MEMORANDUM

To:	McMahon Services	**Date:**	17 December 2020
Attention:	John Walker	**Pages:**	5
From:	Anderson Claxton	**Reference:**	LCE16341-029
Project:	St Marys Freight Hub	**Revision:**	A
Subject:	AS1940 Fuel Storage Assessment		

The following memorandum has been prepared to outline the prescriptive requirements for Diesel fuel storage in accordance with the Australia Standard AS1940-2017 – The Storage and Handling of Flammable and Combustible Liquids. The memorandum as been prepared with reference to the subject site located at Lot 2, Forester Road, St Marys NSW.

PROJECT OVERVIEW

The proposed new freight terminal is located within the St Marys industrial precinct, bounded by the South Creek to the West, Little Creek to the North, Lee Holm Rd, and Forrester Rd to the East, and Great Western Railway to the South.

The project includes the construction of a new freight hub, proposed to operate 24 hours per day, 7 days a week and accommodate a maximum annual operating capacity of 301,000 TEU (Twenty foot Equivalent Unit). Refer Figure 1

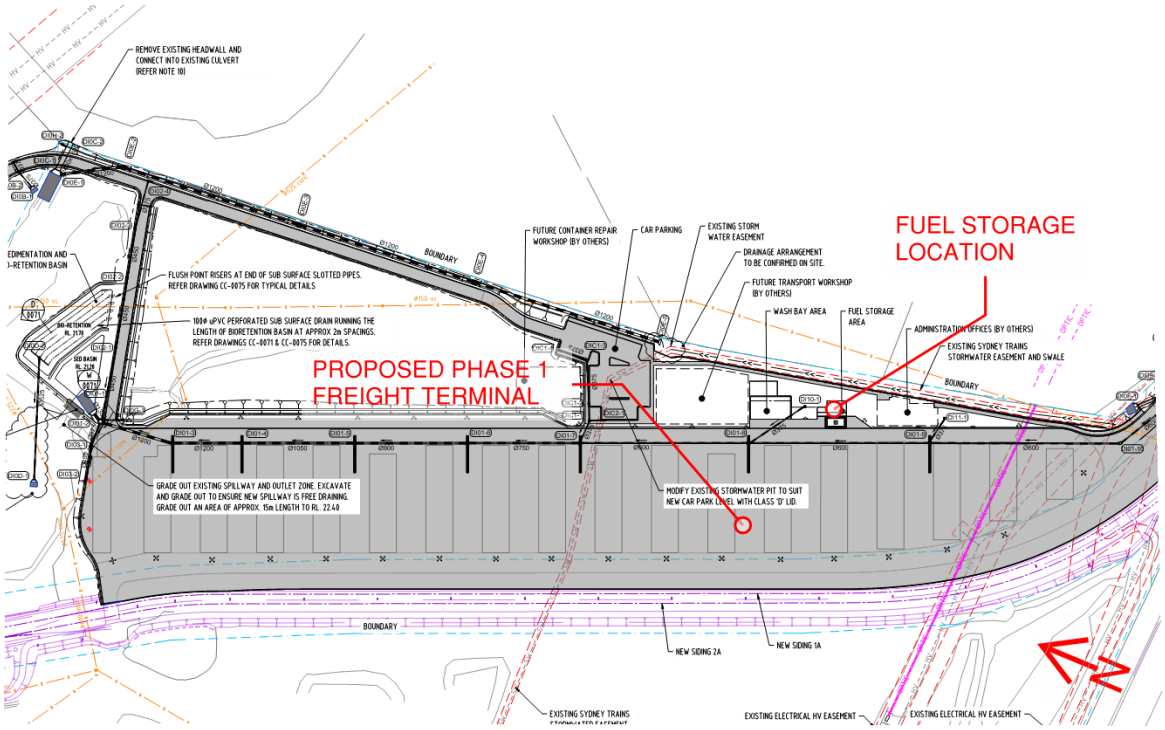

Figure 1 - Site Plan and Indicative Fuel Storage Location.

PROPOSED FUEL STORAGE

The site proposes to store 71,598L (71.6m^3) of diesel fuel within a self bunded tank adjacent the proposed new administration building as presented in Figure 2. The proposed new fuel storage shall be located on a concrete slab graded to a drainage sump. Refer Lucid Services Design Report (Ref LCE16341-028) for drainage and treatment configuration.

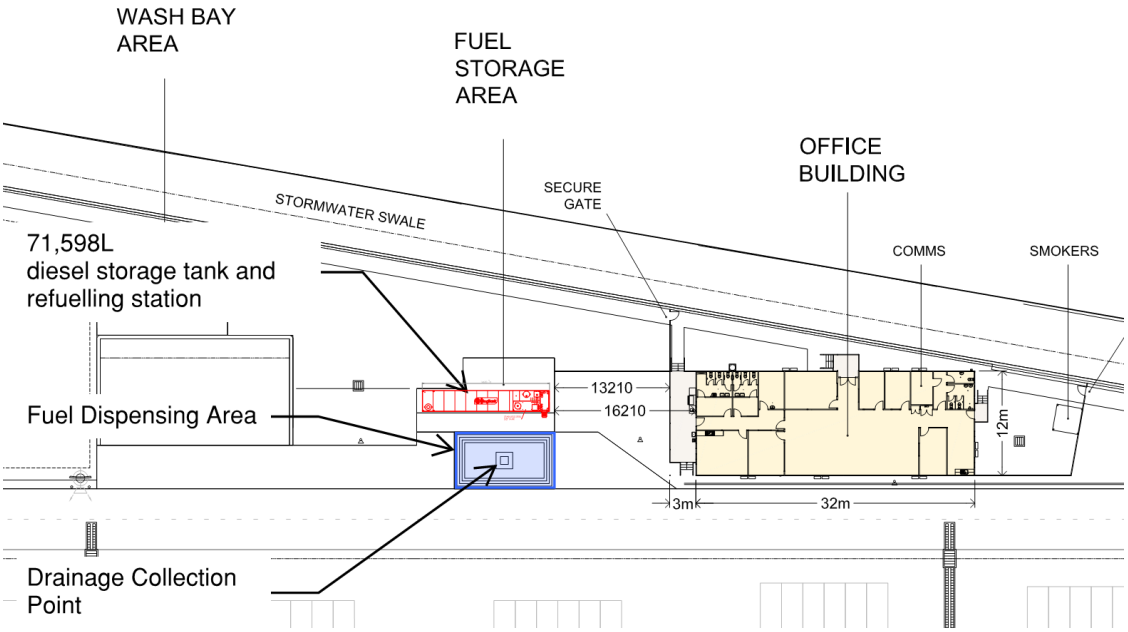

Figure 2 - Proposed Fuel Storage Location.

The assessment presented within this memorandum has been completed on the basis that the fuel storage in the location indicated is limited to Automotive Diesel Fuel with a flashpoint between 60°C and 93°C. In accordance with the definition of a *Combustible Liquid*, a liquid with a flashpoint between 60°C and 93°C is considered to be a C1 Combustible Liquid. This classification shall be used for the remainder of the assessment.

TANK CONSTRUCTION

The tank proposed for fuel storage comprises a Logitank Blue 77 distributed by Complete Fuel Solutions, refer Appendix A for reference drawing. The tank comprises a self bunded vessel with a gross diesel fuel volume of 71,598L and 7,216L of Diesel Exhaust Fluid (DEF). As DEF is considered a non-hazardous liquid is has not been considered further in this assessment. The technical data provided indicates that the tank has been designed to comply with AS1657, AS1692 and AS1940. Therefore, this assessment will not focus on specific elements associated with the tank construction and provide the design requirements to facilitate installation on site.

TANK FILL POINT

Section 5.3 of AS1940 provides the requirements for fill connections on storage tanks that are filled from a tank vehicle. In accordance with Clause 5.3.2 the following provisions shall satisfied:

a. The fill point shall be readily accessible.

b. The fill point shall be protected from accidental damage.

c. N/A – Flammable Liquid only

d. The fill point for a tank containing combustible liquid shall be located outside where possible.

e. The fill point shall be located such that the tank vehicle is not required to enter the tank compound to make the fuel delivery.

f. N/A – Flammable liquid only.

g. The fill point shall be clearly identified.

h. The areas around the tank fill point and vehicle hose connection point shall be impervious to the product.

The tank reference drawing provided in Appendix A appears to provide suction and fill points on the end that incorporates the ladder, southern end in Figure 2. The fill points appear to be protected from the integral tank structure. From the information made available it is considered that items a, b, d, and h have been adequately satisfied. The drawing and project documentation received to date has not provided indication of the signage provisions on site and therefore, compliance with item g shall be verified following construction.

As the tank is self bunded and not located within an independent compound and therefore, it is considered that the objective of item € has been satisfied and the risk associated with delivery vehicles in delivery compounds is suitably mitigated.

Clause 5.3.3 outlines the requirements for tank liquid level indication. Details of the proposed liquid level indication have not been provided for this assessment. However, as it has been indicated that the tank compliant to AS1940 and the fill point is integral to the tank, it is understood that fill level indication is provided at the fill point.

TANK STORAGE SEPARATION REQUIREMENTS

AS1940 Section 5.7 outlines the requirements for separation of above-ground fuel storage tanks. The Australian Standard refers to separation requirements from on and off site *Protected Places,* where a protected place may comprise and any building inside or outside the property boundary.

The separation requirements for fuel storage tanks is determined from two tables. Table 5.3 presents the required separation distances from a security fence and on-site protected place, with Table 5.4 providing the separation distance from an off-site protected place.

Table 5.3 outlines separation distances from a fill point of a tank containing C1 combustible liquid. However, it is clarified that the fill points addressed by this requirement are limited to those used to fill drums, packages and tank vessels. Fill points for the tank are not addressed by this separation distance. The diesel fuel contained within this tank shall be used for the refilling of heavy vehicles (trucks). The concrete hardstand located West of the fuel storage tank has been designed to accommodate fuel dispensing. In accordance with Table 5.3 the separation distance from any fill point shall be equivalent to the diameter of the tank, but not greater than 7.5m or less than 3m.

The fuel storage is consistent with a horizontal circular storage tank with remote filling provisions. This is not explicitly addressed within AS1940 with clearances from fuel distribution equipment requiring consideration of Hazardous Zoning. Where dedicated fuel tankers are loaded a separation distance of 3m is applied and therefore a 3m separation distance from all points of the fuel dispensing are shall be adopted.

The separation distance of a tank containing C1 Combustible liquid from an office building or other habitable onsite building (in accordance with AS1940 Table 5.3) is determined by AS1940 Table 5.4, with the maximum separation distance to an onsite protected place not requiring to be greater than 7.5m (irrespective of storage volume).

AS1940 Table 5.4 provides the separation distances of storage tanks from protected places in 1m increments (15m with increments there after extending to every 5m). This separation distance is provided with respect to the volume of liquid stored. Where the liquid storage volume is between two values presented within Table 5.4, linear interpolation is used to determine the separation distance. For a tank storage volume of 71,598L (71.6m^3) the separation distance is 6.05m Refer Figure 3 for visual representation of the clearance requirement.

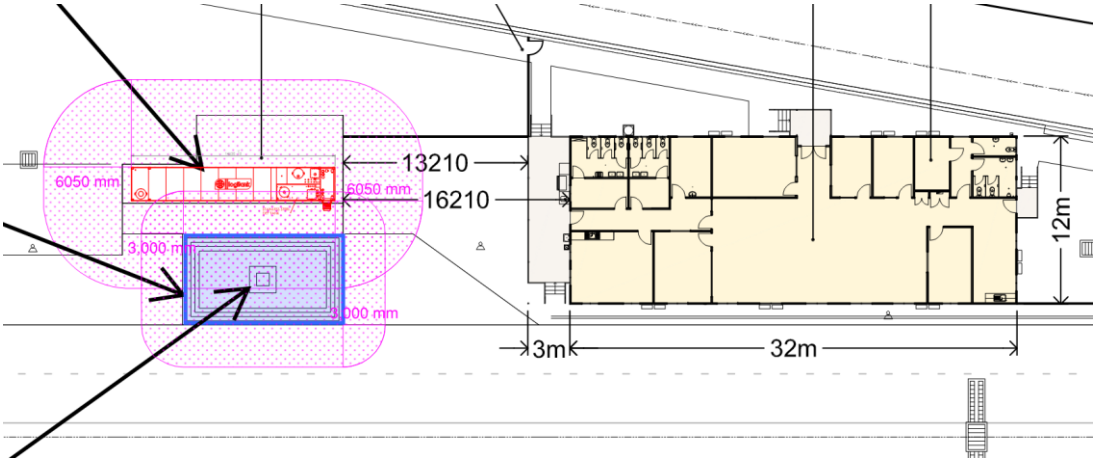

Figure 3 - Clearance Requirement Around Fuel Storage Tank.

FIRE SERVICES AND EQUIPMENT

AS1940 Section 11 provides the minimum Fire Protection requirements for the storage of flammable and combustible liquids depending on the type and capacity. Section 11.12 provides the fire protection requirements for above ground tanks having a capacity between 60m^3 and 2000m^3. Clause 11.12.4 specifically addresses the fire protection requirements of C1 combustible liquids, these comprise:

a. Fire Hose Reel with foam making capability, or

b. Two powder-type portable fire extinguishers where the travel distance to any fire extinguisher does not exceed 15m.

Refer the Lucid Services Design Report (ref LCE16341-028) for furth details on the fire protection system.

CONCLUSION AND RECOMMENDATIONS

The requirements presented in this assessment comprise an overview of the minimum requirements in accordance with the Australian Standard AS1940-2017 and have been prepared using the information available at the time of assessment. With the tank located in its current position, the minimum separation distances required by AS1940 have been achieved.

The following is recommended:

- Clear zone surrounding the fuel storage is presented on site as-constructed and operational documentation.
- Signage for fill point is suitability signed and identified.
- Clearance zones from any fill point is assessed and captured.

Please feel free to contact the undersigned should you have any queries.

Kind Regards
LUCID PROJECTS AUSTRALIA PTY LTD

ANDERSON CLAXTON
ASSOCIATE | NATIONAL FIRE ENGINEERING MANAGER

APPENDIX A – REFERENCE FUEL TANK DRAWING