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23 October 2024

Auckland Council Plan Change 79
Amendments to Transport Provisions to the Auckland Unitary Plan

Section E24 Lighting - Appeal Process

Lighting Council New Zealand and Illuminating Engineering Society of ANZ

LCNZ and IESANZ - JOINT POSITION PAPER

Introduction

This is a Lighting Council New Zealand (LCNZ) and Illuminating Engineering Society of ANZ (IESANZ) joint response as part of the appeal process to the Auckland Council - Auckland Unitary Plan PC 79: Section E24 Lighting, proposed changes.

Whilst we commend the Council for the initiative, LCNZ and IESANZ have only recently become aware of this lighting change proposal. There has been poor stakeholder communication and a lack of opportunity for adequate debate and the solicitation of wider lighting professional input.

We have significant concerns regarding the Auckland Council mandatory imposition of lighting changes in medium density residential developments.

In overview, we consider the proposed light levels are excessive. These are AS/NZS standardised values for public spaces, not intended for private residential spaces.

We recommend that Auckland Council forms an expert group of planning and lighting professionals to consider the appropriate values and achieve a consensus agreement.

Overview

The new Auckland Council requirements introduce a set of application challenges with the potential for unintended consequences, such as overlighting, neighbourhood nuisance, light pollution, installation complexity, vandalism potential, and additional capital and operational costs.

Apart from a very general introductory statement about the security and safety of people and property, the Section E24 document contains no defined objectives regarding the outcomes is it designed to achieve. Clear and tangible outcomes need to be identified in order to substantiate and justify the new mandated lighting requirements contained therein.

An explanation is needed in the E24 specification of why an AS/NZS application standard for road and public lighting is deemed to be applicable for private residential lighting, as such usage contradicts the scope of the AS/NZS 1158 series of standards. There is no explanation of why AS/NZS 1158.3.1 might be applicable, and no modifications to be more suitable for private residential lighting application are adopted. Auckland Council may be at risk of legal challenge regarding the basis for such mandated requirements as they are promulgated without due substantiation and justification.

A modified schedule of light levels (and other light technical parameters) is likely to be required for Auckland Council application, including lower minimum light levels which are more suitable for the lower activity levels encountered in the private residential context. This schedule should include revised provisions for light levels on horizontal surfaces (considering smaller spatial areas, and light the reflectance from light colour concrete rather than dark asphalt) and for light levels on vertical surfaces (considering light reflectance from close-proximity boundary fences and building walls).

It is likely that new Auckland Council planning requirements will create precedents for lighting application, and see uptake in part or whole within other council regions around the country. Auckland Council and Auckland Transport lighting specifications are sometimes used de facto in another regions of New Zealand. This could contribute to greater regional fragmentation of lighting rules and requirements within local government. As such, the Auckland Council E24 specification needs to be very well considered in order to minimise untended consequences.

We recommend that Auckland Council forms a small (online) expert group of planning and lighting professionals to consider the appropriate values and achieve consensus agreement.

The Purple text following are extracts from the Auckland Council planning documents. These are followed by our comment.

Decision following the hearing of Plan Change 79 to the Auckland Unitary Plan under the Resource Management Act 1991:

Plan Change PC 79: Amendment to transport provisions
Signed - Karyn Kurzeja - Chairperson
Date: 31 July 2024

SUBMISSIONS ON: TOPIC 032 – LIGHTING and TOPIC 038 – ARTIFICIAL LIGHTING

A) Submissions

Item No. 282:

PC 79 introduces a new rule framework for the provision of lighting to developments. The memorandum of Ms McKelvie has stated that the lack of 'adequate' lighting requirements has led to an inadequate and inconsistent range of lighting solutions for developments, which in turn leads to poor safety, wayfinding and wellbeing of residents and visitors.

We fully support the aim of providing improved and clarified requirements for lighting on multi-unit developments. The use of the term 'adequate' in the existing E24 document has been unsatisfactory, and measures to provide clearly defined requirements are welcomed.

Item No. 285:

We note that the additional information requirements proposed allow for consideration of site-specific elements, and also require that a lighting plan be prepared by a qualified lighting expert

a) We fully support the requirement of a 'lighting plan' and supporting documentation prepared by a qualified and experienced lighting expert.

b) The scope and depth of the 'lighting plan' content needs to be properly specified to ensure that inadequate lighting plans are not approved. Clear guidance is needed as to what information is to be included in the lighting plan when presenting to council. e.g. the use of appropriate design calculation grid dimensions within each design area rather than allowing ad hoc methods which could misrepresent AS/NZS standards conformance and E24 compliance.
   As noted in our overview comment, we recommend that Auckland Council forms a small (online) expert group of planning and lighting professionals to consider the appropriate lighting plan content and achieve consensus-based agreement.

c) Any proposed regulation by Auckland Council should also accommodate the consideration and customised treatment of 'site specific elements' based on the professional judgement of a qualified and experienced lighting expert.

Item No. 286 - A

Council's lighting engineer Mr Glen Wright, in his memorandum attached at Attachment 19 to the section 42A Hearing Report, supports the proposed PC 79 lighting provisions, which are based on compliance with the requirements of AS/NZS 1158.3.1 in accordance with best and accepted practice in Australasia.

a) The AS/NZS 1158.3.1 standard is not 'best practice', it is 'minimum acceptable practice' regarding the targeted light technical parameters for lighting for roads and public spaces.

b) The provisions of AS/NZS 1158.3.1 apply only to roads and public spaces. Residential and private space application is 'not in scope' of this standard. There is no substantiating information provided to justify the application of the public space light technical parameters in residential and private domains. This omission is unsatisfactory and creates confusion within the lighting community regarding of the applicability of the AS/NZS 1158 series.

c) The citation of the 'AS/NZS 1158.3.1' standard as a single document in the E24 specifications not appropriate. Part 3.1 of AS/NZS 1158 is not a standalone document, it is part of a series of six AS/NZS 1158 standards, the 'Part 3' level document is ancillary to the Part 1 and Part 2 level documents. This needs to be acknowledged and correctly cited within E24.

Item No. 286 - B

Mr Wright has advised that the lighting performance criteria in Standard AS/NZS 1158.3.1 provides appropriate night-time visual conditions for use in residential, private and public realms.

There is no supporting evidence provided to substantiate the assertion that the use of public space light technical parameters is appropriate in residential and private spaces (See comment above for item No 286 - A). The term 'appropriate' needs to be carefully defined, substantiated and justified in the context to which it is being applied. It is not evident that there has been any Auckland Council in-situ trials or evaluation processes undertaken to support this interpretation of the use of the AS/NZS 1158.3.1 lighting parameters.

Item No. 286 - C

He considers that the proposed provisions will ensure that appropriate artificial outdoor lighting is provided to private pedestrian access, including shared driveways, access and car parking.

There is no substantiating information provided to justify the public space light technical parameters are appropriate in residential and private spaces. See the two comments above items 286, A and B.

B) Findings

Item No. 310

Some submitters also suggested that the proposed lighting standards are overly complicated and technical in nature.

Lighting science and technology is an inherently complex and technical subject. The introduction of new technology LED luminaires and control devices/systems makes this even more so. There is no escaping that any well-written regulations that ensure good light application and community stewardship will be difficult for the layperson to understand.

C) Attachment A - Independent Hearing Panel Plan Change 79 decision

E24 Lighting amendments

Section 3 - Add a new Standard E24.6.2 as follows:

E24.6.2. Artificial lighting standards for pedestrian access in residential zones
When lighting for access in residential zones is required by Standard E27.6.3.7(2), it must:
a) Have lighting limits measured and assessed in accordance with Australian/New Zealand Standard Lighting for roads and public spaces (Part 3.1: Pedestrian Area (Category P) lighting – Performance and design requirements Lighting for Roads and Public Spaces (AS/NZS1158.3.1)
AS/NZS 1158.3.1 is a public lighting application document. Using this to define and apply lighting requirements for private lighting application is inappropriate because this is out of the defined scope of this standard. This is not the intended purpose of this standard, as the requirements, issues, and risks of public lighting are very different to those of private sites. The Stephenson and Turner 2022 report used as a basis for the E24 specification changes shows no evidence of a peer review or any wider panel critique to support what are far-reaching lighting design recommendations that use AS/NZS 1158.3.1 lighting parameters as a base. Auckland Council may be at risk of legal challenge if it continues down this path.

b) Must be lit to the appropriate P subcategory for pedestrian access as set out in AS/NZS1158.3.1.
These are light levels intended for public spaces. No professionally derived substantiation and justification is provided for this selection for residential and private spaces.

c) Meet the minimum P subcategories specified in Table 24.6.2.1 below:
- *Pedestrian access only - PP3, 3.00lx*
- *Pedestrian access adjacent to vehicle access – PR2, 3.50lx*
- *Connecting elements, steps, stairwells and ramps – PA3, 7.00lx*
- *Parking spaces and adjacent pedestrian access – PC2, 7.00lx*
- *Vehicle access for 4-9 parking spaces or dwellings – PR5, 0.85lx*
- *Vehicle access for 10-19 parking spaces or dwellings – PR4,1.3lx*
- *Vehicle access for 20 or more parking spaces or dwellings - PR2, 3.5lx*

In addition to the question of suitability of using AS/NZS 1158.3.1 in the private space context, the light levels selected are at the mid to higher region of the range required for public lighting. No substantiation or justification is provided for this selection.

g) The lighting must have automatic daylight controls such that the lights are on during the hours of darkness. Where automatic presence detection or sensor lighting is proposed, this must be supported by a safety assessment.
The requirement for the provision of continuous overnight lighting is likely to be controversial in the community due to issues of:
- Energy waste
- Dark sky protection
- Human sleep/wake cycle disruption

There is no information provided on what is meant by a 'safety assessment'? This needs to be detailed with clear requirements regarding the following aspects:

- The definition of a safety assessment
- The scope and boundaries of a safety assessment
- The goals and outcomes targeted
- Who undertakes the safety assessment
- Who reviews the safety assessment
- What is the pass/fail criteria at the planning consent stage
- What is the pass/fail criteria at the as-built stage

As noted in our overview comment, we recommend that Auckland Council forms a small (online) expert group of planning and lighting professionals to consider the appropriate use of automatic controls, and reach consensus-based agreement

E24.8.2 Assessment Criteria

The Council will consider the relevant assessment criteria for restricted discretionary activities from the list below:

(1A) the effects of lighting on pedestrian safety, wayfinding and access;

a. *whether the number, location, design and orientation of light fittings and light support structures provide adequate lighting for the safety and wayfinding of people, including pedestrians moving, residing, working, or visiting sites or neighbourhoods.*

Note: Adequate lighting is the amount of lighting at eye level for a person with average eyesight so they can identify any potential threat approaching them from at least 15m.

There is no information provided on the scientific basis or the technical/standards origin of this proposed requirement. There is also insufficient information provided to allow calculation of light technical parameters to establish compliance with this regulation:

- What is the 'amount of lighting at eye level'? Quantification is required.
- Does 'at eye level' mean horizontal or vertical illuminance? This is not clear.
- What does 'average eyesight' mean? Explanation is needed (e.g. the lighting needs of 60yr old vision are very different to those of 20yr old vision).
- How are the proposed requirements intended to be calculated or measured, and later monitored and enforced?

This '15m' visual requirement is not in AS/NZS 1158 Part 2 or Part 3, and there is no justification provided to indicate that any of the proposed light technical parameters' would deliver this required visual outcome. Further information and clarification of the above points is needed.

b. *the extent to which any solar powered lighting solution meets the lighting subcategory performance levels outlined in Table 24.6.2.1 throughout the hours of darkness subcategory performance levels outlined and the longevity of this solution over the following 20-year period from the date that it is installed.*

The above E24.8.23 Clause b) is redundant, and should be deleted. The reasons are as follows:

- Provision of the required lighting subcategory performance levels is necessary regardless of the power source to the luminaire (ie on-grid or off-grid).
- Provision of the required lighting subcategory performance levels over the entire nightly hours of darkness is necessary regardless of the power source of the luminaire.
- Inclusion of lifetime requirements for the longevity of physical assets is not appropriate in E24 as this is a lighting application and lighting design specification. If Auckland Council requirements for physical asset durability and longevity are necessary, then such topics should be addressed in a separate 'asset management' document, which should also include the lifetime expectations for other system elements e.g. luminaires, controls, sensors, and poles. If this is to be addressed, the important topic of on-going supplier support and product warranties should be part of this coverage.

D) Monitoring and Enforcement

The E24 document does not address the issue of monitoring and enforcement of the required lighting performance provisions. Such information is necessary to provide for clarity, transparency, and credibility. Regulation without adequate enforcement is worse than useless, as this situation is known to encourage or tolerate non-compliant behaviour.

How will the required lighting performance outcomes:

- Be evaluated and approved at the planning consent stage?
- Be evaluated and approved at the as-built stage?
- Be monitored over the operating life, and non-compliance irregularities enforced?

Is there an intention to introduce an inspection regime similar to that of pool fencing or septic waste water systems? If so:

- Which party/s will undertake such specialist technical inspections?
- Which party/s will pay for the inspections?
- What penalties are envisaged as part of non-compliance enforcement?

E) Harmonisation of Terminology

For avoidance of potential stakeholder confusion and avoidance of conflict with AS/NZS and other lighting standards we recommend some terminology changes in the Auckland Council E24 lighting document.

Artificial Light at Night (ALAN) versus Anthropogenic Light at Night (ALAN)

The term 'Artificial Light at Night' (ALAN) has historically been used to refer to light at night. The use of the term 'artificial' has been challenged by the global standards body of lighting scientists the International Lighting Commission (CIE), stating that no light can be artificial.

The CIE now uses the term 'Anthropogenic Light at Night' (ALAN) as a synonym, or more simply Light at Night (LAN).
Recommendation: Use the term 'Anthropogenic Light at Night' for in-depth application.
Recommendation: Use the term 'Light at Night' for simple application.

Artificial Light versus Electric Light
The term 'artificial light' has historically been used to refer to light generated by non-natural sources. The use of the term 'artificial' has been challenged by the CIE, stating that no light can be artificial. Additionally, buildings are now using photoluminescent light for emergency exit purposes. For general lighting CIE, IEC, and ISO international standards organisations now use the term 'electric light'.
Recommendation: Use the term 'electric light'.

Standard versus Specification
There is confusion in the E24 document about the use of the term 'standard'. The E24 document uses the term 'standard' interchangeably to refer to both E24 and the nationally recognised publications from Standards Development Organisations (SDOs) such as Standards New Zealand and Standards Australia. The Auckland Council E24 lighting document is a 'specification' and not 'standard' and should be as labelled as such.
Recommendation: Use the term 'specification'.

Light Fitting versus Luminaire
The E24 document uses the outdated term 'light fitting'. The accepted modern term is 'luminaire'. To avoid stakeholder confusion and to harmonise terminology with NZTA, Auckland Transport, Standards New Zealand, Standards Australia and international standards organisations like CIE, ISO, and CIE, the term should be 'luminaire'.
Recommendation: Use the term 'luminaire'.

Compliance versus Conformance
There is confusion in the E24 document with the terms 'compliance' and 'conformance'. These are used synonymously. The term 'compliance' relates to meeting the requirements of regulation or legislation, and the term 'conformance' relates to meeting the requirements of technical standards.
Recommendation: Use the term 'compliance' in relation to regulation or legislation.
Recommendation: Use the term 'conformance' in relation to technical standards.

Must versus Shall
Technical specification and standards worldwide have an established history of drafting action descriptors. The term 'must' is not a recognised descriptor. With established usage 'shall' indicates a requirement, and 'should' indicates a recommendation. We suggest that that 'shall' replaces 'must' to align with NZS, AS/NZS, IEC, ISO, CIE standards practice.
Recommendation: Use the term 'shall' to indicate a requirement
Recommendation: Use the term 'should' to indicate a recommendation

Lighting Plan or Lighting Design

Item No. 285 b) in this document identifies the need to clearly define the terms lighting plan' or 'lighting design', and to exactly elaborate on what is needed with specific content for the purposes of submitting an E24 technical submission to Auckland Council.
Recommendation: Select either 'lighting plan'(acceptable) or 'lighting design' (preferred)
Recommendation: Define the term, as selected, providing AC required scope and content.

LCNZ and IESANZ trust that that this information is of value for improvement of the applicability and relevance of the E24 lighting document, and that this can be instrumental in delivering better lighting outcomes and contributing to wider community well-being.

We would be most happy to provide further information or engage in discussion if required.

Yours faithfully,

Chris Byrne – Chair LCNZ
Bryan King – Executive Director LCNZ

Lighting Council New Zealand
https://lightingcouncil.org.nz

Yours faithfully,

Cedric Williams - NZ Chapter President - On behalf of IESANZ
Ewen Cafe – NZ Chapter Standards Chair - On behalf of IESANZ

Illuminating Engineering Society of Australia and New Zealand
New Zealand Chapter
https://www.iesanz.org/chapters/nz-landing-page