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ACN 003 773 975

ENGINEERS SURVEYORS PROJECT MANAGERS

Bindaree Beef Pty Ltd

Stormwater Discharge Report for Proposed Rendering and Bio Digester Plant

• Land Boundary Surveys • Subdivisions • Planning & Environmental Studies • Engineering Surveying
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1. Introduction

CPC Land Development Consultants (CPC) has been commissioned by Meateng Pty Ltd to prepare a stormwater impact assessment for the proposed Rendering and Bio-Digester Plant development at Bindaree Beef.

The site is located to the west of Inverell on the Gwydir Highway and described as Lot 83 DP 753638, 7307 Gwydir Highway, Inverell, NSW.

The site is currently occupied by the existing abattoir facility and is generally surrounded by agricultural and rural properties. The site is located on the side of the hill to the west of the existing entrance road and is slightly undulating (Plate 1, Plate 2, Plate 3 and Plate 4). Natural drainage is generally by runoff through the intermittent gullies within the site.

Plate 1: View of site – Looking southwest

Plate 2: Development site – Looking north

Plate 3: Development site – Looking southwest

Plate 4: Development site – Looking northeast

This report has been prepared for submission with the environmental impact statement. In preparation of the report, consideration has been given to the requirements of the Department of Primary Industries, NSW Office of Water, Crown Land, NSW EPA and Inverell Shire Council.

Attached to this report are runoff calculations and stormwater drainage plans which show the catchment boundaries and details the proposed management of stormwater flows around the development.

2. Undeveloped Catchment

The existing and proposed Bindaree Beef plant area is located on the north eastern section of gently sloping land, predominantly cleared for pasture with a catchment of approximately 61 ha.

This catchment combines with a separate catchment of about 49 ha and discharges to an existing twin cell box culvert (2 x 900x1500) at the Gwydir Highway (Plate 5), discharging to an earth dam on land on the northern side of the road. The dam on the northern side of the road is approximately 90m x 60m with a volume of about 0.75 megalitres.

Plate 5: Existing Culvert at Highway – Looking northwest

The catchment contains 3 earth dams, intercepting natural flows used for on-site storage, collection and reuse.

Natural, undeveloped, Catchment area; 61ha

Length: 1320m

Slope: up to 4.5%

Natural discharge (20year ARI) Q: 1680 l/s, I: 53mm/hr, Tc 52min

The above flow to the box culvert does not include the flows from the secondary 49ha catchment.

This catchment contributes an additional potential natural flow of 1350 l/s to the culvert.

3. Existing Developed Catchment

The undeveloped catchment has been modified considerably by the existing Bindaree Beef plant area and associated on-site works.

The existing hard stand plant area comprises an area of approximately 3 ha, on a level site at the north eastern part of the catchment. This area drains partly to the north east and partly to an existing earth dam used for on-site irrigation purposes. An elevated access road (Plate 6) further divides the catchment between flows directly to the road culvert and to the irrigation dam. Stormwater flows from the plant area are directed to open swale drains (Plate 7 and Plate 8), grass lined and in good condition with negligible scouring or erosion evident, to the irrigation dams and to natural flow lines and ultimately to the existing box culvert at the Gwydir Highway.

Plate 6: Raised internal road and culvert - Looking northeast

Plate 7: Swale drain from plant – Looking west

Plate 8: Typical table drains – Looking north

Peak flows to the culvert are affected by the plant area, resulting in an increased flow rate. These flows appear well contained in the existing constructed open swale drains.

The discharge from the plant area is dissipated to 4 flow routes, which ultimately combine towards the box culvert.

Developed Catchment area:

The existing plant area comprises approximately 18,500 sqm impervious, 9,500 sqm other hard stand, and is combined with approximately 4 ha of natural surface (grassed and pasture) contained in this sub-catchment.

Existing developed catchment area (61 ha total) discharge to culvert:

(20 year ARI) Q: 1930 l/s, I: 53 mm/hr, Tc = 52 min

This represents a potential increase in flow rates to the existing culvert of about 8% overall. However, these increases are currently mitigated by the on-site storage dams and reuse for irrigation purposes.

4. Proposed Render / Bio-Filter and Bio Digester plant

The proposed works involve the construction of a render plant (about 45m x 30m) and bio filter plant on locations on the north eastern side of the existing plant, but within the existing plant area. In terms of storm water discharge, this will result in impervious roof area discharge to pipe flow, surrounding pervious area discharges to swale drains, and some modifications to the existing swale drain discharge network.

Attached are hydraulics and hydrology flow charts and pipe and overland flow route plans for these new plant areas. A design recurrence interval of 20 years has been adopted.

Ultimately, the Render Plant will contribute an additional flow of 51 l/s, and the Bio Filter Plant and additional flow of 16 l/s.

To the west of the Render Plant is the proposed Bio Digester site. This site currently exists as cleared densely grassed land, containing a small stock dam proposed to be removed.

This area discharges to an existing 450 mm rcp then to the existing system. Discharge (Q20) to this existing pipe is currently 165 l/s. The Bio digester site comprises approximately

4400 sqm impervious surfaces, approximately 6400 sqm pervious surfaces and other grassed contributing catchment of about 1.04 ha. Proposed discharges from this site will increase to 284 l/s. This is within the capacity of the existing pipe and contained within existing drainage works.

In terms of an effect on the discharges to the existing stormwater system both in the immediate existing plant area and to the ultimate box culvert at the Gwydir Highway, the additional impact of these works is very minor, when compared to existing discharges to the system.

5. Proposed drainage works and mitigation.

As shown on the attached plans, it is recommended that:

a) A rock lined silt trap and energy dissipater be installed at the discharge points of the Render plant and the Bio filter, above the swale drains. This will assist in potential erosion control, slow discharges to a rate representing existing flows and prevent siltation and gross pollutants from entering the natural system. The traps can be monitored and cleaned within normal maintenance procedures of the Plant.

b) The installation of rock baffles on the swale drains at regular intervals for the purpose of reducing water flow energy, and scour prevention

c) The construction of diversion banks on the north eastern side and southern side of the plant to assist in separating the water flows from the vast bulk of the natural catchment and direct this water towards the irrigation dam and the box culvert, without impact from the plant area. This would have the result of vastly reducing the size of constructed swale drains discharging from the plant area to the natural system.

d) It is not recommended that an additional retention basin be installed as part of this proposal as the impact upon the drainage of these two plants is negligible in terms of total discharge to the box culvert on the Gwydir Highway. The system is currently well grassed, shows little or no signs of active erosion or scouring, there is little or no evidence of siltation at the box culvert (Plate 9, Plate 10 and Plate 11).

Plate 9: Existing Culvert at Highway – Looking northwest

Plate 10: Existing Culvert at Highway – Looking west

Plate 11: Existing Culvert at Highway – Looking south

e) The developer may wish to consider installation of rainwater tanks to be installed for capture and reuse of the roofwater discharge from the render plant. A 100,000 litre tank (50% reuse, 50% detention) would effectively mitigate any additional storm water impact from this proposal. It would have the additional benefit of the provision of additional water on site. However, the plant area is quite confined and the location of such a tank may need additional consideration. However, there is already considerable reuse of on-site storage of water within this development site by way of irrigation and this tank will not have a significant effect on overall discharges from the site.

   Alternatively, the existing anaerobic storage ponds can be converted to detention ponds.

f) Erosion control should be implemented at this site during construction activities to minimise soil erosion and protect surface water quality. The clay surface soils are prone to erosion and maintaining groundcover will be prioritised to minimise erosion on the site.

Site runoff and erosion should be controlled by installing a deflection bank upslope of the construction site and direct clean runoff away from the site. Water should be directed around the site into the existing swale drain and natural drainage line to the existing box culvert at the Gwydir Highway.

Sedimentation of surface flows should be minimised by ensuring stockpiles are located within the construction zone and sediment fencing is installed around the downslope area of the stockpile. Rock line energy dissipaters should be installed and allow sediment to settle out of surface water prior to moving offsite.

Constructed grassed swale drains should be installed to direct surface water flows throughout the site. Water flow will be slowed in the swale drains by using rock lined energy dissipaters, one located where the rendering plant stormwater enters the swale drain, and one located in the swale drain nearest to the car park. A rock lined check dam will be installed to slow flows from the biodigester and rendering plant construction sites.

Potential impacts on water quality during construction can be minimised by the development and implementation of a Sediment and Erosion Control Plan. This can be developed as part of the construction phase. Rehabilitation of exposed surfaces should be implemented to minimise sediment runoff

Attachments:

- Sheet 1 Plan View: Detail and contour detail and stormwater drainage Render & Bio-Digester plant
- Sheet 2 Plan View: Detail and contour detail and stormwater drainage Site Plan
- Sheet 3 Storm Water: Render Plant and Bio-Filter Long Sections, Hydraulics and Hydrology
- Sheet 4 Storm Water: Culverts Long Sections, Hydraulics and Hydrology
- Sheet 5 Storm Water: Channel Stabilization Diagrams