Report

DA Sustainability Statement
FORESTWAY SHOPPING CENTRE REDEVELOPMENT
Are Chemin De La Foret Pty Limited c/- Point Polaris

Report

CONFIDENTIAL

Revision: 1.0 - Development Application
Issued: 28 September 2018

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A TETRA TECH COMPANY

1 EXECUTIVE SUMMARY

Norman Disney & Young has been engaged by Point Polaris to provide a Development Approval (DA) Sustainability Statement for the proposed redevelopment of Forestway Shopping Centre, Sydney.

This report demonstrates compliance with the following policy and development approval documents:

- Warringah Development Control Plan (DCP) 2011, parts:
  - D22 - Conservation of Energy and Water;
  - D12 - Glare and Reflection; and
- NCC Section J 2016.

The overall objective is to identify potential strategies in the project's design that will reduce consumption of energy and other valuable natural resources throughout the construction and operation of the site, as well as addressing issues associated with glare and light spill to neighbouring residences. This will ensure the long term sustainable performance of the site whilst minimising negative impacts on the community and environment.

Sustainable principles are important to implement throughout a development in order to minimise environmental impacts and reduce resource consumption. Energy and water efficiency strategies, as well as improved material selections will result in waste reductions and emissions reductions over the life of the development.

Figure 1 – Forestway Shopping Centre Site in the Wider Geographical Area

The following Sections of the report outline the initiatives currently considered for the project that satisfy DA conditions, as well as highlighting National Construction Code minimum energy performance requirements. A number of additional items for consideration to further improve the sustainability credentials of the development are also summarised throughout, where applicable.

2 PROJECT DESCRIPTION

The existing shopping centre at Forestway comprises 9,577m^2 and 325 car parking spaces with anchor tenants of Woolworths and Aldi. An additional 38 specialties are present and the existing development also includes 3 kiosks, 3 ATM's, 2 pad sites and 9 office suites on the mezzanine level.

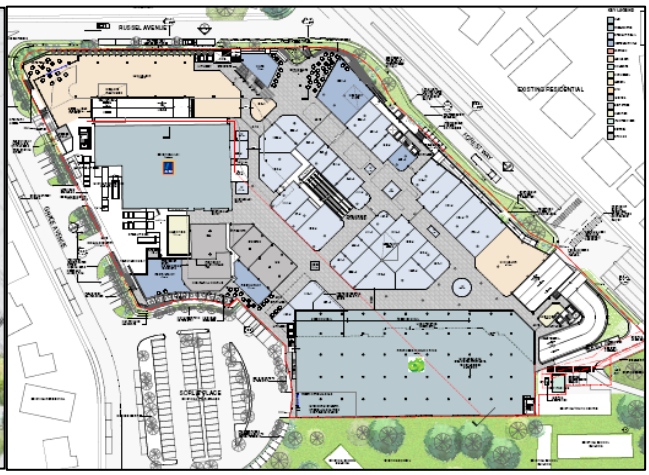
The proposed development will add 11,907.6m^2 GLA to the centre, bringing the total GLA to 21,484.6m^2 over two construction stages:

- Construction Stage 1, comprising:
    - Demolition of carpark area;
    - Construction of two basement levels;
    - Construction of Ground Floor retail;
    - Rooftop car park.
- Construction Stage 2, comprising:
    - Level 1 retail;
    - Rooftop car park.

The project aims to align with the wider Northern Beaches Hospital Structure plan and both stages of design will provide for future flexibility and community growth through structural provision for future residential development. Figure 2 shows the existing site layout, whilst Figure 3 shows the Ground Floor layout for the proposed development.

Figure 2 - Existing Site Layout

Figure 3 - Proposed Ground Floor layout



3 DA COMPLIANCE SUMMARY

Initiatives demonstrating compliance with Warringah DCP 2011, Part D22 – Conservation of Energy & Water, and Part D12 – Glare & Reflection identified at this stage of the project, as well as BCA Section J requirements are summarised in Table 1 below.

Table 1: Warringah DCP 2011 Compliance Summary

DCP Part D22 Requirements	Proposed Compliance Strategy	DCP Compliance
1) The orientation, layout and landscaping of sites is to make the best use of natural ventilation, daylight and solar energy.	Passive design principles, Section J Compliance, resource efficient services, fittings and fixtures, sensor control of lighting and HVAC are currently planned to be implemented across the development. Solar PV will be implemented to a number of roofs or car park shading structures; however, studies are currently being undertaken to determine the correct system size based on available roof space, orientation and shading from adjacent buildings.	✓
2) Site layout and structures are to allow for reasonable solar access for the purposes of water heating and electricity generation and maintain reasonable solar access to adjoining properties.	The site layout allows adequate space for the provision of solar technologies, with no effect on neighbouring properties. Architectural shadow diagrams indicate a high level of solar exposure to the roof space which could be utilised for Solar PV generation.	✓
3) Buildings are to be designed to minimize energy and water consumption.	All conditioned spaces (as per applicable NCC Building Classes) are required to comply with NCC – Section J Energy Efficiency. This will require the design to consider passive design features, building envelope materials, and building services to be designed to meet the NCC Section J requirements. Energy consumption will be minimised through passive design elements, shading, building materials and efficient building services systems to reduce heat loads into the building and better control comfort conditions. This is anticipated, but not limited to the following initiatives: • LED lighting will be used to reduce energy consumption from lighting. • Lighting zoning size will be reduced to provide greater control and reduce energy consumption. • Advanced lighting controls and sensors such as occupancy and daylight (PE) to be incorporated. • Occupancy sensor controls to be incorporated to minimise HVAC energy consumption when unoccupied. • Energy Efficient lift systems, with low standby power to be used. • Energy efficient selection of IT equipment and appliances. • Water efficient fittings usage, selecting using minimum WELS Ratings.	✓
4) Landscape design is to assist in the conservation of energy and water.	The landscape design allows for the capture of rainwater, although roofs and carparks provide the largest opportunity to capture rainwater for reuse across the site. Native plants will be incorporated throughout, minimising water required for irrigation. Green roofs, vertical gardens, the Level 1 sky garden and any raised planters throughout the development will be watered through a drip irrigation system, minimising water wastage. A simple tensile shade canvas system with steel columns will be installed to a large portion of the car park. As well as providing shade for customers and their vehicles, the car park structure will reduce direct radiation being absorbed and re-emitted down to the shopping centre, thus reducing loads on mechanical systems.	✓

DCP Part D22 Requirements	Proposed Compliance Strategy	DCP Compliance
5) Reuse of stormwater for on-site irrigation and domestic use is to be encouraged, subject to consideration of public health risks.	Due to the large roof space area available, there is an opportunity to collect and re-use rainwater throughout the development. Investigations are underway which aim to identify the most practical applications for rainwater reuse throughout the development.	✓
6) All development must comply with Council's Water Management Policy.	The development will comply with Council's Water Management Policy through a number of initiatives, some of which are identified in Section 5 of this report.	✓
DCP Part D12 Requirements	**Proposed Compliance Strategy**	**DCP Compliance**
1) The overspill from artificial illumination or sun reflection is to be minimised by utilising one or more of the following: Selecting an appropriate lighting height that is practical and responds to the building and its neighbours; • Minimising the lit area of signage; • Locating the light source away from adjoining properties or boundaries; and • Directing light spill within the site.	The design team are considering effects of overspill from artificial lighting and reflection. Car park entrances and exits are situated on an angle and slope which ensures light from vehicles is directed downwards, reducing light spill out of the development or into shops. Lit signage will be kept to a minimum, and carefully located in order to minimise disruption to neighbouring properties. Installed glazing will be vertical throughout the project, reducing light overspill to the night sky. Lighting control strategy will ensure lights are dimmed as appropriate outside of operating hours.	✓
2) Any glare from artificial illumination is to be minimised by utilising one or more of the following: • Indirect lighting; • Controlling the level of illumination; and • Directing the light source away from view lines.	Vehicles are anticipated to be one of the largest sources of glare to the surrounding area and will be kept to a minimum through the abovementioned design strategy. A potential issue was highlighted regarding glare from vehicles exiting the Forestway B1/L2 speed ramp, and has been resolved by incorporating an upstand to the ramp. Ground floor glazing sits 1.5-2.5m above street level, and has been orientated away from 'head on' view to vehicles passing the site.	✓
3) Sunlight reflectivity that may impact on surrounding properties is to be minimised by utilising one or more of the following: • Selecting materials for roofing, wall claddings and glazing that have less reflection e.g. medium to dark roof tones; • Orienting reflective materials away from properties that may be impacted; • Recessing glass into the façade; • Utilising shading devices; • Limiting the use of glazing on walls and glazed balustrades and avoiding the use of highly reflective glass; and • Selecting windows and openings that have a vertical emphasis and are significantly less in proportion to solid massing in walls.	The angle and orientation of the developments roofing will result in any sun reflection being directed upwards, and away from neighbouring residences. A matted, shale grey colour will be used for new roofs to reduce sun reflectivity, as well as minimising the urban heat island effect. External shading devices will be installed to glazing systems to minimise any reflectance from glass. Green roofs are currently being explored, with the aim to reduce the urban heat island effect; in particular the roof space above the childcare centre. As discussed, glazing will be vertical throughout the project, reducing light overspill to the night sky. Lighting control strategy will ensure lights are dimmed as appropriate outside of operating hours.	✓

3.1.1 NCC 2016 – Section J

The National Construction Code (NCC) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government with the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently. The Forestway Shopping Centre Redevelopment will achieve compliance with Section J either through DTS Provisions, or a JV3 Alternate Solution. Minimum performance requirements for the development as well as design opportunities that would allow these requirements to be exceeded are outlined in the following section.

4 ENERGY EFFICIENCY

4.1 General Principles

Ineffective energy management can lead to unnecessary growth in greenhouse gas emissions and consumption of natural resources. An effective energy plan should aim to:

(1) Minimise energy consumption through good passive design;

(2) Maximise energy efficiency of systems; and

(3) Consider green energy technologies.

The following section outlines the minimum performance requirements for the project. It is worth highlighting that many initiatives are currently being explored that go over and above the minimum requirements stated in the DCP and Section J.

4.2 Section J Minimum Requirements

Section J of the NCC 2016 sets regulations for energy efficiency for all types of buildings with respect to the building's environment, design and activity. The performance of the building envelope of the Forestway Shopping Centre redevelopment will be designed in accordance with NCC Section J.

- All conditioned spaces are required to comply with NCC Section J;
- For non-conditioned spaces, general energy efficiency principles will be applied to minimise energy consumption where practical, using best practice principles.

The following sub-sections outline the general principles applied to the project that meet the requirements of Section J.

4.2.1.1 Section J1 Building fabric

Deemed to Satisfy provisions apply to all elements forming the envelope of all class types present in the Forestway Shopping Centre development.

Further investigation on the minimum total R-value for wall, ceilings/roofs and floors for climate zone 5 can be undertaken in the next stage of the development.

4.2.1.2 Section J2 Glazing

The glazing will be determined by the NCC Glazing Calculator, and is a function against the percentage of the window area in relation to the wall area (i.e. wall to window ratio). All new glazing must have better thermal properties (U-value / SHGC) than the properties determined through the Glazing Calculator.

High efficiency glazing will be incorporated into the facade design. Glazing on facades with high solar radiation exposure will incorporate high performance glass to reduce solar heat gains through these facades. Glazing on facades with less solar exposure may be increased where practical to improve daylight access and heating during the winter months while still meeting energy performance requirements.

There will be the possibility to further optimise glazing performance in a holistic approach by demonstrating compliance with Section J by carrying out a JV3 Alternate Solution.

4.2.1.3 Section J3 Building Sealing

Deemed to Satisfy provisions apply to all elements forming the envelope of conditioned spaces.

Roof lights must be sealed, or capable of being sealed, when serving a conditioned space. Roof lights must be constructed with either of these items:

- Imperforated ceiling diffuser or the like installed at the ceiling or internal lining level;
- Weatherproof seal if it is a roof window;
- Shutter system readily operated either manually, mechanically or electronically by the occupant.

Doors, openable windows or the like which form part of the envelope of conditioned spaces must be fitted with a seal to restrict air infiltration. This seal may be a foam or rubber compressible strip, fibrous seal or the like.

Entrances to a building leading to a conditioned space must have an airlock or the like.

Roofs, walls, floors and any opening such as a window/door frame or the like which form part of the envelope or external fabric of a habitable room must be:

- Enclosed by internal lining systems that are close fitting at ceiling, wall and floor junction or
- Sealed by caulking, skirting, architraves, cornices or the like.

Exhaust fans must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space or habitable room.

4.2.1.4 Section J5 Air-Conditioning and Ventilation

Section J5.2 specifies minimum energy efficiency ratio requirements for air conditioning equipment and only applies to spaces that are required to be conditioned.

The development will incorporate occupancy sensors and/or timer controls to control the HVAC systems and prevent space conditioning and energy consumption of unoccupied or infrequently used spaces.

It is noted that compliance with Section J5 of the BCA shall be demonstrated by the mechanical project engineer / contractor.

4.2.1.5 Section J6 Artificial Lighting & Power

Section J6 of the NCC provides the requirements for lighting power load within all Classes in the project spaces.

The aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density (table J6.2b in section J6-NCC) and dividing by the illumination power density (table J6.2c in section J6-NCC) adjustment factor where applicable; or

The aggregate design illumination power load is the sum of the design illumination power loads in each of the spaces served.

The above requirements do not apply to the following:

- Emergency lighting;
- Signage and display lighting within cabinets and display cases;

- A heater where the heater also emits light;
- Lighting of a specialist process nature such as in an operating theatre, fume cupboard or clean workstation;
- Lighting of performances such as theatrical or sporting; and
- Lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.

Spaces not included in Section J such as stairs and toilets, must adopt LED flicker free lighting systems, with zoning, dimming controls and daylight sensors. Moreover, glare avoidance should be achieved.

The development will incorporate advanced lighting control strategies in the design with day-lighting and occupancy sensors to prevent energy consumption when sufficient natural light is available or spaces are unoccupied.

It is noted compliance with Section J6 shall be demonstrated by the electrical / lighting engineer / contractor.

4.2.1.6 Section 7 Heated Water Supply

The thermal efficiency for gas heated hot water systems must comply with minimum thermal efficiencies outlined in Specification J5.2d, Table 2b: 80% when under 750Kw thermal load, and 83% when above.

4.2.1.7 Section 8 Facilities for Energy Monitoring

The development must have the facility to individually monitor and record the energy consumption of:

- Air conditioning plant: heating plant, cooling plant, heat rejection and air handling units;
- Lighting;
- Power;
- Central hot water supply; and
- Lifts, escalators, travellators where there is more than one in the building.

4.2.2 Passive Design Principles

In addition to the minimum energy efficiency performance requirements listed in Section J, the Forestway Shopping Centre redevelopment will consider passive design strategies where practical to reduce mechanical energy consumption, also improving the indoor environmental quality and thermal comfort of occupants. The following design strategies have been considered at this stage of design:

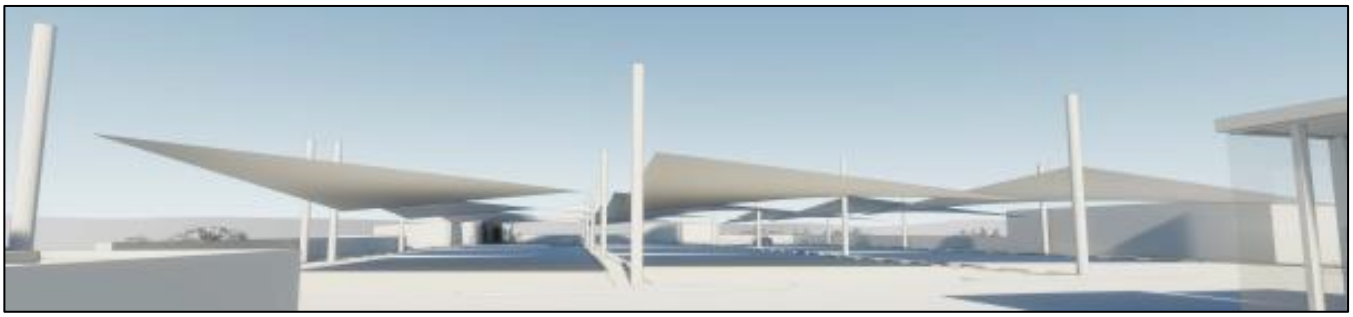
- Integrated shading devices which reduce solar heat gains to conditioned spaces;
- High efficiency glazing.

The Forestway Shopping Centre redevelopment spans a significantly large area, and thus is susceptible to the urban heat island effect. To reduce these impacts, the following passive design principles have been considered for the project:

- Green roofs incorporated in to roof spaces;

- Tree canopies providing shade to roofs;
- A car park shade structure will be incorporated to provide shade to customers and vehicles, as well as minimising solar radiation being absorbed and re-radiated to the building below; and
- New and re-painted/renovated roofs are planned to have a Solar Absorptance value of <0.45.

Figure 4 – Carpark Shading Structure Concept



4.3 Opportunities

In addition to the minimum energy efficiency requirements and passive design principles outlined above, further energy efficiency improvements for the Forestway Shopping Centre development could be achieved by implementing additional initiatives that are currently being explored, in particular:

- Minimising up-lighting from external light fittings unless for a specific purpose;
- Roof mounted solar photovoltaic (PV) system, maximised for the available roof space;
- Utilisation of tempered spill air from adjacent spaces where possible to provide free cooling;
- Adoption of minimum targets energy efficiency of appliances (Air conditioners, TVs, fridges) to make energy efficiency one of the selection requirements. Major appliances to be within 1 star of the best available energy star rating label for the appliance type and size;
- Energy efficient lift system, incorporating VVVF drives, occupancy sensing, LED lighting and reduced standby power consumption;
- Climate and Seasonal Adaptive comfort controls with an expanded temperature range based on outdoor temperature could be applied to spaces where there is not a requirement for precise temperature control.
- Adopting Green Star 'energy' credits across the development.

As design development progresses, the feasibility of implementing the above opportunities will be investigated further.

5 POTABLE WATER CONSUMPTION

5.1 Major End Uses

The major water uses expected for the Forestway Shopping Centre redevelopment include:

- Hydraulic fittings and fixtures (including showers);
- Irrigation;
- Wash bay; and
- HVAC.

The development will minimise water consumption associated to the above end uses through the design features outlined below.

5.2 Best Practice Initiatives

A number of best practice water initiatives will be implemented across the project, and are described in the following sub-sections.

5.2.1 Fixtures & Fittings

Water sanitary fittings and fixtures are expected to account for a large portion of water use for the Forestway Shopping Centre redevelopment. By Selecting water efficient sanitary fittings and fixtures, potable water demand can be significantly reduced. In line with Green Star water efficiency benchmarks, all fittings and fixtures installed by the project will aim to be within one star of the proposed WELS ratings in Table 6.1 below.

Table 6-1 - WELS rated fittings and fixtures as per the Green Star (Design & As Built v1.2) Potable Water Credit.

Fittings and Fixtures	Standard Practice Benchmark	Proposed WELS Rating
Taps	4 Star (7.5 L/min)	6 Star (4.5 L/min)
WC	3 Star (4 L/Flush)	5 Star (3L/Flush)
Urinals	3 Star (2 L/min)	6 Star (1 L/min)
Showers	3 Star (9 L/min)	3 Star (<=6 L/min)

To further reduce water consumption the project proposes to:

- Consider motion sensor taps;
- Adopt a minimum water efficiency target for dishwashers and washing machines; and
- Ensure landscaping selections use low water use species to minimise irrigation water consumption.
- Drip irrigation will feed raised planters, L1 sky garden, and all green walls and roofs.

5.2.2 Rainwater Harvesting

After water demand has been reduced, water supply will be addressed through a water reuse system which will significantly reduce potable water utilisation. Rainwater will be collected from the roof and stored to be utilised in landscaping irrigation, toilet and urinal flushing and possibly more - however the extent is still to be determined. The rainwater re-use strategy and sizing will be further developed during the detailed design phase.

5.3 Opportunities

The following initiatives should be considered during the design development stage to significantly reduce potable water consumption:

- Water meters installed to assist with monitoring and detection of leaks or excessive consumption;
- Develop a water management plan for post occupancy monitoring and provide a platform to allow the facilities manager to identify leaks and water inefficiencies;
- Incorporate water wise landscaping principles, including using xeriscape (draught tolerant species) landscaping, and/or irrigation with non-potable water, sub-soil dripper irrigation and moisture sensors; and
- Trigger hoses and recycled water connections for any wash-down areas.
- Adopting Green Star 'water' credits across the development.

As design development progresses, the feasibility of implementing the above opportunities will be investigated further.

6 WASTE

6.1 General Principles

Sustainable waste management should minimise the production of waste arising from demolition, construction and during the operation of building, with waste disposal to landfill considered a last resort.

The following principles to apply to manage waste:

- Reduce waste;
- Reuse materials and equipment (and facilitate future reuse);
- Recycle waste (and facilitate recycling);
- Compost biodegradable waste;
- Recover energy from waste (and facilitate energy recovery from waste).

The project will provide a dedicated storage area that allows for the separation and collection of recyclable waste that is generated by the building occupants. This ensures that recyclables are sorted and stored for collection and enables recycling opportunities to divert these waste streams from landfill. Waste and recycling storage to be designed to avoid the manual handling of waste and provide a convenient access route for an easy depositing and collection of waste.

Best practice guidelines should be used where applicable to determine the required waste storage area and access to the facilities. The waste storage facilities should be sufficiently sized to accommodate the storage of recyclables, such as:

- Cardboard
- Glass
- Plastics – mixed containers / soft plastics / polystyrene
- Metals
- Paper
- Cans
- Toner cartridges
- Batteries
- Fluorescent / mercury lamps.

6.2 Minimum Requirements

To satisfy the Development Application for the Shopping Centre Redevelopment, Waste Management Plans shall be submitted for demolition, construction and operation of the site. The plans should set targets to divert demolition and construction waste from landfill. Waste records should be retained to demonstrate compliance.

7 CLIMATE CHANGE & LANDSCAPE

7.1 Heat Island Effect

The project will look to utilise roofing materials that have a high Solar Reflectance Index (SRI) value to reduce the heat absorption from the sun and therefore reduce the impact on mechanical HVAC systems. In addition, increasing landscaped areas that incorporate native trees and flora will provide shade and visual interest as well as reduce the urban heat island effect.

The project will investigate opportunities to reduce surface heat absorption through the incorporation of some, or all, of the following:

- Natural shading provided by building overhangs or landscaping;
- Minimising of hardscaping where possible and the utilisation of paving that has a high SRI;
- Incorporation of architectural shade features with a high SRI; and
- Utilisation of open grid pavement systems that can accommodate vegetation in open cells.

7.2 Flood Risk Management

Essential building services equipment such as electrical and mechanical infrastructure will be protected from the inundation of up to a 1 in 100 year flood level through the location of these services above required height levels.

8 INDOOR ENVIRONMENT & MATERIALS

8.1 Indoor Environment

Healthy, comfortable spaces are vital in today's world, particularly in shopping centres where people may be active as well as remaining in the space for a considerable amount of time. The following concepts have been discussed for implementation on the project, including but not limited to:

- Green roofs and walls that minimise radiant temperature of adjacent fabric components;
- Breathable walls that improve local air quality for occupants, as well as provide an acoustic buffer to neighbouring residents;
- Incorporating shade structures to the roof top car park to provide a comfortable entrance to the shopping centre, as well as reducing radiant temperatures to the conditioned space below.

8.2 Materials

The general strategy for use of materials across the Forestway Shopping Centre Redevelopment is to minimise the quantity of material required for installation. To raise the level of sustainability for the project regarding material use, the following will be considered for implementation:

- Low-VOC and formaldehyde products should be used where possible to improve the indoor environment quality for users;
- Reduced materials strategies such as exposed services or prefabricated components will be considered to reduce material consumption;
- Where possible, products and materials procured for the development should come from a local source, and contain a low embodied energy content;
- A target could be set in order to minimise the Portland Cement content used throughout the development.

9 CONCLUSION

The Forestway Shopping Centre redevelopment incorporates various energy efficiency and sustainability initiatives into the concept design. Based on these included initiatives, the development complies with the energy efficiency and sustainability requirements under the Warringah DCP 2011, including compliance with NCC Section J Energy Efficiency. Additional sustainability initiatives to further reduce resource consumption and environmental impacts are to be considered during the detailed design development phase of the project.

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