
- Increased Operating Expenses include;
  - Increased insurance premiums
  - Higher temporary labour costs, and
  - Cyclone Marcus recovery works.
- Depreciation will be higher than budget due to a higher value of assets at year-end than anticipated when the budget was completed.

Within the Statement of Financial Position report, the Receivables figure of \$46.3 million includes around \$38million of Rates struck, which are not yet due.

### Municipal Plan Summary

The Municipal Plan Summary follows a similar format to the statement of cash flows, but is based on working capital rather than cash. Elected Members can also refer to the quarterly budget reviews for more detailed final information as these become available.

### Amended Budget

The amended budget column in the Overall Income Statement and Municipal Plan Summary (**Attachment A**) includes projects/programs carried forward from 2017/18 into 2018/19 for completion.

### Investments Report

- This report details all cash and investments, by institution, and provides information on interest rate returns, maturities and policy compliance. Interest earned is at a weighted average return of 2.74%. This compares well to the 90 day bank Bill Swap rate, (BBSW), of 1.94%.

### Accounts Receivable Report

This report details Rate receipt collection, outstanding general debtors, and performance on Rates recovery compared to the previous year. The report also includes additional information on infringement debtors, rates arrears, rates struck and rates outstanding (bar chart).

## **CONSULTATION PROCESS**

Nil



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### **POLICY IMPLICATIONS**

Nil

### **BUDGET AND RESOURCE IMPLICATIONS**

Nil

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

The information that is provided is considered to more than achieve statutory compliance as set out following:

Part 8 of the Local Government (Accounting) Regulations require that a monthly financial report is presented to Council.

Regulation 18 states:-

1. The CEO must, in each month, lay before a meeting of the council a report, in a form approved by the council, setting out:
  - a) The actual income and expenditure of the council for the period from the commencement of the financial year to the end of the previous month; and
  - b) The forecast income and expenditure for the whole of the financial year.
2. The report must include:
  - a) Details of all cash and investments held by the council (including money held in trust); and
  - b) A statement on the debts owed to the council including the aggregate amount owed under each category with a general indication of the age of the debts; and
  - c) Other information required by the Council.
3. If a council does not hold a meeting in a particular month, the report is to be laid before the council committee performing the council's financial functions for the particular month.

It should be noted that monthly financial reports are not independently audited, but are subject to internal control and review processes.

### **ENVIRONMENTAL IMPLICATIONS**

Nil

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**COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

**RUSSELL HOLDEN**  
**FINANCE MANAGER**

**CHRIS POTTER**  
**CHIEF OPERATING OFFICER**

For enquiries, please contact Russell Holden on 89300523 or email:  
r.holden@darwin.nt.gov.au.

**Attachment A:** Monthly Financial Report – October 2018

**Income Statement**  
**For the Period Ended 31/10/2018**


	<u>2018/19</u>				
	Full Original Budget \$'000	Full Amended Budget \$'000	YTD Actual \$'000	YTD v FAB %	
% of year elapsed				33%	
<b>Income from Continuing Operations</b>					<b>Comment</b>
Rates & Annual Charges	71,678	71,678	71,949	100%	No issues
User Charges, Fees & Other	24,387	24,387	9,500	39%	No issues
Interest & Investment Revenue	1,913	1,913	832	44%	No issues
Grants & Contributions - Operating	5,319	3,487	2,033	58%	No issues
<b>Total Income from Continuing Operations</b>	<b>103,297</b>	<b>101,465</b>	<b>84,315</b>	<b>83%</b>	
<b>Less Expenses from Continuing Operations</b>					
Employee Costs	33,661	33,661	11,117	33%	No issues
Borrowing Costs	790	790	93	12%	No issues
Materials and Services	48,103	48,302	19,096	40%	No issues
Depreciation and Amortisation	27,353	27,353	10,439	38%	Above Target
<b>Total Expenses from Continuing Operations</b>	<b>109,907</b>	<b>110,105</b>	<b>40,746</b>	<b>37%</b>	
<b>Operating Result - Continuing Operations</b>	<b>(6,610)</b>	<b>(8,641)</b>	<b>43,569</b>		
<b>Grants &amp; Contributions - Capital</b>	10,115	10,115	11	0%	Below Target
<b>Net Operating Result For the Year</b>	<b>3,505</b>	<b>1,474</b>	<b>43,580</b>		

**Income Statement**

**Explanation of Columns:** "Full Original Budget" and "Full Amended Budget" are annual amounts. YTD Actual is year to date. YTD v FAB is the % of actuals achieved against the full year amended budget.

**Outlines** income and operating expenses. Capital expenditure has been excluded however depreciation expense has been recognised. The net operating surplus or deficit for the reporting period is a measure of Council's financial performance. This figure is determined by deducting total operating expenses including depreciation from total operating revenue.

**Operating income:** Rates are recognised at the beginning of the year hence 100% achieved. Although User charges, fees and other revenue are slightly above target at 39% this is mainly due to the issuing of Off Street parking permits and animal registrations at the beginning of the year. Operating grants & contributions are showing 58% achieved as library grants received in full for the year. Funbus grant for 1st payment schedule received. FAA Grant for 1st Quarter received.

**Operating expenses:** Overall expenditure appears reasonable for this 4th month of the financial year. Borrowing expenses are scheduled for payment in November and May. Depreciation expense is expected to exceed budget as additional assets were recognised at year end in 17/18. Materials and Services are tracking above budget and can be attributed in part to increase in insurance premiums, higher temporary labor cost and continuing Cyclone Marcus recovery works. Cost will be monitored and addressed during budget quarterly review.

**Capital income:** Anticipated capital grants will not be received until later in the year..



**Municipal Plan Summary**  
For the Period Ended 31/10/2018

	Full Original Budget \$'000	2018/19 Full Amended Budget \$'000	YTD Actual \$'000	YTD v FAB %
% of year elapsed				33%
<b>Funds From Operating Activities</b>				
Net Operating Result From Above	3,505	1,474	43,580	
Add back depreciation (not cash)	27,353	27,353	10,439	
<b>Net Funds Provided (or used in) Operating Activities</b>	<b>30,858</b>	<b>28,827</b>	<b>54,019</b>	
<b>Funds From Investing activities</b>				
Sale of Infrastructure, Property, Plant & Equipment	801	801	104	13%
Purchase of Infrastructure, Property, Plant & Equipment	(32,470)	(48,544)	(3,880)	8%
<b>Net Funds Provided (or used in) Investing Activities</b>	<b>(31,669)</b>	<b>(47,743)</b>	<b>(3,776)</b>	
<b>Funds From Financing Activities</b>				
Proceeds from borrowings & advances	3,000	3,000	-	0%
Repayment of borrowings & advances	(422)	(422)	-	0%
<b>Net Funds Provided (or used in) Financing Activities</b>	<b>2,578</b>	<b>2,578</b>	<b>-</b>	
<b>Net Increase (-Decrease) in Funds Before Transfers</b>	<b>1,767</b>	<b>(16,339)</b>	<b>50,243</b>	
Transfers from (-to) Reserves	(1,767)	16,339	8,432	
<b>Net Increase (-Decrease) in Funds After Transfers</b>	<b>-</b>	<b>-</b>	<b>58,675</b>	

**Municipal Plan Summary**

**Outlines** This statement outlines Councils entire budget in accordance with the published municipal plan. It shows the effect on General Funds (original budget - break even/nil). It groups items into operating, investing and financing and has a very close relationship to cash flows , which is why it is presented in the same international format. It eliminates the depreciation calculation and discloses totals for asset sales and purchases as well as loan raising and repayments. Finally it discloses the transfers to & from cash backed reserves which are detailed in the quarterly budget review reports (actual transfers to/from reserves are not actioned until the end of the 1st quarter).

**Full Amended Budget:** Includes carry forwards from 2017/18

**Net funds provided by operating activities:** These will reduce throughout the year to equate more closely to budget as the rates struck are expended.

**Sale of Plant & Equipment:** This appears low and should increase once fleet purchases are achieved.

**Purchase of Infrastructure, property etc.** This is 8% spent compared to 33% of year elapsed.

**Transfers from (-to) reserves:** This discloses the transfers to & from cash backed reserves.

**Manager Finance:** There are no overall concerns in relation to the budgets.

**Statement of Financial Position**  
For the Period Ended 31/10/2018



<u>2017-18</u> Unaudited Actual \$'000		Full Original Budget \$'000	2017/18 Full Amended Budget \$'000	YTD Actual \$'000
<b>Current Assets</b>				
14,572	Cash at Bank & Investments	13,046	14,752	29,195
46,635	Cash at Bank & Investments - externally restricted	35,351	37,691	41,242
22,236	Cash at Bank & Investments - internally restricted	3,176	14,841	19,197
8,942	Receivables	8,498	8,942	46,320
92	Inventories	110	92	191
-	Other	-	-	-
<u>92,477</u>		<u>60,181</u>	<u>76,318</u>	<u>136,145</u>
<b>Non-Current Assets</b>				
1,000,070	Infrastructure, Property, Plant and Equipment	1,025,558	1,020,461	993,407
<u>1,000,070</u>		<u>1,025,558</u>	<u>1,020,461</u>	<u>993,407</u>
<b><u>1,092,547</u></b>	<b>TOTAL ASSETS</b>	<b><u>1,085,739</u></b>	<b><u>1,096,779</u></b>	<b><u>1,129,552</u></b>
<b>Current Liabilities</b>				
15,379	Payables	11,695	15,379	8,860
423	Borrowings	422	422	423
7,290	Provisions & Other Liabilities	8,171	7,290	7,237
<u>23,092</u>		<u>20,288</u>	<u>23,091</u>	<u>16,519</u>
<b>Non-Current Liabilities</b>				
4,624	Borrowings	7,059	7,383	4,624
29,092	Provisions	19,900	29,092	29,092
<u>33,716</u>		<u>26,959</u>	<u>36,475</u>	<u>33,716</u>
<b><u>56,808</u></b>	<b>TOTAL LIABILITIES</b>	<b><u>47,247</u></b>	<b><u>59,566</u></b>	<b><u>50,235</u></b>
<b><u>1,035,739</u></b>	<b>NET ASSETS</b>	<b><u>1,038,492</u></b>	<b><u>1,037,213</u></b>	<b><u>1,079,316</u></b>
<b>Equity</b>				
669,421	Asset Revaluation Reserve	597,461	669,421	600,552
366,318	Retained Surplus	441,031	367,792	478,764
<b><u>1,035,739</u></b>	<b>TOTAL EQUITY</b>	<b><u>1,038,492</u></b>	<b><u>1,037,213</u></b>	<b><u>1,079,316</u></b>

**Statement of Financial Position Comments:**

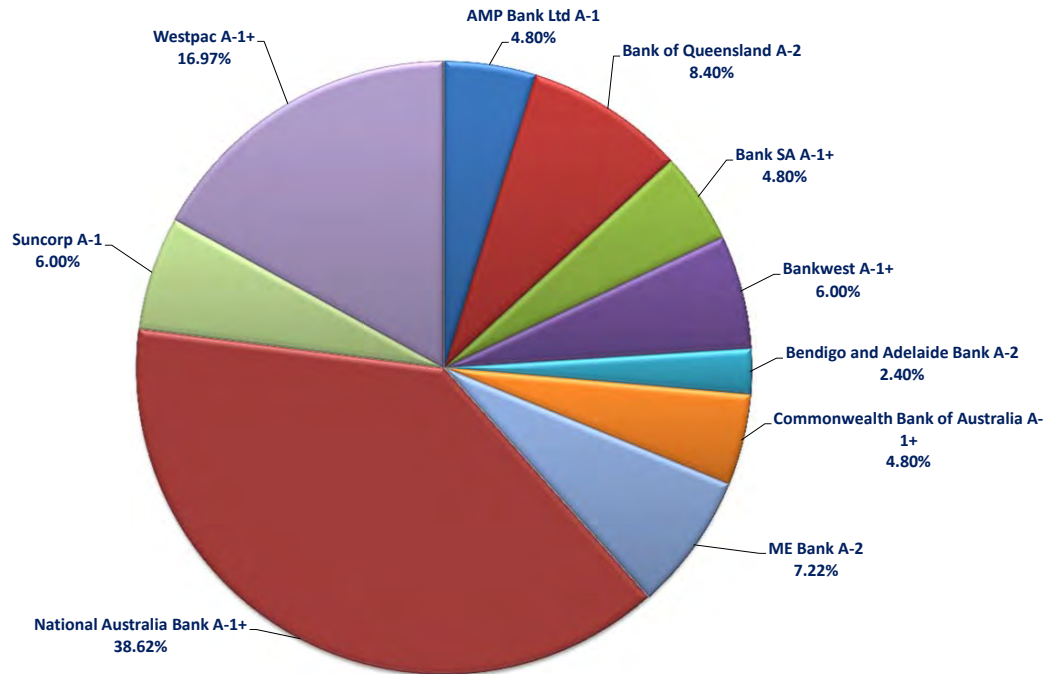
The Statement of Financial Position outlines what Council owns (assets) and what it owes (liabilities) at a point in time. Council's net worth is determined by deducting total liabilities from total assets - the larger the net equity, the stronger the financial position.

**Manager Finance:** there are no concerns in relation to the original budgets at this stage. Note that the full original budget is as published in the adopted Municipal Plan 2018/19. The full amended budget column is based on the unaudited closing balances as at 30/6/2018 plus Council approved amendments, the YTD Actual column is based on unaudited actual closing balances as at 30/6/2018 and adjustment of actual movements since.

INVESTMENTS REPORT TO COUNCIL AS AT 31 OCTOBER 2018



Investment Funds Distribution Per Institution



Portfolio vs Investment Policy

COUNTERPARTY (ADI)	CREDIT RATING (ST)	Policy Limit	% of Total Portfolio
AMP Bank Ltd	A-1	30%	4.80%
Bank of Queensland	A-2	10%	8.40%
Bank SA	A-1+	40%	4.80%
Bankwest	A-1+	40%	6.00%
Bendigo and Adelaide Bank	A-2	10%	2.40%
Commonwealth Bank of Australia	A-1+	40%	4.80%
ME Bank	A-2	10%	7.22%
National Australia Bank	A-1+	40%	38.62%
Suncorp	A-1	30%	6.00%
Westpac	A-1+	40%	16.97%
<b>Grand Total</b>			<b>100.00%</b>

CREDIT RATING (ST)	Policy Limit	% of Total Portfolio
A-1+	100%	71.19%
A-1	45%	10.80%
A-2	25%	18.02%
<b>Grand Total</b>		<b>100.00%</b>

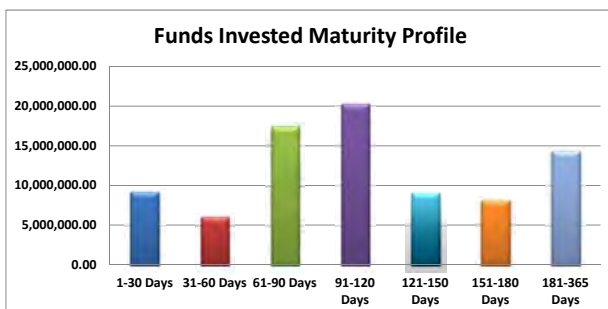
TERM TO MATURITY	Policy Min.	Policy Max.	% of Total Portfolio
< 1 YEAR	30%	100%	100%
> 1 YEAR	0%	50%	0%
> 3 YEARS	0%	30%	0%
> 5 YEARS	0%	10%	0%
<b>Grand Total</b>			<b>100.00%</b>

INSTITUTION CATEGORY	Institution Category Limits	% of Total Portfolio
MAJOR BANK	100%	60.39%
REGIONAL BANK	45%	39.61%
<b>Grand Total</b>		<b>100.00%</b>

**INVESTMENT REPORT TO COUNCIL  
AS AT 31 OCTOBER 2018**



INSTITUTION CATEGORY	COUNTERPARTY (ADI)	CREDIT RATING (ST)	CREDIT RATING (LT)	INV TYPE	MATURITY DATE	INTEREST RATE	PRINCIPAL \$	% of Total Portfolio
<b>MAJOR BANK</b>							<b>\$50,330,537</b>	<b>60.39%</b>
<b>Commonwealth Bank of Australia</b>							<b>\$4,000,000</b>	<b>4.80%</b>
		A-1+	AA-	TD	18 December 2018	2.68%	\$2,000,000	2.40%
					19 March 2019	2.81%	\$2,000,000	2.40%
<b>National Australia Bank</b>							<b>\$32,184,979</b>	<b>38.62%</b>
		A-1+	AA-	TD	11 December 2018	2.75%	\$1,016,953	1.22%
					8 January 2019	2.68%	\$2,032,035	2.44%
					15 January 2019	2.65%	\$2,031,912	2.44%
					15 January 2019	2.70%	\$4,000,000	4.80%
					22 January 2019	2.70%	\$4,000,000	4.80%
					22 January 2019	2.77%	\$1,034,502	1.24%
					29 January 2019	2.75%	\$1,000,000	1.20%
					29 January 2019	2.82%	\$1,017,251	1.22%
					12 February 2019	2.71%	\$4,000,000	4.80%
					19 February 2019	2.82%	\$1,000,000	1.20%
					5 March 2019	2.79%	\$2,000,000	2.40%
					30 April 2019	2.73%	\$2,052,325	2.46%
					7 May 2019	2.73%	\$3,000,000	3.60%
					14 May 2019	2.74%	\$2,000,000	2.40%
					21 May 2019	2.73%	\$2,000,000	2.40%
<b>Westpac</b>							<b>\$14,145,558</b>	<b>16.97%</b>
		A-1+	AA-	TD	6 November 2018	2.66%	\$2,000,000	2.40%
					13 November 2018	2.70%	\$2,014,961	2.42%
					20 November 2018	2.70%	\$2,000,000	2.40%
					27 November 2018	2.70%	\$1,000,000	1.20%
					27 November 2018	2.75%	\$2,030,953	2.44%
					4 December 2018	2.75%	\$1,000,000	1.20%
					4 December 2018	2.78%	\$1,000,000	1.20%
					11 December 2018	2.78%	\$1,000,000	1.20%
					22 January 2019	2.73%	\$1,059,721	1.27%
					29 January 2019	2.76%	\$1,039,923	1.25%
<b>REGIONAL BANK</b>							<b>\$33,016,079</b>	<b>39.61%</b>
<b>AMP Bank Ltd</b>							<b>\$4,000,000</b>	<b>4.80%</b>
		A-1	A	TD	12 February 2019	2.80%	\$2,000,000	2.40%
					2 April 2019	2.92%	\$2,000,000	2.40%
<b>Bank of Queensland</b>							<b>\$7,000,000</b>	<b>8.40%</b>
		A-2	BBB+	TD	26 February 2019	2.73%	\$1,000,000	1.20%
					26 February 2019	2.75%	\$1,000,000	1.20%
					26 March 2019	2.73%	\$1,000,000	1.20%
					16 April 2019	2.73%	\$1,000,000	1.20%
					16 April 2019	2.75%	\$1,000,000	1.20%
					23 April 2019	2.75%	\$2,000,000	2.40%
<b>Bank SA</b>							<b>\$4,000,000</b>	<b>4.80%</b>
		A-1+	AA-	TD	5 February 2019	2.74%	\$2,000,000	2.40%
					28 May 2019	2.85%	\$2,000,000	2.40%
<b>Bankwest</b>							<b>\$5,000,000</b>	<b>6.00%</b>
		A-1+	AA-	TD	19 February 2019	2.65%	\$2,000,000	2.40%
					19 February 2019	2.80%	\$1,000,000	1.20%
					12 March 2019	2.80%	\$2,000,000	2.40%
<b>Bendigo and Adelaide Bank</b>							<b>\$2,000,000</b>	<b>2.40%</b>
		A-2	BBB+	TD	26 March 2019	2.80%	\$2,000,000	2.40%
<b>ME Bank</b>							<b>\$6,016,079</b>	<b>7.22%</b>
		A-2	BBB	TD	26 February 2019	2.85%	\$1,016,079	1.22%
					9 April 2019	2.80%	\$2,000,000	2.40%
					3 September 2019	2.73%	\$2,000,000	2.40%
					14 May 2019	2.70%	\$1,000,000	1.20%
<b>Suncorp</b>							<b>\$5,000,000</b>	<b>6.00%</b>
		A-1	A+	TD	19 February 2019	2.82%	\$1,000,000	1.20%
					6 February 2019	2.60%	\$4,000,000	4.80%
<b>Grand Total</b>							<b>\$83,346,616</b>	<b>100.00%</b>



General Bank Funds	\$5,145,652
Total Funds	\$88,492,269
Total Budgeted Investment Earnings	\$1,603,778
Year to Date Investment Earnings	\$557,127
Weighted Ave Rate:	2.74%
BBSW 90 Day Rate	1.94%

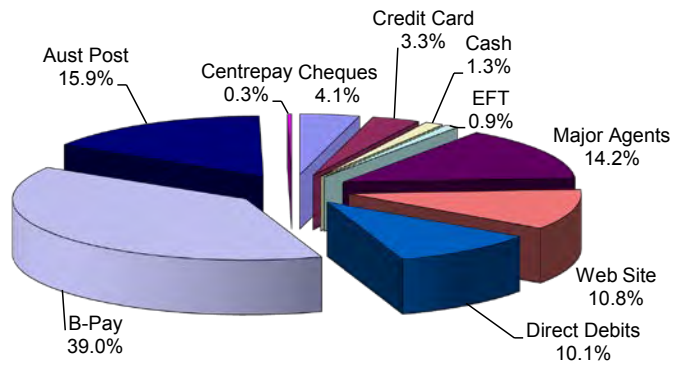
Council has an arrangement with its financial institution the Commonwealth Bank of Australia to offset Council's overdraft facility against pooled funds held in Council's Trust Account and General Account

Trust Bank Account \$591,675

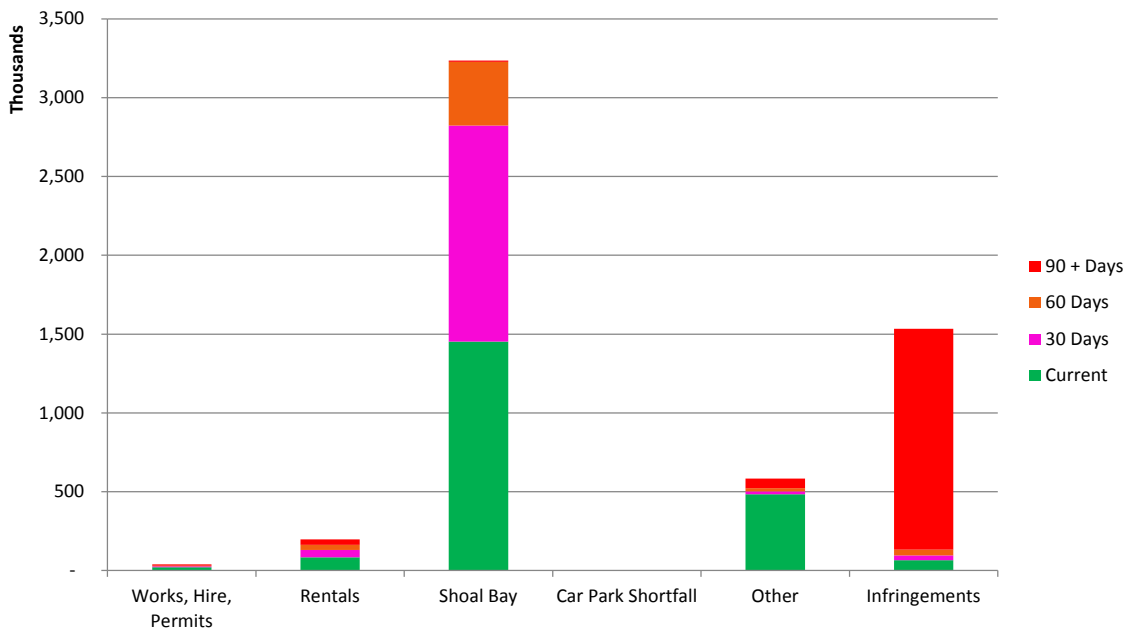


**FINANCE DEPARTMENT  
SERVICE LEVEL REPORT TO COUNCIL  
FOR THE MONTH OF OCTOBER 2018**

**RATE RECEIPTS BY PAYMENT TYPE LAST 12 MONTHS**

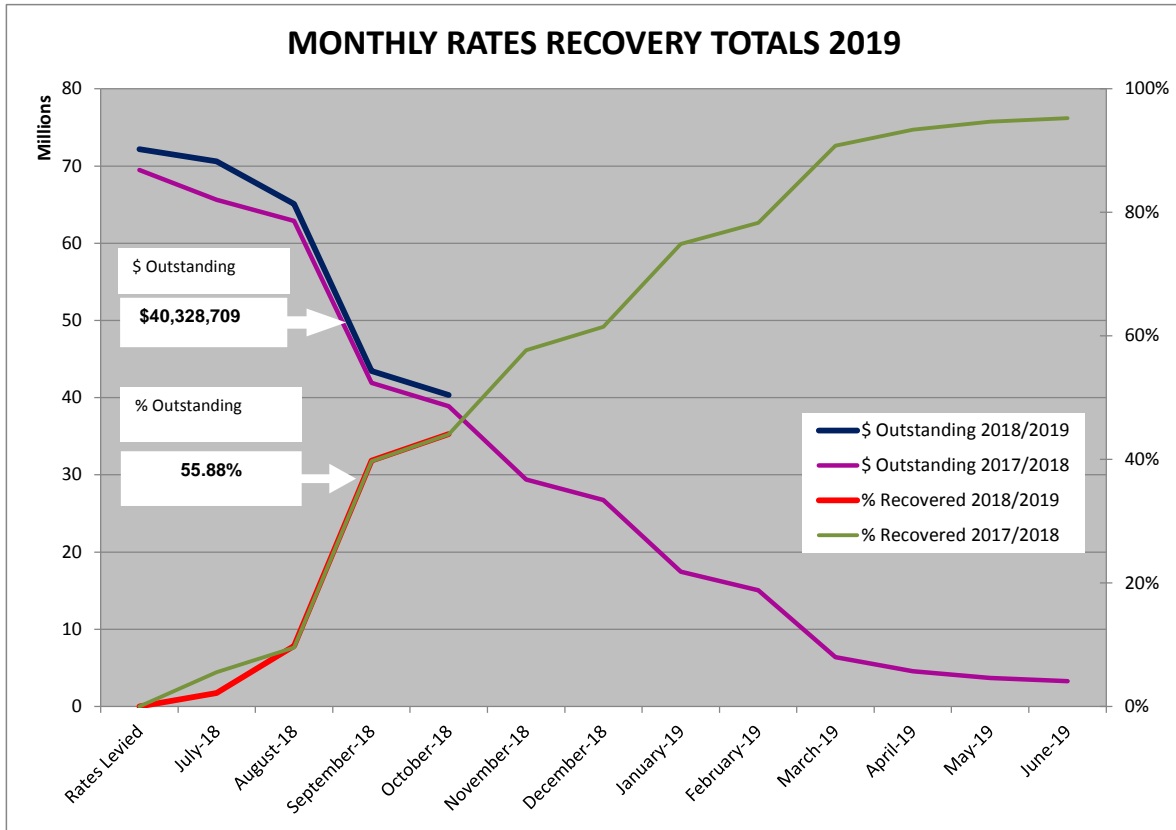


**ACCOUNTS RECEIVABLE OUTSTANDING DEBTORS**

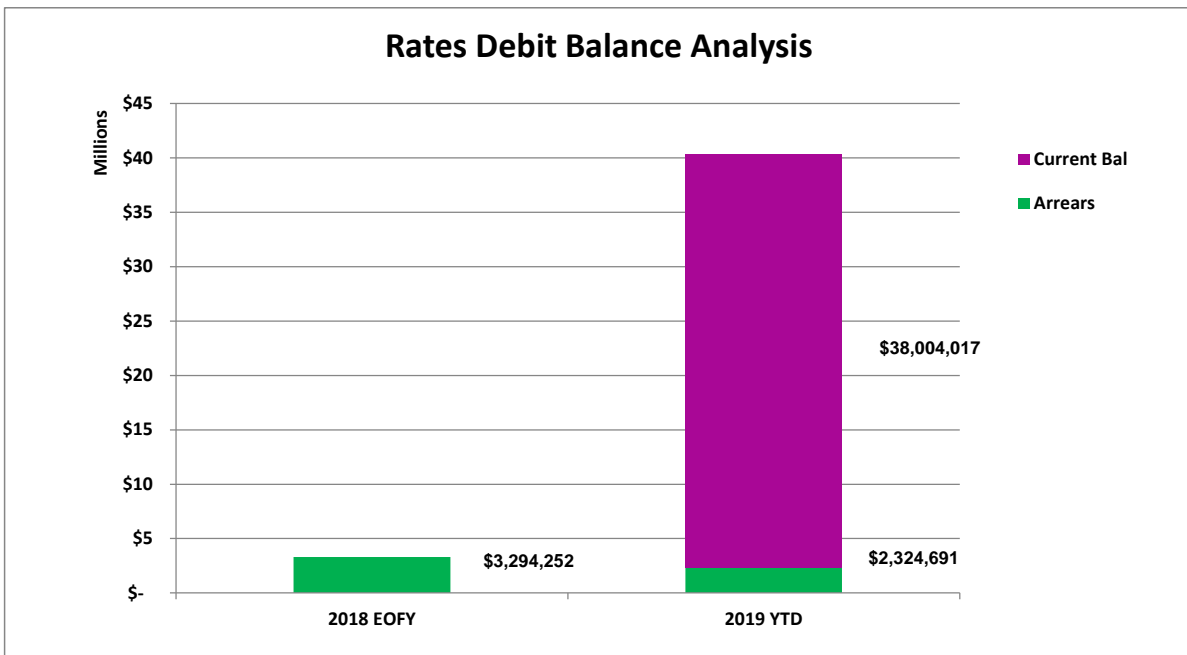


Pursuant to Local Government (Accounting) Regulations Sec 18(2)(b) the chart labelled "Accounts Receivable Outstanding Debtors" represents sundry debts owed to Council on an "aged" basis.





The chart labelled "Monthly Rates Recovery Totals" represents the amounts currently outstanding in Rates to Council, rates are either due or overdue and no further "ageing" is possible.



ENCL: 2ND ORDINARY COUNCIL MEETING/OPEN AGENDA ITEM: 14.2.2  
 YES

### BLACK SPOT PROGRAM 2019-20 NOMINATIONS

REPORT No.: 18CO0048 BS:dl COMMON No.: 3917726 DATE: 27/11/2018

**Presenter:** Manager Design, Development and Projects, Drosso Lelekis

**Approved:** General Manager Engineering and City Services

#### **PURPOSE**

The purpose of this report is to provide information and to seek Council's endorsement of nominations for the 2019/2020 Black Spot Program.

#### **LINK TO STRATEGIC PLAN**

The issues addressed in this Report are in accordance with the following Goals/Strategies as outlined in the 'Evolving Darwin Towards 2020 Strategic Plan':-

#### **Goal**

2 Vibrant, Flexible and Tropical Lifestyle

#### **Outcome**

2.1 Improved access and connectivity

#### **Key Strategies**

2.1.3 Manage the road network to meet community needs

#### **KEY ISSUES**

- The City of Darwin has been invited to submit nomination projects for the 2019/2020 Black Spot Program by the Northern Territory Government's (NTG) Department of Infrastructure, Planning and Logistics (Civil Services).
- The total funding allocation for the whole of the Northern Territory in the 2019/2020 Black Spot Program is \$1 million.
- Nominations are due by 30 November 2018.
- Council's endorsement of the following project which meets the Black Spot Benefit Cost Ratio eligibility criteria is sought, for inclusion in the City of Darwin's submission:
  - East Point Road and Lampe Street intersection modifications.
- Endorsement for the nomination of the following projects, based on the outcomes of a road safety audit and a traffic management study, is also sought:
  - Stage 2 traffic calming works from the Anula and Wulagi Local Area Traffic Management Study;
  - Traffic Calming works along Alawa Crescent as a result of an investigation into traffic and pedestrian safety along this road.

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SUBJECT: BLACK SPOT PROGRAM 2019-20 NOMINATIONS

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- An additional project, a traffic engineering study of Lee Point Road between McMillans Road and Vanderlin Drive is also proposed for inclusion in the submission.

## **RECOMMENDATIONS**

THAT Report Number 18CO0048 BS:dI entitled Black Spot Program 2019-20 Nominations, be received and noted.

## **BACKGROUND**

The Department of Infrastructure, Planning and Logistics has written to the City of Darwin (refer **Attachment A**), seeking nomination projects for the 2019/2020 Black Spot Program.

The Black Spot program generally targets those road locations where crashes are occurring. By funding traffic control measures such as roundabouts, intersection channelization, traffic signals etc. at dangerous locations, the program projects reduce the risk of crashes.

The Black Spot Program is open to all local governments in the Northern Territory to nominate candidate projects.

The annual Black Spot Program funding for the whole of the Northern Territory is \$1 million and City of Darwin will be competing against other organisations within the Territory for a portion of this funding.

## **DISCUSSION**

The Northern Territory Black Spot Consultative Panel assesses all nominations and will meet in early 2019 to consider the nominations received and recommend priority projects to the Federal Government for approval.

All Black Spot nominations for the 2019/2020 Black Spot Program must be submitted by 30 November 2018. Nominations received after 30 November 2018 may not be submitted for the Panels consideration.

The main eligibility criteria for Black Spot nominations are as follows:

1. Benefit Cost Ratio Based Submissions – For individual sites such as intersections, mid-block or short road sections there has to be a history of at least three casualty crashes over a five year period. In addition, the minimum required benefit cost ratio for eligible projects is 2:1. For lengths of road, there must be an average of 0.2 casualty crashes per kilometre per annum of the length in question over five years.
2. Road Safety Audit Based Submissions – The Black Spot Program also recognizes that there are road locations that could be considered as “accidents waiting to happen”. Some program funding may be used to treat

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sites where traffic engineers have completed a Road Safety Audit and found that remedial works are necessary.

An assessment of potential sites has been undertaken across Council's road network and the following projects (including scope and estimated cost) are proposed for inclusion in the City of Darwin's submission.

### **Nomination 1 – East Point Road and Lampe Street intersection modifications.**

The East Point Road and Lampe Street intersection is a Give Way controlled "T" intersection in the suburb of Fannie Bay.

There have been six crashes recorded in the past five years at this intersection, with four of these being casualty crashes. Three of the four crashes have involved pedestrians and a cyclist.

The following design treatment is identified as suitable for this site:

- Improving intersection sight lines and the provision of traffic islands with pedestrian linkages; and
- Upgrade the existing street lighting.

The Benefit Cost Ratio for this treatment is 3.68 which meets the eligibility criteria for 100% funding.

The estimated cost of this project is \$160,000 (excluding GST) and 100% funding will be sought.

### **Additional Projects**

### **Nomination 2 – Anula and Wulagi Traffic Management Plan – Stage 2 Traffic Calming Works**

In response to resident concerns about speeding in the suburbs of Anula and Wulagi, an investigation into the issues raised was undertaken and a number of traffic calming measures were identified as being required to address speeding and safety along specific roads in these suburbs.

The key outcome of this study was the development of the Anula and Wulagi Traffic Management Plan which included various treatment measures to manage speeds and driver behaviour within these areas. The recommended works were staged, based on priority, including impact on road safety and based on the value of the works.

Design for Stage 1 of the traffic management plan is currently underway and this project is funded in Council's 2018/2019 Capital Works Budget.

It is proposed that **Stage 2** of the traffic management works from the Anula and Wulagi Traffic Management Plan be included in this year's Black Spot submission.

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The **Stage 2** works include:

- Construction of raised intersection treatments at Wulagi Crescent/Brolga Street and at Wulagi Crescent/Rosella Crescent.

The estimated cost of the Stage 2 works is \$355,000 (excluding GST) and 100% of the funding to be sought.

### **Nomination 3 – Alawa Crescent - Outcomes from the investigation into traffic and pedestrian safety.**

There is a history of road safety concerns along Alawa Crescent associated with speeding and pedestrian safety, particularly in the vicinity of the Alawa Primary School.

As a result of these concerns, a traffic study was undertaken for the section of Alawa Crescent between its intersections with Trower Road.

The design treatments identified as suitable for this site include:

- The provision of a pedestrian crossing points and associated road geometry changes along Alawa Crescent in the vicinity of 37 and 95 Alawa Crescent
- Construction of a roundabout at the intersection of Scriven Street.

The estimated cost to implement these recommendations is \$210,000 (excluding GST) and 100% funding is sought.

Note that although a Road Safety Audit (RSA) had not been undertaken along Alawa Crescent at the time of writing this report, advice received from the Northern Territory Government confirms that this nomination will be considered providing an RSA is received prior to the end of December 2018. An external Traffic Engineering Consultant has been engaged to undertake this Audit.

### **Nomination 4 – Lee Point Road Traffic Engineering Study**

Undertake a traffic engineering study to identify existing issues/problems and determine solutions at the various intersections along Lee Point Road, given the high number of accidents recorded as identified in the Black Spot assessment of this road.

The estimated cost for a traffic engineering study is \$50,000 (excluding GST) and 100% of funding is sought.

### **Submission**

A formal Black Spot submission is being prepared for the above mentioned projects and should these projects be endorsed by Council, this submission will be forwarded to the Northern Territory Consultative Panel for their consideration and endorsement.

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 SUBJECT: BLACK SPOT PROGRAM 2019-20 NOMINATIONS

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It is recommended that Council endorse the above mentioned nominated projects for inclusion in its 2019/20 Black Spot Program submission.

### **CONSULTATION PROCESS**

In preparing this report, the following City of Darwin officers were consulted:

- Design Team Leader
- Design Technical Officer

In preparing this report, the following External Parties were consulted:

- I3 Consultants WA
- GTA Consultants

Pending Council's endorsement and subsequent approval for Black Spot funding, community consultation will follow.

### **POLICY IMPLICATIONS**

Any community consultation prior to the implementation of these projects will be undertaken in accordance with City of Darwin Policy No. 025 – Community Engagement.

### **BUDGET AND RESOURCE IMPLICATIONS**

The nominated projects have a total estimated cost of \$775,000 (excluding GST).

100% of funding is sought for:

- **Nomination 1** – East Point Road and Lampe Street intersection - \$160,000.
- **Nomination 2** – Anula and Wulagi Traffic Management Plan, Stage 2 Traffic Calming Works - \$355,000.
- **Nomination 3** – Outcomes of the Alawa Crescent Traffic Assessment - \$210,000.
- **Nomination 4** – Lee Point Road Traffic Engineering Study - \$50,000.

The Black Spot Program allows for costs associated with design/documentation, community consultation and project management. The above cost estimates allow for this.

### **RISK/LEGAL/LEGISLATIVE IMPLICATIONS**

Implementing appropriate road safety measures increases the safety of the City of Darwin's road network for all road users.

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SUBJECT: BLACK SPOT PROGRAM 2019-20 NOMINATIONS

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Undertaking any early community consultation on un-funded projects could raise the public's expectations and if funding does not become available, there is a risk of significant community dissatisfaction.

### **ENVIRONMENTAL IMPLICATIONS**

Implementing appropriate road safety measures will likely result in a safer road environment for all users.

### **COUNCIL OFFICER CONFLICT OF INTEREST DECLARATION**

We the Author and Approving Officers declare that we do not have a Conflict of Interest in relation to this matter.

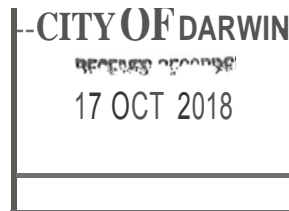
**DROSSO LELEKIS**  
**MANAGER OF DESIGN,**  
**DEVELOPMENT AND PROJECTS**

**BRENDAN SMITH**  
**GENERAL MANAGER**  
**ENGINEERING AND CITY**  
**SERVICES**

### **Attachments:**

**Attachment A:** Letter from the Northern Territory Government seeking Black Spot nominations for the 2019/2020 financial year.

CEO Scott Waters  
GPO Box 84  
Darwin  
NT 0801



Civil Services  
Level 2 Highway House  
Palmerston Circuit  
PALMERSTON NT 0830

Postal Address  
GPO Box 61  
PALMERSTON NT 0830

T 08 8999 4894  
F 08 8999 4682  
E [robert.pemble@nt.gov.au](mailto:robert.pemble@nt.gov.au)

File Ref: DDPI2010/4170-02-0120-000S

Dear Sir/Madam

Re: Black Spot Program 2019-20 Nominations

My Department is seeking nominations of suitable projects for Black Spot Program 2019-20. The Northern Territory Black Spot Consultative Panel will meet in early 2019 to consider the nominations and recommend priority projects to the Federal Minister for the Department of Infrastructure and Regional Development for approval. The nomination form and the copy of the Notes of Administration are available at: <http://investment.infrastructure.gov.au/funding/blackspots/>.

Please note that annual Black Spot Program for the Territory is \$1.0million. In order to prepare a quality funding application, it is important that the current application form, eligibility criteria, and notes of administration are downloaded and understood very well.

All nominations received in time will be submitted to the Panel for their consideration regardless of project eligibility for funding. Nominations are due by 30 November 2018. Nominations received after 30 November 2018 may not be submitted for the Panel's consideration. All nominations should be referred to Ben Langdon, GPO Box 61, Palmerston, NT 0830.

Should you require assistance with the preparation of your nomination you may contact Mr Peter Mclinden (Local Government Association of the Northern Territory) on 8944 9691 or Mr Ben Langdon (Department of Infrastructure, Planning, and Logistics) on 8999 4822.

Yours sincerely,



Bob Pemble  
Executive Director Civil Services

9 October 2018



TWENTY-EIGHTH ORDINARY COUNCIL MEETING – OPEN SECTION  
TUESDAY, 27 NOVEMBER 2018

ORD11/12

**15. INFORMATION ITEMS AND CORRESPONDENCE RECEIVED**

Nil

**16. REPORTS OF REPRESENTATIVES**

**17. QUESTIONS BY MEMBERS**

**18. GENERAL BUSINESS**

**19. DATE, TIME AND PLACE OF NEXT ORDINARY COUNCIL MEETING**

Common No. 2695130

HAT the next Ordinary Meeting of Council be held on Tuesday, 11 December 2018, at 5:30pm (Open Section followed by the Confidential Section), Council Chambers, 1st Floor, Civic Centre, Harry Chan Avenue, Darwin.

**20. CLOSURE OF MEETING TO THE PUBLIC**

Common No. 2695131

THAT pursuant to Section 65 (2) of the Local Government Act and Regulation 8 of the Local Government (Administration) Regulations the meeting be closed to the public to consider the Confidential Items of the Agenda.

**21. ADJOURNMENT OF MEETING AND MEDIA LIAISON**

