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Onshore Gas
Department of Environment and Natural Resources
Northern Territory Government
Floor 1, Goyder Centre, Chung Wah Terrace, Palmerston, NT
PO Box 496, Palmerston, 0831

19 June 2019

Dear Mr. Shaw,

Santos QNT Pty Ltd (Santos) is the operator of exploration permits (EP) 161, located approximately 350 km south-east of Katherine in the Northern Territory (NT). On 6 June 2019, Santos received formal advice that the Environmental Management Plan: *McArthur Basin Civil and Seismic Program* (DENR EMP assessment document reference: NTEPA2019/0032-007~0005) was approved.

In accordance with Regulation 22 of Petroleum (Environment) Regulations, Santos proposes to modify the regulated activity for the above EMPs and is writing to the Minister to give notice and specify details of the proposed modification. The modification of the regulated activity relates to:

1. A modification of the lease pad layout design at the Inacumba 1/1H location
2. The installation and filling of tanks with bore water at the Tanumbirini 1/2H location and the Inacumba 1/1H location.

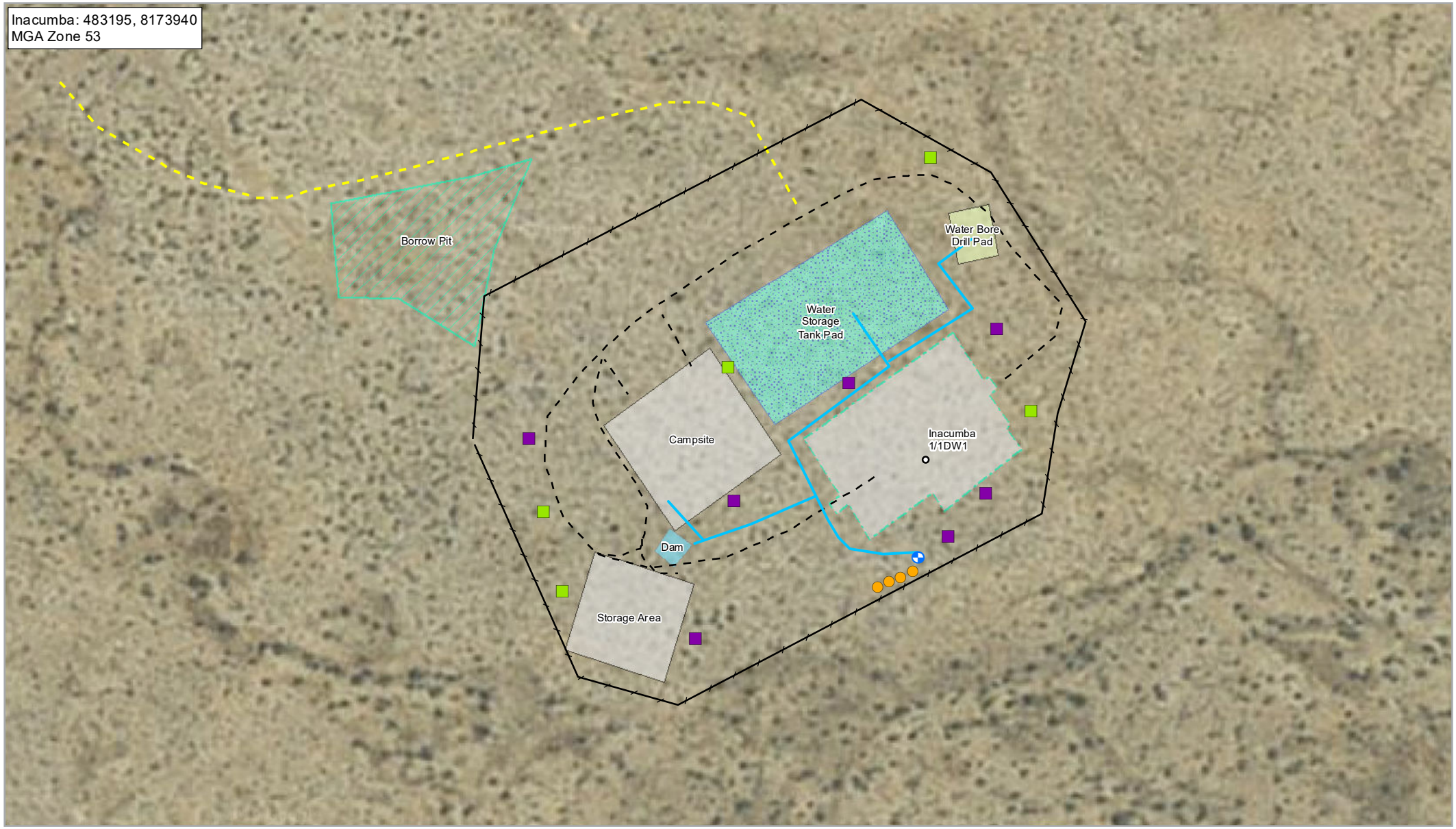
Lease pad layout design at the Inacumba 1/1H location

The lease pad layout design at the Inacumba 1/1H location has been modified as a result of learnings associated with the recently constructed Dukas-1 exploration well lease pad. The new proposed lease layout is provided in Figure 1 below. Major elements of the reconfiguration include combining the two separate tank pads and moving them from the east of the well site to the north and moving the laydown area from the north to the south-west. Existing infrastructure (water bore infrastructure) and the proposed petroleum well location and well site infrastructure (sumps etc.) are unchanged.

Modification has not caused a new or an increase in environmental impact or risk

The modification has not caused a new environmental impact or environmental risk and has not resulted in an increase in an existing environmental impact or environmental risk. The size of the fire control area associated with the Inacumba 1/1H exploration lease pad will not increase. The quantum of vegetation clearing required will not increase and vegetation clearing within the areas mapped as “drainage line vegetation” will be reduced as a result of the reconfiguration (see Attachment 1).

The risk mitigation controls outlined in the existing EMP will not require any amendment to accommodate the modification. Santos has reviewed the EMP and the proposed modification will not result in an increase in likelihood, consequence or overall risk ranking.



Legend

- Proposed Well
- 30,000L Tank
- Water Bores
- Soil Stockpile
- Vegetation Stockpile
- Loop Road Access
- Water Flowline
- New Access Road Option 1
- Fence
- Water Bore Drill Pad
- Inacumba Lease
- Borrow Pit
- Facilities
- Dam
- Water Tank Pad

1:5000 @ A4

0 25 50 75 100 125 150

Metres

Map Projection: Universal Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 53

N

Santos
McArthur Basin Civil & Seismic
Environmental Management Plan

Proposed Infrastructure for the Inacumba-1/1DW1 Location

Project No. **43-22812**
Revision No. **C**
Date **13/06/2019**

FIGURE 3-6

N:\AU\Brisbane\General\Services\GIS\Projects\4322812\GIS\Maps\432281200_006_InacumbaLeasePad_RevC.mxd
Print date: 13 Jun 2019 - 16:51

Data source: . Google Earth: imagery (Jun 2016, captured Mar 2017). Santos: Water Bores, Wells, Drilling Opportunities, Valves, Access Roads (existing and proposed), Waterline, Leases, Facilities, WaterTanks, Dam, Borrow Pit (2019). GHD: Proposed Topsoil Area (2019). Created by: xlee

Construct and fill of water tanks

The modification to install and fill tanks with bore water at the Tanumbirini 1/2H location and the Inacumba 1/1H location is important to secure the water supply requirements for the all stages of the 2019 exploration project. Water supply has been lower than anticipated at all monitoring bores. To date all water bores that have been drilled in 2018 and 2019 have either produced water at a lower rate than expected or produced no water at all (i.e. first water bore at the Inacumba South location). We interpret that variability in permeability that is intrinsic to limestone aquifers is the primary cause for the lower than expected water flow results hence, there is no change to environmental risk or assumptions regarding the sustainability of the proposed water extraction. A reliable water supply is critical for all stages of the 2019 exploration project. The tank pad layout plans for the two potential configurations are provided in Attachment 2 and the Tank specification is provided in Attachment 3

Construction and filling of the tanks will only occur in the areas identified in the Civils and Seismic EMP. The activity of clearing and levelling of the tank lease pads is already approved as described in the Civils and Seismic EMP. The modification relates to the constructing of tanks and the filling of tanks with water. No additional disturbance is required.

The tanks have been designed and certified to be in accordance with the relevant Australian Standards (AS/NZS 1170.0, 1170.1 and AS4100). The tank characteristics and components are provided in Attachment C. Key specifications and environmental controls include:

- Ponds will be filled to a maximum of 30 cm freeboard (for bore water)
- Leak detection measures will be in place
- Tanks will be double lined
- Volumes pumped into each of the tanks will be measured and recorded, including estimated evaporation rates
- Tanks will be monitored via a fluid management crew
- Tanks pad will be bunded with low point sumps at either end to be able to capture fluid (see Attachment D).

Modification has not caused a new or an increase in environmental impact or risk

The modification has not caused a new environmental impact or environmental risk and has not resulted in an increase in an existing environmental impact or environmental risk. No additional vegetation clearing is required. There will be no increase in the approved water extraction volumes.

The risk mitigation controls outlined in the existing EMP will not require any amendment to accommodate the modification. Santos has reviewed the EMP and the proposed modification will not result in an increase in likelihood, consequence or overall risk ranking.

Cultural Heritage

The additional activities are located on land that has undergone cultural heritage clearance, sacred site avoidance clearance and AAPA certification. The scope of works and the location of all proposed activities are covered by AAPA Certificate C2019/043.

Stakeholder Engagement

Santos QNT Pty Ltd has continued to engage with key stakeholders on an ongoing basis. Contact has been maintained as per the existing Land Access Agreement (LAA) and in accordance with the LAA, the landholder will be notified of these works.

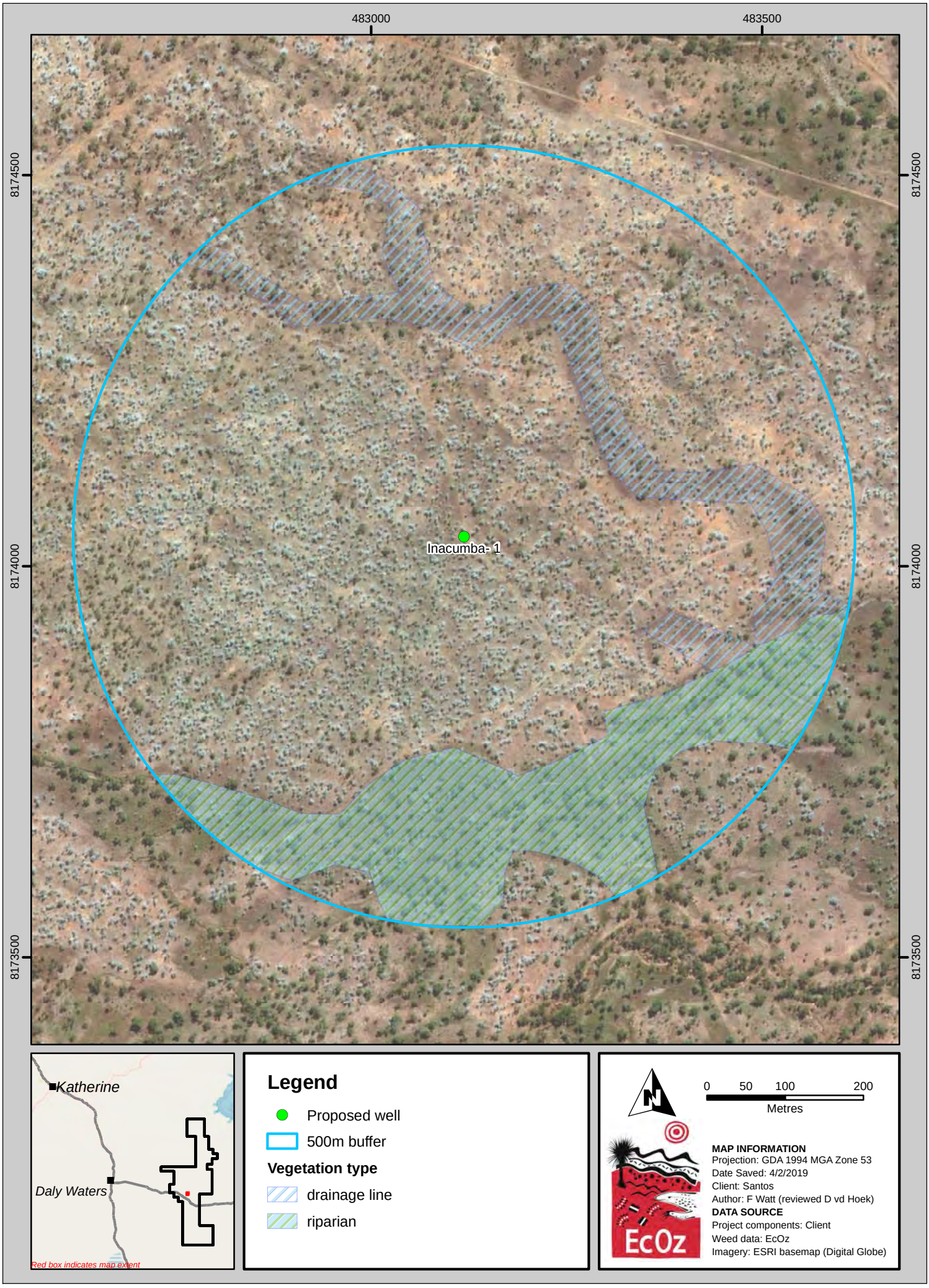
If you require any further information of have any queries please don't hesitate to contact myself or Mitch Bird, Senior Environmental Adviser, at mitch.bird@santos.com or (07) 3838 3799.

Yours Sincerely,

David Close
General Manager – Onshore New Ventures

Attachments

Attachment 1 – Vegetation mapping surrounding the Inacumba lease
Attachment 2 – Two proposed tank pad layout plans
Attachment 3 – Tank Specification



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19041 - Santos EP161 EMP aspects\01 Project Files\Figure 5-2. Location of riparian and drainage line vegetation within Inacumba 1_1H survey area.mxd

Figure 4-5. Map showing location of riparian and drainage line vegetation within Inacumba-1 survey area

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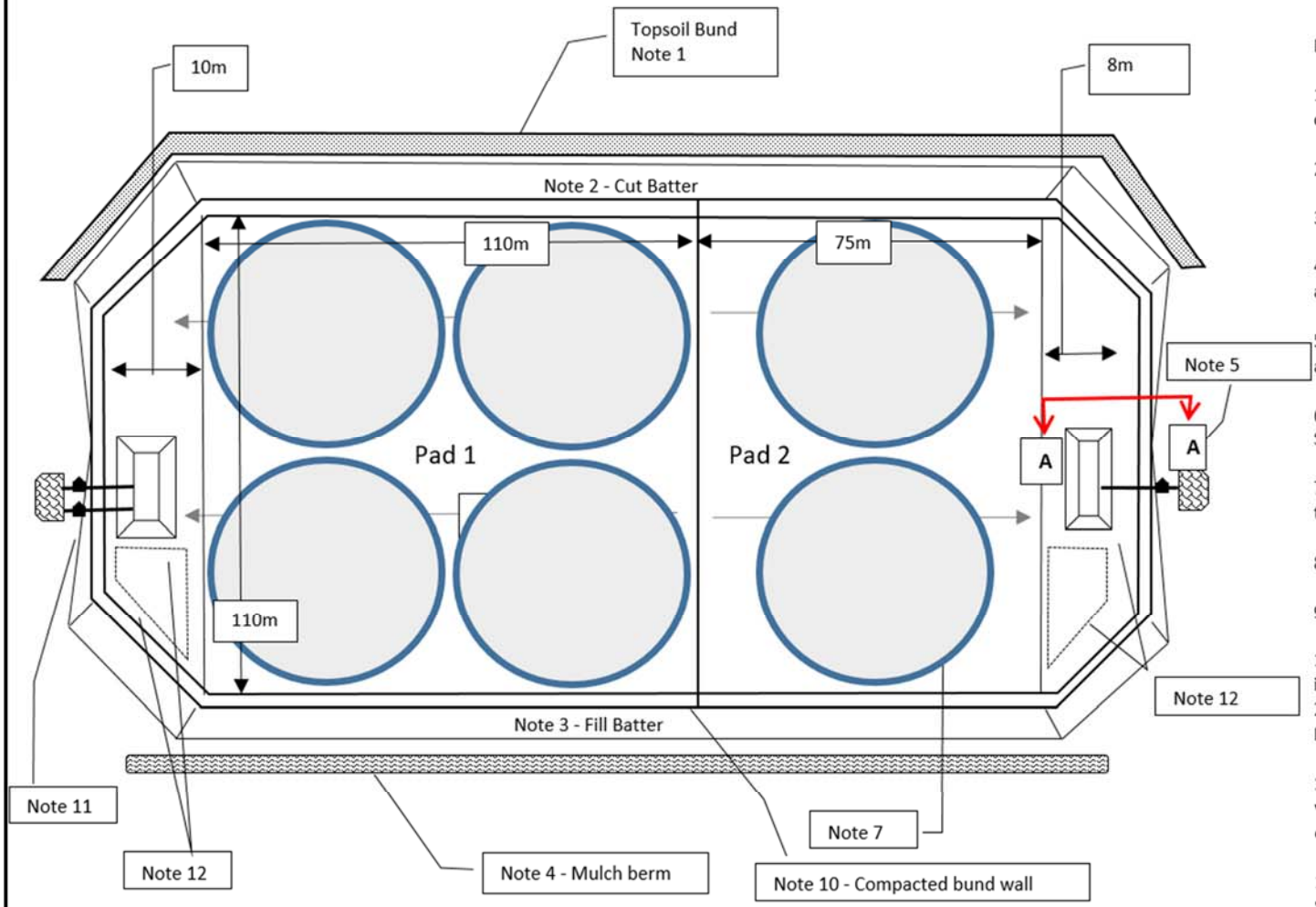

Notes

1. Strip minimum 100mm topsoil and use topsoil to create bund on high side of tank pad.

2. Cut Batter not to exceed 3:1.

3. Fill batter no less than 1:1

4. Material from woody vegetation to be spread adjacent down stream extent of tank pad.

5. Rock chute - Drainage line from HDPE pipe to avoid erosion

6. Site access location to be confirmed onsite by Santos Civil Works Supervisor

7. Tank pad to be constructed within +/- 50mm tolerance

8. Tank area drainage to fall to basin pond/sumps

9. Volume of material refer to workscope document

10. Compacted bund wall 1m (h) x 3m (w) around intire Tank area - Incorparate/condition betonitre 200mm into inside walls - Compaction to reach 95% Refer Bund wall & Pipe valve drawing.

11. Install 1 & 2 x 200mm HDPE pipe with Gate valve for controlled release of rain water as showing on drawing, Refer Bund wall & Pipe valve drawing.

12. Excavate 8m x 20m x 3m & 10m x 20m x 3m Sump/basin, Excavated material to be stockpile nearby for future rehab.

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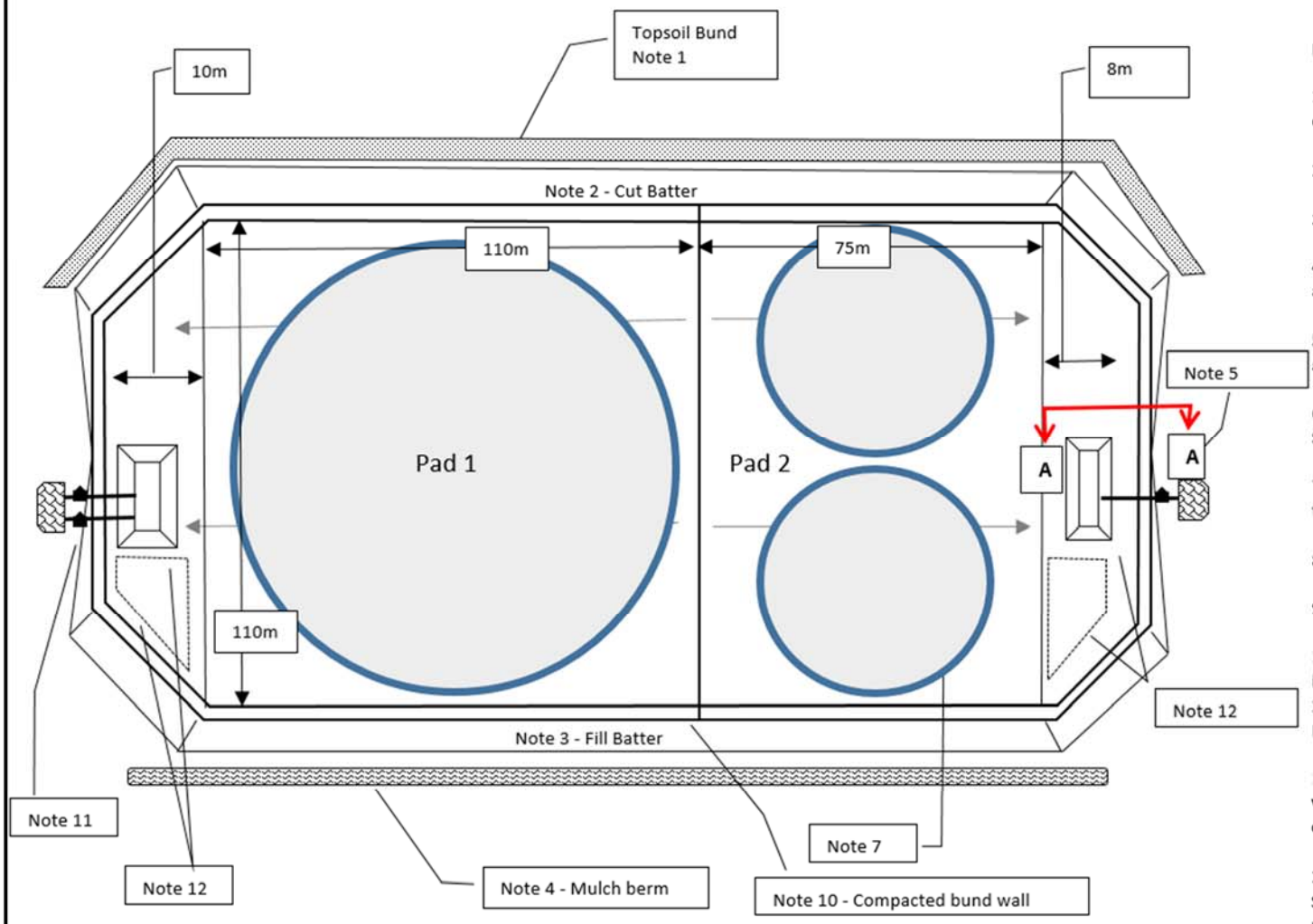

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6.4 ML MODULAR STEEL STORAGE TANK

Tank Specification

Description

The 6.4 ML tank is a steel storage tank. The steel tank has a short and efficient construction period, as a result of the small number of components utilised. A Tank Liner is incorporated, which retains the water within the tank.

Tank Characteristics

- 48metres tank diameter
- In same location for greater than 6 months
  - Earth Ring Beam compacted to 98% SDD
  - Tank Base: Compacted to 95% SDD
- For leak prevention system 1:100 fall from earth ring beam to the centre of the tank for drainage. If shaped from existing natural foundations soil should have a strength of 100 KPa and approved by CES Site Supervisor
- If in same location for less than 6 months pad to be proof rolled and soft spots to be removed as per instructions from Concept Site Supervisor.
- Base area: 1662 m^2
- Depth: 3500 mm
- Complete Tank Footprint: 48m x 48m
- Wind Loading:
  - Region: A
  - Terrain Category: 2.5 Relatively flat open terrain
- Wind Rating: 148 km/hr (1 in 100 event)
- Design Service Life: 5 years

Tank Components

Steel Wall Sections

Size	Qty	Material
10900 mm(L)x3500mm (H)	14	6mm Rolled Plate

Wall Section Connection Details

The panels are connected by a tongue and pin joint.

Tank Liner

The liners in the tank will depend on the customer requirements and will comprise of a combination of the following

- Primary liner: 0.75mm LLDPE Enviro 4000 or 6000 series available
- Composite Net Layer: Geomembrane/Geonet Layer
- Secondary Layer / Leak Prevention Layer: Depending on requirements a choice of Enviro 4000 or 6000 series
- Geotextile Cushioning layer: Bidim A34 or thicker
- 50mm solid width weld (factory and field)
- Design Life dependent on material chosen

Leak Prevention System (Solar Pump) - Optional

Pump Amount	Pump Duration	Battery Power
13L of water per minute	24 hrs/day (sufficient power)	3 days (overcast conditions, no sun)

Water Collection Sump Pit – part of the leak detection system

Maximum Water collection

No greater than 20% capacity of recovery pump

Ballasts

Option 1: **Water Ballasts**

- 300mm of water required at the toe of the tank, to be pumped in within 24 hours of liner installation completion

Option 2: Water Tube Ballast (WTB)

- WTB consists of individual lengths of tubing that are tied together. There is a series around the toe of the wall and a second series forming a triangle in the centre of the tank. It is designed to restrain a 1 in 100 wind event without water in the tank.
- All tubes to be attached to the tank walls

References

- 10340-S10.01 Rev A
- Specification for Tank Pads
- SP-3207 (Steel Wall Sections)
- SP-3208 (Tank Liner)
- PR-3502 (SOP Manual Handling & Ergonomics)
- PR-3507 (SOP Power Actuated and Hand Tools)
- PR-3509 (SOP Handling DG's and Hazardous Substances)
- PR-3510 (SOP Generator Set Up)
- PR-3511 (SOP Safe use of equipment)
- PR-3512 (SOP Safe Lifting)
- PR-3513 (SOP PPE)
- PR-3517 (SOP Emergency Rescue from Tanks)
- PR-3518 (SOP Ballast Install)
- PR-3525 (SOP Tank Decommissioning or Relocation)
- AS1101 Part 3 (Steel Work Fabrication & Erection)
- AS4100 Part 1 & 2 (Steel Work Fabrication & Erection)