JRPP No.	2010STH004
DA No.	DA-2010/139
Proposal	Erect lights at Bulli Park
Property	Lot 7025 DP 110745, Bulli Park, Trinity Row, BULLI NSW 2516
Applicant	Nigel Pennington – Bulli Soccer Club
Responsible Team	City Planning East Team

EXECUTIVE SUMMARY

Reason for consideration by Joint Regional Planning Panel

The proposal has been referred to Joint Regional Planning Panel pursuant to clause 13C of State Environmental Planning Policy (Major Development) 2005. The proposed lights are structures in excess of 13 metres height and are located within the coastal zone.

Proposal

The proposal is for the erection of eight football field lights on two adjacent sporting fields for the purpose of providing evening training and football matches. The lights on the western field will be 18.3m in height and the lights for the eastern field will be 24.4m high to light

Permissibility

The site is zoned 6(a) - Public Recreation Zone pursuant to WLEP 1990. The proposal is categorised as a "recreation area" and is permissible in the zone with development consent. LEP 2009 was in draft form when the application was lodged and proposed to zone the site RE1 Public Recreation. Recreation areas were proposed to be permissible in this zone with development consent.

Consultation

The proposal was notified in accordance with Council's Notification Policy and received five submissions which are discussed at section 12.1 of the assessment report.

Main Issues

The main issues raised in the submissions and through the assessment process were as follows:

- Additional traffic generation and parking issues
- Noise disturbance from users of the park to adjoining residential dwellings
- Light spill to adjoining residential dwellings
- Visual impact as viewed from adjoining residential areas and the public domain

RECOMMENDATION

It is recommended that approval be granted to DA-2010/93 subject to the draft conditions contained in attachment 4.

ASSESSMENT REPORT

1 Background

There are many applications relating to the site. The following is a list of the most recent or more relevant applications which may have a bearing on consideration of this DA:-

App_No	App Description
DA-1998/264	New Gear Shed
DA-2003/346	Hang gliding and Paragliding Activities At Bulli Park, Bulli
DA-2005/1481	Demolition of existing buildings & construction of new sports amenities building & canteen
DA-2009/599	The use of Bulli Park for commercial fitness training activities
DA-2009/599/A	The use of Bulli Park for commercial fitness training activities - modification to condition 11 to remove Sunday training and permit operations from Monday to Saturday between 6.00 am until 8.00 pm as per Council policy
DA-2009/599/B	The use of Bulli Park for commercial fitness training activities Modification B - modification to condition 11 to allow activities to occur from Monday to Saturday 6am to 8pm and Sunday 7am to 10am all year around
DA-2010/125	Erect lights at Bulli Park

Timeline of events

Lodgement date	9 February 2010	
Notification	Start: 23 February 2010	End:10 March 2010
Additional information	Requested: 22 March 2010	Submitted: 31 March 2010
Submissions	5	
External referrals	Owners consent from Land and Property Management Authority	Provided 29 January 2010

2 Site description

The site is located at Trinity Row, Bulli and the title reference is Lot 7025 DP 110745. The site contains two playing fields and is currently used for a variety of sporting activities including cricket and soccer as well as for recreation for the general public.

Immediately surrounding the site to the north, south and west are low density residential developments. Waniora Public School and Bulli High School are also adjacent the park to the south. The subject eastern portion of the park is designated as sportsground pursuant to the Plan of Management and the western half is designated as park.

The park contains an amenities block and is surrounded by a steel fence approximately 1m high but is otherwise free of any other structures.

Approximately 90 car parking spaces are available along Trinity row and on the site. Park Road has parking along the north side of the street only. Street parking is available on both sides of Ursula Road to the south.

Site constraints

Council records list the site as being affected by acid sulphate soils and heritage items in the way of trees and nearby Aboriginal sites.

Figure 1: Aerial photograph

Figure 2: WLEP 1990 zoning map

Figure 3: WLEP 2009 zoning map

3 Proposal

The proposal is for the erection of eight floodlights on the site for the purposes of providing lighting for various sporting activities on two sporting fields. The overall height of the lights for the western field will be 18.3m and 24.4m for the eastern field. The lighting is to comply with Australian Standards with regards to light coverage and light spillage.

Approval for the following hours of operation for the lights is requested:

- Monday to Friday from 6.30pm to 8.30pm.
- Six weekend night games per year between the hours of 6.30pm and 10pm
- Benefit or special event from 6.30pm to 10pm (although not expected to be required)

It is noted that at present it is unlikely that funding will be available for construction of all eight lights even though this is the preferred outcome for the applicant. The likely outcome is that only the four lights for the western field will be constructed in the medium term. However, approval is sought for the eight lights in the event that this situation changes.

4 Environmental Planning and Assessment Act 1979

In determining a development application, the consent authority must take into consideration matters referred to in section 79C(1) of the EP&A Act 1979 as are of relevance to the development. The following table summarises the relevant matters of consideration under section 79C(1) and the significant matters are discussed in further detail in the report.

Section 79C(1) of the Environmental Planning and Assessment Act 1979
(a)(i) any environmental planning instrument
State Environmental Planning Policies • SEPP 71 – Coastal Protection • SEPP (Major Development) 2005 • Illawarra REP No. 1 1986 (Deemed SEPP) Regional Environmental Planning Policies None applicable. Local Environmental Planning Policies • Wollongong Local Environmental Plan (WLEP) 1990 Detailed assessment is provided below the table.
(a)(ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority
• Draft Wollongong Local Environmental Plan (WLEP) 2009 Detailed assessment is provided below the table.
(a)(iii) any development control plan
• Wollongong Section 94A Development Contributions Plan 2009 • DCP 6 Commercial and Industrial Development
(a)(iiia) Any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under Section 93F
There are no planning agreements entered into or any draft agreement offered to enter into under S93F which affect the development.
(a)(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph)
The site is located on land to which the Government Coastal Policy applies however the NSW Coastal Policy 1997 only applies to the seaward part of the LGA. No demolition is proposed.

Section 79C(1) of the Environmental Planning and Assessment Act 1979

b) the likely impacts of development

Context and Setting:

Bulli Park is currently used for a variety of sporting activities and recreation by the general public. Council's Generic Plan of Management is relevant to the site and the proposal is considered to be consistent with the categorisation of the site as sportsground. The majority of other sportsgrounds within the Wollongong LGA have lighting and the erection of lights on this site is considered to be consistent with the use of the site.

The erection of the light poles on the park will impact on the views from dwellings adjacent to the park and on the public domain. The park is located close to the popular recreational areas of the beach and cycle path to the east. However, the lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are considered to be consistent with the categorisation of the park as a sportsground.

An existing light pole is located adjacent to the amenities block on the eastern field. This pole provides an alternate lower level of lighting for the eastern field for less formal sporting activity. It is not considered that this light remaining would result in any significant additional amenity impacts.

Access, Transport and Traffic:

The proposal does not involve any additional car parking or servicing requirements. The park is currently utilised for similar purposes and there are a large number of car parking spaces available along Trinity row, Park Road and Ursula Road as well as on-site.

The proposed lighting will extend the hours of use of the park, predominantly during the winter months, extending also the period of associated traffic and parking generation. However, it is considered that the availability of parking in the locality and expected numbers of people will not have a significant adverse impact on traffic generation in the locality.

Public Domain:

Concern has been raised in the submissions regarding the impact of the lights on the public domain by way of generation of noise and traffic through increased park useage, visual impact and light spillage.

Noise issues will be mitigated by limiting the hours and days of operation for the lights. This is proposed to be a condition of consent.

There are considered to be sufficient car parking spaces in the locality and on site to cater for the needs of the development.

The lights at 18m and 24m in height will have a visual impact on the public domain. However, the lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are considered to be consistent with the categorisation of the park as a sportsground.

In relation to light spillage, the lights are designed with hoods that accurately direct the light to the playing fields. Estimated readings around the perimeter of the site have been provided and these comply with the maximum permitted by the Australian Standards.

Utilities:

The proposal is not envisaged to place an unreasonable demand on utilities supply. Council's Coordinator Building Construction & Maintenance has reviewed the application and is satisfied that the proposed lighting will comply with Council specifications and Australian Standards for this type of lighting.

Heritage:

Council's Heritage Officer has reviewed the application and is satisfied that there will not be any negative impacts on the heritage values of the site or surrounds.

Section 79C(1) of the Environmental Planning and Assessment Act 1979

Other land resources:

The proposal is not envisaged to impact upon any valuable land resources.

Water:

The proposal will not generate any additional demand for water.

Soils:

No significant earthworks are proposed.

Air and Microclimate:

The proposal is not expected to have any negative impact on air or microclimate.

Flora and Fauna:

There is no vegetation removal or landscaping proposed or required.

Waste:

A condition will be attached to any consent granted that an appropriate receptacle be in place for any waste generated during the construction.

Energy:

The proposal is not envisaged to have unreasonable energy consumption. The design of the lights incorporates fewer fixtures to achieve desired light levels, reducing energy costs.

The design of the lamps increases lamp life from 3,000 to 5,000 hours.

Noise and vibration:

The hours of operation of the lights will be restricted to 6.30pm to 8.30pm on week nights only with a limited number of weekend night games per season. This is expected to minimise noise disturbance to nearby residences. This is proposed to be a condition of consent.

Natural hazards:

There are no natural hazards affecting the site that would prevent the proposal.

Technological hazards:

Council records list the site as acid sulphate soil affected. There are no significant earthworks involved and it is not envisaged that there will be any adverse impacts in this regard.

Safety, Security and Crime Prevention:

This application does not result in any significant increase in opportunities for criminal or antisocial behaviour.

Social Impact:

The proposal will have a positive social impact through the enhancement of a sporting facility for use by the sporting groups from the community. This is considered to be consistent with the objectives of the zone and the use of the site. Disturbance to adjacent residential dwellings is expected to be mitigated through conditions of consent limiting operational hours of the lights.

Economic Impact:

The proposal is not expected to create any negative economic impact.

Section 79C(1) of the Environmental Planning and Assessment Act 1979

Site Design and Internal Design:

The application does not result in any departures from development standards or Council's development control plans as outlined below.

A condition will be attached to any consent granted that all works are to be in compliance with the Building Code of Australia.

Construction:

A condition will be attached to any consent granted that WorkCover be contacted for any demolition or use of any crane, hoist, plant or scaffolding.

Cumulative Impacts:

The potential for a negative cumulative impact on adjoining dwellings by way of noise and traffic generation as well as visual impact and light spillage was considered. Appropriate conditions limiting the hours and requiring compliance with Australian Standards for lighting are considered sufficient to mitigate impacts in relation to noise and light spillage. It is considered that the proposed eight lights will have an impact on the visual amenity of the park. However, the lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are also considered to be consistent with the categorisation of the park as a sportsground.

c) the suitability of the site for development

Does the proposal fit in the locality?

The proposal is considered appropriate with regards to the zoning and expected use of the site.

Are the site attributes conducive to development?

There are no site constraints that would prevent the proposal.

d) any submissions made in accordance with this Act or the regulations

The application was notified in accordance with Council "Development Assessment and Compliance Notification Policy". Five submissions were received which are discussed in section 12.1 of this report

Submissions from public authorities

The Land and Property Management Authority have granted owners consent.

e) the public interest

The site is zoned 6(a) Public Recreation and Council's Generic Plan of Management for Community Land is applicable.

The site is Crown land and is classified as community land, being further categorised as sportsground.

Core objectives for land categorised as sportsground

- *to encourage, promote and facilitate recreational pursuits in the community involving organised and informal sporting activities and games, and*
- *to ensure that such activities are managed having regard to any adverse impact on nearby residences.*

The proposal promotes recreational pursuits and it is considered that any impacts from lighting and noise, and parking can be adequately addressed via conditions of consent that regulate operation of the lights.

Section 79C(1) of the Environmental Planning and Assessment Act 1979

Community values for land categorised as sportsground

SG VALUE	SG OBJECTIVE
Scenic	*To provide a recreational facility which has minimal impact on the visual amenity of the area.* As stated above, the lights will result in an impact on the current visual amenity of the park. However, the lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are also considered to be consistent with the categorisation of the park as a sportsground.
Ecological	*To provide a recreational facility which is ecologically sustainable and has minimal adverse impact on surrounding natural areas.* The proposal is not expected to have a negative impact on any ecological communities or natural areas.
Heritage	*To recognise, enhance and conserve those heritage items located on community land categorised Sportsground.* Council's Heritage Officer has reviewed the application and is satisfied the proposal will not have any significant impacts on the heritage values of the site.
Recreational	*To provide sportsgrounds that offer quality sports facilities.* *To utilise Sports Liaison Committees Sports Planning Process in evaluating the priorities for sports development.* *To ensure that all sporting groups are provided access to sportsgrounds and facilities wherever possible.* The proposal provides a facility that can be utilised by a variety of sporting groups.

The proposal is considered to be consistent with the Plan of Management and provides sporting infrastructure for use by the broader community. Council's Recreation Officer has provided a satisfactory referral in this regard.

5 State Environmental Planning Policy No. 71 – Coastal Protection

2 Aims of Policy

(a) to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast, and

(b) to protect and improve existing public access to and along coastal foreshores to the extent that this is compatible with the natural attributes of the coastal foreshore, and

(c) to ensure that new opportunities for public access to and along coastal foreshores are identified and realised to the extent that this is compatible with the natural attributes of the coastal foreshore, and

(d) to protect and preserve Aboriginal cultural heritage, and Aboriginal places, values, customs, beliefs and traditional knowledge, and

(e) to ensure that the visual amenity of the coast is protected, and

(f) to protect and preserve beach environments and beach amenity, and

(g) to protect and preserve native coastal vegetation, and

(h) to protect and preserve the marine environment of New South Wales, and

(i) to protect and preserve rock platforms, and

(j) to manage the coastal zone in accordance with the principles of ecologically sustainable development (within the meaning of section 6 (2) of the Protection of the Environment Administration Act 1991), and

(k) to ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and

(l) to encourage a strategic approach to coastal management.

8. Matters for consideration

The matters for consideration are the following:

Matters for consideration	Comment
(a) the aims of this Policy set out in clause 2,	The proposal will not have any negative impacts on the coastal environment and is considered to be consistent with the objectives outlined in Clause 2.
(b) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved,	The proposal will not affect access to the coastal foreshore.
(c) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,	The site does not provide direct access to the coastal foreshore.
(d) the suitability of development given its type, location and design and its relationship with the surrounding area,	The proposal complies with Council's planning requirements and is consistent with the zone. Impacts on adjacent residential areas are considered to be adequately managed through conditions of consent addressing operation of the lights.
(e) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,	The proposal is not envisaged to detrimentally affect the coastal foreshore.
(f) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,	The lights will result in a visual impact on the landscape however, the lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are considered to be consistent with the categorisation of the park as a sportsground.
(g) measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats,	No significant flora or fauna are envisaged to be affected by the proposal.
(h) measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats	There are not expected to be any negative impacts on fish or marine vegetation and their habitats.
(i) existing wildlife corridors and the impact of development on these corridors,	No wildlife corridors are envisaged to be impacted by the proposal.

Matters for consideration	Comment
(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,	The proposal will not impact on or be affected by any coastal processes or hazards.
(k) measures to reduce the potential for conflict between land-based and water-based coastal activities,	The proposal will not result in any conflicts between land and water based coastal activities.
(l) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,	Council's Heritage Officer has reviewed the application is satisfied that the proposal will not impact on any aboriginal or natural heritage values of the site.
(m) likely impacts of development on the water quality of coastal water bodies,	The proposal will not impact on the water quality of any coastal water bodies.
(n) the conservation and preservation of items of heritage, archaeological or historic significance,	No items of heritage, archaeological or historic significance are affected by the proposal.
(o) only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities,	Not applicable.
(p) only in cases in which a development application in relation to proposed development is determined:	
(i) the cumulative impacts of the proposed development on the environment, and	There are not expected to be any negative cumulative impacts from the proposal.
(ii) measures to ensure that water and energy usage by the proposed development is efficient.	The proposal will not result in excessive energy or water usage.

14. Public Access

Clause 14 of the SEPP states:-

"A consent authority must not consent to an application to carry out development on land to which this Policy applies if, in the opinion of the consent authority, the development will, or is likely to, result in the impeding or diminishing, to any extent, of the physical, land-based right of access of the public to or along the coastal foreshore."

The proposed development will not impede or diminish the physical, land-based right of access of the public to or along the coastal foreshore.

6 State Environmental Planning Policy (Major Development) 2005

The proposal is classified as regional development pursuant to this policy as outlined below.

Part 3 Regional development

13C Coastal development to which Part applies

This Part applies to development within the coastal zone for any of the following purposes:

(b) buildings or structures (other than minor alterations or minor additions to existing buildings or structures) that are greater than 13 metres in height, excluding any building that complies with all development standards relating to the height of such a building set by a local environmental plan that applies to the land on which the building is located,

7 Wollongong IREP 1 1986

The aim of this plan is to maximise the opportunities for the people of the region and the State to meet their individual and community economic and social needs with particular reference to the way in which these needs are related to the allocation, availability, accessibility and management of the region's land resources.

Division 2 Development applications—environmental heritage

126 Conservation of items of the environmental heritage

(1) A person shall not, in respect of a building, work, or relic or place that is an item of the environmental heritage:

(a) demolish, renovate or extend that building or work,

(b) damage or despoil that relic or place or any part of that relic or place,

(c) excavate any land for the purpose of exposing or removing that relic,

(d) erect a building on the land on which that building, work or relic is situated or the land which comprises the place, or

(e) subdivide the land on which that building, work or relic is situated or the land which comprises that place,

except with the consent of the consent authority.

(2) The consent authority shall not grant consent pursuant to subclause (1) in respect of an item of the environmental heritage unless it has made an assessment of:

(a) the significance of the item as an item of the environmental heritage of the local government area in which the item is situated,

(b) the extent to which the carrying out of development in accordance with the consent would affect the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item and its site,

(c) whether the setting of the item, and in particular, whether any stylistic, horticultural or archaeological features of the setting should be retained, and

(d) whether the item constitutes a danger to the users or occupiers of that item or to the public.

(3) The consent authority shall not grant consent pursuant to subclause (1) to the renovation of a building that is an item of the environmental heritage unless it has made an assessment of:

(a) the colour, texture, style, size and type of finish of any materials to be used on the exterior of the building and the effect which the use of these materials will have on the appearance of the exterior of the building and of any other building in its vicinity,

(b) the style, size, proportion and position of openings for any windows and doors which will result from, or be affected by, the carrying out of the development, and

(c) the pitch and form of the roof, it any.

128 Development in the vicinity of an item of the environmental heritage

The consent authority shall not consent to the carrying out of development in the vicinity of an item of the environmental heritage unless it has made an assessment of the effect which the carrying out of that development would have on the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item of the environmental heritage and its setting.

Council's Heritage Officer has reviewed the application and is satisfied that there will be no impact on the heritage values of the site.

Part 13 relates to coastal lands, wetlands and other water bodies. Clause 107 relates to development generally and states:

"In deciding whether to grant consent to a development application to carry out development on land adjacent to, or in close proximity to, a lake, lagoon, river or the coast, the consent authority shall take into consideration the need to facilitate public access to the waterfront by requiring dedication of appropriate land, for open space purposes."

No dedication of land is required in this instance as the application seeks consent for the works on existing public land. It is considered that the proposal will not have an unreasonably adverse impact on public access to the foreshore.

8 Wollongong Local Environment Plan 1990

The site is zoned 6(a) - Public Recreation Zone pursuant to WLEP 1990. The proposal falls within the definition of a 'recreation area' and is permissible in this zone with development consent.

Clause 6 – Definitions

recreation area means an area used for outdoor sporting activities including changing rooms and other associated facilities, but does not include a racecourse, showground, sports stadium or the like.

Clause 9 – Zone objectives and development control table

The objectives of the zone are as follows:

(a) to identify areas where recreation facilities for the general use of the community for active and passive recreation may be developed, and

(b) to cater for the development of a wide range of facilities for the benefit of nearby communities.

The proposal provides a facility that allows the use of the park for active recreation for the general public. The use of the site for passive recreation remains unaffected. The lights are slimline structures that do not obscure or significantly obstruct views to the escarpment or the coast. They are also considered to be consistent with the categorisation of the park as a sportsground.

Clause 29C - Development in the vicinity of a heritage items

Consideration has been given to the likely impact of the proposed development on the heritage items on the site. Consultation with Council's Heritage Officer is of the opinion that the proposed development would have no impact on the listed heritage items on and within the vicinity of the site.

Clause 32. Consideration of certain applications

Clause 32 states:

(1) The Council shall, in respect of an application to carry out development on land within view of any waterway or adjacent to any main road, railway, public reserve or land zoned as open space, take into consideration the probable aesthetic appearance of the proposed building or work on that land when used for the proposed purpose and viewed from that waterway, main road, railway, public reserve or land zoned for open space.

(2) The Council shall, in respect of an application to carry out development likely to cause increased vehicular traffic on any road in the vicinity of that development, take into consideration –

(a) whether adequate vehicular exits from and entrances to the sites have been provided so that vehicles using those exits and entrances will not endanger persons using those roads;

(b) provision of space on the site or on land adjoining the site, other than a public road, for the parking or standing of such number of vehicles as the Council may determine; and

(c) whether adequate space has been provided within the site of the building or development for the loading, unloading and fuelling of vehicles and for the picking up and setting down of passengers.

Clause 32(1), is not considered to be relevant to the proposal. In relation to Clause 32(2), and as outlined above the proposal is envisaged to generate only a small amount of additional traffic.

Clause 37. Development in Zone No. 6(a) or 9

Criteria	Comment
37. In deciding whether to grant consent to the carrying out of development of land within Zone No. 6(a) or within Zone No. 9 and marked "9(d)" and "Proposed Open Space" on the map, being land owned or controlled by the Council, the Council must take into consideration the following matters:	
(a) the need for the proposed development on the land;	The proposal provides a facility to cater for the demand for night training opportunities in the locality.
(b) the impact of the proposed development on the existing or likely future use of the land;	The proposed lighting will not prejudice the existing or likely future use of the land for passive and active recreational pursuits.
(c) the need to retain the land for its existing and likely future use.	The land will remain available for the existing and likely future uses.

9 Wollongong Local Environmental Plan 2009

WLEP 1990 was repealed on 26 February, 2010 by WLEP 2009. However it continues to apply to the subject application by reason of the savings provision in clause 1.8A of WLEP 2009. Clause 1.8A states that:

> *If a development application has been made before the commencement of this Plan in relation to land to which this Plan applies and the application has not finally been determined before that commencement, the application must be determined as if this Plan had not commenced.*

WLEP 2009 commenced on 26 February 2010. The subject development application was submitted on 9 February 2010 and therefore both WLEP 1990 and WLEP 2009 (in the form it was immediately prior to gazettal) apply.

Subject to savings provisions the application must be determined as if this Plan had not commenced meaning that it is to be considered as a draft LEP in the form in which it existed immediately prior to gazettal.

Immediately prior to its gazettal, WLEP 2009 zoned the subject site as RE1 Public Recreation zone on the draft zoning map and the development is permissible with consent.

Clause 1.4 – Definitions

recreation area means a place used for outdoor recreation that is normally open to the public, and includes:

(a) a children's playground, or

(b) an area used for community sporting activities, or

(c) a public park, reserve or garden or the like,

and any ancillary buildings, but does not include a recreation facility (indoor), recreation facility (major) or recreation facility (outdoor).

Clause 2.3 – Zone objectives and land use table

The objectives of the zone are as follows:

- *To enable land to be used for public open space or recreational purposes.*
- *To provide a range of recreational settings and activities and compatible land uses.*
- *To protect and enhance the natural environment for recreational purposes.*
- *To cater for the development of a wide range of uses and facilities within open spaces for the benefit of the community.*

The proposal allows the extension of hours that the park can be used for active recreational pursuits. The park will remain available for passive recreation. Amenity impacts to the surrounding residential dwellings are considered to be adequately addressed by way of conditions of consent and compliance with Australian Standards. The proposed development is not contrary to the zone objectives.

5.5 Development within the coastal zone

(1) The objectives of this clause are as follows:

(v) protect amenity and scenic quality

(ix) ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area

(xii) protect and preserve items of heritage, archaeological or historical significance.

(2) Consent must not be granted to development on land that is wholly or partly within the coastal zone unless the consent authority has considered:

(b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account:

(i) the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and

(ii) the location, and

(iii) the bulk, scale, size and overall built form design of any building or work involved, and

(c) the impact of the proposed development on the amenity of the coastal foreshore including:

(i) any significant overshadowing of the coastal foreshore, and

(ii) any loss of views from a public place to the coastal foreshore, and

(d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected

It is not envisaged that there will be any negative impact on the coastal environment.

5.10 Heritage conservation

Council's Heritage Officer has reviewed the application is satisfied that the proposal will not impact on any aboriginal or natural heritage values of the site.

7.5 Acid Sulfate Soils

Council records list the site as acid sulphate soil affected. There are no significant earthworks involved and it is not envisaged that there will be any adverse impacts in this regard.

7.6 Earthworks

The proposal does not involve significant earthworks.

10 Wollongong Section 94A Development Contributions Plan 2009

It is considered that the proposal qualifies for an exemption subject to clause 9(k) as outlined below.

9. Are there any exemptions to the levy?

In addition, Council may allow for the following exemptions (partial or full):

k. An application for privately funded community infrastructure, such as education facilities, universities, and private hospitals.

A submission was provided from the applicant arguing the case for an exemption and this has been reviewed as satisfactory by Council's Strategic Officer.

11 DCP 6 Commercial and Industrial Development

DCP 6 is relevant to the application with regards to any impacts on the amenity of the locality by way of noise, traffic and light spillage. As outlined throughout this report, the proposed lighting is not expected to have any significant amenity impacts in regards to these issues.

12 Consultation

12.1 Notification Policy

The application was notified in accordance with Council "Development Assessment and Compliance Notification Policy". Five (5) submissions were received and the main issues identified in the submissions are discussed below:

Submissions	Council comment
Visual impact/light spillage *30 Park Road* The view from the properties in park Road, ours included encompasses most of the Park and certainly both soccer fields. This means that all of the 8 lights will be in our sight all of the time. As ours is an old property we are situated close to the footpath and look down on the soccer fields. Bulli Park has a natural beauty and we believe the additional lights will detract from this. As we are located just south of the crest of the hill in Park Road we will in fact be looking into the propose lights. *17 Beach Street* 8 towers, 20M high, with 3 x 3000W lights will be a constant eye sore during the day and an unacceptable intrusion to the lives of adjacent residents when in use. Visitors who use this park and the adjacent beach are aware of the extraordinary mountain and ocean views. The view is what is remembered and why people return. This vista will be irreparably spoilt by 8 light towers. *36 and 38 Park Road* The lights proposed at Bulli Park are significantly higher than any of the trees in the park and the surrounding houses in Park Rd and Ursula Rd. This will impact on the landscape detracting from the natural beauty of the park as the lights will become the dominant visible feature. Property values will also be affected, as aspect is a major real estate selling point. Home owners live in this sought after area surrounding the park because of its scenic attributes and green open space. Steel towers and blinding lights are an incompatible contradiction in this environment. Also of concern is the number of lights proposed. Currently there is one light in the park which is acceptable. An additional eight lights is not, as the amount of light generated by these lights is enormous. The full effect of this type of lighting is exemplified at Ocean Park in Woonona. Most sporting grounds have an adjoining area of open ground between the lit up area and residential housing. This is not the case at Bulli Park as the houses on Park Rd and Ursula Rd frame the sporting grounds and will sustain the full brunt of these lights on their doorsteps.	The lights will result in a visual impact on the landscape. However, the lights are slim structures that will not significantly obscure or impact on views to the escarpment or the coastline. The visual impact is not considered excessive and the proposal will bring broader benefit to the community by extending the use of the facility. Further, hours of operation will be imposed that restrict use of the lights until 8.30pm during week nights and for a limited number of weekend games. The lights are to comply with Australian Standards for light spillage. The lights incorporate hoods that direct light to the specific areas intended to be lit. Estimated light readings at the perimeter of the grounds indicate that the expected light spillage to surrounding residential dwellings will be minimal. An existing light pole is located adjacent to the amenities block on the eastern field. This pole provides an alternate lower level of lighting for the eastern field for less formal sporting activity. It is not considered that this light remaining would result in any significant additional amenity impacts.

Submissions	Council comment
Safety risk to pedestrians and motorists *17 Beach Street* Park Road is the main access to our home. When travelling either way in Park Rd at night, visibility ahead will be seriously compromised by glare from these lights. This will only exist when the lights are in use but that is when pedestrians, boosted in numbers by the facility, will be most at risk. This danger to pedestrians will be extreme in Park Rd near the crest of the hill. Eye level positioning of the lights, the narrow road, the extra parked cars, increased traffic, trees impeding visibility and the young age of the people attracted is a recipe for disaster. The above situation will exist to a lesser degree in Ursula Road and Trinity Row. A measure of the potential hazard can be assessed by entering Station Street Bulb from the Princes Hwy at night One security light tower illuminating the railway station car park produces glare and reduces visibility immediately ahead. Children, and the associated car parking from sports in the adjacent Police Boys Club create a danger. We can, and do, avoid this street. Avoiding the streets affected by this DA is not practical. This proposal's 8 light towers will multiply the danger.	The lights are to comply with Australian Standards and are not expected to pose a safety risk to motorists or pedestrians on adjoining streets. Light spill readings were taken at the perimeter of the site that indicate the light spill beyond the boundaries will be minimal. The design of the lighting ensures light spillage is kept to a minimum and there are not expected to be any safety issues with regards to motorists on the surrounding roads. In addition, the light from the poles is significantly screened from the top of the hill by existing vegetation.
Out of context with the locality *17 Beach Street* This development is far beyond the purpose of this historic park. For the sake of what little heritage we have left, some things should be left alone. I, we, our children and our grandchildren, have continually, and will continually, use this park. These towers will not add to our use of the park, they will detract from it. *30 Park Road* Bulli Park is a small community park for all of the community to use not a sports arena. Not everyone enjoys sport. It is a lovely area with a lovely view for families to picnic in or just sit and admire the view. When will there be time for that to occur if the park is now used early morning and night. We are concerned that should the addition of lights go ahead it will not be long will it be before we have night cricket and after work exercise groups. And what will the view be? 8 very tall lights dominating the Park. *36 and 38 Park Road* We also object to both grounds being usurped with lights as the park is a public place for everyone.	The proposal does not restrict use of the site by the general public. There is further a large adjacent open area categorised as park that is available at all times for use by the general public. The site is categorised as sportsground and the proposed lights facilitate the use of the grounds for active sporting activities. This is consistent with the Plan of Management for land categorised as sportsground. With regards to use of the park for night cricket or exercise groups, these activities would require separate Council approval.

Submissions	Council comment
Energy usage *17 Beach Street* The power usage of these lights is not environmentally sound. There would appear to be sufficient hours of daylight for training junior soccer players after school. As a suitably placed lighting pole already exists for the lower playing field one imagines it only requires correct scheduling to solve any possible shortage.	Use of the lights is to be restricted to 6.30pm to 8.30pm Monday to Friday with a limit of six weekend night games. During summer months it is not envisaged that the lights will be needed. The proposal is not envisaged to have unreasonable energy consumption. The design of the lights incorporates fewer fixtures than older lights to achieve desired light levels, reducing energy costs. The design of the lamps additionally increases lamp life from 3,000 to 5,000 hours.
Parking issues on surrounding streets *36 and 38 Park Road* A major concern of ours and is echoed by many of our neighbours is the parking problems that residents of Park Rd experience most weekends and many afternoons and some weekday mornings. I noted on Sunday 7th March, there was not a single space available kerbside in Park Road. One side is no parking I noted 5 cars infringing on residents driveways. As well as one coffee vender parked on the corner of Park & Edmondson selling his wares. Park Rd is an old narrow road. There were 25 vacant official parking spaces available in Trinity Row and room at the bottom of the park however as usual parents of players choose to avoid a 2 minute walk and park in Park Rd. At the best of times it is a dangerous exercise navigating the street. The extended use of the soccer fields means extended associated parking problems for the residents of Park Road. We already have the same existing problems with parking from the catholic church and the other activities undertaken in the park. Cricket, Exercise Programs from very loud trainers motivating their paid customers in the morning.. *36 and 38 Park Road* Parking is also a problem during sporting events as there are not enough parking spaces.	It is considered that there is sufficient parking on Trinity Road, on site and in Ursula and Park Roads to meet the demands for parking from use of the park. Parking across driveways is illegal however this is not considered to be a matter relevant to this application. The proposal is not expected to generate significant impacts from the intensification of the use of the site and will facilitate the spreading of activities over a longer period.
Rubbish *30 Park Road* Who will clean up the park and surrounding area once the soccer club parents have gone home .	Conditions will be attached to any consent granted that it is the responsibility of the organisers of the training to ensure the site is left clear of rubbish.
Noise generation *36 and 38 Park Road* Noise levels are considerably louder at this time and this is not welcome at night.	Hours of operation for the lights are to be limited to 8.30pm Monday to Friday with a limit of six weekend night games per year. This is expected to minimise disturbance to surrounding residences.

12.2 Internal consultation

Environment

Council's Environment Officer provided a satisfactory referral subject to conditions

Recreation

Council's Recreation Officer has raised no concern with the proposal.

Heritage

Council's heritage officer has reviewed the application in relation to the heritage values of the site and has raised no concerns.

Coordinator Building Construction & Maintenance

Council's Coordinator Building Construction & Maintenance is satisfied that the application addresses Council requirements with regards to Council's controls for sports field lighting and compliance with Australian Standards.

12.3 External consultation

Land and Property Management Authority (LPMA)

The LPMA are the owners of the land and Wollongong City Council has care control and management of the land. As such, their consent is required for the development. The LPMA have provided owners consent and have raised no objection to the proposed development.

Conclusion

This application has been assessed having regard to the Heads of Consideration under Section 79C(1) of the Environmental Planning and Assessment Act 1979, the provisions of Wollongong Local Environmental Plan 1990, Draft Wollongong Local Environmental Plan 2009 and all relevant Council DCPs, Codes and Policies. Potential noise, traffic and amenity impacts on the locality through the use of the lights are considered to be mitigated through conditions of consent limiting the hours and days of use of the lights. Light spillage to surrounding residential dwellings is not expected to be significant and will be in compliance with Australian Standards. It is considered that the proposal will have an impact on the current visual amenity of the locality. However, this is not considered significant given the slimline nature of the structures. The proposal facilitates the extended use of the site for sporting activities for which it is designated. It is therefore recommended that approval be granted to the application subject to the conditions in Attachment 4.

ATTACHMENTS

1. Plans
2. Draft Conditions

PERFORMANCE SPECIFICATION

NORMAN DISNEY & YOUNG

DISTRIBUTION BOARD UPGRADES

Project No. s26806\006
Revision: C
Date: 9 February 2004

Wollongong City Council

NORMAN DISNEY & YOUNG
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NDY QA SYSTEM

Project Number:	s26806\006
Revision:	C
Date:	9 February 2004
Reason for Issue:	Revised Issue
Authorisation:	P Koulos
Verification:	
Project Co-ordinator:	Peter Koulos
Project Engineer:	David Kyle – Electrical Services

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General Requirements

General Requirements

1 APPLICATION OF GENERAL REQUIREMENTS CLAUSES

These General Requirement clauses of the specification shall be read as supplementary to the Wollongong City Council General Conditions of Contract and in the event of any conflict or inconsistency between any of these General Requirement clauses of the specification and the General Conditions of Contract, the General Conditions of Contract shall prevail to the extent only of the conflict or inconsistency.

2 INTERPRETATION OF TERMS

"Principal" means Wollongong City Council

"Engineer" means Norman Disney & Young

"Contractor" means the Services Contractor responsible for the works of this services specification.

"Approved", "directed" and "selected" shall mean respectively approved, directed and selected by the Principal or Engineer.

"Provide" means the supply and all installation necessary for the satisfactory operation of the item.

"Supply" means supply and delivery without installation.

"Install" means the installation with all ancillary fittings for the satisfactory operation of the item, excluding supply.

"Submit" means submit to the Principal or Engineer.

"Works" means the services and goods to be delivered by the Contractor under this contract.

3 HEALTH AND SAFETY

Take all steps to ensure that the obligations imposed by all Health and Safety Legislation, Acts, Regulations and Codes of Practice are complied with at all times. Together with general Health and Safety requirements, the following points shall apply in particular to Asbestos Switchboards including:

- being familiar with the requirements of those Acts, Regulations and Codes of Practice as applicable to the works
- ensuring that the specified works provides for the safety of all personnel during construction, inspection, testing and subsequent operation of the system/s
- providing for the identification of hazards, assessment of risks, implementation of necessary risk control measures and devices and provision of information to ensure the safety of all personnel during construction, inspection, testing and subsequent operation of the system/s
- advising of all potential hazards not adequately protected to the requirements of the Health and Safety Legislation, Acts, Regulations and Codes of Practice
- providing all temporary or permanent screens, guarding, safety notices, identification labels and safety clothing, footwear and equipment required for the execution, testing and maintenance of the works

Even where the above obligations are not imposed on the Contractor by Health and Safety Legislation, the Contractor will take all steps to ensure that the obligations are complied with at all times.

In performing its Health and Safety obligations the Contractor will coordinate with other services to ensure that notwithstanding the activities of other services, its Health and Safety Obligations are met.

4 CODE OF PRACTICE

The Contractor must comply with the current Code of Practice for the Building and Construction Industry. Lodgement of a tender by the Contractor will be evidence of the Contractor's agreement to comply with the Code for the duration of any contract that may be awarded.

Failure to comply with the Code may be taken into account by the Principal when considering this or any subsequent tender and may result in this or any subsequent tender being passed over.

5 SHOP DRAWINGS

Submit shop drawings and equipment details as required to co-ordinate the works, indicate associated work to be carried out by other trades, and verify that the equipment will be in accordance with requirements set out in the specifications.

Submit with the shop drawings a list of all deviations from the specifications requirements for equipment and the installation. Should such a list not be provided, the Contractor shall be responsible for full compliance with the specification, irrespective of any review by the Engineer.

Shop drawings shall be in a suitable scale and on standard sheet sizes as agreed for the project. Layout drawings for co-ordination with the structure and other services shall be to a scale of 1:50.

Submit a schedule of shop drawings listing the drawings to be submitted for review. Update the schedule to show the date of submission and return of each drawing and resubmit the schedule when drawings are added to the list.

Drawings shall be reviewed, marked to show where amendments are required, and returned. Review of drawings does not diminish the obligation that the work be co-ordinated and that it complies with statutory regulations and specified requirements. If the returned drawing is marked Resubmit, the Contractor shall submit an amended drawing for review with clouds outlining the parts of the drawing altered as a consequence of the last revision.

If alternative procedures are not specified elsewhere, submit shop drawings for review, in the form of one plain paper or transparent print of each drawing. Interested parties shall take prints for their own records at their own expense.

6 REVIEW OF WORK

Review of a drawing, means that the drawing has been reviewed for general compliance with the specification and drawings. Amendments required are noted on the drawing. Dimensions, site co-ordination with associated plant and all other services and site conditions, compliance with Statutory Regulations and compliance with specified requirements and compliance with the contract and subcontract remain the responsibility of the Contractor.

Engineering review, means that the work shall be reviewed during construction, and after completion strictly for the benefit of the Principal only, for the purpose of determining whether such work has been conducted and completed in substantial conformity with the drawings and the specification.

The work shall be reviewed to determine whether the quality of materials is as specified, to witness such tests as are specified, and as considered necessary to confirm that materials, plant and equipment complies with and performs in accordance with the drawings and the specification.

Reviewed work not in conformity with the specification and drawings shall be advised in writing giving the reason/s for the non conformity. A further review shall occur when written advice is received advising that the defective works have been completed in conformity with the drawings and the specification.

Should the works be reviewed for the purpose of practical completion and are found not to be complete or if previously advised defective works are reviewed again and found not to be complete, all additional reviews and reports shall be charged at the Engineer's current hourly rates plus expenses and such charges will be deducted from the contract amount.

Review does not guarantee that the works accepted as satisfactory are entirely in conformity with the drawings and the specification notwithstanding approval of such work by any notice in writing. No reliance should be placed upon any such review or approval.

Review does not imply supervision of the conduct of the works, nor the construction or that safety procedures have been followed, in the execution of the works by the Contractor.

7 TESTING AND COMMISSIONING

Prior to practical completion, test and commission all installed equipment and systems to verify that they operate correctly and function in accordance with the manufacturer's requirements, this specification and the contract conditions.

Submit before commencement of commissioning, a program itemising the systems and the proposed dates for conducting acceptance tests in accordance with the program.

Indicate on the program the numbers of commissioning staff on site at any time during the testing and commissioning period and the anticipated duration of the various activities on a system by system basis.

Notify the Principal or Engineer one week prior to the proposed date of tests which shall be performed and require witnessing.

Perform tests on dates as agreed.

Keep a record of tests carried out and the results obtained and compile into a test report.

Provide for site tests all necessary labour, materials, stores, apparatus and instruments.

Submit details of the proposed commissioning procedures and methods of measurement. Commissioning procedures and measurement methods which are not approved or not in accordance with methods detailed in this specification will not be accepted as evidence that the systems have been correctly commissioned.

Commission and test the systems in accordance with the approved program. A representative, who is qualified to commission the installation, shall remain on site until the system is operating to satisfaction and signed off.

Operate all systems and equipment to the extent required for final installation, adjust and calibrate controls and instruments and rectify all faults.

Arrange for the setting up of major equipment provided for these works to be supervised by the manufacturer's representative, who shall remain on site until the equipment is operating satisfactorily.

Co-ordinate manufacturer's representatives so that testing is carried out according to the approved program.

Document and record the results of commissioning tests on standard test forms, samples of which will be supplied on request.

When a system is operating satisfactorily, submit a copy of the test results on the standard test forms. Test forms shall be neatly hand written or typed and incorporated within the Operation and Maintenance manual.

Ensure that acceptance tests are witnessed when the test results are considered to be satisfactory. Two acceptance tests of each system will be witnessed if necessary. If the equipment fails the second test, witnessing of further tests will be charged at the Engineer’s current hourly rates plus expenses and such charges will be deducted from payments otherwise due to the Contractor.

Ensure that all instruments have been calibrated by an independent certified testing authority within 6 months of the date of use and a current calibration certificate is available for inspection. Instruments shall not be used to measure quantities which are outside their accurate measuring range. If there is reasonable doubt as to the accuracy of an instrument, the instrument shall be re-calibrated or alternatively, quantities measured with the disputed instrument shall be re-measured with another approved instrument.

Conduct the tests as detailed in the specification and perform all additional tests as instructed to bring the plant into running order.

8 TUITION

Provide an experienced technical person/s who has a complete technical knowledge of the installation to instruct and demonstrate to the Principal or his nominated representatives, in the location and method of operation and maintenance requirements of all components in the installation.

All operating manuals and as installed drawings shall be available prior to tuition being given.

9 OPERATION AND MAINTENANCE MANUAL

9.1 GENERAL

Provide documentation for the purpose of enabling the Principal to operate and maintain the plant and equipment.

Together with all relevant information that would assist the Principal in carrying out the operation, maintenance, additions and/or alterations to the installation.

Documentation shall include:

- As installed drawings and all Distribution Board circuit schedules;
- Manufacturer's documentation of all equipment and accessories used in the installation e.g. socket outlets, circuit breakers, contactors, timers, keying, meters etc.
- Instructions for operation of the system;
- Recommended maintenance procedures;
- As installed drawings including;
  - Single line diagram of electrical reticulation system including cable sizes and ratings
  - Switchboard design and locations
- Information relating to the expected operational life of all major system components;
- Warranty details in excess of the defects liability period.

The details to be contained within the documents are specified in the Scope and Quality Requirements sections of this specification.

The above documents shall be collated into a Manuals section containing printed texts and a Drawings section containing the drafted drawings.

Submit a draft copy of the document for approval prior to practical completion.

9.2 MANUALS

The manuals shall be concise and written in English language to describe the systems installed, method of operation and maintenance procedures.

All text in the manual shall be written in terminology which is understood by non-technical personnel and prepared by personnel who are familiar with the system design and capable of providing a detailed description of the system operation and related items.

The manuals shall include:

- a title section including the project name, address, Principal, Engineer and Contractor
- revision and distribution list history of the manual
- a listing of the name, address, telephone, facsimile, e-mail and WEB address contacts of equipment manufacturers, system installers, service companies and maintenance contractors for the contract works
- a comprehensive index of the contents of each volume of the manual including associated drawings
- a description of all systems in the installation including the method of operation
- a schedule of routine maintenance and testing procedures and periods between activities
- manufacturer's brochures and documentation on all equipment and accessories used in the installation
- test reports including the results of commissioning tests for equipment and systems which have been formally tested and commissioned as required by the specification
- approval and compliance certificates and notices issued by Authorities, Agencies, Suppliers, Installers and Contractors

9.3 DRAWINGS

The drawings shall include the as installed drawings for the installation and final shop drawings as provided during the progress of the works.

Drawings prepared by the Engineer may be utilised for the as installed drawings provided that all details including notes on the drawings, are revised to depict the as installed condition.

All drawings shall be produced in electronic format (latest revision of CAD) using a standard print font. Freehand or manually drafted drawings and sketches are not acceptable.

9.4 FORMAT

Hard copy manuals shall:

- be sized with A4 pages
- contain typewritten text; handwritten documents are not acceptable
- be bound in binder/s which are labelled with the project description, service and volume number on the cover and spine of the binder. Binders shall be hard covered, three ring type which enable easy removal or insertion of pages
- include original copies of printed documents of equipment by manufacturers, note that if the applicable component is only a minor part of printed manufacturer's documents, the relevant pages shall be colour photocopied and inserted in the manual
- include dividers between sections of the manual with printed identification of the section as cross referenced in the index
- include clear plastic sleeves to contain documents which are not suitable for binding, eg., certificates, etc

Electronic format manuals shall:

- be sized with A4 paper
- be provided in two formats:
  - Adobe Portable Document Format, PDF
  - the original source file
- be produced to suit electronic on line documentation
- be produced in a form suitable for use with Adobe Acrobat 5.0 reader software or higher
- be produced in one of the following format files not less than a maximum three versions older than the current release version:
  - Microsoft Office
  - Adobe FrameMaker
- for pre-formatted documents produced by other software products for inclusion in the manuals, be provided in one of the following formats:
  - Adobe Portable Document Format, PDF
  - Postscript File, Level II
- where manufacturer's documents are not available in electronic format, be provided with electronically scanned images of relevant sections of the documents in Adobe Acrobat PDF format at a resolution not less than 150dpi
- be provided on an indexed CD ROM labelled with the following information:
  - project name
  - service
  - drawing numbers
  - file type/s
  - date

Hard Copy drawings shall:

- be provided on the same size print sheet for uniformity of all drawings
- be bound in a set with a proprietary binding system which enables easy removal or insertion of drawings.
- be bound in a set with a cover sheet labelled with the project description, service and volume number of the drawing set.
- include an index of all drawings in the set

- be provided in A3 format for insertion in the hard copy manual.

Electronic format drawings shall:

- be produced in a suitable file format that can be viewed and opened by the latest two versions of AutoCAD
- be prepared utilising one of the latest two versions of AutoCAD with all details of the layers system utilised.
- be prepared as a black and white postscript plot file or Adobe Acrobat PDF file in the same standard as for AutoCAD printed versions
- be provided on an indexed CD ROM labelled with the following information:
  - project name
  - service
  - drawing number/s
  - file type/s
  - date

9.5 QUANTITIES

Provide the following quantities of documents for the Operation and Maintenance Manual:

Manuals

- one set in hard copy format
- two sets in CD ROM electronic format

Drawings

- one set in hard copy format
- two sets in CD ROM electronic format

10 MAINTENANCE

For the duration of the defects liability period carry out preventative maintenance as required by Statutory Authorities and as specified in the relevant clauses of this specification.

Prior to commencement of the defects liability period, submit a maintenance schedule for appraisal, setting out maintenance procedures and frequencies to ensure trouble free operation and maintain plant operating efficiency and include the maintenance schedule in the operation and maintenance manuals.

Perform maintenance at times and in a manner, which will cause the least inconvenience to the normal operation of the equipment.

Notify the Principal of intent to perform service at least three days prior to each visit and obtain the representative's signature on a service report at the end of each visit and leave a copy on site. The service report shall detail the work carried out and shall list any adjustments and/or rectification work found to be necessary.

Unsigned reports will not be recognised and the Principal, at the end of the maintenance period, may elect to:

- have additional services carried out to make up the number of signed reports or
- deduct the cost of disputed visits at the pro rata rate for each of the preventive maintenance visit(s) disputed

At least fourteen days before carrying out the final service, the Contractor shall request that an inspection be arranged to coincide with this service.

The maintenance schedule shall include the procedures set out in the Preventative Maintenance Schedule which shall be modified as necessary to cover the maintenance requirements of the actual plant and equipment installed.

11 PRACTICAL COMPLETION

The date of practical completion shall be the date of practical completion of the head contract and for this purpose the installation or part thereof shall have been placed into commercial operation or shall have

been ready to be used substantially for the purpose for which it is intended and preliminary operating instructions shall have been provided sufficient to ensure safe and reasonable use of the installation.

Minor works necessary to complete painting, labelling, rectification of minor installation and/or commissioning defects and provision of final operation and maintenance manuals shall be finalised within a reasonable time to be agreed at the time of giving practical completion. Payment of retention money or release of bank guarantee due at the date of practical completion will not be authorised until the above minor works are finalised and a certificate has been issued to this effect.

In cases where any of the above minor works are incomplete at the time of practical completion under the head contract the granting of practical completion under the contract will be provisional upon finalisation of the minor work above within the agreed time and shall not diminish the Builder's rights under the contract and head contract.

Where the above minor works are carried out while the works are being used or occupied, co-operate with the building occupants to carry out the minor works with minimum interruption and minimum interference.

Prior to the issue of a Practical Completion Certificate, the Contractor shall complete and forward to the Engineer the Certificate of Compliance (forming part of this specification), scheduling the systems and items of plant forming the works and certifying that the work is complete and is in accordance with the specification and accompanying drawings.

In signing the Certificate of Compliance, the Contractor acknowledges that the Engineer and the Principal rely upon the Certification provided.

12 DEFECTS LIABILITY

The defects liability period shall be 12 calendar months from the date of issue of a Certificate of Practical Completion certifying that stage of the works to be practically completed. Equipment installed in any stage and not put into commercial use at the completion of that stage shall not be included in the defects liability period for that stage.

Replace or otherwise make good:

- any defect which becomes apparent during the defects liability period and
- damage which results from such defect or from work to remedy such defect and which becomes apparent during the defects liability period

Adjust and test equipment replaced during the defects liability period to show that the system of which it forms a part is giving commercial operation and the replaced items are performing according to the specified operating conditions.

Equipment repaired or replaced during its defects liability period shall have a further 12 month defects liability period commencing from the date of completion of making good, renewal or replacement.

Carry out all defects rectification work as may be instructed in writing within seven days after such notices or, on failure, the right is reserved to engage others to finish such work without further notice and deduct the costs of same from amounts otherwise due or payable or to recover such costs if they exceed the amounts due or payable. Such action shall not vitiate any of the responsibilities implied by this specification.

13 FINAL COMPLETION

Final completion shall mean the end of the defects liability period or when defects notified during the defects liability period have been made good, whichever shall last occur.

14 WARRANTIES

Where the manufacturers of items of equipment give standard warranty periods in excess of the defects liability period, assign such warranties to the Principal prior to final completion.

Certificate of Compliance

NORMAN DISNEY & YOUNG

Project: WOLLONGONG CITY COUNCIL – DB UPGRADES **Project No: S26806-006E**

Architect: **Date:**

Contract:

Head Contractor:

Contractor:

We have undertaken the work, being the systems and items of plant listed in the schedule, and certify that the work is complete and is in accordance with the documents listed in the Document Schedule below, except where specifically stated in a non compliance sche dule attached hereto.

SCHEDULE:

DOCUMENT SCHEDULE:

NDY Specification No: SP000554E- Revision No: B Dated: 01/09/03 Addendums:

NDY Drawings:

Other Documents:

A non compliance schedule is/is not attached to this certificate. (Contractor to circle as appropriate)

The non compliance schedule is identified as .....(Contractor to insert document reference) **dated……**

Contractor Signed:.....

Date: **Name:** **Position:**.

CONTENTS

Scope

Scope

1 FUNCTIONAL STATEMENT

Wollongong City Council (WCC) are in the process of upgrading their distribution board assets and removing any asbestos related material/ switchboards. This specification is intended to be used as a generic performance specification for the upgrade of all distribution board assets.

2 EXTENT OF WORKS

The extent of work covered by these documents includes the supply, delivery, installation, testing, commissioning and subsequent maintenance as detailed in this specification and on the accompanying drawings.

Provide materials, labour, cartage, tools, plant, appliances, accessories and fixings necessary for the proper execution of the works, together with all minor and incidental works.

The following list identifies the work to be undertaken by the Contractor. The listed items are not intended to limit or exclude any items required by the contract documents.

Refer to the separate contract document for quantity and type of distribution boards to be upgraded for the specific project.

The Electrical Services work shall comprise the provision of the following major items:

- Initial confirmation of existing circuits and verification of circuit schedules to assist in the preparation of the new distribution board details;
- Disposal of existing Distribution Boards (DB's) and provision of disposal receipts (for asbestos switchboards);
- Installation of the new DB's in the location nominated by WCC;
- Diversion and re-instatement of circuits and associated control from the existing DB's to the new DB;
- Testing and commissioning of all diverted circuits;
- Update and provide new circuit breaker schedules in hard copy and soft copy (excel format) as part of the operation and maintenance manual;
- Modification of metering to suit new DB;
- Warranties;
- Preventative maintenance.

The Switchboard Services work shall comprise the provision of the following major items:

- Supply new DB's as per the scheduled details to replace existing DB's;
- Allow for site inspections to audit the existing DB's and to document and duplicate them in coordination with the Electrical Contractor;
- Submission of workshop drawings to WCC for approval prior to construction;
- Labelling (details to be provided by WCC);
- Keying and locking devices based on the location of the switchboard (shared Integral Energy locks to be supplied by WCC).
- Preparation of as built documentation to be handed over to the electrical services contractor for incorporation into operation and maintenance manual;
- Internal and external labelling. All major labelling to be either screw fixed traffolyte or engraved stainless steel based on location and application.
- Defects liability;
- Warranties;
- Preventative maintenance over the defects liability period

Switchboard construction shall be as a minimum as follows:

Location	Construction	Keying	Labelling
Internal	Powder coated steel	Heavy duty tumbler type lock	Engraved traffolyte labels internal and external.
External (swimming pools, surf clubs, waste depots, guard towers, public parks)	Stainless steel	Pad lockable with cover over padlock	Engraved traffolyte labels internal. Engraved stainless steel labels, external.

3 WORK ASSOCIATED WITH OTHER TRADES OR PARTIES

3.1 BY WOLLONGONG CITY COUNCIL

- Supply any existing documentation or information on the scheduled DB's to assists the contractor in detailing and designing the new DB's.

4 RULES AND REGULATIONS

Comply with the requirements of the local Electricity Distributor and any other Authority having jurisdiction over the project.

Carry out the work in accordance with the current Standards Australia Wiring Rules and all other applicable regulations.

Comply and observe in all respects the provision of any law relating to the licensing of Electricians and Electrical Contractors.

5 PAINTING

Items of equipment shall be painted off site in accordance with the requirements specified herein.

Where damage occurs to the paintwork of equipment, the damaged item shall be returned to the respective paint shop where it shall be refinished with primer and final coats to restore the surface to its specified conditions of colour, finish and quality.

All distribution boards shall be cleaned down and polished with automotive polish prior to practical completion.

Exposed pipes, valves, conduits, wiring ducts, cable trays, brackets, frames, covers, etc., shall be painted with at least two coats of best quality oil paint of a colour nominated by the Engineer.

- Galvanised surfaces shall be etch primed before painting.
- At least one coat shall be applied prior to installation in position.
- At least one coat shall be applied after erection.

The following colours / finishes shall be used based on the location of the Distribution Board.

- Plant rooms, switch rooms, utility rooms – Orange X15
- Office Areas – colour to match area to be confirmed by WCC
- External – stainless steel board, not painted

6 MARKING AND LABELS

Provide labels on every distribution board cubicle, pilot lamp, push button, switch, relay and similar equipment. For labelling internal to a Distribution Board or for a Distribution Board located internally the label shall be a non-tarnishable cast or engraved traffolyte label of approved size, wording and design, clearly indicating the function and/or circuit designation of the component concerned and securely fixed.

The face shall be white with black machine engraved lettering. In certain instances for safety purposes, danger and fire services labels shall have a red face with white lettering. Edges shall be bevelled.

For labelling of Distribution Boards located externally, all external labels shall be screw fixed (using vandal proof screws), engraved stainless steel labels of approved size, wording and design, clearly indicating the function and/or circuit designation of the component concerned.

Generally, equipment identification shall adopt 5mm high letters.

Labels shall correspond to the relevant wiring diagrams. Circuit charts showing the duty and location of the circuit protected, shall be securely fixed inside the cover of each distribution board. Bind an additional copy of each chart into the maintenance manuals.

All lettering and numbers shall be in metric SI units.

CONTENTS

Quality Requirements

Quality Requirements

1 SWITCHBOARDS AND SWITCHGEAR

1.1 GENERAL

Provide assemblies:

- of approved manufacture as detailed further herein
- of overall dimensions suitable for the space allocated
- designed to facilitate easy access to and removal of component parts and to facilitate the undertaking of a thermograph survey of all joints and terminations without the need to isolate any parts or circuits.
- constructed and containing equipment to the approval of the local Electricity Distributor and Electricity Retailer
- incorporating main protective devices with tripping characteristics which are co-ordinated with other protection devices of the Electricity Distributor and other protective devices on the line and load sides of the device

1.2 COMPLIANCE

1.2.1 General

All assemblies shall comply with the requirements of AS 3439.1 and the additional requirements of this specification.

Use certified type tested components in the construction of all switchboards.

The installed position of assemblies shall allow adequate access for operation and maintenance when doors are open or equipment is in the operate or test position.

1.2.2 Diversity Factors

Each individual circuit and busbar system shall be capable of carrying its full rated current as nominated.

Where busbar ratings are not nominated the rated diversity factor of each assembly shall be in accordance with Table 1 in Clause 4.7 of AS 3439.1 with all spaces filled by circuits rated at 90% of the aggregate of the maximum spaces ratings.

Assumed currents as noted on the drawings shall be used for temperature rise tests without further diversity factors.

1.2.3 Forms of Segregation

The form of segregation for each assembly shall be as noted in the schedules and/or on the drawings.

Unless stated otherwise, the following applies as a minimum requirement:

- less than 150 amps capacity - Form 1
- 150 amp to 500 amp - Form 2
- 500 amp to 1000 amp - Form 3A
- 1000 amps and higher - Form 3B with segregation between incoming and outgoing terminals

Insulation of cables and busbars and the insulated housing of switchgear shall not be considered as segregation, unless nominated in the form of segregation by suffixes:

- ‘i’ to denote the insulation of busbars and cables are acceptable as segregation
- ‘h’ to denote that the insulated housings of switchgear are acceptable as segregation

1.2.4 Prospective Short Circuit Current

The short circuit protection and short circuit strength of each assembly shall be verified as part of each switchboard replacement and be suitable to withstand the thermal and dynamic stresses of the short circuit capacity determined. The short circuit current as a minimum shall be equal to the existing arrangement.

1.2.5 Degree of Protection

Provide a degree of protection in accordance with AS 1939 for switchboard assemblies:

- Internally located assemblies IP42
- Externally located assemblies IP56

Cable entries into switchboards shall not void the specified degree of protection.

1.2.6 Tests

Provide routine tests of all assemblies as required by AS 3439.1 and issue certified test results.

Where assemblies incorporate components that are not type tested or partially type tested as defined in AS 3439.1, the method of construction shall be type tested in accordance with the requirements of AS 3439.1. Components used for type testing shall not be used in the construction of the assembly.

Partially type tested arrangements may be derived by calculation as permitted by AS 3439.1.

Submit test certificates for type tested assemblies.

1.3 Discrimination of Switchgear

All switchgear shall be selected to provide discrimination between upstream and downstream devices. In general, discrimination shall be arranged so that in the event of a fault, only that switchgear immediately upstream of the fault shall operate to clear the fault. For the purposes of this clause, devices include circuit breakers or fuses. Switchgear manufacturer's proprietary interlock tripping systems shall be used to achieve discrimination where required.

Submit with shop drawings all details of protection settings demonstrating the discrimination of selected devices, commencing from Electricity Distributor protective devices and/or alternate supply (generator) paths and finishing at final subcircuit protection devices.

Final settings of all adjustable protective devices, and plotted curves demonstrating discrimination of devices, shall be provided within the operation and maintenance manual.

Where existing switchgear is being reused or remains in place at completion of the works, discrimination shall be achieved between new and existing devices and details of protection settings submitted shall include existing devices. Allow to modify settings of protective devices on existing equipment within their capability to improve discrimination if necessary.

1.4 Service Conditions

The service conditions for all switchboards shall be as noted in AS 3439.1

A pollution degree of three shall apply.

1.5 Switchboard Drawings

Submit drawings of assemblies that incorporate unmetered conductors and/or Electricity Distributor equipment for their acceptance prior to approval submission.

Drawings shall be in the format specified herein and show the following information:

- manufacturer's name and type of any standard equipment
- the general arrangement of equipment
- full details of cabinet construction and dimensions
- the method of supporting busbars and equipment
- a description of all materials to be used
- clearances between live parts, and live parts and earth
- busbar dimensions and ratings
- internal wiring sizes and ratings
- the size and wording of labels
- wiring diagrams and schematics of instrument protection and control circuits

- front elevation
- vertical section through each compartment
- sheet metal details
- finishing process details
- weights of assemblies heavier than 500 kg
- calculations where PTTA assemblies are being adopted
- calculations verifying the maximum internal temperature ratings will not be exceeded
- details of:
  - compliance with AS 3439.1
  - maximum fault withstand ability
  - IP rating to AS 1939

1.6 CABINET CONSTRUCTION

Cabinets shall have:

- 2 mm sheet steel construction for internal switchboards or stainless steel construction for external switchboards fitted with doors attached with lift off pintle hinges. Where approved, small enclosures with all dimensions less than 450 mm may be fabricated from 1.6 mm thick sheet steel
- edges concealed by folding
- fully welded ground external joints
- suitable means of securing the complete assembly to the building structure
- a separate compartment for Electricity Distributor equipment, where required, incorporating a means of fitting the Electricity Retailer's seals
- flush fronted type with only toggles, handles, indicators, dials and like equipment for operational use protruding through the front panel
- single core cables arranged such that they do not pass through individual holes in ferrous metal enabling eddy currents to be established
- sets of cabling for incoming or outgoing circuits grouped together to minimise the magnetic field strength generated
- outgoing cables arranged so they do not pass through busbar chambers
- a maximum height of 2300 mm
- adequate space for outgoing wiring having consideration for the types of cables entering and leaving the assembly
- cable entries and/or gland plates, sized to suit the cables and installation requirements
- have gland plates of insulating material unless required to be brass for MIMS cabling
- sealed cut outs for busbar and cabling installation where cabinets are extendable
- natural ventilation by means of louvered vents in the upper and lower sections, backed with fine bronze wire mesh for switchboards larger than 0.3 m^3 in volume. All vent locations shall encourage natural ventilation to limit temperature rise within the ambient conditions

Assemblies exposed to weather or where situated in adverse environments shall contain:

- thermostatically controlled anti condensation heaters of fixed resistor type
- a ventilated cavity space at the top of assemblies to prevent condensation accumulating on the inside

Free standing cubicle type assemblies shall have:

- adjacent cubicles bolted together to provide a rigid structure
- a supporting base frame formed from 75 mm galvanised channel sections
- removable lifting eyebolts or equivalent facilities
- rear access to each section by means of lift off panels
- sheet metal segregation barriers enabling arc fault containment between adjacent compartments or cubicles where required to suit the form of construction
- sufficient cabling space at the rear for cables entering from above or below with vertical cable fixing inserts for cable anchorage

- explosion vents at the top of each segregated compartment
- for external switchboards be fitted with a stainless steel removable bar and padlock fixing across the door.

Wall/floor mounted assemblies shall have:

- an open base and a wiring compartment with cover panel for access to cables and/or conduits that pass through the base of wall/floor mounted assemblies
- a 50 mm wide flange around all sides where recessed into walls
- a full complement of conduit knockouts in a removable coverplate at the top and bottom of the enclosure
- front access only with cable fixing inserts for cable anchorage for cables rated over 100A

Doors shall:

- be fabricated from 1.6 mm, minimum, folded sheet steel (internal) or stainless steel (external)
- for internal switchboards have a heavy duty tumbler type lock complete with two keys per cabinet which are common to all switchboard locks installed. The standard E type key lock coding shall be adopted
- for external switchboards be fitted with a stainless steel removable bar, padlock and cover
- be secured in the closed position by means of two, minimum, large diameter, captive, knurled, cylindrical head screws for doors providing access to busbar and wiring components only
- have folded metal stiffeners and bracing to achieve rigidity and prevent warping or sagging
- have flush mounted escutcheons for recessed switchboard enclosures
- have chromium plated lift off pintle type hinges for internal switchboards and fixed hinges with latching bars for external switchboards
- have latching bars on doors larger than one metre high
- have suitable lifting handles on doors larger than one metre high
- have compressible neoprene gaskets contained within a metal channel
- be sized so that the weight of any door does not exceed 20 kg
- be fitted with circuit schedules on the inside of the door for fuse and circuit breaker distribution switchboards which shall be typewritten and placed in transparent non flammable pockets. Refer also to clause Switchboard Labelling
- be fitted with braided earthing straps in instances where equipment is fitted to doors

Removable panels, escutcheons and coverplates shall:

- be fabricated from 2 mm, minimum, folded sheet steel
- be not larger than one metre in height or width, and in no case exceed 0.6m^2 in area
- be provided with two polycarbonate lifting handles
- be secured with large head chromium plated screws with larger diameter nylon washers for panels sized 0.2 m^2 and smaller
- incorporate cut outs which:
  - expose only toggles, handles, indicators, dials and similar items
  - are adequately stiffened where long cut outs are provided for equipment groups
- allow multipole circuit breakers to be replaced with 3 single pole breakers without requiring extra fill in sections
- contain proprietary plastic inserts or painted metal covers over unused openings
- be provided with locating pins or hangers on the switchboard able to retain the panel in place when all fixings are released

1.7 FINISHES

Ferrous metal shall:

- be cleaned free from rust, corrosion, grease and scale
- have rough surfaces filled and rubbed smooth

- be finished with an electrostatically applied polyester thermoset powdercoat oven baked finish to give a minimum thickness of 0.07 mm. As an alternative and where approved be painted using at least one coat of rust inhibiting self-etching primer, an undercoat of zinc enriched paint and two coats of gloss enamel

The enclosure shall have:

- surfaces finished in :
  - Orange X15 for plant rooms, switch rooms, utility rooms
  - Colour to match area (to be confirmed by WCC) for Office Areas
  - Stainless steel for all external switchboards
- have the interior finished in gloss white colour
- have internal mounting and gear trays finished in gloss white colour

Retouch minor chips or blemishes on site.

Ripple paint finishes will not be accepted.

Submit a painted colour sample, approximately 300 mm x 300 mm, for approval prior to painting.

Non-ferrous parts shall be passivated zinc plated or tinned.

External handles, bolt heads, catches, locks, nuts and screws shall be stainless steel or chromium plated.

1.8 BUSBARS

Internal busbars shall:

- comply with AS/NZS 3439.2
- be sized for a maximum temperature rise of 50^{o}C above an ambient of 40^{o}C
- be manufactured from high conductivity hard drawn copper bar with radiused edges
- be of sufficient cross sectional area to supply the capacity of the assembly plus 20% when all equipment spaces are filled
- be of minimum size 25 mm x 4 mm except for tee offs to miniature circuit breakers
- be arranged for miniature circuit breakers so that a multipole circuit breaker can be replaced with single pole breakers without disturbing the three phase busbar assembly
- have neutral busbars of the same current rating and size as the phase busbars
- have neutral busbars installed with the phase busbars to reduce eddy current heating of adjacent ferrous materials.
- be provided for all connections carrying 100A or above
- be arranged so that all joints, terminations and fixings are fully accessible
- be disposed and supported so that under short circuit conditions no busbar material is stressed to more than 25% of its breaking load or 33% of its elastic limit, whichever is the lesser, for a one second fault current
- have fully lapped joints linished, coated with acid free petroleum jelly and bolted together with passivated zinc plated steel bolts, washers, nuts and locknuts
- be arranged for future extensions to adjacent assemblies where required
- have a removable section where mounting current transformers so that transformers may be removed or replaced without disturbing the remainder of the assembly
- be supported on synthetic resin moulded type insulators, panels and cleats. Bobbin insulators secured through the busbar are not acceptable
- have insulation with shrink on PVC phase identification on busbar sections rated over 200 amps. Should PVC sleeving be adopted for insulation purposes a minimum of two layers shall be used meeting a 1mm overall wall thickness
- have busbar joints insulated with removable insulation fixed with ties of synthetic material suitable for 120^{o}C applications and arranged so that the insulation is in permanent contact with the busbars and bolts
- be identified as follows:
  - A phase : red

- B phase : white
- C phase : blue
- Neutral : black

- have PVC dipped insulation, two coats, for three phase busbar assemblies rated up to 250 amps for connection to miniature circuit breakers

1.9 INTERNAL WIRING

All instrument, indicator and control wiring shall:

- be of stranded copper conductors, minimum size 1.0mm^2 V75 grade 0.6/1 kV PVC insulated
- be supported on the square grid form using approved ducting and channels for groups of cables and approved plastic clips for single circuits. Adhesive type cable clips shall not be used
- be identified using an engraved or moulded thimble suitably and securely fixed to the wire adjacent each terminal connection of the wire
- be connected to approved 30A, minimum, rating terminal blocks of moulded insulating material which are labelled and numbered for the termination of all external wiring
- be terminated using approved crimping lugs
- comprise flexible conductors where connected to equipment mounted on doors or in positions subject to movement

All other interconnection wiring not of copper bar shall:

- be made with copper conductors sized for 120% of the calculated demand
- be installed having consideration to short circuit capacity
- employ full section neutral conductors

All wiring terminal blocks shall be screw type. Insulation displacement terminals are not acceptable.

1.10 CABLE TERMINATIONS

All terminals shall be of adequate size to accommodate the cable sizes specified irrespective of the rating of the switchgear.

Provide busbar stub connections on terminals for cables rated at 100A and above suitable for the connection of bolted cable lugs.

All termination connections shall be fully accessible for inspection and servicing, and identified as nominated within AS 3439.1.

1.11 LINKS

Links for terminating neutral and earthing connections shall be:

- of brass or copper and square or rectangular section
- provided with the same number of terminals as there are active poles and numbered to correspond
- be fitted with tunnel type terminals for cables up to 6mm^2 and stud type terminals to accept cable lugs for other cables
- installed over the full length of multi-compartment switchboards and be fully accessible

1.12 HARDWARE

All bolts, screws and nuts shall:

- have metric threads conforming to AS 1275
- have hexagonal shaped heads
- be of non ferrous metal, or alternatively passivated zinc plated
- be fitted with flat and spring washers
- be chromium plated where exposed to view

Self-tapping screws and pop rivets will not be accepted.

Non-metallic bolts and screws may only be used to secure internal non-metallic segregation barriers.

1.13 LABELLING

Provide labels to details specified in clause Marking and Labels and as follows:

- adjacent every item on the front of the assembly
- indicating the position of equipment which is concealed from view behind panels and doors
- indicating the function of main controls, submain controls, relays, fault current limiters, links, contactors, relays, starters and switches
- indicating the current rating of fuses for fault current limiters and the equipment protected by the fault current limiter
- indicating the settings of adjustable tripping characteristics of circuit breakers
- positioned on the rear of main controls and submain controls of back connected assemblies so that the control can be identified from the rear
- identified in the form of a numeral for each single pole of sub circuit controls, including each pole of multi pole controls
- located on each assembly and indicate:
  - the assembly reference number as directed
  - supply mains, number, size and type
  - the origin of supply mains
  - the designed prospective fault level applicable
  - other requirements as indicated in AS 3439.1
- the main label of the distribution board shall contain the following information, and be indicated as follows:

<NAME OF BOARD>
<SOURCE OF SUPPLY>
<INCOMING CABLE DETAILS>
<RATING OF BOARD, FAULT RATING>

- fixed onto the coverplate in front of fault current limiters which are mounted behind the coverplate and displaying the wording Fault Current Limiters Behind Panel
- indicate on/off and other positions of all controls, switches, isolators and circuit breakers unless clearly indicated on the equipment
- where provision is made for the mounting of future equipment, labelling shall be fixed in position and shall indicate the circuit number and maximum rating
- for sub circuit circuit breakers to which frequent access is required for switching and testing purposes, e.g., light circuits, security lights, emergency lights, etc., indicating the purpose of the circuit breaker
- for circuit breakers which are locked in the on position to prevent unauthorised operation, e.g., security circuits, clocks, fire alarms, etc., indicating the purpose of the circuit breaker together with the additional wording Do Not Switch Off

Labels shall be arranged so that they can be readily replaced by fixing with two, minimum, chromium plated or stainless steel screws, secured by spring washers or nuts or by drilling and tapping sheetmetal. Self-tapping screws are not acceptable.

A line diagram of all connections and controls shall be mounted in a clear acrylic windowed frame located adjacent or on the rear of distribution switchboard doors if located externally.

Provide a label fixed to the front of the main switchboard indicating:

- the switchboard manufacturer
- designed service conditions
- weight
- safety instructions, where applicable

- all information required by AS 3439

1.14 EQUIPMENT

The requirements of these clauses, where appropriate, shall also apply to switchgear and control components mounted remote from an assembly.

1.14.1 Circuit Breakers

All circuit breakers used as part of this project shall be Merlin Gerin or NHP/Terasaki.

Miniature circuit breakers shall:

- be of the same manufacture throughout the installation
- incorporate the following features
  - arc interrupting device
  - inverse time current characteristic
  - trip to operate when breaker is locked on
  - thermal and magnetic tripping mechanism
  - non welding contacts
  - comply with AS 3111
  - be interchangeable for single and multipole units used on final sub circuits
- have an interrupting capacity adequate for the maximum prospective fault current to which they may be subjected, and not less than 6 kA
- incorporate similar features and uniformity of style regardless of frame size and rating
- be provided with mechanisms to allow lockout of the circuit breaker. Submit proposed device to WCC for review and approval prior to implementation

Moulded case circuit breakers shall:

- incorporate similar features as listed for miniature circuit breakers and be of the same manufacturer
- be fitted with operating toggle extensions to limit the force required to operate
- be labelled to indicate trip unit model and settings where the trip unit is not clearly visible
- comply with AS 2184
- be provided with mechanisms to allow lockout of the circuit breaker. Submit proposed device to WCC for review and approval prior to implementation

1.14.2 HRC Fuses

HRC fuse carriers and bases shall:

- comply with AS/NZS 60269
- have a moulded plastic insulated fuse carrier of sufficient depth to prevent inadvertent contact with live parts
- have a fuse indicator which is visible without the need to remove the fuse
- have fully shrouded base contacts
- be of BS88 style equal to GEC Redspot manufacture unless otherwise approved

1.14.3 HRC Fuse Cartridges

HRC fuse cartridges shall:

- be class gG for general purpose in accordance with AS/NZS 60269
- be GEC Type T

Three spare HRC fuse cartridges of each rating and type used, including fault current limiting fuses regardless of whether they are incorporated within a circuit breaker or not, shall be provided on a labelled panel adjacent each switchboard or within a spares compartment of the switchboard.

1.14.4 Emergency Stop Buttons

Emergency stop buttons shall:

- be large diameter head type
- incorporate shrouds to protect against inadvertent operation

1.14.5 Switches and Isolators

All switches and isolators shall:

- comply with AS/NZS 3947.3 and AS 3133
- be rated for AC-23 utilisation category
- be fault make and load break rated
- be spring assisted manual closing
- be suitable for the prospective fault current specified herein
- have double make and break contacts
- shall include a mechanical on and off visual indicator linked directly to the main contact movement
- be provided with mechanisms to allow lockout of the device. Submit proposed device to WCC for review and approval prior to implementation

1.14.6 Auxiliary and Control Switches

Auxiliary and control switches less than 100A rating shall:

- comply with AS 3133
- have contacts of minimum 10A continuous rating
- be rotary snap action type
- be of Kraus & Naimer manufacture, or approved equal

1.14.7 Time Switches

Time switches shall incorporate the following features:

- microprocessor based control
- LCD readout
- have a minimum contact rating of 10 amps resistive and 2 amps inductive at 240 volt 50Hz
- have a minimum switching period of one minute
- have a minimum programming period of one minute
- have day omitting device
- external manual operation
- be plug in type
- have 100 hour minimum battery operation reserve
- be wired with a bypass control for manual selection of automatic - off - manual selection

1.14.8 Current Transformers

Provide approved current transformers for Electricity Retailer's equipment.

Current transformers for other usage shall:

- comply with AS 1675
- be Class 1M for metering, Class 2M accuracy for maximum demand metering and Class 2.5P for protection
- have secondary shorting links or an earthed secondary winding
- be of the resin encapsulated type
- have 5A secondary windings
- be separate units for metering and protection
- be suitable to withstand the maximum fault current as specified herein
- be clearly labelled to identify their rating and use
- be capable of operating the load of the related device with an additional capacity of 5%

1.14.9 Meters

All instantaneous meters shall:

- comply with IEC51 for accuracy Class 2.5
- be industrial grade with shock resistant jewel bearings
- be of the flush mounted type, square fronted of dimensions 96mm x 96mm with a quadrant scale
- have suppressed zero and compressed full scale deflection appropriate to the circuit in which they are installed
- be provided with a means of zero adjustment without the need for any dismantling
- be suitable for continuous duty
- have direct reading scales graduated to suit each application with 125% over scaling
- have dials with black characters on a white background

Ammeters shall be provided for each phase and have a deflection of approximately 80% full scale range with a 5A current transformer secondary load.

Voltmeters shall:

- cable of 460 volt, maximum, indication
- be connected to a selector switch, complete with off position, so that phase to phase and phase to neutral readings can be obtained and be complete with off position

Kilowatt hour meters shall:

- comply with AS 1284.1
- be polyphase type
- incorporate cyclometer register with six drums
- be matched to current transformers so that they indicate the actual power consumption, the use of a multiplying ratio is unacceptable
- be equipped with pulsed output contacts for remote monitoring. Meters shall be labelled with the pulsed output constant expressed in pulses/kWh

Varmeters shall:

- comply with AS 1284.1
- be polyphase type, suitable for unbalanced loads
- be maximum demand indicating
- indicate over the range noted on drawings
- be matched to current transformers so that they indicate the actual Var consumption, the use of a multiplying ratio is unacceptable

Power factor meters shall:

- be polyphase type, suitable for unbalanced loads
- indicate over four quadrants, 360^{o} scale calibrated : 0-1-0-1 cos x
- indicate forward (export) and reverse (input) power flow
- have rotating iron vane movement
- have silicon fluid damping
- be matched to current transformers so that they indicate actual power factor, the use of a multiplying ratio is unacceptable
- have an accuracy of two degrees electrical maximum error

Maximum demand indicators shall be:

- provided on each phase
- have a 15 minute time constant thermal element
- have both a demand pointer and manually resettable maximum indicator

Frequency meters shall:

- have indication by digital LED display or similar with two decimal places displayed

- have 0.2 class accuracy
- indicate between 40 and 60 hertz

1.14.10 Digital Power Analyser

Metering of the following instantaneous functions shall be registered on a single panel mounted digital instrument.

- kilowatt and kilowatt/hour
- true RMS volts, phase to phase and phase to neutral
- true RMS current for each phase
- power factor
- apparent power
- frequency

Additionally the following maximum functions shall be stored for future display with manual resetting facility:

- active power
- apparent power

Analyser units shall:

- be of flush mounted type, or DIN rail mounted with door cut-out to allow the display to be visible with the door closed
- be suitable for continuous duty
- have digital liquid crystal display
- have RS232 serial output for connection to a future energy monitoring computer
- be equal to Power Measurement 7300 ION meter
- include THDV, THDI recording
- be equal to Power Measurement Ltd 7330 ION
- include THDV, THDI recording
- be capable of displaying harmonic content up to 31
- include the facility, with vendor software, to record user programmable events and to record waveforms at the time of any defined trigger event
- be equal to Power Measurement Ltd 7500 ION

1.14.11 Hour Run Indicators

Hour run indicators shall:

- be industrial grade
- be surface mounted type
- be of self starting synchronous motor driven type
- be driven from a supply voltage of 230 V, 115% and 50 Hz
- have clamping type terminals
- have a counter range of 99999.9, minimum, without resetting to zero
- have minimum figure size of 1.5mm wide x 3.5mm height
- have contrasting decimal indication to integer indication
- have case protection to IP54 rating

1.14.12 Indicator Lights

Panel mounted indicator lights shall:

- comply with IEC 73
- be ultra bright light emitting diode (LED) type with a minimum design life of 50,000 hours equal to Telemecanique ZB series or higher range
- have Fresnel patterned coloured lenses of 19 mm diameter minimum

- be capable of being replaced from the front without having to remove the lamp holder assembly except where minimum design life of at least 100,000 hours is offered.

Installations having in excess of three indicator lamps on the one switchboard shall be fitted with a push to test button to verify the operation of the lamps powered from a common voltage supply.

1.14.13 Control Relays

Control relays shall:

- be DIN rail mounted
- have 10A minimum contact rating
- be continuously rated
- have silver contacts
- have one spare set of normally open and normally closed contacts
- have surge suppression on coils by means of metal oxide varistors connected in parallel with the coils

Time delay relays shall be solid state electronic type where used for non-critical applications such as general light and power controls. Where used in ATS or other critical applications, time delay relays shall be electro mechanical type immune to supply voltage transients. Pneumatic or dashpot operated devices are unacceptable.

Phase failure relays shall monitor three phase supplies for correct phase sequence, voltage balance with a 5 - 15% adjustable setting and 75% to 95% adjustable under voltage setting, 105% - 125% adjustable over voltage setting.

1.14.14 Contactors

Contactors shall:

- comply with AS/NZS 3947.1 and 4 as appropriate
- be suitable for AC3 utilisation category with Type 2 co-ordination duty
- have IP20 protection to AS 1939
- be rated for operation at 60^{o}C
- have a minimum current rating of that specified for the protective device immediately preceding where no rating is specified
- be suitable for uninterrupted duty
- be capable of withstanding the let through current of the protection device preceding it to ensure Type 2 protection
- be of the block type
- be of Sprecher & Schuh manufacture or approved equal, consistent and tested with circuit breakers
- have renewable type main contacts, auxiliary contacts and operating coils
- contain at least one spare set of normally open and closed contacts

1.14.15 Transducers

Provide three phase kilowatt (kW) current, frequency and voltage transducers where shown on single diagrams.

Transducers shall be suitable for either DIN, rail or screw mounting as follows:

- accuracy class : 0.5 or better
- output voltage : fully protected against short circuited output
- overload capacity : 2 x rated current or 1.25 x rated voltage continuous 15 x rated current or 1.5 x rated voltage for 10 seconds
- isolation : input/output/supply case
- output : 4 - 20mA
- type : Crompton Paladin or approved equal

Note: All transducers shown on drawings are three phase devices. Where necessary, provide three off single phase transducers to achieve three phase measurements, indication and monitoring. Combined

electronic power analyser devices capable of communicating with the required downstream are permitted in lieu of transducers.

1.14.16 Surge Diverters

Provide suitable surge diverters where specified on each phase of switchboards, incorporating the following features:

- capable of withstanding surges to ANSI C62.41 Categories A, B and C
- rated to 70kA
- transverse and common mode protection
- fitted with local indication visible on the front of the switchboard
- fitted with voltage free contacts for transmission of remote alarm
- independent certification of performance

Provide transient voltage surge suppression system in accordance with Standards UL 1449 and UL 1283 on consumers mains inputs to main switchboard/s.

The system operating conditions shall be 400 V AC, 50 Hz, 3 phase, neutral and earth.

Each system shall incorporate 70 kA transient voltage surge suppressers between each phase and earth, each phase and neutral and neutral and earth.

The whole system shall be duty life cycle tested to survive 10,000 surges at 20 kV, 10 kA, IEEE C62.41 Category C3 surge current with less than 5% degradation of clamping voltage.

1.14.17 Residual Current Devices

RCD's shall:

- be provided on ALL final sub circuits unless noted otherwise
- be rated for 30mA operation
- be integrated with a miniature circuit breaker with over current and short circuit current protection
- be arranged within the switchboard so that the test button is accessible without the need to remove covers
- comply with AS/NZS 3190

Pole spaces used by the neutral or extra poles of RCD circuit breakers shall not be included in any switchboard pole quantity

1.15 Mounting of Equipment

All equipment:

- shall be mounted within the assembly cabinet with only toggles, indicators, handles and dials protruding from the internal escutcheon. No equipment shall protrude from the front panel/door.
- shall be mounted on fixing rails or insulating panels
- shall not rely on busbars for support
- shall be mounted to enable easy access for adjustment, replacement or maintenance
- shall be mounted so that arc discharges during faults are not directed towards live metal or insulating medium
- that is intended for future installation shall have mountings, studs, busbar connections and escutcheon openings provided with painted blanking covers
- shall be installed so that a unit can be simply replaced without disturbing adjacent units

Circuit breakers rated above 100A shall:

- be arranged for back connection where installed within free standing cubicle type switchboards
- be arranged for front connection where installed within wall mounted switchboards
- be installed with the supply connected to the top terminals where mounted vertically
- be arranged so that the toggles operate in a vertical direction with all on and off positions in the same direction unless otherwise approved
- shall be mounted so that the operating toggles of adjacent circuit breakers are in straight alignment;

- be provided with a 75 mm air gap between circuit breakers rated up to 200 amps or 100 mm air gap for circuit breakers rated above 200 amps where more than two circuit breakers are mounted adjacent each other
- not be horizontally mounted in vertical stacks in common compartments where moulded case circuit breakers are used

Alternative mounting arrangements will not be considered unless independent tests by an approved testing authority is made available for approval prior to manufacture. This applies in particular to horizontally mounted breakers. In such cases test results should be made available proving the proposed configuration, sizes and number within a similar enclosure, especially with regard to thermal effects.

For moulded case circuit breakers (MCCB) up to 630 amps rating, which are, arranged in common sections up to six circuits per section, plastic barriers (including the casing of MCCB devices) in lieu of sheet metal may be used for segregation where form segregation suffix 'h' is nominated

Miniature circuit breakers shall be:

- secured by separate clip in type fixings as provided by the circuit breaker manufacturer
- mounted on a lift out chassis assembly
- mounted so that the toggle operation to the on position is upwards for all vertically mounted breakers
- separately mounted at the top of the switchboard where used as a main switch/isolator

Flush mount FCU units so that the front covers provided with the unit can be opened or removed without removing the cover plates from the switchboard.

Mount current transformers within a removable section of busbar so that they can be removed or replaced without disturbing other sections of the switchboard.

HRC fuses for fault current limiters shall not project through the front cover-plates.

Mount time switches so that they are accessible for adjustment without the need to remove switchboard covers.

Mount equipment that has a liquid crystal display (LCD) at a suitable height to enable clear reading of the instrument display and within 700 mm to 1600 mm above floor level.

Mount all isolating switches, circuit breakers and FCU's so that any interlock preventing the opening of the door when the equipment is ON is defeatable for maintenance access (thermo scanning or similar).

1.16 INSTALLATION OF SWITCHBOARDS

Secure all switchboards in position with masonry anchors and screws or bolts.

Cubicle type switchboards shall be levelled with approved packing.

Entry holes into switchboard enclosures shall be cut only by means of hole saw or machine punching.

Flame equipment for making entry holes is not acceptable.

Provide a location plan of the main switchboard comprising a floor plan diagram on photo sensitive anodised aluminium sheet 0.8mm thick with black lining on a matte silver background and mount at the Fire Indicator Panel or other location as directed.

1.17 TESTING AND COMMISSIONING

1.17.1 Factory Testing

The distribution boards shall be tested in accordance with the applicable parts of AS 3439. All instrumentation and controls functions shall be tested to prove their correct operation. The set points for adjustable devices, such as sensing relays, shall be recorded on test results and additionally marked within the switchboard, with adjustment points sealed to prevent movement and unauthorised tampering. Calibrated instruments shall be used for all tests.

Results of all tests including dielectric strength, and the instruments used to conduct tests, shall be recorded and a copy provided within the operation and maintenance manual. Where initial tests are

unsuccessful, the results of these tests together with the corrective measures taken shall also be provided. All test results shall be signed and dated.

Once testing has been completed, factory test results shall be verified and submitted for approval. Following that approval a witness test shall be arranged with the Engineer with one weeks notice should be allowed for the arrangement of witness testing.

1.17.2 On Site Testing

Upon completion of the installation, complete testing of all switchboard controls with all internal and external interfaces and controls connected and operational to confirm their functionality. Retest any functions requiring rewiring adjustment or modification.

Co-ordinate with other trades and arrange for all trades to be present to verify the operations of all external controls and monitoring.

Submit signed test results in an approved format confirming the completion of these test, prior to arranging witness testing by the Engineer.

1.17.3 Thermographic Survey

For boards rated at greater than 500A arrange for a thermographic survey of all busbar, equipment and cable joints and connections within the switchboard by an approved independent thermographic survey company prior to practical completion and also prior to the expiry of the defects liability period.

The dates of the survey shall be agreed and shall be conducted when electrical supply and loads are connected, i.e., during normal operation periods of the building with all available and building load connected and whilst under maximum load.

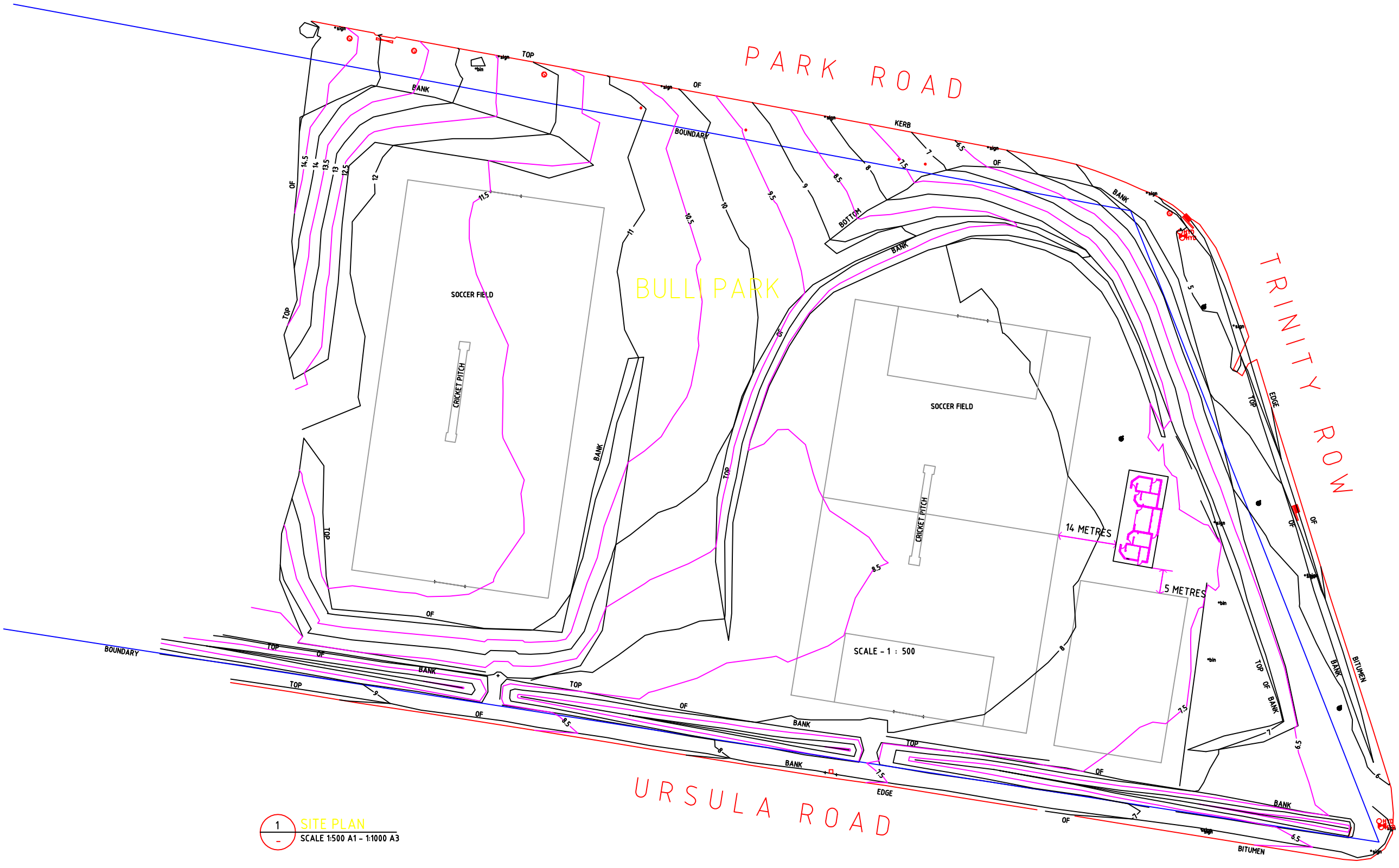
Record the results of each survey and submit a detailed report including ambient temperature, loads, photographs and thermograms for each item being surveyed.

Rectify all joints and connections indicated as requiring attention and undertake new thermograms to prove the effectiveness of the remedial work prior to submitting final results.

1.18 DISTRIBUTION BOARD MAINTENANCE

Perform the following tasks within six months of practical completion and within one month prior to the completion of the defects liability period:

- tighten all busbar joints, cable terminations and connections during out-of-hours periods at a time as agreed
- remove by vacuum cleaning all dust and debris from within the switchboard enclosure
- wipe down and polish the exterior surfaces of the switchboard
- replace any defective hardware items and ineffective dust seals



1 / - SITE PLAN
SCALE 1:500 A1 - 1:1000 A3

LEGEND

- *bin GARBAGE BIN
- *sign SIGN
- ELECTRIC LIGHT POLE
- HYD HYDRANT
- STOP VALVE
- DOUBLE GRATED GULLY PIT

NOTE: BOUNDARIES ARE SUBJECT TO FINAL SURVEY.

PM 17174

RL 5.775

Pole / Fixture Summary

Pole ID	Pole Height	Fixture Qty	Lamp Type	Switching	KW Each	KW Total
S1	18.30	1	1500W MZ	C	1.56	1.56
		1	1500W MZ	A	1.56	1.56
S2	18.30	1	1500W MZ	C	1.56	1.56
		1	1500W MZ	A	1.56	1.56
S3	18.30	1	1500W MZ	A	1.56	1.56
		1	1500W MZ	C	1.56	1.56
S4	18.30	1	1500W MZ	A	1.56	1.56
		1	1500W MZ	C	1.56	1.56
S5	24.40	1	1500W MZ	B	1.56	1.56
		1	1500W MZ	D	1.56	1.56
S6	24.40	1	1500W MZ	B	1.56	1.56
		1	1500W MZ	D	1.56	1.56
S7	24.40	1	1500W MZ	B	1.56	1.56
		1	1500W MZ	D	1.56	1.56
S8	24.40	1	1500W MZ	B	1.56	1.56
		1	1500W MZ	D	1.56	1.56
8		***16***				***25.02***

Calculation Grid Summary

Grid Name	Calculation Metric	Light Level				Uniformity		Groups	Fixture Qty
		Type	Ave	Min	Max	Min/Max	Min/Ave		
Soccer - 1# - 100Lux	Horizontal Illuminance	Constant	134	69	181	0.38	0.51	A,C	8
Soccer - 1# - 50Lux	Horizontal Illuminance	Constant	66.6	20.8	122	0.17	0.31	C	4
Soccer - 2# - 100Lux	Horizontal Illuminance	Constant	104	70.4	143	0.49	0.68	B,D	8
Soccer - 2# - 50Lux	Horizontal Illuminance	Constant	52.1	18.2	93.6	0.19	0.35	D	4
Spill - Road	True Max Vert Illuminance	Constant	5.17	0.67	9.77	0.07	0.13	A,B,C,D	16

Group / Switching Summary

Group Name	Description	Fixture Qty
A		4
B		4
C		4
D		4

MUSCO
GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

PROJECT SUMMARY

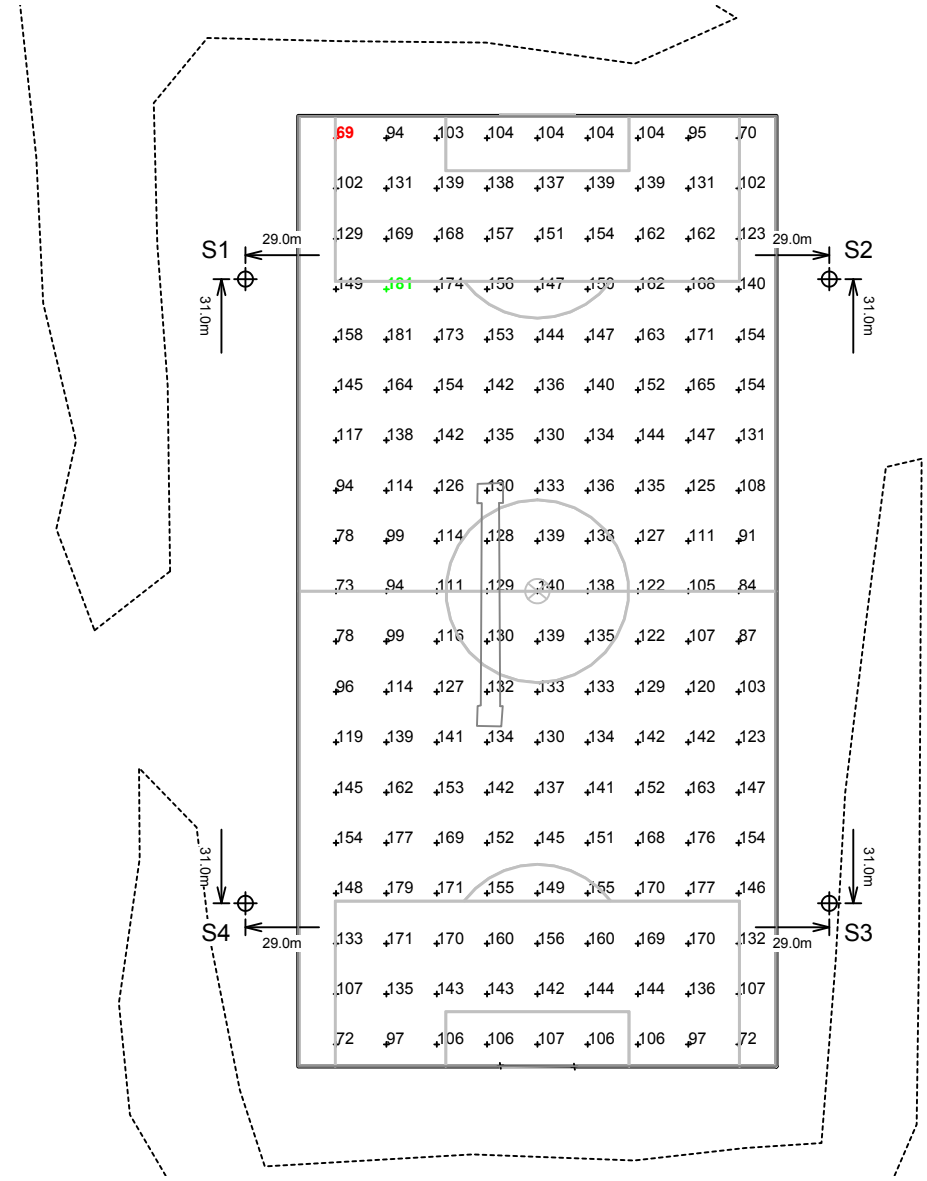
Design	Bulli Park Soccer Fields
Location	Bulli,NSW
Date	15-Mar-2010
Engineer	Endeavor.Yin

From Hometown to Professional

We Make It Happen®

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	18.3m	-	18.3m	1500W MZ	2	2	0
4	← TOTALS →					8	8	0



SCALE 1: 750

0 20m 40m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Soccer-1

Bulli Park Soccer Fields
Bulli,NSW

Soccer - 1# - 100Lux

· Size: 94m x 47m
· Grid Spacing = 5.0m x 5.0m
· Values given at 0.0m above grade

· Luminaire Type:	Green Generation
· Rated Lamp Life:	5,000 hours
· Avg Lumens/Lamp:	134,000

CONSTANT ILLUMINATION
HORIZONTAL LUX

	Entire Grid
No. of Target Points:	171
Average:	134.39
Maximum:	181.32
Minimum:	69.00
Min/Avg:	0.51
Min/Max:	0.38
UG (Adjacent Pts):	1.49
CV:	0.19

Average Lamp Tilt Factor:	1.000
Number of Luminaires:	8
Avg KW over 5,000 hours:	12.51
Max KW:	13.6

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

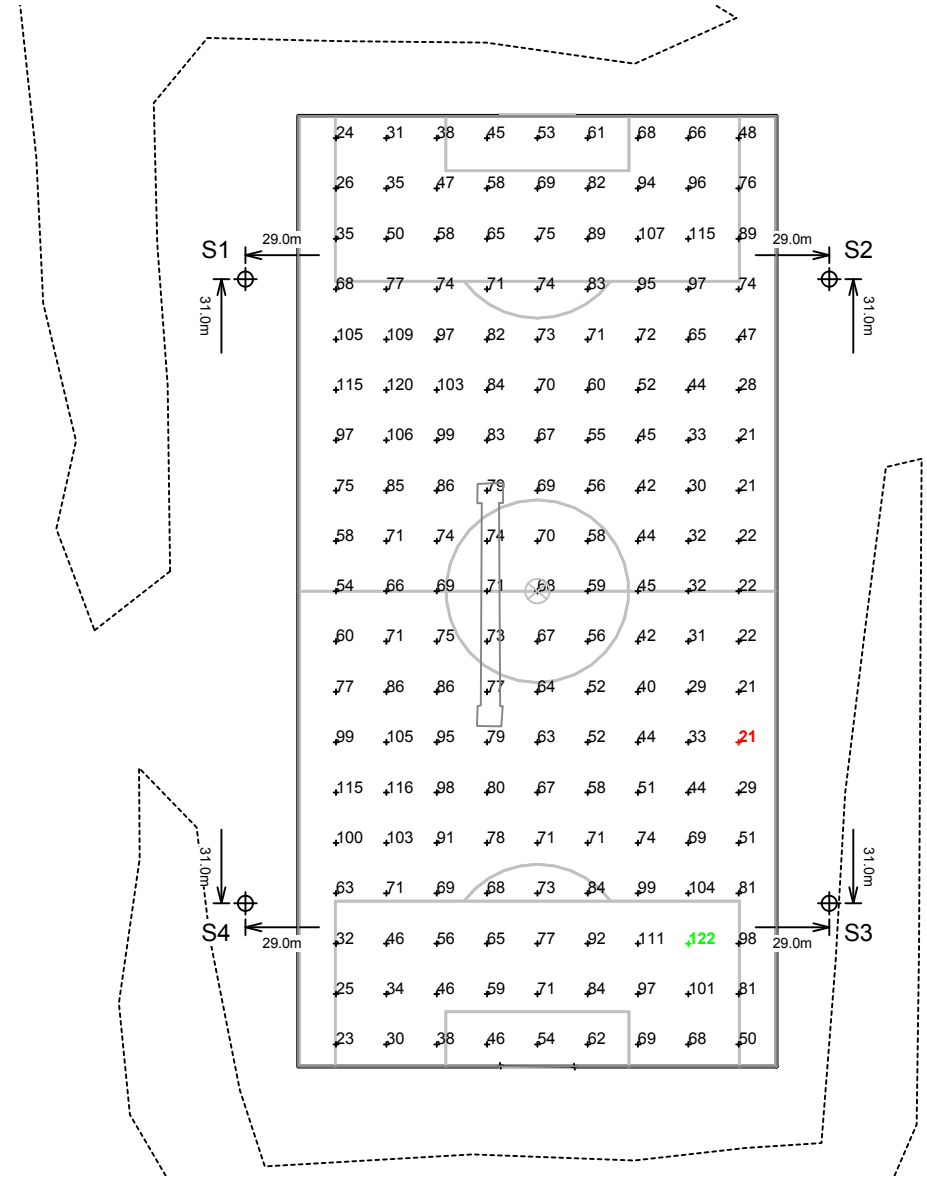
Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Endeavor.Yin

File #: 147359A1 Date: 15-Mar-10

EQUIPMENT LIST FOR AREAS SHOWN								
Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	18.3m	-	18.3m	1500W MZ	2	1	1
4	← TOTALS →					8	4	4



SCALE 1: 750

0 20m 40m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Soccer-1

Bulli Park Soccer Fields
Bulli,NSW

Soccer - 1# - 50Lux

· Size: 94m x 47m
· Grid Spacing = 5.0m x 5.0m
· Values given at 0.0m above grade

· Luminaire Type:	Green Generation
· Rated Lamp Life:	5,000 hours
· Avg Lumens/Lamp:	134,000

CONSTANT ILLUMINATION
HORIZONTAL LUX

	Entire Grid
No. of Target Points:	171
Average:	66.57
Maximum:	122.34
Minimum:	20.77
Min/Avg:	0.31
Min/Max:	0.17
UG (Adjacent Pts):	1.97
CV:	0.37

Average Lamp Tilt Factor:	1.000
Number of Luminaires:	4
Avg KW over 5,000 hours:	6.26
Max KW:	6.8

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Endeavor.Yin

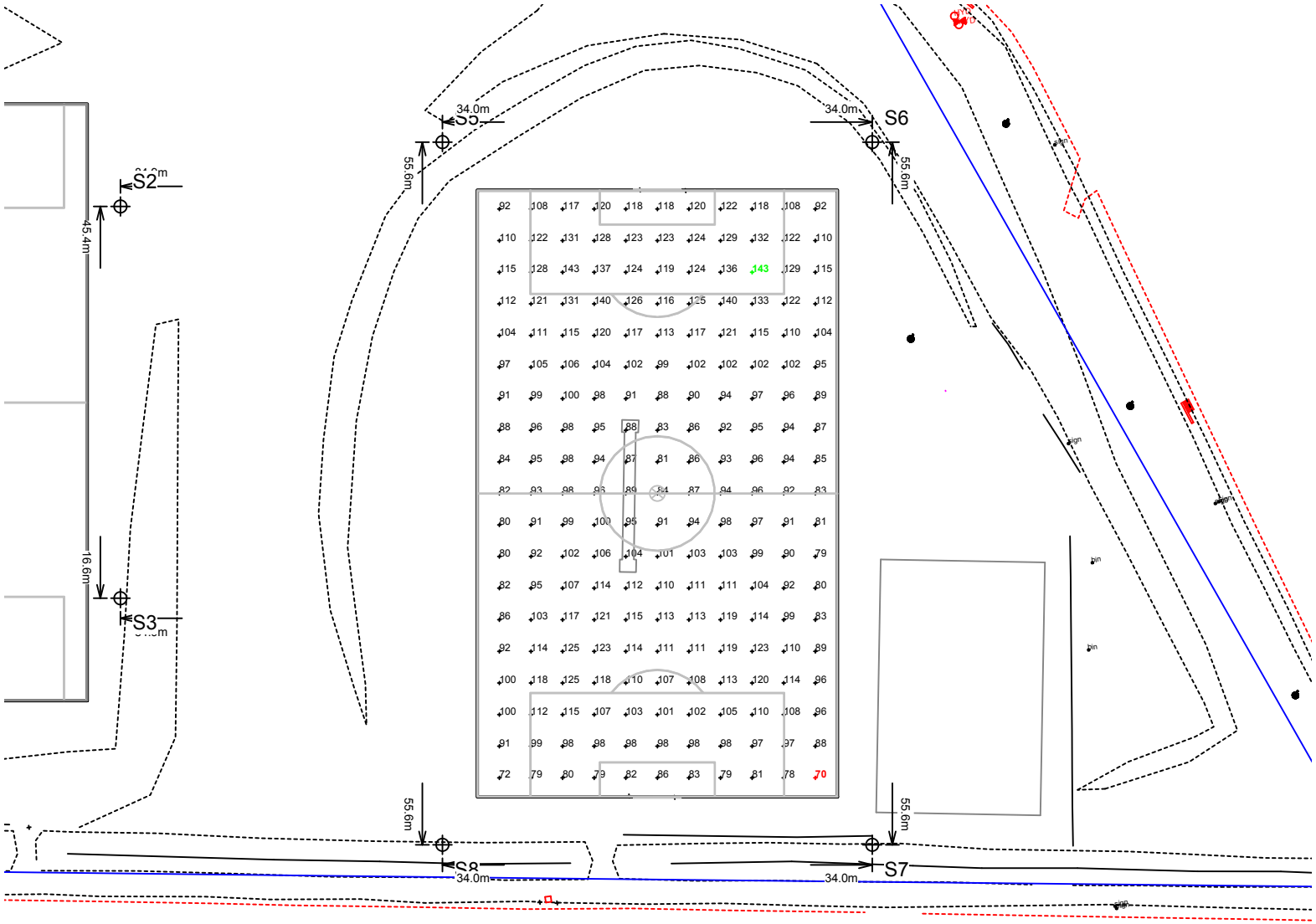
File #: 147359A1 Date: 15-Mar-10

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S5-S8	24.4m	-	24.4m	1500W MZ	2	2	0
4	← TOTALS →					8	8	0

GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE



SCALE 1 : 1000

0 20m 40m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

ILLUMINATION SUMMARY

Soccer 2

Bulli Park Soccer Fields
Bulli,NSW

Soccer - 2# - 100Lux

· Size: 96m x 57m
· Grid Spacing = 5.0m x 5.0m
· Values given at 0.0m above grade

· Luminaire Type:	Green Generation
· Rated Lamp Life:	5,000 hours
· Avg Lumens/Lamp:	134,000

CONSTANT ILLUMINATION
HORIZONTAL LUX

	Entire Grid
No. of Target Points:	209
Average:	103.77
Maximum:	142.72
Minimum:	70.40
Min/Avg:	0.68
Min/Max:	0.49
UG (Adjacent Pts):	1.26
CV:	0.15

Average Lamp Tilt Factor:	1.000
Number of Luminaires:	8
Avg KW over 5,000 hours:	12.51
Max KW:	13.6

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

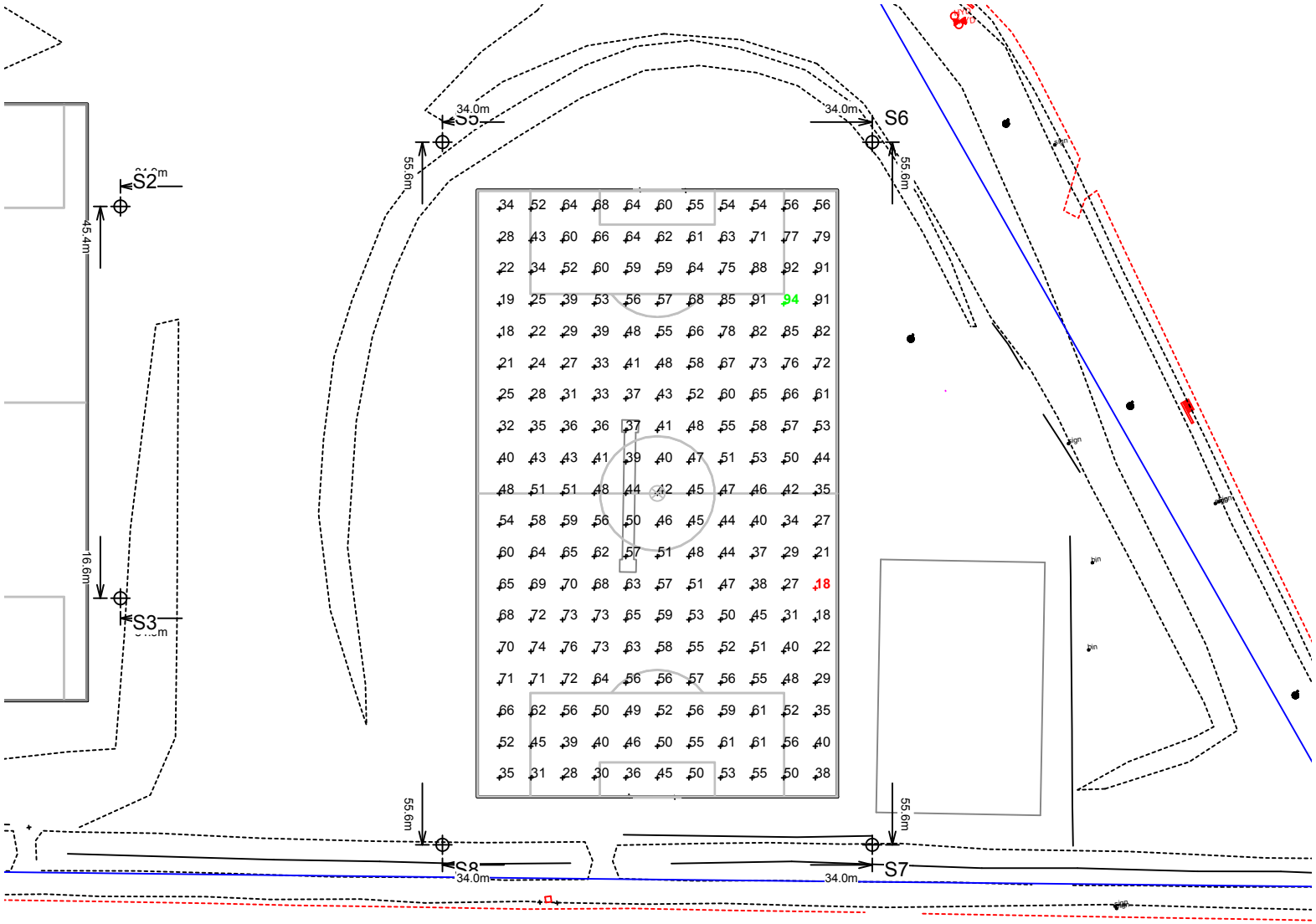
Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Endeavor.Yin

File #: 147359A1 Date: 15-Mar-10

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S5-S8	24.4m	-	24.4m	1500W MZ	2	1	1
4	← TOTALS →					8	4	4



SCALE 1 : 1000

0 20m 40m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

MUSCO GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

ILLUMINATION SUMMARY

Soccer 2

Bulli Park Soccer Fields
Bulli,NSW

Soccer - 2# - 50Lux

- Size: 96m x 57m
- Grid Spacing = 5.0m x 5.0m
- Values given at 0.0m above grade

· Luminaire Type:	Green Generation
· Rated Lamp Life:	5,000 hours
· Avg Lumens/Lamp:	134,000

CONSTANT ILLUMINATION HORIZONTAL LUX

	Entire Grid
No. of Target Points:	209
Average:	52.06
Maximum:	93.56
Minimum:	18.22
Min/Avg:	0.35
Min/Max:	0.19
UG (Adjacent Pts):	1.81
CV:	0.31

Average Lamp Tilt Factor:	1.000
Number of Luminaires:	4
Avg KW over 5,000 hours:	6.26
Max KW:	6.8

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Endeavor.Yin

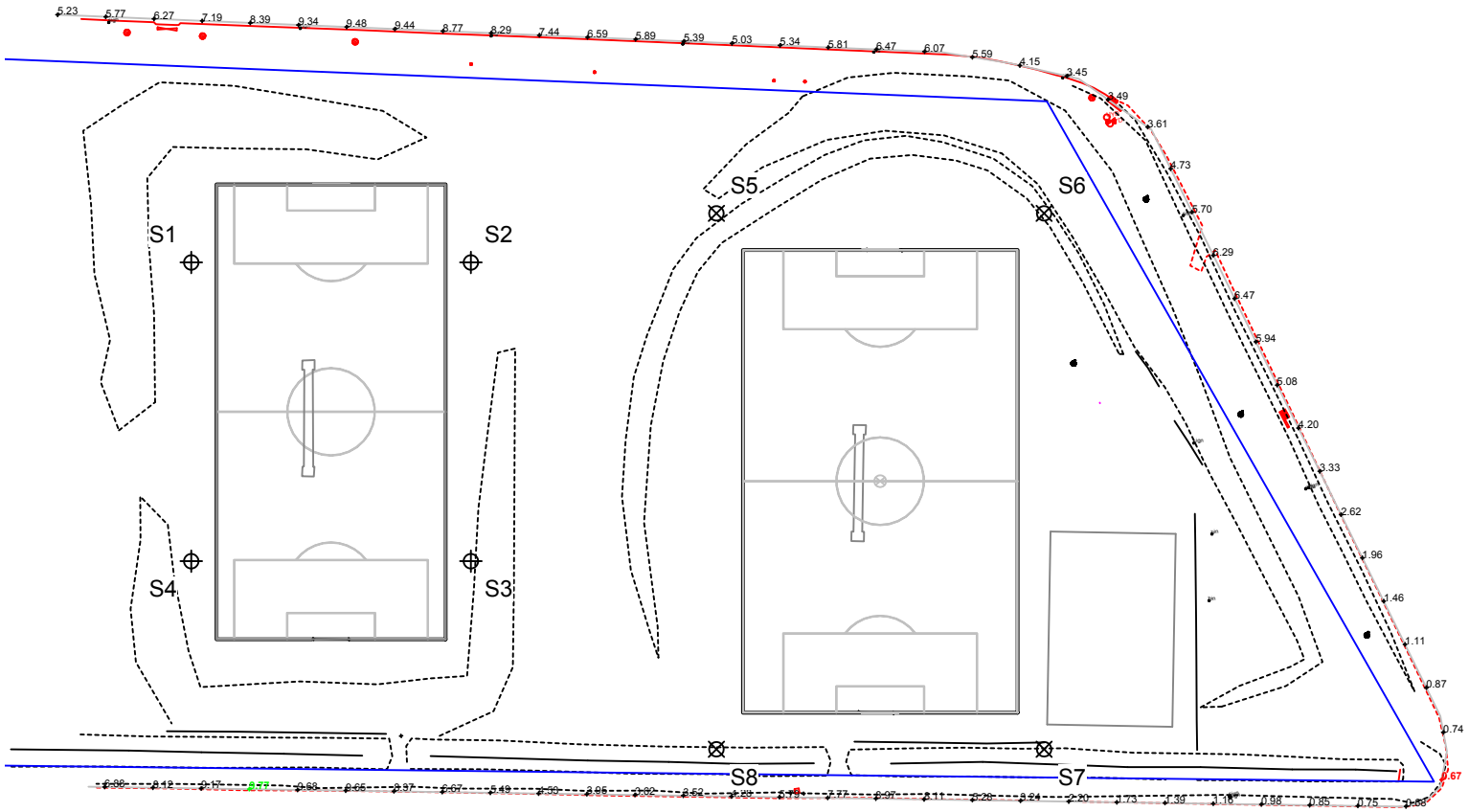
File #: 147359A1 Date: 15-Mar-10

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	18.3m	-	18.3m	1500W MZ	2	2	0
4	S5-S8	24.4m	-	24.4m	1500W MZ	2	2	0
8	← TOTALS →					16	16	0

MUSCO GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE



SCALE 1 : 1500

0 15m 30m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

ILLUMINATION SUMMARY

Soccer 2

Bulli Park Soccer Fields
Bulli,NSW

Spill - Road

· Grid Spacing = 10.0m
· Values given at 1.5m above grade

· Luminaire Type:	Green Generation
· Rated Lamp Life:	5,000 hours
· Avg Lumens/Lamp:	134,000

CONSTANT ILLUMINATION
MAX VERTICAL LUX

	Entire Grid
No. of Target Points:	67
Average:	5.1685
Maximum:	9.7705
Minimum:	0.6672

Average Lamp Tilt Factor:	1.000
Number of Luminaires:	16
Avg KW over 5,000 hours:	25.02
Max KW:	27.2

Guaranteed Performance: The CONSTANT ILLUMINATION described above is guaranteed for the rated life of the lamp.

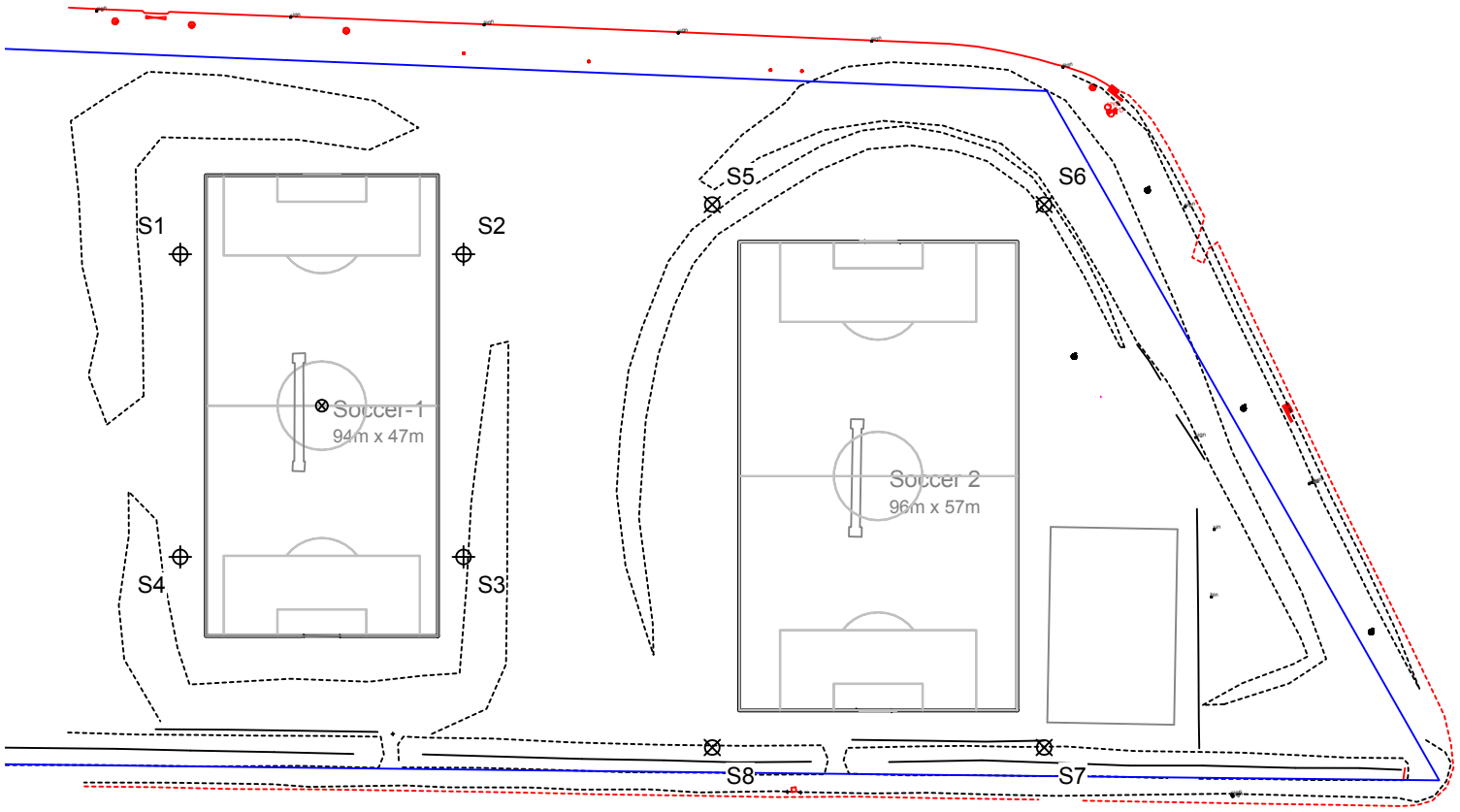
Field Measurements: Averages shall be +/-10% in accordance with IESNA RP-6-01 and CIBSE LG4. Individual measurements may vary from computer predictions.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

By: Endeavor.Yin

File #: 147359A1 Date: 15-Mar-10



SCALE 1 : 1500

0 15m 30m

Pole location(s) ⊕ dimensions are relative to 0,0 reference point(s) ⊗

GREEN GENERATION LIGHTING™

GUARANTEED PERFORMANCE

EQUIPMENT LAYOUT

Bulli Park Soccer Fields

Bulli,NSW

INCLUDES:

· Soccer 2
· Soccer-1

Electrical System Requirements: Refer to Amperage Draw Chart and/or the **"Musco Control System Summary"** for electrical sizing.

Installation Requirements: Results assume +/- 3% nominal voltage at line side of the ballast and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LAMP TYPE	QTY / POLE
4	S1-S4	18.3m	-	18.3m	1500W MZ	2
4	S5-S8	24.4m	-	24.4m	1500W MZ	2
8	← TOTALS →					16

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)								
Single Phase Voltage	120 (50)	208 (50)	220 (50)	240 (50)	277 (50)	347 (50)	380 (50)	415 (50)	480 (50)
1500 watt MZ	-	-	7.7	7.7	-	-	4.7	4.2	-

By: Endeavor.Yin

File #: 147359A1 Date: 15-Mar-10

Attachment 4: Conditions: DA-2010/139

Plans and Specifications	Site plan Illumination Summary - Perimeter light readings - 15 March 2010 - Musco Lighting Illumination Summary - Soccer 1 100Lux - 15 March 2010 - Musco Lighting Illumination Summary - Soccer 1 50Lux - 15 March 2010 - Musco Lighting Illumination Summary - Soccer 2 100Lux - 15 March 2010 - Musco Lighting Illumination Summary - Soccer 2 50Lux - 15 March 2010 - Musco Lighting Equipment Layout - 15 March 2010 - Musco Lighting Project Summary - 15 March 2010 - Musco Lighting Performance Specification - 9 February 2004 - Normal Disney Young

General Matters

1) **Building Work - Compliance with the Building Code of Australia**
All building work must be carried out in compliance with the provisions of the Building Code of Australia.

2) **Construction Certificate**
A Construction Certificate must be obtained from Council or an Accredited Certifier prior to work commencing.

A Construction Certificate certifies that the provisions of Clauses 139-148 of the Environmental Planning and Assessment Amendment Regulations, 2000 have been satisfied, including compliance with all relevant conditions of Development Consent and the Building Code of Australia.

Note: The submission to Council of two (2) copies of all stamped Construction Certificate plans and supporting documentation is required within **two (2)** days from the date of issue of the Construction Certificate, in the event that the Construction Certificate is not issued by Council.

3) **Occupation Certificate**
A final Occupation Certificate must be issued by the Principal Certifying Authority prior to occupation or use of the development. In issuing an Occupation Certificate, the Principal Certifying Authority must be satisfied that the requirements of Section 109H of the Environmental Planning and Assessment Act 1979, have been complied with as well as all of the conditions of the Development Consent.

Prior to the Issue of the Construction Certificate

4) The proposed sports lighting system shall be installed as per AS 2560. 2.3 – 2007 – Sports Lighting and shall comply with "control obtrusive lighting" as per AS 4282.

5) Prior to the use/operation of the sports lighting a copy of "Certificate of Compliance" prepared by the suitable qualified contractor shall be submitted to the council.

Prior to the Commencement of Works

6) **Appointment of Principal Certifying Authority**
Prior to commencement of work, the person having the benefit of the Development Consent and a Construction Certificate must:

a) Appoint a Principal Certifying Authority (PCA) and notify Council in writing of the appointment. irrespective of whether Council or an accredited private certifier is appointed (if Council is nominated as the PCA please use the attached form) and
b) notify Council in writing (on the attached form) of their intention to commence the erection of the building (at least two days notice is required).

The Principal Certifying Authority must determine when inspections and compliance certificates are required.

7) **Sign – Supervisor Contact Details**
Before commencement of any work, a sign must be erected in a prominent, visible position:

a) stating that unauthorised entry to the work site is not permitted;
b) showing the name, address and telephone number of the Principal Certifying Authority for the work; and
c) showing the name and address of the principal contractor in charge of the work site and a telephone number at which that person can be contacted at any time for business purposes.

This sign shall be maintained while the work is being carried out and removed upon the completion of the construction works.

8) **Structural Engineer's Details**
Structural engineer's details for all structurally designed building works such as reinforced concrete footings, reinforced concrete slabs and structural steelwork must be submitted to the Principal Certifying Authority, prior to the commencement of any works on the site.

9) **Enclosure of the Site**
The site must be enclosed with a suitable security fence to prohibit unauthorised access, to be approved by the Principal Certifying Authority. No building work is to commence until the fence is erected.

10) **Consultation with NSW WorkCover Authority**
Prior to any work commencing on the site it is the responsibility of the owner to contact NSW WorkCover Authority in writing in respect to any demolition or use of any crane, hoist, plant or scaffolding.

11) **Temporary Sediment Fences**
Temporary sediment fences (eg haybales or geotextile fabric) must be installed on the site, prior to the commencement of any excavation, demolition or construction works in accordance with Council's guidelines. Upon completion of the development, sediment fencing is to remain until the site is grassed or alternatively, a two (2) metre strip of turf is provided along the perimeter of the site, particularly lower boundary areas.

During Demolition, Excavation or Construction

12) **Restricted Hours of Work (domestic residential scale ie single dwellings)**
The developer must not carry out any work other than emergency procedures to control dust or sediment laden runoff outside the normal working hours, namely, 7.00 am to 5.00 pm, Monday to Friday and 8.00 am to 4.00 pm Saturday, without the prior written consent of the Principal Certifying Authority and Council.

No work is permitted on public holidays or Sundays.

Any request to vary these hours shall be submitted to the **Council** in writing detailing:

a) the variation in hours required;
b) the reason for that variation;
c) the type of work and machinery to be used.

Note: The developer is advised that other legislation may control the activities for which Council has granted consent including but not limited to the Protection of the Environment Operations Act 1997. Developers must note that EPA Environmental Noise manual restricts use of power tools (electronic or pneumatic) to between the hours of 7.00 am to 5.00 pm Mondays to Fridays and 8.00 am to 4.00 pm on weekends.

13) The developer must carry out work at all times in a manner which will not cause a nuisance, by the generation of unreasonable noise, dust or other activity, to the owners and/or occupiers of adjoining and adjacent land.

14) **Provision of Waste Receptacle**
The developer must provide an adequate receptacle to store all waste generated by the development, pending disposal. The receptacle must be regularly emptied and waste must not be allowed to lie or accumulate on the property other than in the receptacle. Consideration should be given to the source separation of recyclable and re-usable materials.

Operational Phases of the Development/Use of the Site

15) **Timer**
The lights shall be operated by timer so as to comply with the hours of operation specified in this consent.

16) **Waste management**
It is the responsibility of the organisers to ensure the site is left clear of rubbish at the end of each training session or game.

17) **Restricted Hours of Operation**
The hours of operation for the lights shall be restricted to 6.30pm to 8.30pm Monday to Friday. Any alteration to the approved hours of operation will require separate approval. In addition, the lights may be used for no more than six weekend night games between the hours of 6.30pm and 10pm.

Reasons

The reasons for the imposition of the conditions are:

1 To minimise any likely adverse environmental impact of the proposed development.

2 To ensure the protection of the amenity and character of land adjoining and in the locality.

3 To ensure the proposed development complies with the provisions of Environmental Planning Instruments and Council's Codes and Policies.

4 To ensure the development does not conflict with the public interest.