Kyoto energy park

15. Hydrology

15.0 HYDROLOGY

15.1 Surface Water Hydrology

The topography of the Upper Hunter Valley ranges from rugged with slopes greater than 30% to gentle river flats and plateaus with slopes less than 3%. Drainage patterns are determined by this topography.

The Upper Hunter area is located within the catchment of the Hunter River and its tributaries. The Hunter is the major river of the Hunter Valley used for a wide range of uses including urban water supply, power generation, and industrial and agricultural use.

The Dartbrook/Kingdon Ponds catchment is situated in the northwest of the Hunter catchment originating in the in the Liverpool Ranges flowing in a southerly direction to join the Hunter River south of Aberdeen. The Dartbrook/Kingdon Ponds catchment can be further subdivided into the Dartbrook, Kingdon Ponds and Middlebrook sub catchments associated with each respective tributary.

The streams of the Dartbrook catchment are highly connected to the alluvial aquifer system with the recharge rate of the aquifer largely dependent on stream flows. There are a total of 66 registered water licenses within the Dartbrook/Kingdon Ponds River Catchment. Most of these are located directly on the main alluvial aquifer system along the tributaries as shown in Figure 15.0.

Middlebrook Station is wholly located in the Dartbrook catchment. Middlebrook Creek dissects the Middlebrook Station site and is located east of the Middlebrook road away from the main ridgelines and proposed works. There are no other major streams or creeks within either the Middlebrook or Mountain Station properties. Numerous secondary and tertiary drainage depressions run form the upper slopes of the main ridgelines. These slopes are generally either well grassed or vegetated but are eroded in sections which make them highly susceptible to erosion. Erosion and sedimentation controls will be used to prevent and control soil erosion around works areas and along access tracks constructions.

The majority of the Mountain Station site is located within the Dartbrook Catchment which drains to the Dartbrook Creek to the east. The western portion of the site is situated within the Wybong catchment, which drains to the Wybong Creek to the west. Given the site location on elevated ridgelines overlooking the Hunter Valley, the hydrology of the site is primarily confined to a number of first and second order drainage depressions which originate on site. Erosion and sedimentation works will be adopted to prevent and control erosion around works areas and access tracks.

15.2 Groundwater Resources

The Kingdon Ponds/Dartbrook alluvial aquifer system is the major fresh groundwater resource in the area and exists along major river and creek tributaries (Dartbrook Creek, Middlebrook Creek) as shown in Figure 15.0.

The main recharging mechanism for the alluvial aquifer system is from high rainfall periods originating in the mountainous ranges of the Upper Catchment at some distance from the Kyoto Energy Park sites. Local rainfall events contribute to a lesser extent to stream levels and recharge rates of the aquifer.

15.2.1 Impacts on Groundwater

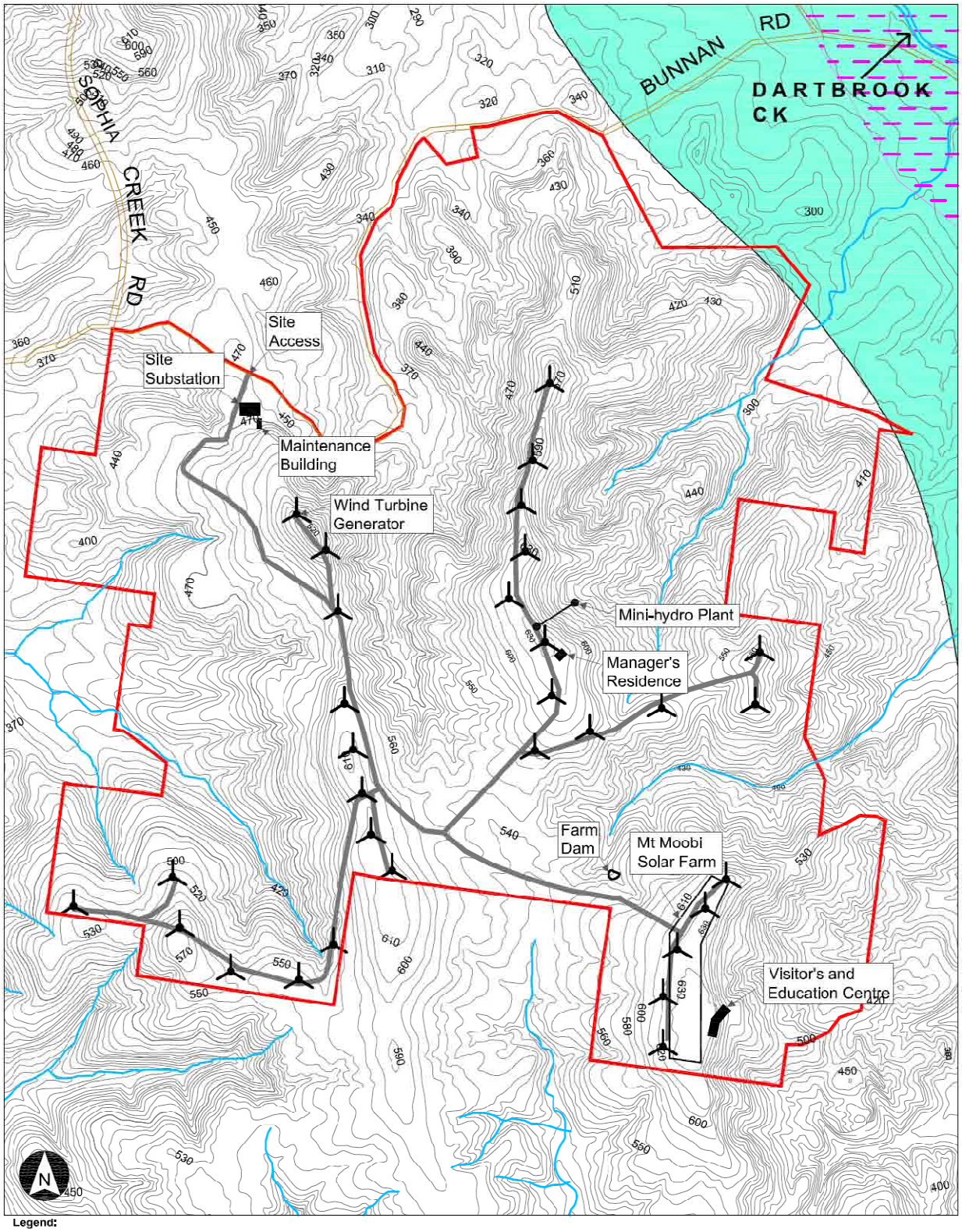
No registered bores are located on the Mountain Station property. A number of registered bores are located within Middlebrook Station site along alluvial deposits of the creek bed. No water resources shall be sourced from on site bores during construction or operational stages of the development.

Operational water requirements for generators and general operations including amenities are contained within Section 6.6.5. Water for on-site amenities will be sourced from rooftop runoff and stored in water tanks. Surplus water and backup water for emergency services will be trucked in by a water tanker and is considered to be negligible. Additional potable water will be sourced from public registered bores located nearby to the Scone town.

Water for operational dust suppression shall be sourced from existing farm dams during early stages of operations and during road maintenance. This is likely to be minimal and well below the existing maximum harvestable right dam capacity (MHRDC) for these dams. Dams are not licensed as they were constructed prior to 1999. Water for dust suppression would be phased out as roads and disturbed areas are consolidated and rehabilitated over the sites.

Groundwater is unlikely to be encountered during the proposed works which includes construction of wind turbine foundations along the ridgelines. This is mainly due to the elevation of the ridgeline and distance from the hardrock and alluvial groundwater resources (see Figure 15.0 and 15.1). Drilling and grouting of rock anchors used for turbine footings would be in the order of 20-30 metres below ground surface level however final depth would be determined based on engineering design. No groundwater is expected to be encountered nor are any impacts to any groundwater systems as identified expected or likely.

Wind turbine foundations would be designed prior to construction based on detailed geotechnical investigation, and would be either gravity based or reinforced anchored type design. The maximum excavation depth for concrete footings would be in the order of 3-5 metres below ground surface level. Rocks anchors (used in reinforced anchor design) would be drilled into rock foundations below this. Footings are sited on elevated points along the ridgeline and it is unlikely that groundwater would be encountered.



Legend:

- Property Boundary
- Proposed Access Track
- Natural Drainage
- Natural Contour (10m Interval)
- Extent of Deep Hardrock Aquifer
- Extent of Alluvial Aquifer

0 1.0 2.0 Kilometres

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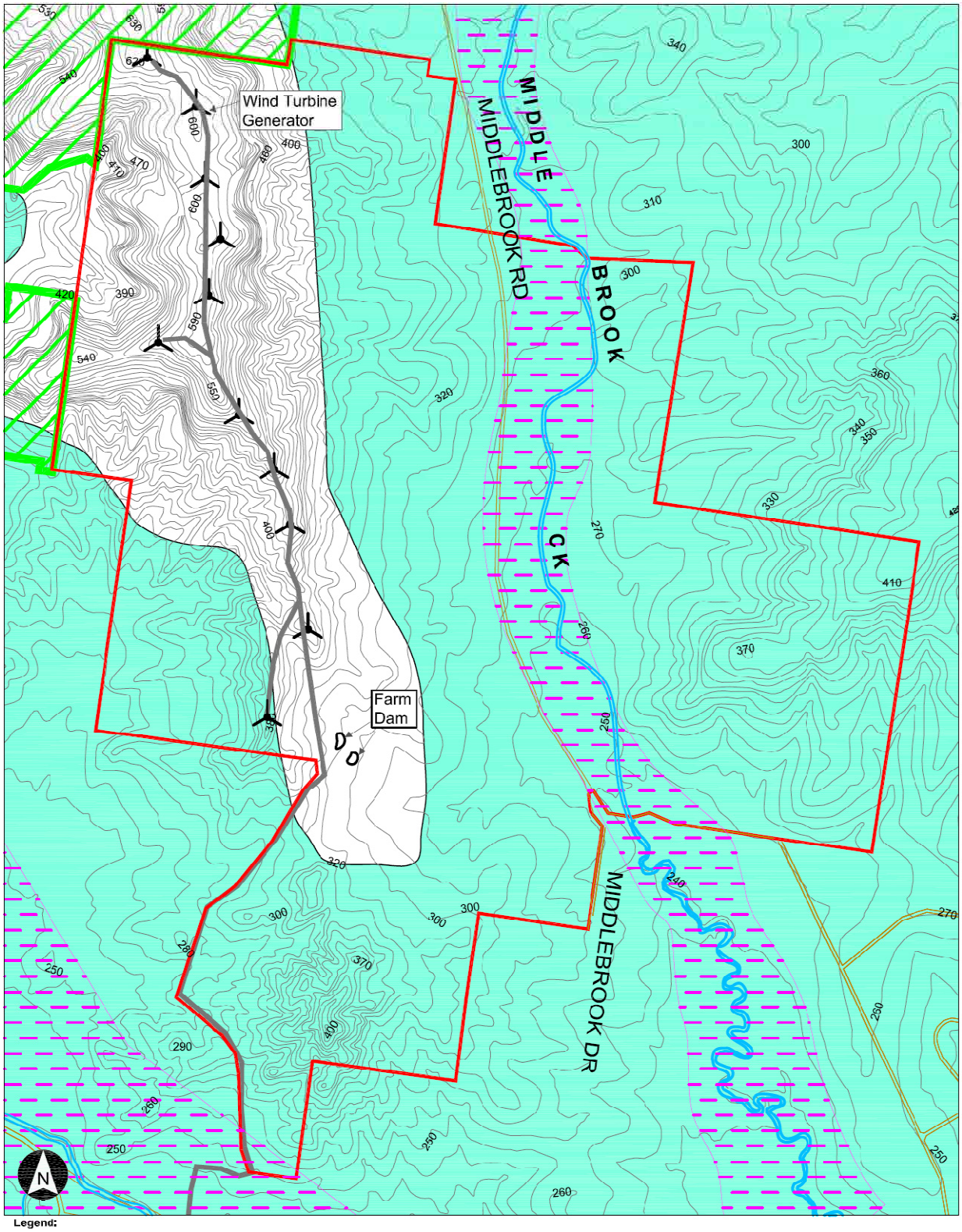

Legend:

Property Boundary
Proposed Access Track
Natural Drainage
Natural Contour (10m Interval)
Extent of Deep Hardrock Aquifer
Extent of Alluvial Aquifer

0 1.0 2.0
Kilometres

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Figure 15.1 - Hydrology (Middlebrook Station)

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