



APPENDIX A: GLOSSARY

Taken from the Floodplain Development Manual (April 2005 edition)

acid sulfate soils	Are sediments which contain sulfidic mineral pyrite which may become extremely acid following disturbance or drainage as sulfur compounds react when exposed to oxygen to form sulfuric acid. More detailed explanation and definition can be found in the NSW Government Acid Sulfate Soil Manual published by Acid Sulfate Soil Management Advisory Committee.
Annual Exceedance Probability (AEP)	The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 m ³ /s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500 m ³ /s or larger event occurring in any one year (see ARI).
Australian Height Datum (AHD)	A common national surface level datum approximately corresponding to mean sea level.
Average Annual Damage (AAD)	Depending on its size (or severity), each flood will cause a different amount of flood damage to a flood prone area. AAD is the average damage per year that would occur in a nominated development situation from flooding over a very long period of time.
Average Recurrence Interval (ARI)	The long term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
caravan and moveable home parks	Caravans and moveable dwellings are being increasingly used for long-term and permanent accommodation purposes. Standards relating to their siting, design, construction and management can be found in the Regulations under the LG Act.
catchment	The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.
consent authority	The Council, Government agency or person having the function to determine a development application for land use under the EP&A Act. The consent authority is most often the Council, however legislation or an EPI may specify a Minister or public authority (other than a Council), or the Director General of DIPNR, as having the function to determine an application.
development	<p>Is defined in Part 4 of the Environmental Planning and Assessment Act (EP&A Act).</p> <p>infill development: refers to the development of vacant blocks of land that are generally surrounded by developed properties and is permissible under the current zoning of the land. Conditions such as minimum floor levels may be imposed on infill development.</p> <p>new development: refers to development of a completely different nature to that associated with the former land use. For example, the urban subdivision of an area previously used for rural purposes. New developments involve rezoning and typically require major extensions of existing urban services, such as roads, water supply, sewerage and electric power.</p> <p>redevelopment: refers to rebuilding in an area. For example, as urban areas age, it may become necessary to demolish and reconstruct buildings on a relatively large scale. Redevelopment generally does not require either rezoning or major extensions to urban services.</p>
disaster plan (DISPLAN)	A step by step sequence of previously agreed roles, responsibilities, functions, actions and management arrangements for the conduct of a single or series of

	connected emergency operations, with the object of ensuring the coordinated response by all agencies having responsibilities and functions in emergencies.
discharge	The rate of flow of water measured in terms of volume per unit time, for example, cubic metres per second (m ³ /s). Discharge is different from the speed or velocity of flow, which is a measure of how fast the water is moving for example, metres per second (m/s).
ecologically sustainable development (ESD)	Using, conserving and enhancing natural resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be maintained or increased. A more detailed definition is included in the Local Government Act 1993. The use of sustainability and sustainable in this manual relate to ESD.
effective warning time	The time available after receiving advice of an impending flood and before the floodwaters prevent appropriate flood response actions being undertaken. The effective warning time is typically used to move farm equipment, move stock, raise furniture, evacuate people and transport their possessions.
emergency management	A range of measures to manage risks to communities and the environment. In the flood context it may include measures to prevent, prepare for, respond to and recover from flooding.
flash flooding	Flooding which is sudden and unexpected. It is often caused by sudden local or nearby heavy rainfall. Often defined as flooding which peaks within six hours of the causative rain.
flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse, and/or coastal inundation resulting from super-elevated sea levels and/or waves overtopping coastline defences excluding tsunami.
flood awareness	Flood awareness is an appreciation of the likely effects of flooding and a knowledge of the relevant flood warning, response and evacuation procedures.
flood education	Flood education seeks to provide information to raise awareness of the flood problem so as to enable individuals to understand how to manage themselves and their property in response to flood warnings and in a flood event. It invokes a state of flood readiness.
flood fringe areas	The remaining area of flood prone land after floodway and flood storage areas have been defined.
flood liable land	Is synonymous with flood prone land (i.e. land susceptible to flooding by the probable maximum flood (PMF) event). Note that the term flood liable land covers the whole of the floodplain, not just that part below the flood planning level (see flood planning area).
flood mitigation standard	The average recurrence interval of the flood, selected as part of the floodplain risk management process that forms the basis for physical works to modify the impacts of flooding.
floodplain	Area of land which is subject to inundation by floods up to and including the probable maximum flood event, that is, flood prone land.
floodplain risk management options	The measures that might be feasible for the management of a particular area of the floodplain. Preparation of a floodplain risk management plan requires a detailed evaluation of floodplain risk management options.
floodplain risk management plan	A management plan developed in accordance with the principles and guidelines in this manual. Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.

flood plan (local)	A sub-plan of a disaster plan that deals specifically with flooding. They can exist at State, Division and local levels. Local flood plans are prepared under the leadership of the State Emergency Service.
flood planning area	The area of land below the flood planning level and thus subject to flood related development controls. The concept of flood planning area generally supersedes the 'flood liable land' concept in the 1986 Manual.
Flood Planning Levels (FPLs)	FPLs are the combinations of flood levels (derived from significant historical flood events or floods of specific AEPs) and freeboards selected for floodplain risk management purposes, as determined in management studies and incorporated in management plans. FPLs supersede the 'standard flood event' in the 1986 manual.
flood proofing	A combination of measures incorporated in the design, construction and alteration of individual buildings or structures subject to flooding, to reduce or eliminate flood damages.
flood prone land	Is land susceptible to flooding by the Probable Maximum Flood (PMF) event. Flood prone land is synonymous with flood liable land.
flood readiness	Flood readiness is an ability to react within the effective warning time.
flood risk	<p>Potential danger to personal safety and potential damage to property resulting from flooding. The degree of risk varies with circumstances across the full range of floods. Flood risk in this manual is divided into 3 types, existing, future and continuing risks. They are described below.</p> <p>existing flood risk: the risk a community is exposed to as a result of its location on the floodplain.</p> <p>future flood risk: the risk a community may be exposed to as a result of new development on the floodplain.</p> <p>continuing flood risk: the risk a community is exposed to after floodplain risk management measures have been implemented. For a town protected by levees, the continuing flood risk is the consequences of the levees being overtopped. For an area without any floodplain risk management measures, the continuing flood risk is simply the existence of its flood exposure.</p>
flood storage areas	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. Hence, it is necessary to investigate a range of flood sizes before defining flood storage areas.
floodway areas	Those areas of the floodplain where a significant discharge of water occurs during floods. They are often aligned with naturally defined channels. Floodways are areas that, even if only partially blocked, would cause a significant redistribution of flood flows, or a significant increase in flood levels.
freeboard	Freeboard provides reasonable certainty that the risk exposure selected in deciding on a particular flood chosen as the basis for the FPL is actually provided. It is a factor of safety typically used in relation to the setting of floor levels, levee crest levels, etc. Freeboard is included in the flood planning level.
habitable room	<p>in a residential situation: a living or working area, such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom.</p> <p>in an industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to flood damage in the event of a flood.</p>
hazard	A source of potential harm or a situation with a potential to cause loss. In relation to this manual the hazard is flooding which has the potential to cause damage to

	the community. Definitions of high and low hazard categories are provided in the Manual.
hydraulics	Term given to the study of water flow in waterways; in particular, the evaluation of flow parameters such as water level and velocity.
hydrograph	A graph which shows how the discharge or stage/flood level at any particular location varies with time during a flood.
hydrology	Term given to the study of the rainfall and runoff process; in particular, the evaluation of peak flows, flow volumes and the derivation of hydrographs for a range of floods.
local overland flooding	Inundation by local runoff rather than overbank discharge from a stream, river, estuary, lake or dam.
local drainage	Are smaller scale problems in urban areas. They are outside the definition of major drainage in this glossary.
mainstream flooding	Inundation of normally dry land occurring when water overflows the natural or artificial banks of a stream, river, estuary, lake or dam.
major drainage	<p>Councils have discretion in determining whether urban drainage problems are associated with major or local drainage. For the purpose of this manual major drainage involves:</p> <ul style="list-style-type: none"> • the floodplains of original watercourses (which may now be piped, channelised or diverted), or sloping areas where overland flows develop along alternative paths once system capacity is exceeded; and/or • water depths generally in excess of 0.3 m (in the major system design storm as defined in the current version of Australian Rainfall and Runoff). These conditions may result in danger to personal safety and property damage to both premises and vehicles; and/or • major overland flow paths through developed areas outside of defined drainage reserves; and/or • the potential to affect a number of buildings along the major flow path.
mathematical/computer models	The mathematical representation of the physical processes involved in runoff generation and stream flow. These models are often run on computers due to the complexity of the mathematical relationships between runoff, stream flow and the distribution of flows across the floodplain.
merit approach	<p>The merit approach weighs social, economic, ecological and cultural impacts of land use options for different flood prone areas together with flood damage, hazard and behaviour implications, and environmental protection and well being of the State=s rivers and floodplains.</p> <p>The merit approach operates at two levels. At the strategic level it allows for the consideration of social, economic, ecological, cultural and flooding issues to determine strategies for the management of future flood risk which are formulated into Council plans, policy and EPIs. At a site specific level, it involves consideration of the best way of conditioning development allowable under the floodplain risk management plan, local floodplain risk management policy and EPIs.</p>
minor, moderate and major flooding	<p>Both the State Emergency Service and the Bureau of Meteorology use the following definitions in flood warnings to give a general indication of the types of problems expected with a flood:</p> <p>minor flooding: causes inconvenience such as closing of minor roads and the submergence of low level bridges. The lower limit of this class of flooding on the reference gauge is the initial flood level at which landholders and townspeople</p>

	<p>begin to be flooded.</p> <p>moderate flooding: low-lying areas are inundated requiring removal of stock and/or evacuation of some houses. Main traffic routes may be covered.</p> <p>major flooding: appreciable urban areas are flooded and/or extensive rural areas are flooded. Properties, villages and towns can be isolated.</p>
modification measures	Measures that modify either the flood, the property or the response to flooding. Examples are indicated in Table 2.1 with further discussion in the Manual.
peak discharge	The maximum discharge occurring during a flood event.
Probable Maximum Flood (PMF)	The PMF is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation, and where applicable, snow melt, coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain. The extent, nature and potential consequences of flooding associated with a range of events rarer than the flood used for designing mitigation works and controlling development, up to and including the PMF event should be addressed in a floodplain risk management study.
Probable Maximum Precipitation (PMP)	The PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year, with no allowance made for long-term climatic trends (World Meteorological Organisation, 1986). It is the primary input to PMF estimation.
probability	A statistical measure of the expected chance of flooding (see AEP).
risk	Chance of something happening that will have an impact. It is measured in terms of consequences and likelihood. In the context of the manual it is the likelihood of consequences arising from the interaction of floods, communities and the environment.
runoff	The amount of rainfall which actually ends up as streamflow, also known as rainfall excess.
stage	Equivalent to $A_{\text{water level}}$. Both are measured with reference to a specified datum.
stage hydrograph	A graph that shows how the water level at a particular location changes with time during a flood. It must be referenced to a particular datum.
survey plan	A plan prepared by a registered surveyor.
water surface profile	A graph showing the flood stage at any given location along a watercourse at a particular time.
wind fetch	The horizontal distance in the direction of wind over which wind waves are generated.



COUNCIL REFERENCE: 28112E (D15/274459)
CONTACT PERSON: Kate Britton
DATE: 23 September 2015

STEVEN RICHARDSON
PO Box 738
Nowra NSW 2541

Thank you for your recent inquiry in relation to flood data held by Shoalhaven City Council.

Please find below the original details of your inquiry, some general information on flooding as well as the requested property specific Flood Certificate.

Details of Inquiry:

Name of Inquirer	STEVEN RICHARDSON	Date Requested: 14 Sep 2015
Reason for Enquiry	New Construction	
Contact Details	Phone: 44236198 Email: steve@cowmanstoddart.com.au Postal: PO Box 738 Nowra	
Preferred Response	Email	
Notes		
Survey Detail	Not Provided	
Flood Safety Tip	Causeways can kill! Never drive through flood waters! Wait and be safe!	
General Flood Information	Shoalhaven City Council in conjunction with SES has produced site specific flood brochures for Shoalhaven Heads, Nowra / Bomaderry / Terara, Greenwell Point/Orient Point and Sussex Inlet. General Flood Information booklets, such as "What to do before, during & after a flood" prepared by Emergency Management Australia are also available. You can pick up free copies of all brochures at the City Administration Building in Nowra.	

FLOOD CERTIFICATE

According to the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Assessment (2011)* this property, Bolong Rd, BOMADERRY - Lot 2 DP 538289, **is affected by the 1% AEP flood event.**

FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	Not applicable	6.1m AHD	6.2m AHD

Hazard Category	High	High	High
Hydraulic Category	Flood Storage	Flood Storage	Flood Storage

Probable Maximum Flood Level	7.9m AHD	7.9m AHD	7.9m AHD
1% AEP Flood Level	5.6m AHD	5.6m AHD	5.7m AHD
2% AEP Flood Level	5.2m AHD	5.2m AHD	5.2m AHD
5% AEP Flood Level	4.7m AHD	4.7m AHD	4.7m AHD
10% AEP Flood Level	3.4m AHD	3.4m AHD	3.5m AHD

Velocity (1% AEP flood event)	1.0m/s	0.9m/s	0.9m/s
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SITE SPECIFIC CONSIDERATIONS

Current NSW Government legislation requires climate change to be considered as part of this Floodplain Risk Management Study and Plan. Climate change related information evolves with time and it is expected that existing flood behaviour and levels may change in the future.

All applications for buildings, and the like, must take into account the projected 2050 flood information. All subdivision and other long-term planning must take into account the projected 2100 flood information.

On Tuesday 10th February 2015 Council's Policy & Resources Committee resolved to "Establish a sea level rise benchmarks for planning purposes based on a 2030 horizon 100 mm, a 2050 horizon of 230 mm and 360 mm horizon for 2100".

These benchmarks vary from the benchmarks used in the flood information provided above (400mm and 900mm for the 2050 and 2100 horizon's respectively). The new benchmarks will be incorporated into the flood information in future. Until studies incorporating the new benchmarks are undertaken, however, Council will continue to use our best available information.

STANDARD CONSIDERATIONS

Properties below the Flood Planning Level:

Council considers the land in question to be below the flood planning level and therefore subject to flood related development controls. The conditions as set out below will reduce

flood risk in flood events up to the Flood Planning Level, however the property may still be subject to flooding at higher levels during rare flood events.

Development controls apply to flood affected properties.

Development conditions will vary depending on flood hazard, hydraulic category as well as the type of development that is proposed. Please refer to the following documents for information on Council's flood related development controls and the NSW State Government's Floodprone Land Policy.

- Shoalhaven Development Control Plan – Chapter 9: Development on Flood Prone Land <http://dcp2014.shoalhaven.nsw.gov.au/main-category/whole-document>
- NSW Floodplain Development Manual 2005:
<http://www.environment.nsw.gov.au/floodplains/manual.htm>

DISCLAIMER

Your enquiry relating to the likelihood of the land specified in the application being flooded has been referred to the Council's Floodplain Engineer.

In responding to your application the Council seeks to bring to your attention the fact that pursuant to s.733 of the Local Government Act a council does not incur liability in respect of the giving of any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding.

The Council does not have a legal obligation to provide advice to you and to the extent that this reply is giving advice, the Council provides that advice in good faith with the intention of preserving, so far as is legally possible, the Council's immunity from liability pursuant to s.733 of the Local Government Act.

While all reasonable care has been taken to ensure the accuracy of the information given in this reply, its purpose is to provide a general indication of flood risk in the area. Flood lines shown on Council maps indicate the approximate extent of flooding only in relation to the abovementioned land.

The information provided may contain errors or omissions and the accuracy may not suit the purposes of all users. A site survey and further investigation are strongly recommended before commencement of any project based on this data.

The information given is the most current information at the time of the request. It is to be noted, however, that flood information is constantly reviewed and updated and as such, the information contained in this regard is current only on the day of issue.

Before acting upon the information provided in this reply, the Council urges you to obtain separate and independent advice as Council, in giving this information, does not intend it to be relied upon in such a fashion as to impose liability upon the Council.

Should you not be prepared to accept the information contained in this reply upon that basis then you should immediately notify Council.

GLOSSARY

AEP (Annual Exceedance Probability) means the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage – for example a 1% AEP flood event has a 1% chance of occurring in any one calendar year.

AHD (Australian Height Datum) is a common national surface level datum corresponding approximately to mean sea level.

Flood fringe is the part of the floodplain remaining after the floodway and flood storage areas have been defined.

Flood planning area is any land identified as being flood affected in the 1% AEP flood event plus freeboard.

Flood planning level (FPL) is the 1% AEP flood level plus freeboard. The FPL is used for planning purposes, as determined in floodplain risk management studies and incorporated in floodplain risk management plans.

Flood prone land means any land susceptible to flooding up to the probable maximum flood event (that is, land within the floodplain) as identified in an adopted Council flood study or floodplain risk management study and plan.

Flood storage areas are those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood.

Flood study is a technical investigation of flood behaviour. It defines the nature of flood risk by establishing the extent, level and velocity of floodwaters. The study also provides information on the distribution of flood flows across various sections of the flood plain for the full range of flood events up to and including the PMF.

Floodplain risk management plan is a plan developed in accordance with the principles and guidelines contained in the NSW Government Floodplain Management Manual. Usually includes both written and diagrammatic information describing how particular areas of flood prone land are to be used and managed to achieve defined objectives.

Floodplain risk management study is a study that identifies and compares various risk management options. This includes an assessment of their social, economic, ecological and cultural impacts, together with opportunities to maintain and enhance river and floodplain environments.

Floodway means those parts of the floodplain where a significant discharge of water occurs during floods. They are often aligned with natural defined channels. Floodway's are areas that, even if only partially blocked, would cause a significant redistribution of flood flow, or a significant increase in flood levels.

Freeboard is currently 0.5m for all catchments in the Shoalhaven. Freeboard is a factor of safety used to set the FPL (i.e. $FPL = 1\% \text{ AEP flood level plus freeboard (0.5m)}$). Freeboard takes into account uncertainties in flood modelling and climate change predictions, local factors that cannot be included in the flood model or wave action caused by wind, boats or vehicles driving through flood waters.

Hazard category represents the risk or danger to personal safety, evacuation movements and buildings and structures within the Flood Planning Area during the 1% AEP flood. There are only two possible hazard categories – high or low.

Hydraulic category describes the function of a specific part of the Flood Planning Area in conveying flood waters during a 1% AEP flood. There are three possible hydraulic categories – floodway, flood storage or flood fringe.

Probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.

Provisional is used for hazard categories that have been determined in a flood study. Hazard categories are provisional until the floodplain risk management study and plan has been completed and adopted by Council, as this document considers additions risks, not considered during the flood study.

COUNCIL REFERENCE: 28112E (D15/274463)
CONTACT PERSON: Kate Britton
DATE: 23 September 2015

STEVEN RICHARDSON
PO Box 738
Nowra NSW 2541

Thank you for your recent inquiry in relation to flood data held by Shoalhaven City Council.

Please find below the original details of your inquiry, some general information on flooding as well as the requested property specific Flood Certificate.

Details of Inquiry:

Name of Inquirer	STEVEN RICHARDSON	Date Requested: 14 Sep 2015
Reason for Enquiry	New Construction	
Contact Details	Phone: 44236198 Email: steve@cowmanstoddart.com.au Postal: PO Box 738 Nowra	
Preferred Response	Email	
Notes		
Survey Detail	Not Provided	
Flood Safety Tip	Causeways can kill! Never drive through flood waters! Wait and be safe!	
General Flood Information	Shoalhaven City Council in conjunction with SES has produced site specific flood brochures for Shoalhaven Heads, Nowra / Bomaderry / Terara, Greenwell Point/Orient Point and Sussex Inlet. General Flood Information booklets, such as "What to do before, during & after a flood" prepared by Emergency Management Australia are also available. You can pick up free copies of all brochures at the City Administration Building in Nowra.	

FLOOD CERTIFICATE

According to the *Lower Shoalhaven River Floodplain Risk Management Plan – Climate Change Assessment (2011)* this property, Railway St, BOMADERRY - Lot 16 DP 1121337, is affected by the **1% AEP flood event**.

FLOOD INFORMATION

Year	Existing	Projected 2050	Projected 2100
Flood Planning Level	Not applicable	6.2m AHD	6.3m AHD

Hazard Category	High	High	High
Hydraulic Category	Flood Storage	Flood Storage	Flood Storage

Probable Maximum Flood Level	8.0m AHD	8.0m AHD	8.0m AHD
1% AEP Flood Level	5.7m AHD	5.7m AHD	5.8m AHD
2% AEP Flood Level	5.3m AHD	5.3m AHD	5.3m AHD
5% AEP Flood Level	4.8m AHD	4.8m AHD	4.8m AHD
10% AEP Flood Level	3.4m AHD	3.4m AHD	3.5m AHD

Velocity (1% AEP flood event)	1.0m/s	0.9m/s	0.9m/s
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SITE SPECIFIC CONSIDERATIONS

1. Current NSW Government legislation requires climate change to be considered as part of this Floodplain Risk Management Study and Plan. Climate change related information evolves with time and it is expected that existing flood behaviour and levels may change in the future.
All applications for buildings, and the like, must take into account the projected 2050 flood information. All subdivision and other long-term planning must take into account the projected 2100 flood information.
On Tuesday 10th February 2015 Council's Policy & Resources Committee resolved to "Establish a sea level rise benchmarks for planning purposes based on a 2030 horizon 100 mm, a 2050 horizon of 230 mm and 360 mm horizon for 2100".
These benchmarks vary from the benchmarks used in the flood information provided above (400mm and 900mm for the 2050 and 2100 horizon's respectively). The new benchmarks will be incorporated into the flood information in future. Until studies incorporating the new benchmarks are undertaken, however, Council will continue to use our best available information.
2. Not all of the property is categorised high hazard flood storage. Part of the property is categorised low hazard flood storage and part of the property is above the flood planning level. For more specific information regarding the different hazard and hydraulic categorisations affecting this property please contact Council's Natural Resource and Floodplain Unit.

STANDARD CONSIDERATIONS

Properties below the Flood Planning Level:

Council considers the land in question to be below the flood planning level and therefore subject to flood related development controls. The conditions as set out below will reduce flood risk in flood events up to the Flood Planning Level, however the property may still be subject to flooding at higher levels during rare flood events.

Development controls apply to flood affected properties.

Development conditions will vary depending on flood hazard, hydraulic category as well as the type of development that is proposed. Please refer to the following documents for information on Council's flood related development controls and the NSW State Government's Floodprone Land Policy.

- Shoalhaven Development Control Plan – Chapter 9: Development on Flood Prone Land <http://dcp2014.shoalhaven.nsw.gov.au/main-category/whole-document>
- NSW Floodplain Development Manual 2005: <http://www.environment.nsw.gov.au/floodplains/manual.htm>

DISCLAIMER

Your enquiry relating to the likelihood of the land specified in the application being flooded has been referred to the Council's Floodplain Engineer.

In responding to your application the Council seeks to bring to your attention the fact that pursuant to s.733 of the Local Government Act a council does not incur liability in respect of the giving of any advice furnished in good faith by the Council relating to the likelihood of any land being flooded or the nature or extent of any such flooding.

The Council does not have a legal obligation to provide advice to you and to the extent that this reply is giving advice, the Council provides that advice in good faith with the intention of preserving, so far as is legally possible, the Council's immunity from liability pursuant to s.733 of the Local Government Act.

While all reasonable care has been taken to ensure the accuracy of the information given in this reply, its purpose is to provide a general indication of flood risk in the area. Flood lines shown on Council maps indicate the approximate extent of flooding only in relation to the abovementioned land.

The information provided may contain errors or omissions and the accuracy may not suit the purposes of all users. A site survey and further investigation are strongly recommended before commencement of any project based on this data.

The information given is the most current information at the time of the request. It is to be noted, however, that flood information is constantly reviewed and updated and as such, the information contained in this regard is current only on the day of issue.

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Hydraulic category describes the function of a specific part of the Flood Planning Area in conveying flood waters during a 1% AEP flood. There are three possible hydraulic categories – floodway, flood storage or flood fringe.

Probable maximum flood (PMF) is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation. Generally, it is not physically or economically possible to provide complete protection against this event. The PMF defines the extent of flood prone land, that is, the floodplain.

Provisional is used for hazard categories that have been determined in a flood study. Hazard categories are provisional until the floodplain risk management study and plan has been completed and adopted by Council, as this document considers additional risks, not considered during the flood study.

3. CONCLUSIONS

3.1 Proposed Development

For the reasons detailed above, and as agreed in consultation with Council and DLWC, hydraulic modelling of the proposed development has not been undertaken. There is a need however, to consider (amongst other things) the flood hazard and structural assessment (with regard to velocity of floodwaters and impact by flood debris) of the proposed development. In quantifying the flood hazard, some important issues for consideration include:

- damage to the plant, including as a result of flood debris or structural failure,
- damage to the plant due to the possible buoyancy of equipment,
- malfunction of the plant (or any services on which the plant relies for operation) as a result of inundation and the associated risk of such malfunction to other users of the floodplain,
- access and evacuation.

3.2 Future Development

In consultation with Council and the DLWC, it is agreed that any future development of the Manildra Starches Plant within the intensively built-up area, as defined on Figures 2 and 4, will not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects. The hydraulic impacts and cumulative effects of such developments are considered to be insignificant given the intensive development already present. As mentioned in previous sections, the only opportunity for floodwaters to pass through the intensively built-up area of the site is through the limited number of gaps or openings between the plant and associated buildings. Although these gaps or openings may be relocated to accommodate any future development, the movement of overland floodwaters will never be completely blocked, as gaps or openings similar to those which currently exist will always be maintained for trafficability requirements.

Any proposed future development is not exempt from flood hazard and structural assessment as outlined in Section 3.1

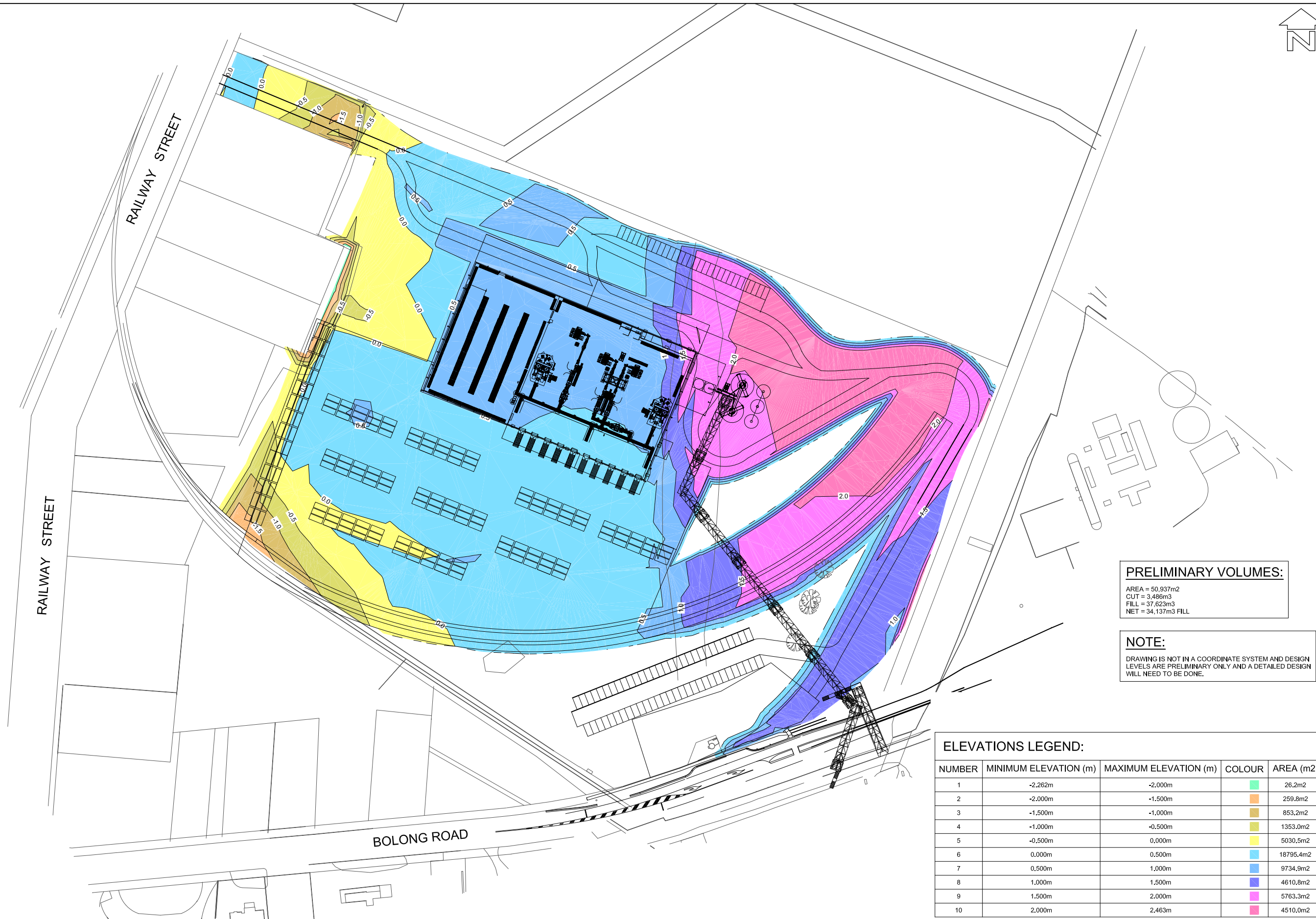
3.3 Future Development on the Northern Floodplain

This study has identified that there is no need for hydraulic modelling of the proposed, or any future proposed development within the existing intensively built-up area of the Manildra Starches Plant (shown on Figures 2 and 4). However during the course of this investigation, and in consultation with Council and the DLWC, it should be noted that any further development upon the northern floodplain (outside the built-up area shown on Figures 2 and 4), and in particular any development adjacent to the river bank, has the potential to increase the cumulative impact on flood levels and velocities.

The main areas of concern on the northern river bank are the unrestricted low lying areas between high ground and the existing developments, termed flowpaths or floodways. The bank is relatively







PRELIMINARY VOLUMES:

AREA = 50,937m²
CUT = 3,486m³
FILL = 37,623m³
NET = 34,137m³ FILL

NOTE:

DRAWING IS NOT IN A COORDINATE SYSTEM AND DESIGN LEVELS ARE PRELIMINARY ONLY AND A DETAILED DESIGN WILL NEED TO BE DONE.

ELEVATIONS LEGEND:

NUMBER	MINIMUM ELEVATION (m)	MAXIMUM ELEVATION (m)	COLOUR	AREA (m ²)
1	-2.262m	-2.000m		26.2m ²
2	-2.000m	-1.500m		259.8m ²
3	-1.500m	-1.000m		853.2m ²
4	-1.000m	-0.500m		1353.0m ²
5	-0.500m	0.000m		5030.5m ²
6	0.000m	0.500m		18795.4m ²
7	0.500m	1.000m		9734.9m ²
8	1.000m	1.500m		4610.8m ²
9	1.500m	2.000m		5763.3m ²
10	2.000m	2.463m		4510.0m ²

LAYOUT PLAN
SCALE 1:800

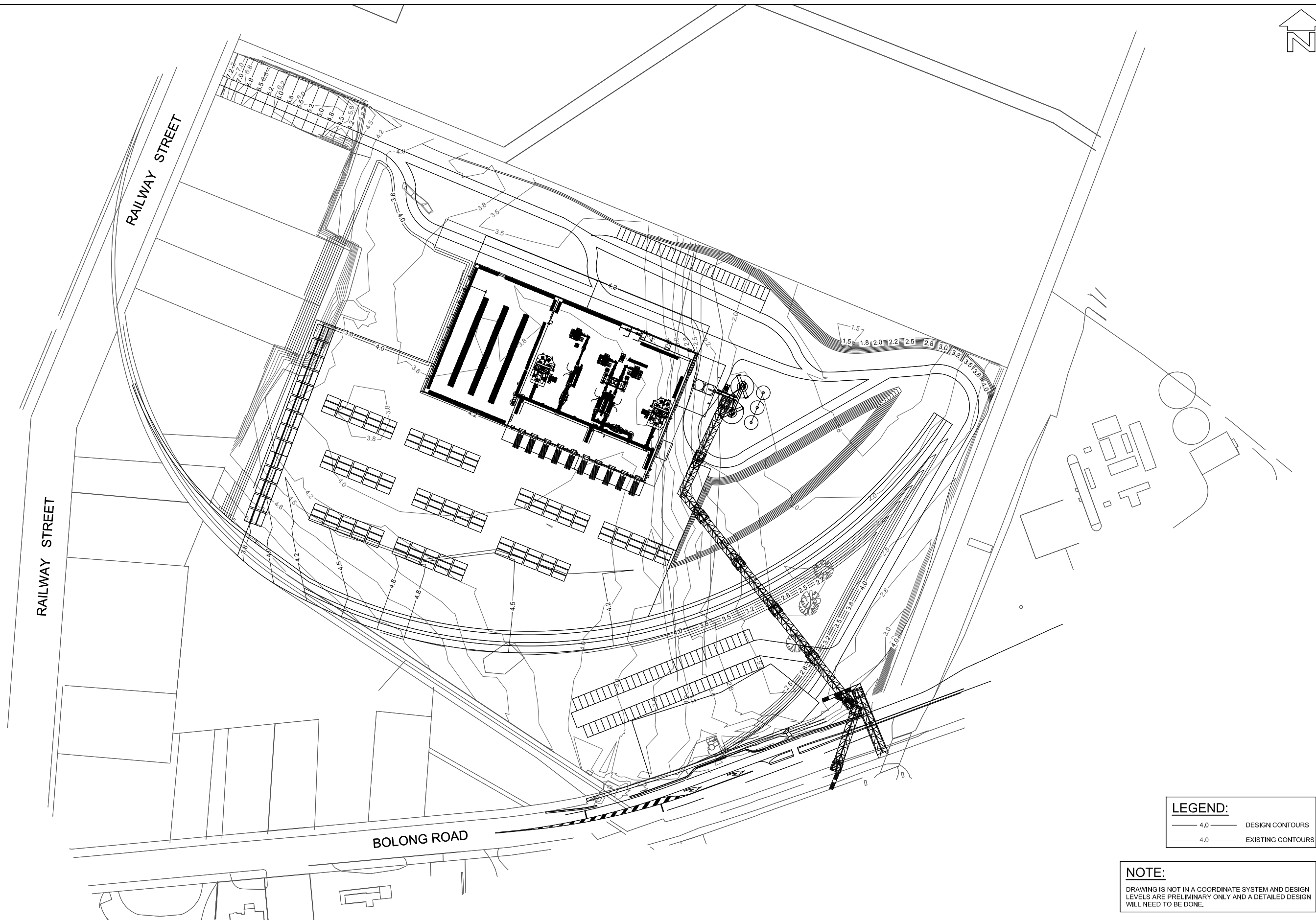
0 10 20 30 40 50
SCALE: 1:800



BEWARE!
THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE, AT THE CONTRACTOR'S EXPENSE, FOR ANY REPAIRS TO DAMAGE CAUSED DURING CONSTRUCTION.

DIAL BEFORE YOU DIG
www.1100.com.au

RATIO: 1:800 (AT A1 ORIGINAL)	DATUM: AUSTRALIAN HEIGHT DATUM	SURVEY	APS	REV	DESCRIPTION	BY	DATE	 allen price & scarratts land and development consultants Head Office: 75 Plunkett Street, Nowra NSW 2541 Kilma Branch: 5/125 Terralong Street, Kilma NSW 2533 phone: (02) 4421 6544 fax: (02) 4422 1821 consultants@allenprice.com.au www.allenprice.com.au	PROPOSED MODIFICATION APPLICATION FOR PACKING FACILITY, MANILDRA - SHOALHAVEN STARCHES PTY LTD PRELIMINARY BULK EARTHWORKS SHADING LAYOUT PLAN FOR THE MANILDRA GROUP	DRAWING STATUS PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES		
	ORIGIN: SSM RL	DESIGN	CJG	=						DRAWING NUMBER 25003-200_S01	SHEET 1 OF 1	REVISION P2
		DRAWN	CJG									
	DATE OF PLAN: DECEMBER 2015	CHECK'D	MP									



4.0 DESIGN CONTOURS

4.0 EXISTING CONTOURS

DRAWING IS NOT IN A COORDINATE SYSTEM AND DESIGN LEVELS ARE PRELIMINARY ONLY AND A DETAILED DESIGN WILL NEED TO BE DONE.



THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL BE RESPONSIBLE, AT THE CONTRACTOR'S EXPENSE, FOR ANY REPAIRS TO DAMAGE CAUSED DURING CONSTRUCTION.



aps allen price & scarratts
land and development consultants
Head Office: 75 Plunkett Street, Nowra NSW 2541
Kiama Branch: 5/125 Terralong Street, Kiama NSW 2533
phone: (02) 4421 6544 fax: (02) 4422 1822
consultants@allenprice.com.au www.allenprice.com.au

PRELIMINARY CONTOUR LAYOUT PLAN FOR THE MANILDRA GROUP

DRAWING NUMBER	SHEET	1	REVISION
25003-200_S02	OF	1	P2

EXISTING — BLACK.
APPROVED MODIFIED PROPOSAL—RED
APPROVED & YET TO BE CONSTRUCTED—BLUE.



143.75M
SETBACK

MANILDRA

PROPOSED EXTENSION
OF EXISTING GANTRY.

DRYER #5.
SEPARATE
MODIFICATION
APPLICATION

CAR PARK
ENTRY
VIA APPROVED
ENTRY.

31.38M
SETBACK

SOUTH COAST RAILWAY
STREET

APPROVED
CONTAINER
STORAGE
AREA.

PROPOSED TEMPORARY CAR PARK
FOR CONST. OF PRODUCT DRYER
MODIFICATION.

APPROVED
WEIGHBRIDGE

APPROVED
EXIT.

EASEMENT

PROPOSED
SILOS.

APPROVED
RAIL LINE
AND ROADWAY.

125M
SETBACK

88M
SETBACK

MANILDRA LAND

PROPOSED NEW
RAIL LINE.

RE-VEGETATION ALONG
DRAIN BANK.

PROPOSED
WEIGHBRIDGE

APPROVED
ENTRY.

APPROVED SERVICES BRIDGE.

OPEN PADDOCKS

BOLONG ROAD


COMPLEX

DP 1069758

MANILDRA LAND
OPEN PADDOCK

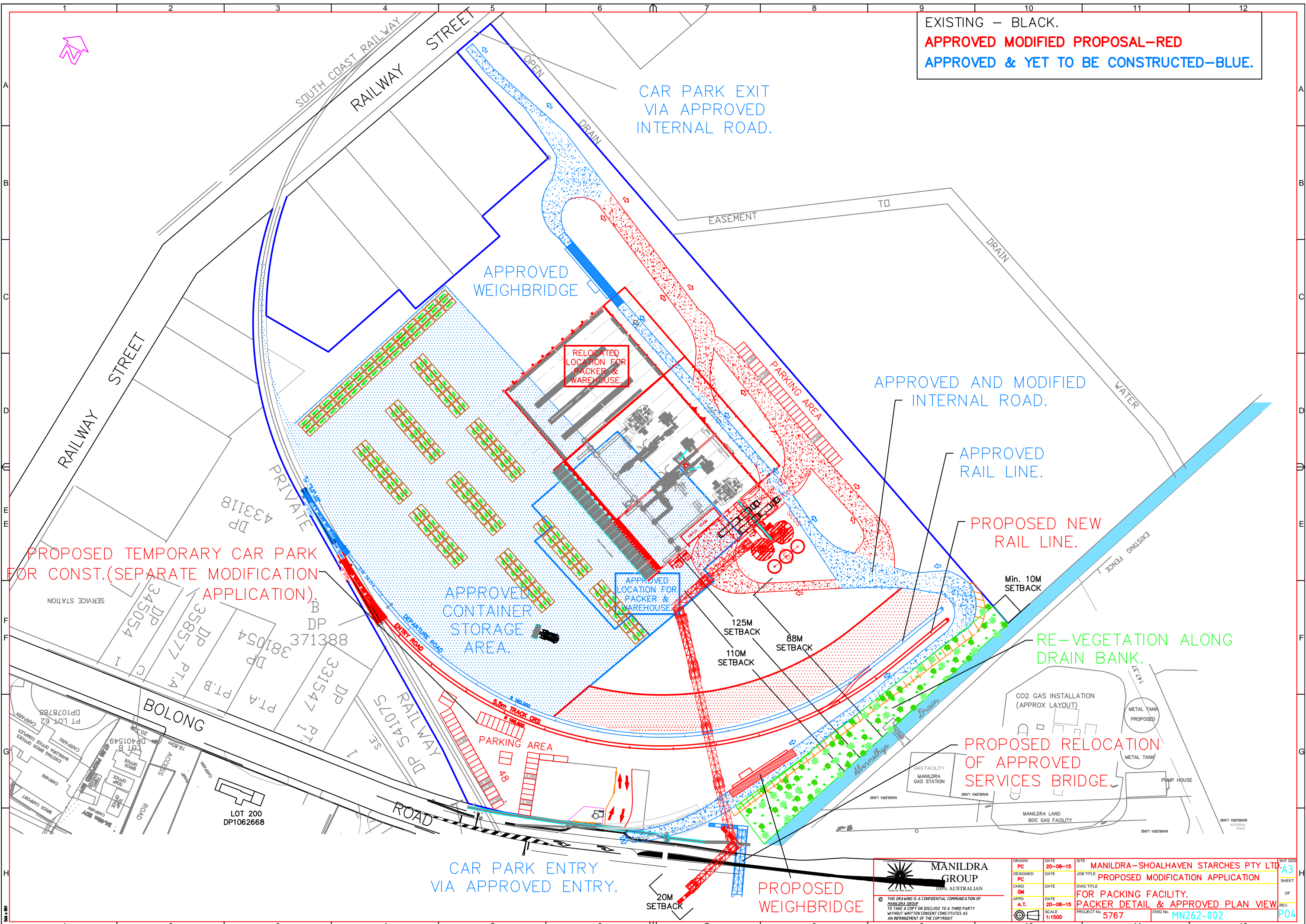
DP 385145

Shoalhaven River

 MANILDRA GROUP 100% AUSTRALIAN	DATE	20-08-15	SITE	MANILDRA-SHOALHAVEN STARCHES PTY LTD
	DESIGNED	PC	JOB TITLE	PROPOSED MODIFICATION APPLICATION
	CHKD	GM	DWG TITLE	FOR PACKING FACILITY.
	APPRD	A.T.	DATE	20-08-15
SCALE		1:2500	PROJECT No.	5767
			DWG No.	MN262-001

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SHEET SIZE: A3
SHEET: 04
REV: P04



EXISTING — BLACK.
APPROVED MODIFIED PROPOSAL—RED
APPROVED & YET TO BE CONSTRUCTED—BLUE.

CAR PARK EXIT
VIA APPROVED
INTERNAL ROAD.

APPROVED
WEIGHBRIDGE

RELOCATED
LOCATION FOR
PACKER &
WAREHOUSE.

APPROVED AND MODIFIED
INTERNAL ROAD.

APPROVED
RAIL LINE.

PROPOSED NEW
RAIL LINE.

APPROVED
CONTAINER
STORAGE
AREA.

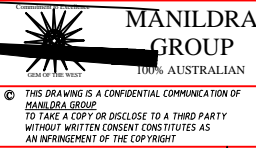
APPROVED
LOCATION FOR
PACKER &
WAREHOUSE

RE-VEGETATION ALONG
DRAIN BANK.

PROPOSED RELOCATION
OF APPROVED
SERVICES BRIDGE.

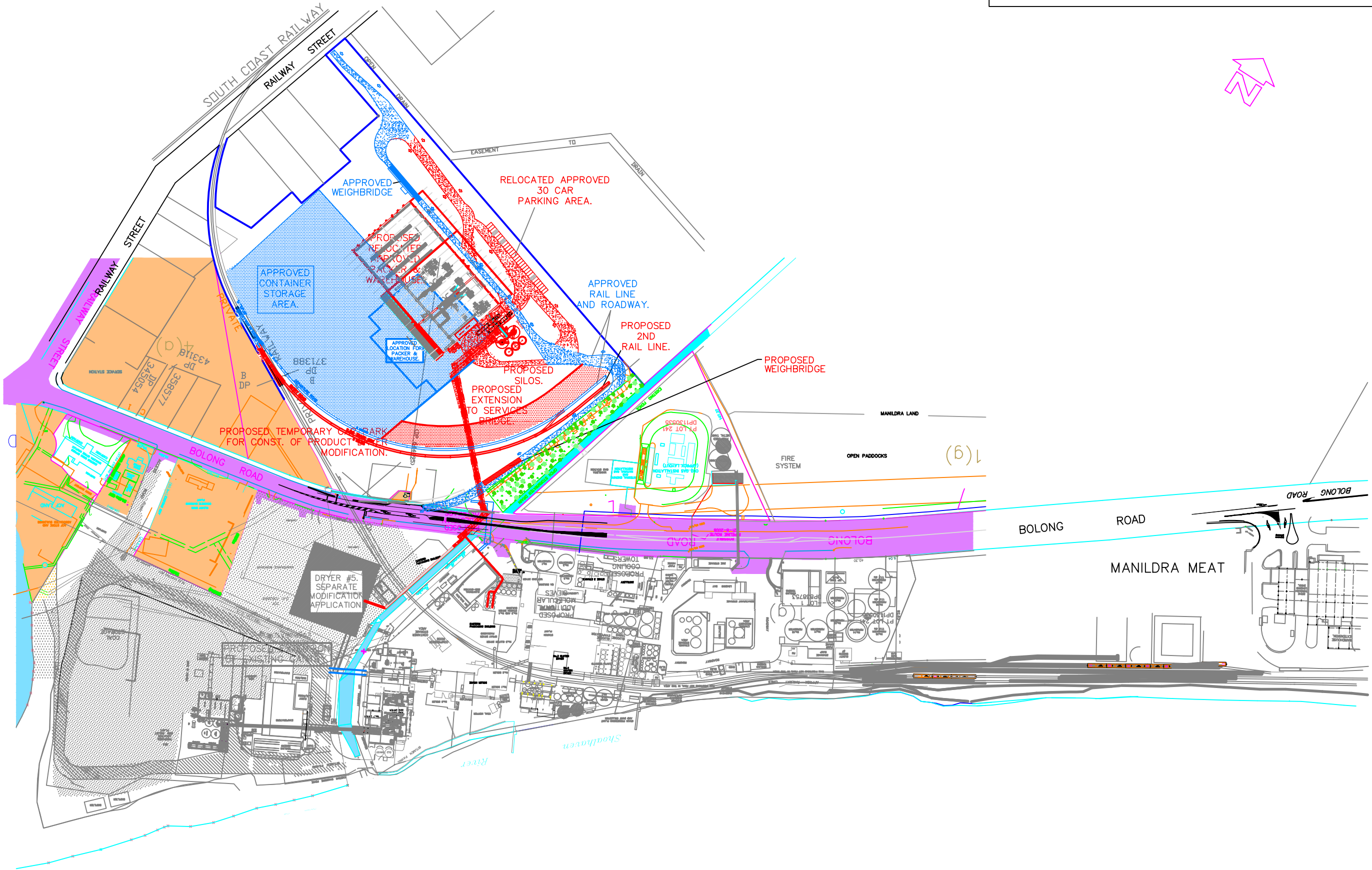
CAR PARK ENTRY
VIA APPROVED ENTRY.


PROPOSED
WEIGHBRIDGE



DRAWN PC	DATE 20-08-15	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD	SHEET SIZE A3
DESIGNED PC	DATE	JOB TITLE PROPOSED MODIFICATION APPLICATION	SHEET 004
CHKD GM	DATE	DWG TITLE FOR PACKING FACILITY.	OF
APPRD A.T.	DATE 20-08-15	PROJECT NO. 5767	REV. P04
SCALE 1:1500		DWG No. MN262-002	

APPROVED MODIFIED PROPOSAL-RED
APPROVED & YET TO BE CONSTRUCTED-BLUE.





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DRAWN PC	DATE 20-08-15	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD
DESIGNED PC	DATE	JOB TITLE PROPOSED MODIFICATION APPLICATION
CHECKED GM	DATE	DWG TITLE PACKING FACILITY. OVERALL SITE PLAN.
APPROVED A.T.	DATE 20-08-15	PROJECT No. 5767
SCALE 1:3000		DWG No. MN262-003

10

11

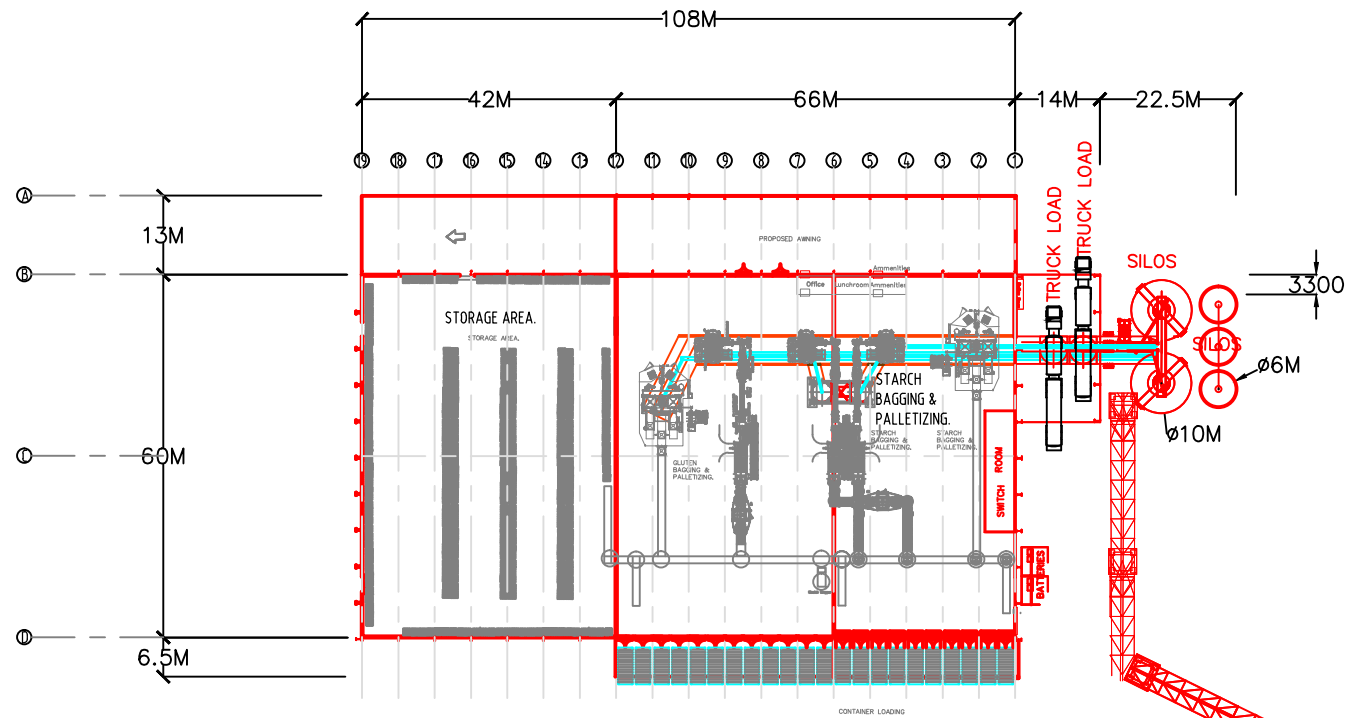
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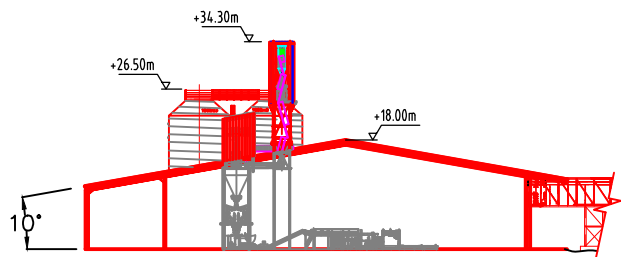
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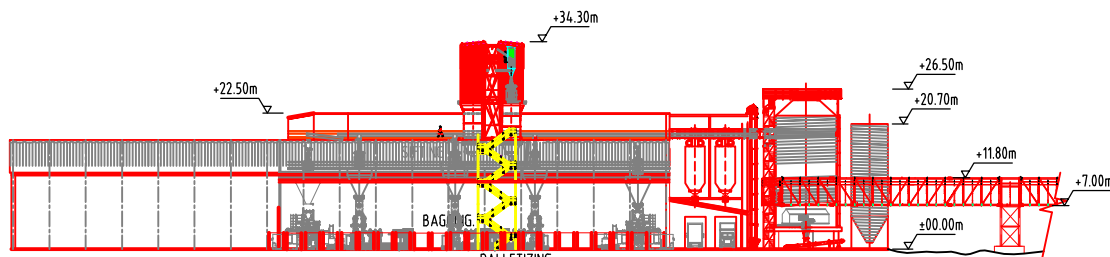
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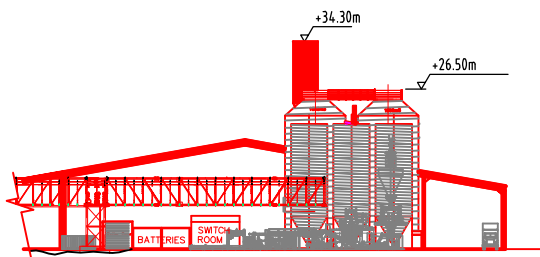
PLAN VIEW





WESTERN ELEVATION

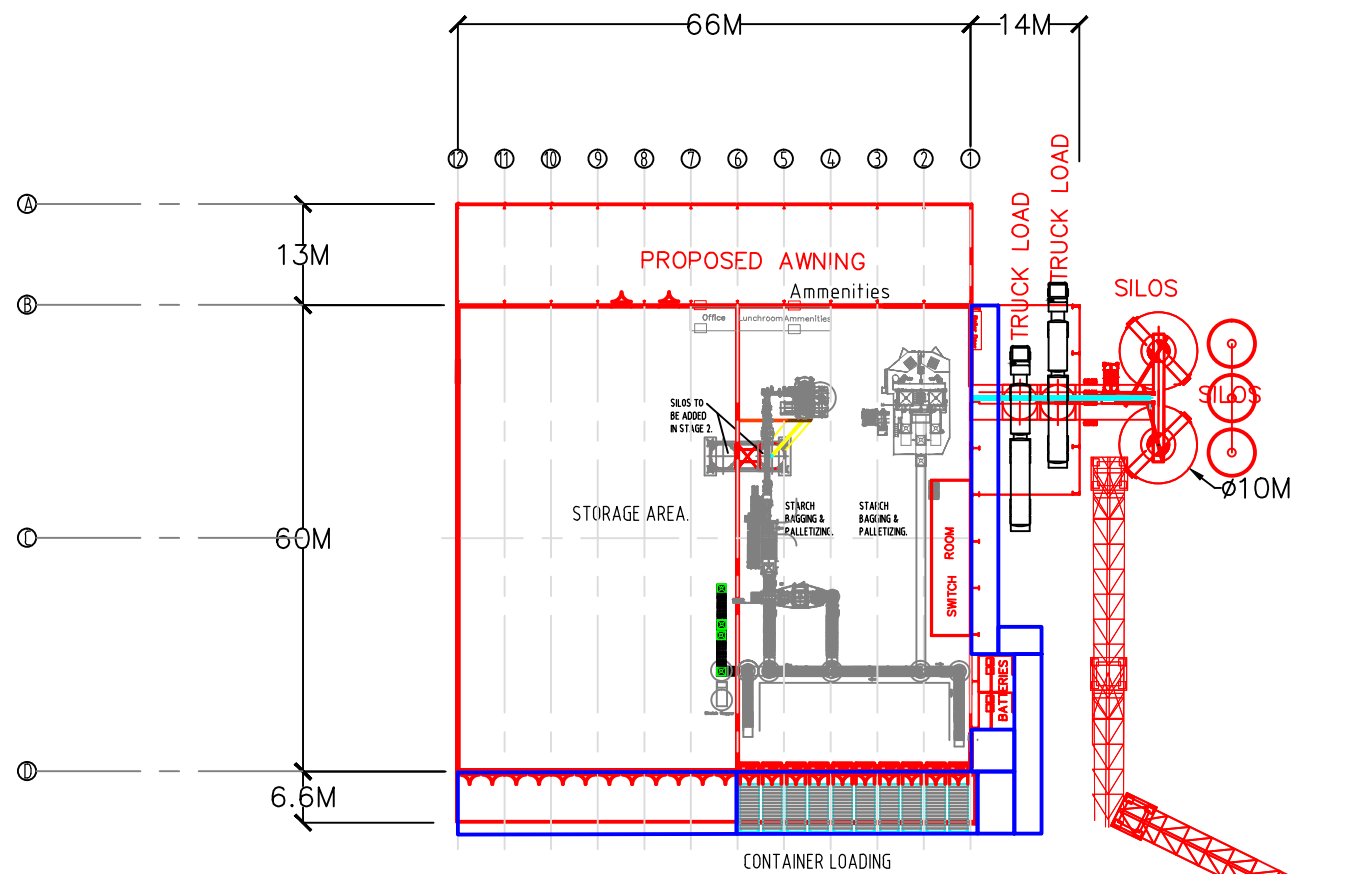


SOUTHERN ELEVATION

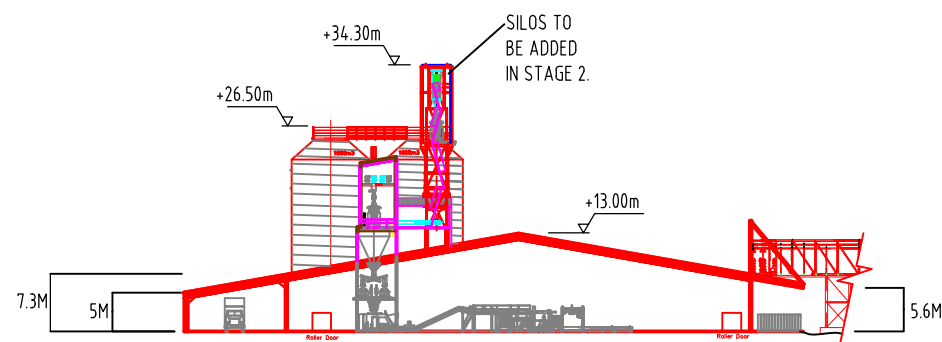


EASTERN ELEVATION

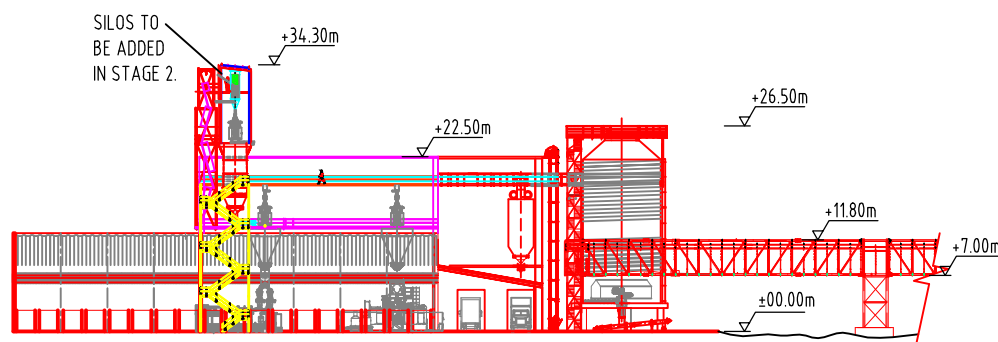
<div><div><div><div>MANILDRA GROUP</div><div>100% AUSTRALIAN</div></div></div><div><div><div><div>THIS DRAWING IS A CONFIDENTIAL COMMUNICATION OF MANILDRA GROUP</div><div>TO TAKE A COPY OR DISCLOSE TO A THIRD PARTY WITHOUT WRITTEN CONSENT CONSTITUTES AN INFRINGEMENT OF THE COPYRIGHT</div></div></div></div></div>		<div><div><div>DRAWN PC</div><div>DATE 20-08-15</div></div><div><div>DESIGNED PC</div><div>DATE 20-08-15</div></div><div><div>CHKD GM</div><div>DATE 20-08-15</div></div><div><div>APPD A.T.</div><div>SCALE 1:1250</div></div></div> <div></div>		<div><div><div>SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD</div><div>JOB TITLE PROPOSED MODIFICATION APPLICATION</div><div>DWG TITLE PACKING FACILITY. BUILDING DETAIL.</div><div>PROJECT No. 5767</div></div><div><div>DWG No. MN262-004</div></div></div>		<div><div>SHEET SIZE A3</div><div>SHEET OF</div><div>REV. P04</div></div>
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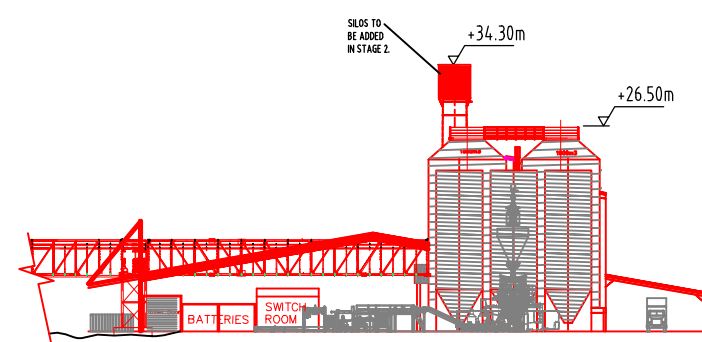
PLAN VIEW



WESTERN ELEVATION
AT BAG PACKER.

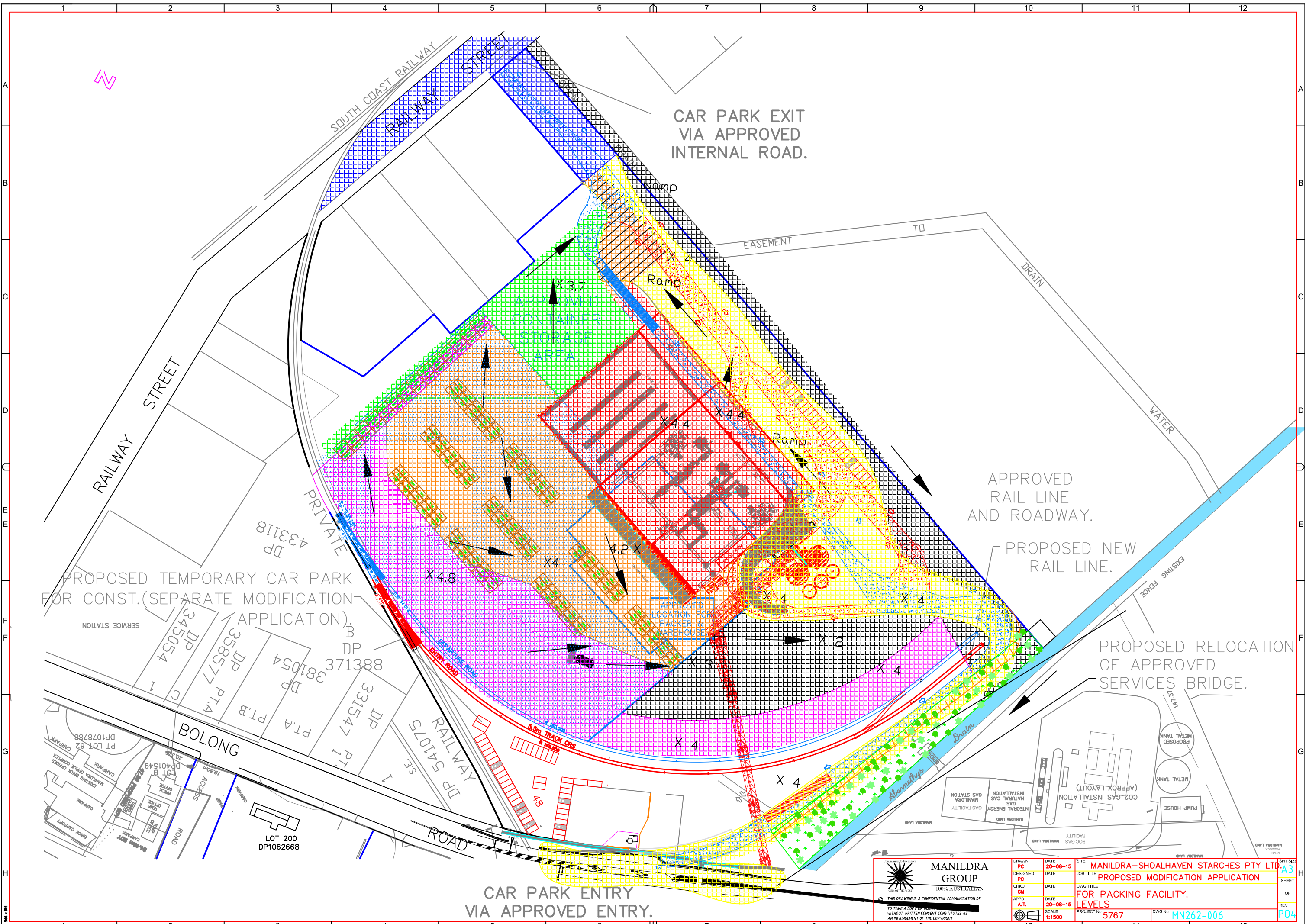


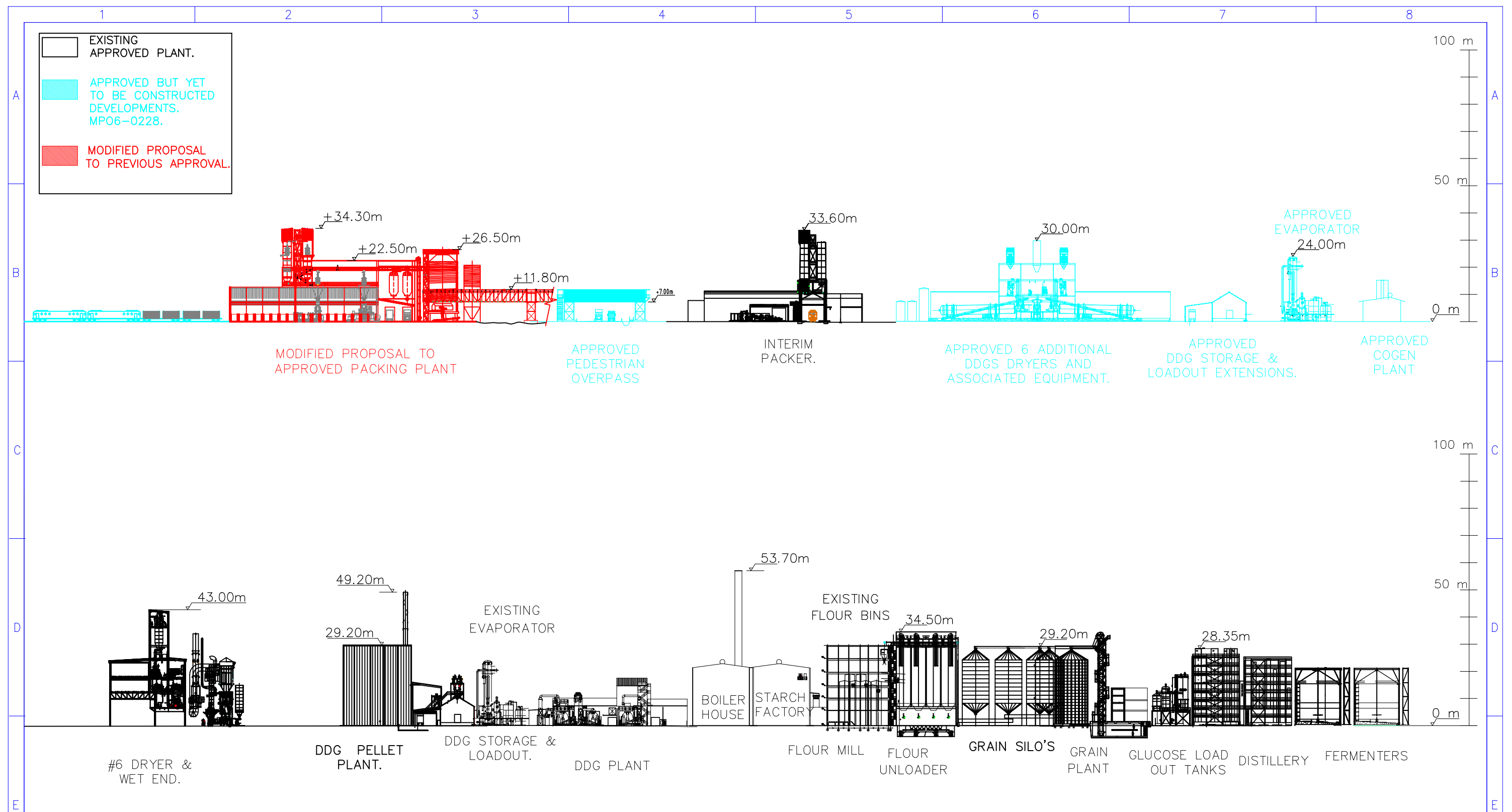
SOUTHERN ELEVATION



EASTERN ELEVATION

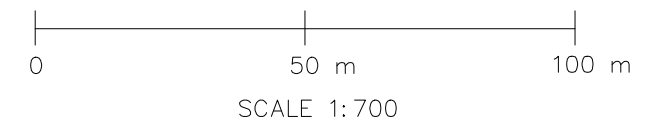
DRAWN PC	DATE 20-08-15	SITE MANILDRA-SHOALHAVEN STARCHES PTY LTD.	SHT SIZE A3
DESIGNED PC	DATE	JOB TITLE PROPOSED MODIFICATION APPLICATION	SHEET OF
CHKD GM	DATE	DWG TITLE PACKING FACILITY. STAGE 1 BUILDING DETAIL.	REV. P02
APPD A.T.	DATE 20-08-15	PROJECT No. 5767	DWG No. MN262-005
SCALE 1:1000			





TYPICAL ELEVATIONS OF STRUCTURES
ON SHOALHAVEN STARCHES SITE.

F	J	30-10-15	ALL	Proposed packaging plant amended.	Paul C. S.R./ J.S.
	I	9-02-15	D2	Colour amended.	Paul C. S.R./ J.S.
	H	9-02-15	D1	Dryer #6 added.	Paul C. S.R./ J.S.
	G	30-01-15	ALL	Notes amended, council applications added.	Paul C. S.R./ J.S.
	F	28-01-15	ALL	Original proposal removed.	Paul C. S.R./ J.S.
	E	27-01-15	ALL	Approved and proposed separated.	Paul C. S.R./ J.S.
	D	14-01-15	D2	Pellet plant silos added.	Paul C. S.R./ J.S.
	C	05-11-14	ALL	Pellet plant stack added.	Paul C. m.m./ J.S.
	B	24-01-14	ALL	Proposed now approved, new pellet plant added.	Paul C. / B.H.
	A	10-04-08	ALL	Pedestrian bridge added. Scale was 1:650	Paul C. / B.H.
	I	22-10-07	ALL	Draft.	Paul C. Greg M.
	ISS	DATE	ZONE	CHANGE AMENDMENTS	BY CKD



Commitment to Excellence

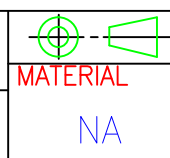


GEM OF THE WEST

MANILDRA
GROUP
100% AUSTRALIAN

DRAWN	P.J.C.
TRACED	---
CHECKED	
APPROVED	
DRG PRACTICE	
AS1100	

TOLERANCES
LINEAR $\pm .2$
ANGULAR $\pm .5$
FINISH
NA



MANILDRA GROUP.NOWRA.
LE SITE DRAWING
ELEVATIONS.

SIZE A 1	SCALES 1:700	SHT
MR-5653		
DRG. No. MN88-001-J		

Ming Leung
Site Manager
Shoalhaven Starches Pty Ltd
PO Box 123
NOWRA NSW 2541
E-mail: ming.leung@shoalstarches.com.au

Dear Mr Leung

RE: Proposed Modification to Approved Packing Plant, Shoalhaven Starches (MP06_0228)

Thank you for consulting us regarding the proposed modification to the approved Shoalhaven Starches expansion project. We understand that the proposed modification comprises an increase in the floor area of the approved packing plant from 3050m² to 6200m², additional rail spur and realigned bridge crossing of Bolong Road.

The implications of the full range of floods, including events greater than the design flood, up to the probable maximum flood (PMF), should be considered as part of the proposed modification. In particular, consideration should be given to:

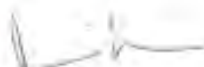
- the impact of flooding on the development;
- the impact of the development on flood behaviour including any management measures to mitigate adverse flood impacts;
- the impact of flooding on the safety of people/users of the development;
- the development control plans or policies of Shoalhaven City Shire Council (SCC) in relation to the management of flood risk;
- the best available flood information for the area from SCC;
- the SCC's requirements for flood investigations to support development, whether flood information is currently available or not;
- the full range of flood events, up to and including the probable maximum flood (PMF);
- the flood hazard in the area including the hydraulic hazard, floodways, flood readiness, flood warning time, rate of rise of floodwater, flood duration and type of development;
- the flood hazard of any access routes;
- the implications of climate change on flooding; and,
- the impact of flooding on the safety of people/users of the development.

PO Box 513 Wollongong NSW 2520
84 Crown Street Wollongong NSW 2501
www.environment.nsw.gov.au

Page 2

Please do not hesitate to contact me on 4224 4179 or via e-mail calvin.houlison@environment.nsw.gov.au should you have any further queries.

Yours sincerely



CALVIN HOULISON
Conservation Planning Officer

