Open Country Dairy Ltd
Waharoa

Stormwater Report

S&L CONSULTANTS LTD

Prepared by: S & L Consultants Ltd
Author: R P Woods
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1.0 Introduction

The Waharoa Open Country Dairy Ltd (OCDL) cheese and milk powder factory is located in the Waharoa Industrial Park west of State Highway 27 and the Kinleith Branch railway line. S & L Consultants Ltd have been engaged through Gwilym Environmental Services Ltd (GES) to review the existing stormwater reticulation and wetland and consider the effects of expansion of the buildings on site increasing the runoff rates and volumes. We have undertaken a limited topographical survey of the existing stormwater drainage and grassed areas, however some manholes were unable to be located during the time available.

For the rainfall runoff analysis we have used the Matamata Piako District Council Hirds numbers adjusted for climate change.

2.0 Site Description

The buildings are located on a flat area which mostly slopes gently to the east.

The balance of the area slopes to the west where the Waitoa River meanders past the property's western boundary. Stormwater runoff from other buildings located on Factory Road is collected and piped through the OCDL Property direct to the Waitao River.

A very small amount of runoff from the roadway between the LPG storage tank and the grass to the south discharges into this pipe via an oil and grit separator.

The stormwater runoff is collected from the building roofs and adjacent hardstand areas via catchpits and reticulation conveyed to the flow diverter and then to the treatment wetland which discharges to the Waitoa River.

The buildings vary significantly in height however the side yard areas are large so there is no rainfall shadow effects on any of the neighbouring properties.

The OCDL property occupies approximately 7.7 ha of which 3.4 ha is currently still in grass.

The offsite storage shed immediately east of the factory discharges a portion of its roof runoff into the OCDL reticulation along the north/south boundary road. This adds approximately 0.15 ha to the catchment area. There are two large wastewater ponds and adjacent multistage treatment plant which are located near the southwest corner of the property and south of the stormwater wetland.

The proposed works have been assessed from the Stiles and Hooker Drawing 14-177 SP 1 Option 6 Issue M.

3.0 Existing Stormwater Management

3.1 Layout

We have received a number of drawings which show the reticulation layout and in some cases pipe diameters, grades, and some invert levels. The Stiles and Hooker drawings provide the most recent information (2013) however some of the older OCDL drawings show some different layouts.

There are three basic reticulation systems part of which are shown on our drawing 21462 – D01:

The most northern one (Line B) runs east to west across the northern side of the offices and lunch room clear of the western side of the building (to MH B02) and connects to the central pipeline between the diversion box and the wetland at MH A04. This pipeline which services approximately 3000 m^2 of roof and hardstand area is capable of conveying a 10 minute duration storm in excess of a 1:100 year AEP storm.

There is no condensate discharging into this pipeline so a new section of 300 mm diameter pipeline was laid across the contour to a manhole just upstream of the wetland (MH B01 - MH A02).

The central system (Line A) collects the main access road, carparks and most of the road running north/south along the eastern boundary and runs between the various storage tanks, under the boiler no. 1 building to a manhole (MH A04) in the driveway near the lactose tanks where it turns to the diverter box and then down to the wetland.
The central pipeline servicing approximately 1.3 ha or more of roof and hardstand is undersized due to a very flat grade from the eastern access road MH A08 to the manhole above the diverter box MH A04.
The flow capacity is less than $1/6^{th}$ of a 1 : 2 year AEP storm.
The runoff from the factory entry road, carpark and all of the north/south access road is conveyed to this pipe and includes Lines C, D, and G.
Some also flows over the surface eastwards to Factory Road.
The layout is shown on S & L Drawing 21462 – D01 which is a combination of our surveyed data and data from Stiles and Hooker As built drawing last updated in 2013.

The third system (Line E) collects road runoff out from the tanker wash area and includes the ash bay and conveys runoff through an oil/grit separator to the pipeline which runs from Factory Road westwards and just south of the tanker wash to the Waitoa River south of the wastewater treatment plan.

Runoff from the roads past the LPG tank and tanker wash would appear to go direct to the Factory Road pipeline (Line F) and overland to the Waitoa River.

The diverter box (MH A03) is a concrete chamber containing a conductivity meter linked to the factory scada system. In the event of the conductivity exceeding 50 mill-siemens per metre a solenoid valve closes off the flow to the wetland and directs it into the wastewater pond and raises the alarm through the scada system in the operations room.

3.2 Management

OCDL have a stormwater discharge consent (109456) from Waikato Regional Council which requires treatment to the runoff and drier condensate via a stormwater wetland, monitoring of the conductivity, pH, BOD_5, suspended solids, hydrocarbons, turbidity, total Nitrogen and total Phosphorous.

GES have prepared a Stormwater Management Plan as required by the consent which outlines, the consent requirements, spill procedures and diversion in high turbidity incidents (greater than 50 milli-siemens per metre). There is a maximum volume of 340 m^3 of condensate in any 24 hour period discharged to the stormwater wetland but no other restrictions on flow rates or volumes. The condensate conductivity is not to exceed 2.5 milli siemens per metre.

The consent requires daily measurements of condensate volume and combined discharge from the wetland to be forwarded to the Waikato Regional Council quarterly along with the monthly condensate and combined discharge sample analysis.

The Waikato Regional Council require an annual report of the monitoring results and analyses and a comparison with previous results, improvement works and recommendations on altering the monitoring conditions.

3.3 Water Quality Volume

The Waikato Regional Council consent stipulates that the wetland shall have a minimum volume of 485m^3 with a forebay containing an additional 150 m^3 and that it be bunded to a height in excess of the 1:50 year Waitoa River flood height. Based on the Stiles and Hooker drawing S1 dated June 2007, confirmed by our survey, the above volumes have been met and an additional 1550 m^3 of storage is available before the pond spillway overflows.

Our analysis and calculations are based on the Auckland City TP10 Guideline and show that a WQV of 978 m^3 is required which includes a forebay volume of 147 m^3.

The Auckland City Guideline is based on 75% removal of sediment on the basis that a significant portion of the heavy metals and some hydrocarbons are adsorbed by the sediment particles and so rendered harmless to the environment.

4.0 Proposed Stormwater Management

4.1 Reticulation

The indications are that only relatively frequent occurring storms can be conveyed by the reticulation. The lower portions of the reticulation appear to be relatively deep so heading up can occur within the manholes increasing the head in the system and consequently the flow rate.

The existing reticulation has been assessed on the currently available information, and there is spare capacity in the northern pipeline.

The coolstore and canopy proposed on the western side will be overtop of the 225 mm diameter pipeline and some of the upper end of the 300 mm diameter pipeline.

We recommend that a new pipeline be constructed from the wetland towards the northern boundary and eastwards along the side of the new cheese factory either north or south of it (Line H, MH H01a – MH H05) The new MH H01a will need to be 1500mm diameter to accommodate the large diameter pipes coming through the wall. The north side of the new cheese plant route would allow the road

runoff to be collected and avoid the other services along the northern frontage of the existing administration building.

This pipeline would collect the new facilities runoff and the areas served by the existing pipeline which would then become redundant. The pipe sizes would vary from 225 mm at the new carpark to 600 mm as it approaches the wetland. The approximate pipeline route is shown on our drawing 21462 – D02. Where the existing pipeline is going to be under buildings and or driveways it should be removed and hardfill compacted in the trench.

The existing carpark and entry road runoff reticulation should be intercepted from the manhole A09 on the north side of the entry road that collects the catchpits from the road and carpark and conveyed into the new pipeline (MH H05) to reduce flows through the central pipeline. See S & L Drawing 21462-D02. MH A09 will need to be replaced with a 1200mm diameter one to accommodate the number of pipes coming into it and still retain the wall strength. The existing 225mm diameter outlet will then be sealed off separately.

The wetland will require cleaning out of the forebay and a dimension/condition check on the discharge structure and outlet pipeline to ensure there is capacity for the additional flows.

4.2 Management

Compliance with the Waikato Regional Council stormwater discharge consent conditions are to be adhered to at all times unless amendments are agreed to by the Council after 2 years of monitoring that shows that changes are appropriate.

On site management should consist of sucking out accumulated debris in all the catchpits on an annual basis unless proven longer time intervals can be maintained without any catchpits filling up to the outlet pipe invert level.

The flow diverter should be calibrated and operation checked at monthly intervals as set out in the Stormwater Management Plan 7.3 Maintenance. Consideration should be given to discharge existing and proposed roof runoff to a separate system to the river as this runoff will require little to no treatment and would provide extra capacity for treatment in the wetland.

4.3 Water Quality Volume

We understand that sampling and analysis of the results shows the stormwater and condensate discharges have been fully compliant to date. This would indicate that there is some spare capacity in the wetland for additional stormwater.

There are better species of wetland plants available which have a proven bio-remedial potential than the grasses currently being used. Should the quality of the discharge need to be improved then a change in the species should be carried out to reduce the monitored contaminant levels.

A further WQV analysis was carried out for the proposed expansions which would require a total of 1300m^3.

TP10 sets out a number of ways the WQV can be provided varying from no "wet" storage to 100% WQV "wet" storage. The method as constructed contains 639 m^3 of 'wet' storage and a further 1550 m^3 of additional storage.

The TP10 methodology does not provide for the additional treatment demands of the condensate contents, however given the relatively dense vegetation and storage volumes available the system appears adequate.

4.4 Discharge Rates

The theoretical calculated discharge rates in a 1:10 year storm of 10 minute duration (shortest period = highest runoff rate) will increase by 27 % to 1520 l/s once the proposed development is completed.

This is the calculated flow rate into the wetland area. The discharge rate out of the wetland and into the river has not been calculated as the details required for the outlets configuration, dimensions and levels are not known.

The stormwater discharge consent does not refer to any discharge rates and the direction of flow off the land to the river is continuing in the same direction as occurs currently. The increase in runoff rates compared to grass are attenuated in the wetland pond so the overall effect on the river is comparable to the current situation.

5.0 Conclusion

From our site inspection during steady light rain, the drawings supplied by OCDL and GES and the stormwater consent and management plan we consider the system is functioning adequately to meet the discharge consent criteria and safely convey stormwater away from the buildings.

We have not undertaken any condition surveys accept to note that the previously galvanised step irons set into the manhole walls have corroded to varying degrees some being unusable.

The central stormwater reticulation is under capacity so it if is practical, clean roof runoff from this area should be diverted to the new pipeline on the western side of the factory. This will relieve the flow into this pipeline but not significantly

The proposed carpark, administration building, cheese processing building, coolstores, adjacent canopy, new and existing roadways should have their runoff directed to a new collector pipe laid along the northern boundary falling east to west then south along the western edge of the proposed roads and buildings to the wetland.

The road runoff can be treated in suitable catch pits fitted with enviropods or similar devices before discharge into the new reticulation.

The surface runoff from the existing entry road and adjacent carparks should be connected to the new pipeline running east to west then south to the wetland.

To enable a condition survey and estimate of replacement timing a CCTV survey would be necessary. This would also assist in identifying positions of all connections to the main pipelines. We can provide an estimate of costs for this work and the reporting if desired.

Our drawing 21462-CA1a identifies the catchment typologies and total areas within the site as known to us at the time of writing.

Drawing 21467-CA1b shows the future development typologies for comparison.

6.0 Appendices

Drawing 21462 – CA 1a existing features

Drawing 21462 – CA 1B proposed development features

Drawing 21462 – D01 Existing Reticulation

Drawing 21462 – D02 Proposed Reticulation

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S&L CONSULTANTS LTD

Prepared by: S & L Consultants Ltd
Author: R P Woods
Ref: 21462
Date: 12 April 2016
Revised 11 July 2016

Surveyed Lines

Adopted from S&H Asbuilts

CKD BY	REV No.	DESCRIPTION	DATE

	NAME	DATE	SIGNED
Surveyed			
Designed			
Drawn	NP	07/16	
Checked			
Approved			

References

S & L CONSULTANTS LTD
S & L CONSULTANTS LT
SURVEYORS – ENGINEERS – PLANNER
102 Hamilton Street, Tauranga, New Zeal
P.O. Box 231 Ph.(07)577–6069
Fax(07)577–6065
Email: slconsultants@sltga.co.nz
Web Site: www.sltga.co.nz

Title

Open Country Dairy Ltd Waharoa As Built

Existing Reticulation Surveyed 2016

Original Scales @ A3	Date
1:1500 Do Not Scale Dimensions	07/16
Drawing No: 21462 - D01	Revision: 1

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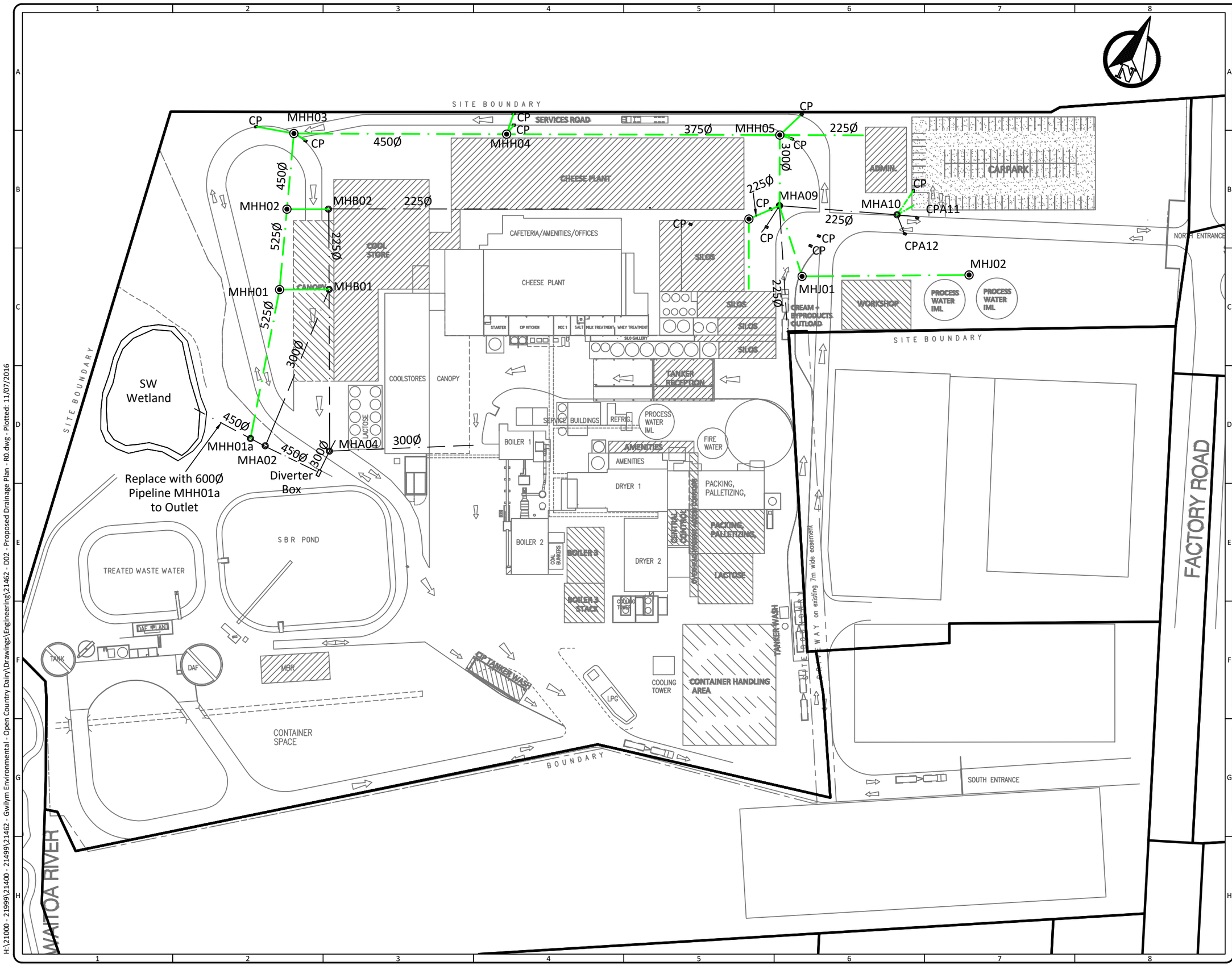

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	NAME	DATE	SIGNED
Surveyed			
Designed			
Drawn	NP	07/16	
Checked			
Approved			

References

21462-D01 Existing reticulation layout S&H 12-278 D1-1 B

S & L CONSULTANTS LTD
SURVEYORS - ENGINEERS - PLANNERS
102 Hamilton Street, Tauranga, New Zealand
P.O. Box 231 Ph.(07)577-6069
Fax(07)577-6065
Email: slconsultants@sltga.co.nz
Web Site: www.sltga.co.nz

Title

Open Country Dairy Ltd Waharoa

Proposed Reticulation

Original Scales @ A3	Date
1:1250	07/16
Do Not Scale Dimensions	
Drawing No	Revision
21462 - D02	1

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