
Brunswick Heads Sewage Treatment Plant



Land Use Options Update

Prepared for Byron Shire Council
by MikeSvikisPlanning
7 February 2017

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CONTENTS

Background	4
Objectives	5
What has Changed?	6
Local Environmental Plan	6
Draft Rural land Use Strategy	7
Draft Residential Strategy	7
Environmental Constraints	8
Re-evaluation of the Options	13
Solar Farm	13
Council Works Depot	13
Rural with No Dwelling	14
Environmental Conservation	14
Public Recreation	15
Conclusion	16

Background

Byron Shire Council engaged GHD in 2008 to determine preliminary land use options for the Brunswick Heads Sewage Treatment Plant (STP) in anticipation of its closure. The new Brunswick Valley STP was commissioned in 2010, and the Brunswick Heads STP was decommissioned. It is currently being used as a pump station to transfer untreated sewage to the Brunswick Valley STP in Vallances Road for treatment. The STP remains largely the same as it was in 2008, with most of the above- and below-ground infrastructure still in place. Council has undertaken contamination testing across the site and prepared a Remediation Action Plan (RAP). It is understood that the RAP is not yet finalised. However, this report assumes the RAP will be implemented.

The December 2016 RAP (draft version 2) indicated the following:

- The site has elevated concentrations of contaminants of concern in soil, sediment, groundwater and surface water across the site.
- Minor impacts associated with inert waste materials are present across much of the site, with higher proportions of waste materials observed in the south-western and north-western corners of the site, likely associated with former landfilling activities on adjacent lots.
- Localised areas of impact around former STP infrastructure and/or localised impacts within the fill profile across the site.
- Asbestos-containing infrastructure has been identified to remain below the ground surface (ie asbestos pipe) at the site and within existing infrastructure (ie skim boards and baffles), with some broken fragments of asbestos cement sheeting identified within fill materials across the site.
- Analysis of sediments within the effluent lagoon identified elevated concentrations of copper, zinc, benzo(a)pyrene, TRH fraction <C16–C34.
- Elevated concentrations of heavy metals (Cu, Ni and Zn) were reported in groundwater west, north-west and north of the site. Elevated concentrations of total nitrogen were found throughout the site.
- Surface water within the effluent lagoon reported concentrations of total nitrogen, ammonia and faecal coliforms above relevant standards.

The RAP approach to remediation is:

- Removal of retained water, including dewatering of the effluent lagoon;
- Construction of a bund wall through the central portion of the effluent lagoon as directed by the Principal, with sediments removed from the southern portion placed into the northern portion;
- Demolition of all above-ground infrastructure, including the removal of asbestos materials and products, and placement within the northern portion of the effluent lagoon;
- Demolition and excavation of all below-ground infrastructure to a depth of at least RL 4.0 metres AHD and placement within the northern portion of the effluent lagoon;
- Excavation of unsuitable material and areas of contamination to RL 4.0 metres AHD and placement within the northern portion of the effluent lagoon;
- Unsuitable material will be placed to ensure a minimum of 0.5 metres of clean fill, or unrestricted reuse material is established as a physical barrier; and
- Placement of a physical barrier and marker layer above all areas of unsuitable material, and final grading to achieve the design surface levels across the site. The outcome will be a level site at 4.5 metres AHD, slightly draining towards the remaining portion of the effluent lagoon.

Brunswick Heads Sewage Treatment Plant is still described as Lot 1 DP 560486, Gulgan Road, Brunswick Heads, and is currently in Council ownership. The site has a total area of approximately 2.1 hectares (Figure 1).



Figure 1: The subject land

Objectives

The objective of this report is to establish:

- What has changed since the preliminary land use options report was prepared in 2008?
- How have those changes affected the options for land use?
- Has the preferred land use option changed?

It is not intended that the original report will be completely rewritten.

What has Changed?

Local Environmental Plan

A new standard format Local Environmental Plan was introduced in 2014. It did not completely replace Byron LEP 1988 because the new LEP did not contain any environmental zones. The subject land is mapped as mostly RU2 Rural Landscape and partly Deferred Matter under LEP 2014 (Figure 2). The Deferred Matter is zoned partly 5A Special Uses under LEP 1988 (Figure 3). The Deferred Matter on the subject land correlates mostly with a vegetated riparian strip adjacent to the Brunswick River. The Deferred Matter was publicly exhibited as an E2 Environmental Conservation zone.

The land affected by LEP 2014 is also subject to DCP 2014. This DCP provides a range of development controls and guidelines relevant to future development on the subject land.

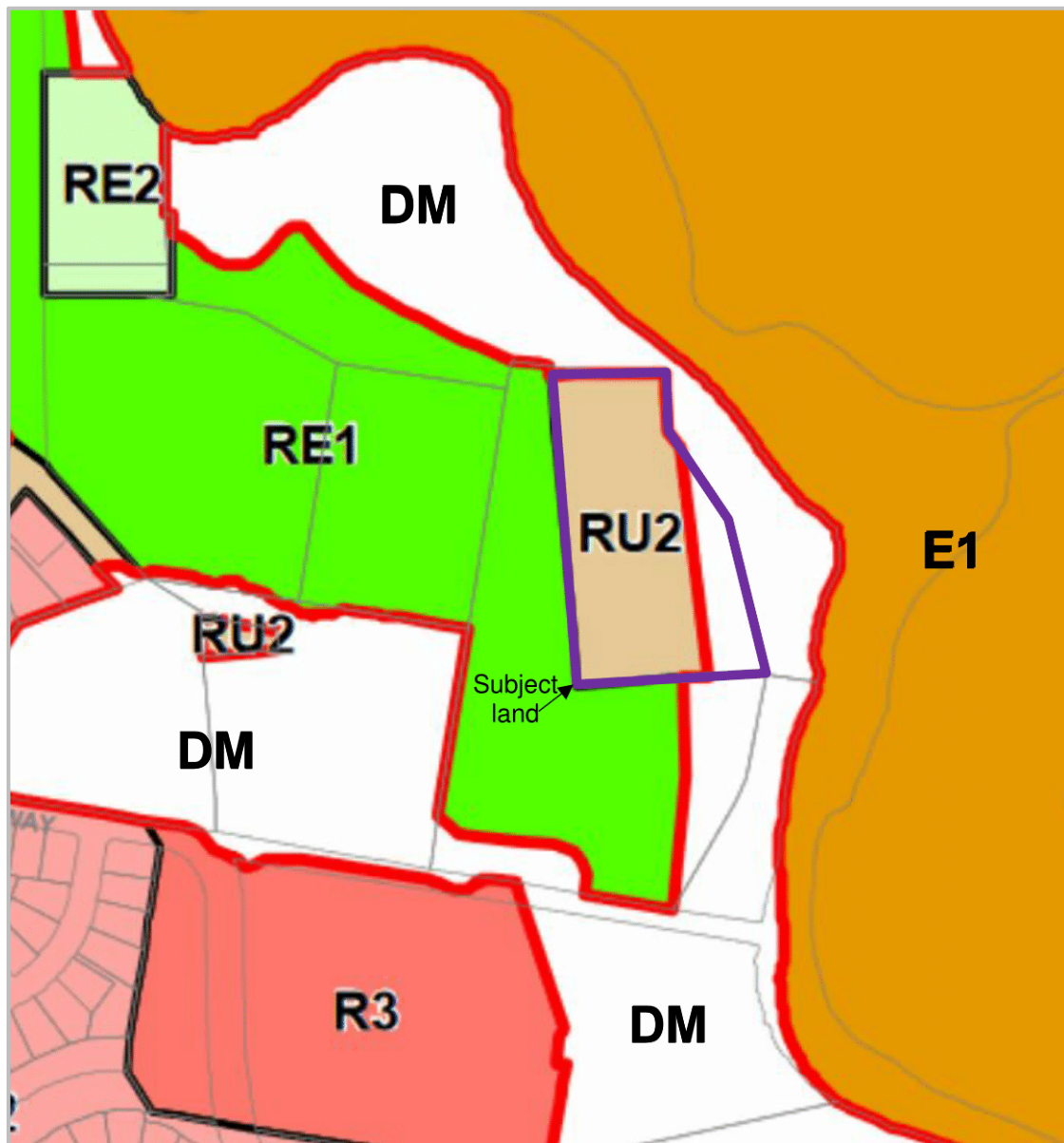


Figure 2: Zones under LEP 2014

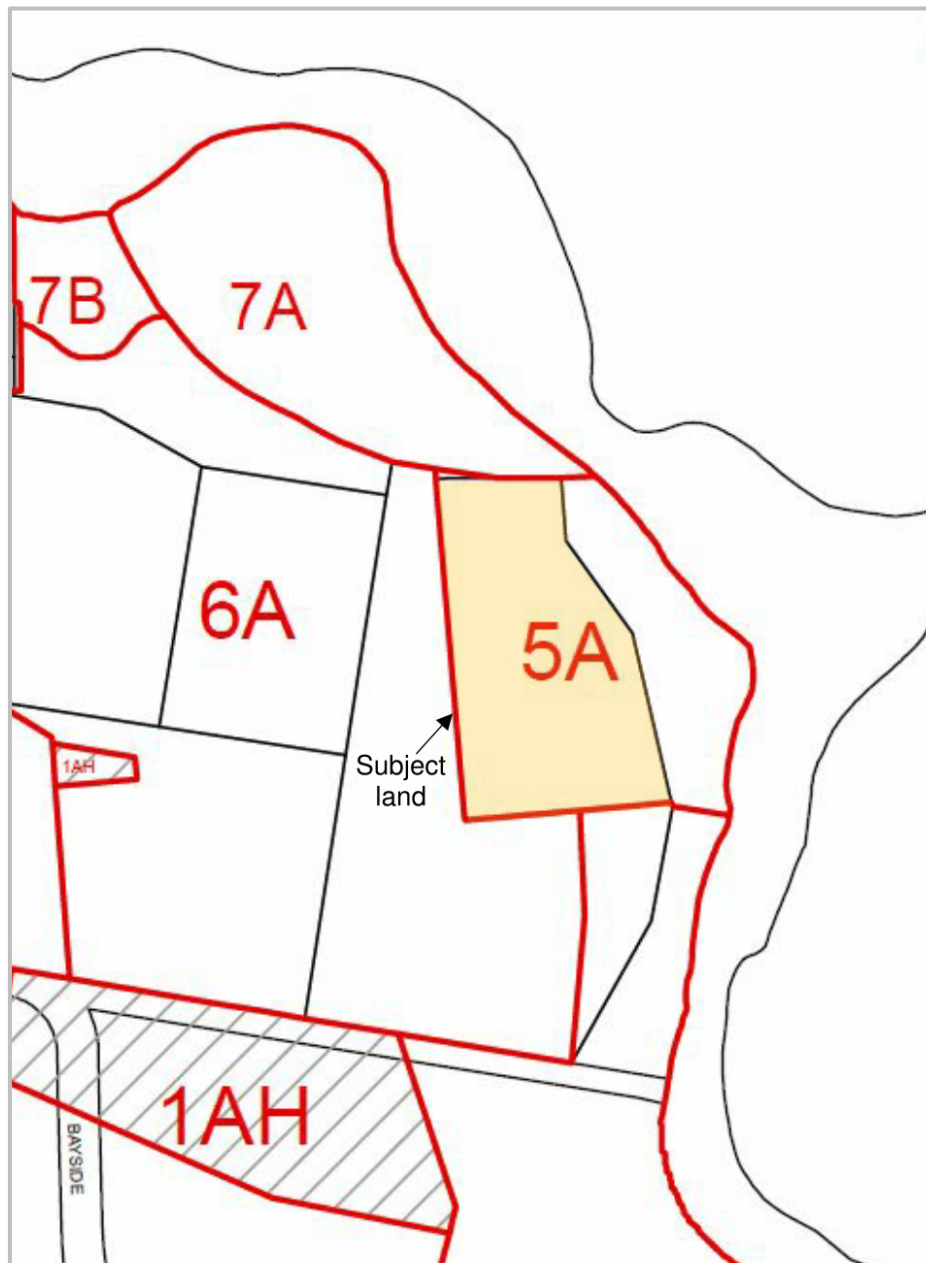


Figure 3: Zones under LEP 1988

Draft Rural Land Use Strategy

Byron Shire Draft Rural Land Use Strategy was prepared in March 2016. It was considered by Council in late 2016, but has not been finalised. It has also not received the approval of the Department of Planning and Environment. The draft strategy used site suitability criteria to map land as potentially suitable for rural residential use. Land was potentially “unconstrained land” or “assessable rural development land”. The subject land is not regarded as a priority area for rural lifestyle living. The subject land is not identified for rural residential development on the “Priority Locations Map – 4” on page 40 of the draft strategy. On this basis, the subject land or any land it adjoins is not likely to be rezoned in the foreseeable future for rural residential development.

Draft Residential Strategy

Byron Shire Preliminary Draft Residential Strategy was prepared in August 2016. Council is preparing the residential strategy to set a clear vision and policy framework for the Shire’s urban residential lands. Part of the

process involves identifying areas that have potential for additional housing to accommodate the expected 7,500 new residents by 2036.

The draft strategy did not classify the subject land as an “area of Interest” for future residential development. An area located approximately 150 metres south of the subject land is identified as an area of interest for future urban development. This area is the extension of the Bayside Brunswick locality.

On this basis, the subject land is not likely to be rezoned in the foreseeable future for residential development.

Environmental Constraints

Northern Councils E Zone Review and Section 117 Direction

In October 2015, the NSW Department of Planning and Environment released the final recommendations of its E zone review. This will influence the zone of the subject land when E zones are eventually inserted back into Byron LEP 2014. The key recommendations of the final report relevant to Byron and the subject land are:

- Environmental zones should only be applied to those areas which have important environmental values, based on validated ecological evidence.
- E2 and E3 zoning should only be applied where there is proven evidence of significant environmental values that meet the specific criteria listed by the consultant.
- Land that does not meet the criteria should be zoned according to its primary use.
- Where an environmental value is identified which may not warrant an environmental zone, it should be protected through an environmental overlay on the LEP map with an accompanying clause. The consultant considers environmental values which should be managed in this way are drinking water catchment areas, scenic protection areas, coastal risk areas and terrestrial biodiversity.

The section 117 Direction that requires Council to implement the E zone review at some time in the future when E zones are inserted back into Byron LEP 2014 states:

A planning proposal that introduces or alters an E2 Environmental Conservation or E3 Environmental Management zone or an overlay and associated clause must:

- a) *Apply the proposed E2 Environmental Conservation or E3 Environmental Management zones, or the overlay and associated clause, consistent with the Northern Councils E Zone Review Final Recommendations.*

The area which is currently represented by the Deferred Matter (DM) on the LEP map is likely to be included in an “E zone” or an environmental overlay at some time in the future.

Coastal Vegetation Communities Mapping

Coastal vegetation mapping, including extensive field investigation, has been undertaken by Council and was released for public comment in 2015.

The subject land is mostly cleared, but the remnant vegetation at its eastern edge is mapped as Community #2114 and Community #2225. These communities are described below and are shown in Figure 4.

#2114: COASTAL DUNE DRY SCLEROPHYLL FORESTS – Blackbutt – Scribbly Gum – Satinwood – Tassell Rush open forest of sandy waterlogged soils

A tall, open forest growing in wet, sandy Pleistocene back barrier sediments at Wardell, Tyagarah and west of Brunswick Heads and on the Far North Coast. The overstorey includes a number of species including Blackbutt (*Eucalyptus pilularis*), Scribbly Gum (*Eucalyptus signata*), Red Mahogany (*Eucalyptus resinifera*) and Brush Box (*Lophostemon confertus*). Satinwood (*Nematolepis squamea* subsp. *squamea*), Blueberry Ash (*Elaeocarpus reticulatus*), Corkwood (*Endiandra sieberi*) and Tooton (*Leptospermum polygalifolium*) form a mid-layer of small trees and shrubs. There is a layer of small

shrubs including Midgenberry (*Austromyrtus dulcis*) and *Acrotriche aggregata*. Tassell Rush (*Baloskion tetraphyllum* subsp. *meiostachyum*) is common in the ground layer as well as Saw Sedge (*Gahnia clarkei*) and Spiny-headed Mat-rush (*Lomandra longifolia*).

#2225: MANGROVE SWAMPS – Grey Mangrove – River Mangrove low open or closed

Low to mid-high open to closed forest or shrubland occurring on the margins of coastal estuaries on mudflats that are exposed to tidal inundation. The canopy is usually dominated by Grey Mangrove (*Avicennia marina* subsp. *australasica*) which often forms a simple, monospecific stand, although in brackish waters, the River Mangrove (*Aegiceras corniculatum*) is more frequent. Diversity in mangroves increases with decreasing latitude. North from the Manning River, Milky Mangrove (*Excoecaria agallocha*) appears in the king-tide zone. North from around Coffs Harbour, the Black Mangrove (*Bruguiera gymnorhiza*) and Spider Mangrove (*Rhizophora stylosa*) are present at low frequency and abundance. The shrub and ground layers are usually absent, although a few scattered herbs such as Creeping Brookweed (*Samolus repens*), *Sarcocornia quinqueflora* subsp. *quinqueflora* (Samphire) and Seablite (*Suaeda australis*) may be present.

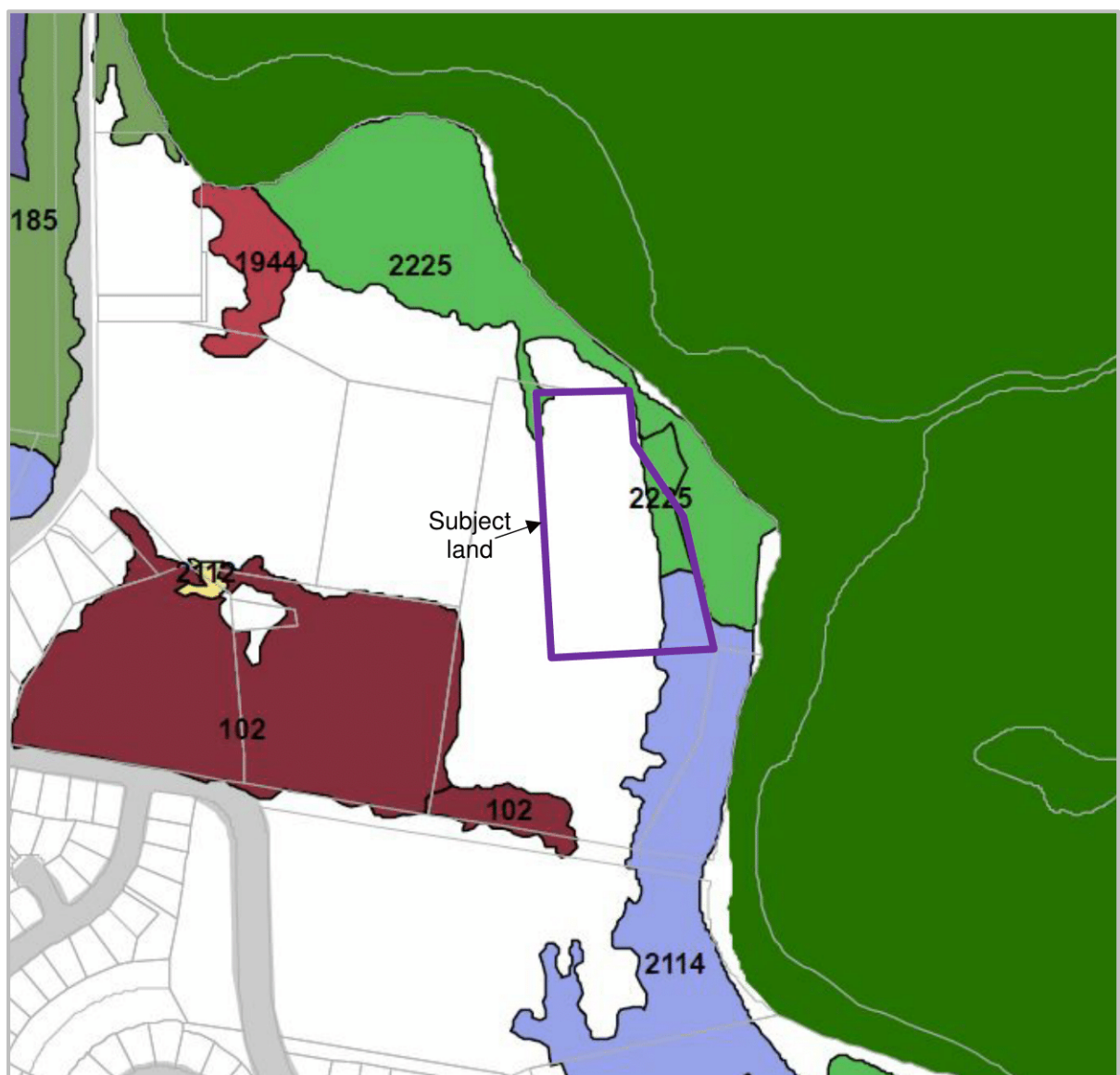


Figure 4: Coastal vegetation communities

As part of the RAP, a local ecologist was engaged to assess the subject land in relation to flora and fauna. He found that:

Vegetation within the STP, and around the majority of built infrastructure, is predominantly mown exotic grasses, mainly Blue Couch with occasional patches of Para Grass. Areas not subject to regular mowing include various exotic weeds including Blue Billygoat Weed, Mexican Clover, Farmer's Friends, Cuphea, Broad-leaved Paspalum, Paddy's Lucerne and Thickhead. Scattered trees within the site include exotic Frangipani and Jacaranda, with non-local Cajeput, and native Broad-leaved Paperbarks, Blueberry Ash, and Riberry. Non-local Ornamental Bottlebrushes are also present. Around the effluent lagoon a dense narrow stand of paperbarks is present, mainly comprising the local Broad-leaved Paperbark (Melaleuca quinquinervia), but also the non-local Cajeput (Melaleuca leucadendron). These are regrowth trees up to 10 m tall. Vegetation outside the fence to the north, east and south comprises a dense closed stand of weedy shrubs dominated by Barner Grass, with Wild Tobacco Bush, Castor-oil Plant and Lantana. Occasional native trees are present, but the stand to the south includes the invasive weed Madeira Vine. No threatened flora species were found within the STP or nearby. The narrow stand of regrowth paperbarks around the effluent lagoon collectively with the remnant mature paperbarks of the site were not considered representative of the Swamp Sclerophyll EEC. Effects of remediation of the Effluent Lagoon will depend upon which scenario is adopted. Considering the survey results where 16 species of birds and three species of frogs were observed using the resources of this small wetland and its fringing regrowth paperbark thickets, the maximum practicable retention of both vegetation and water is recommended. Use of the site by the threatened Little Bent-wing Bat contributes to its local significance.

Draft North Byron Flood Study

The Draft North Byron Flood Study was publicly exhibited from 18 January to 29 February 2016. The flood study outlines and discusses flood behaviour for the entire Brunswick River catchment, including the subject land. It looks at flooding up to the extreme event known as a Probable Maximum Flood (PMF), which is a flood with an annual return interval of greater than 500 years. The "design flood" on which Byron LEP 2014 bases its flood planning level and flood planning area is based on the 100 year ARI flood plus a 500 mm "freeboard".

Figure 5 shows the hazard category in a 100 year ARI flood as it affects the subject land. Flooding impacts less than 5% of the site on the eastern edge of Lot 1 DP 560486. This land is mostly vegetated with riparian vegetation and wetlands that will probably be included in an E zone in the long term. The main works area and effluent pond are all above the 100 year ARI flood event.

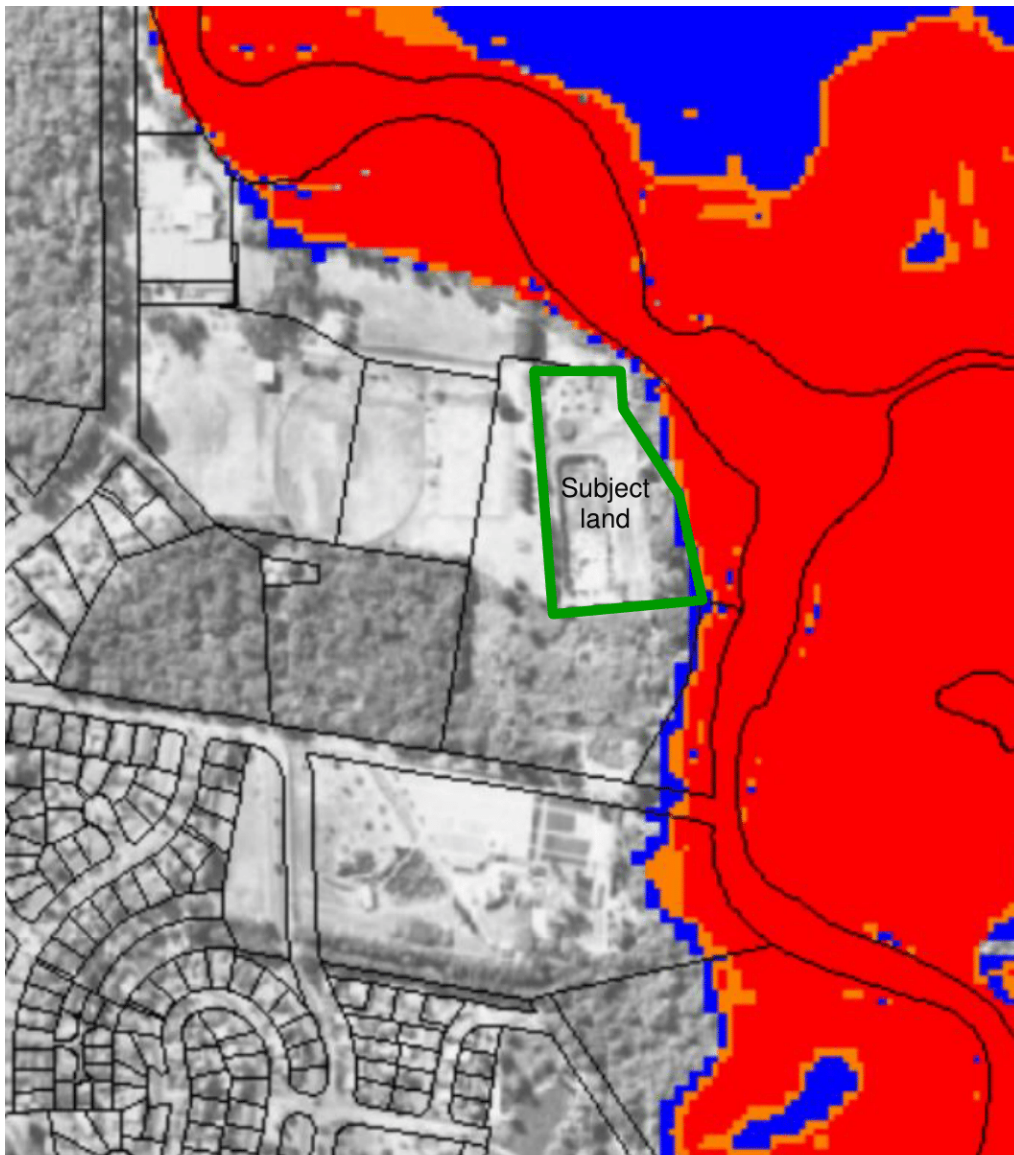


Figure 5: Subject land in a 100 year ARI flood event



The Probable Maximum Flood (PMF) map (Figure 6) shows that the subject land is significantly affected by flood water in an extreme event. For a PMF flood event, about 75% of the site including all of the main effluent pond and part of the works area are impacted.

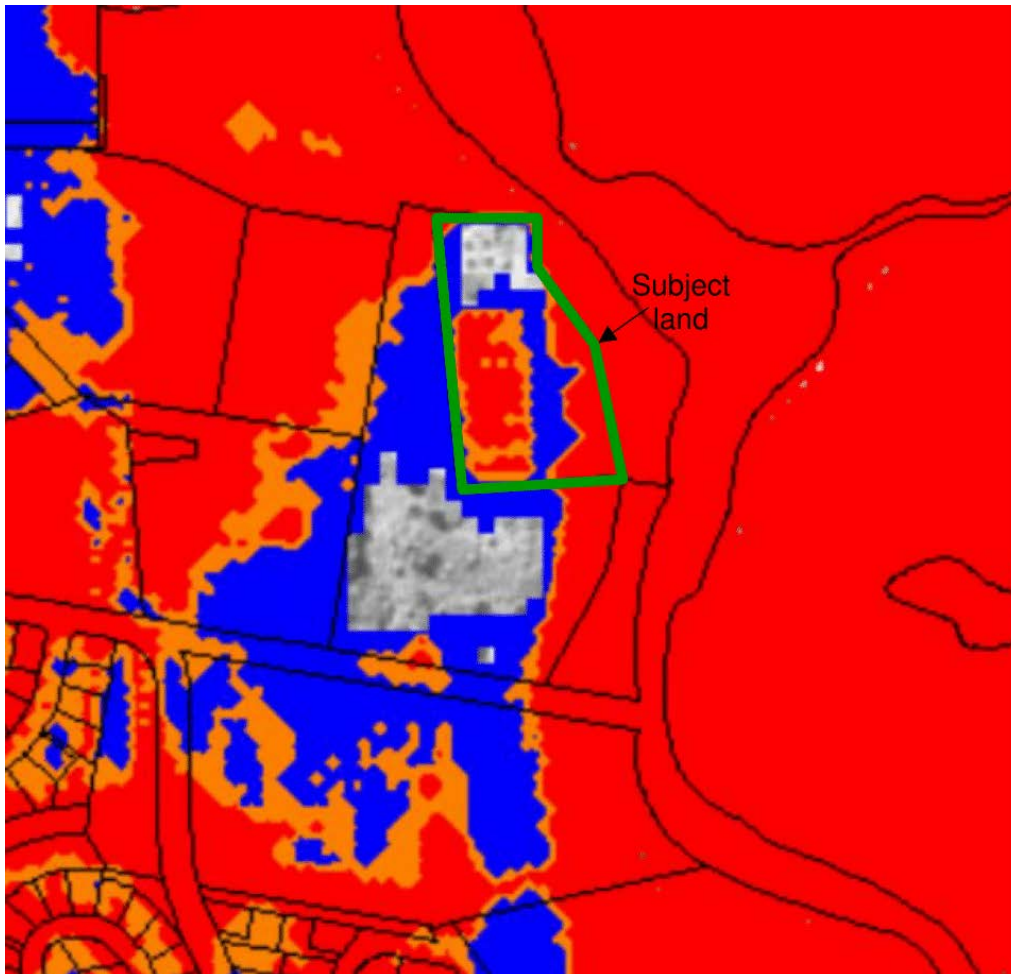
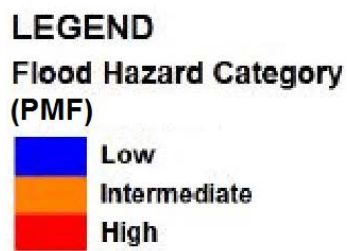


Figure 6: Subject land in a Probable Maximum Flood (PMF) event



Re-evaluation of the Options

In 2008, GHD concluded that the amount of contamination from past use of the site as a landfill made it unsuitable for residential development of any density. Its small size and separation from other residential areas were also a factor. The circumstances have not changed, and the latest RAP documents the extent of past contamination from both landfill and STP. The subject land is not being considered by Council in its latest draft rural residential or residential strategies, and this use is not recommended.

Commercial use was also discounted in 2008 because the site is remote from existing commercial areas, and this is still the case.

In 2008, it was considered that industrial land uses were not suitable for the site due to its small size, isolation from other industrial areas, and proximity to sensitive vegetation and a marine park. The site is also only accessible via the same access road for the adjacent sports fields, and this would be a source of potential conflict. These circumstances have not changed, however it is worth considering a single "light industrial" type use such as an electricity generating works (eg a solar farm) or a Council works depot.

Solar Farm

It is worth considering a niche "light industrial" type use such as an electricity generating works (eg solar energy system). SEPP (Infrastructure) 2007 states that a **solar energy system** means any of the following systems:

- (a) a photovoltaic electricity generating system,
- (b) a solar hot water system,
- (c) a solar air heating system.

The SEPP states (clause 34) that an electricity generating works (which includes a solar energy system) can be constructed on the subject land with Council consent in the current RU2 zone. If the solar energy system is ancillary to an existing infrastructure facility then it is permitted without development consent as long as it is undertaken by a public authority (such as Council); is ancillary to the existing infrastructure facility; and is a photovoltaic system that is less than 100 kW in capacity. There is an argument that preserving a pump station that delivers sewage to the Brunswick Valley STP retains the use of the site as an existing infrastructure facility, which means that Council does not need development consent for a photovoltaic system that is less than 100 kW in capacity. The energy from the photovoltaic system could be used to offset the cost of running the pump station and/or sold back to the grid as "green energy". The cost/benefit of this needs to be established.

The RAP outlines that about half of the existing pond (the southern half) will be retained as a freshwater habitat area surrounded by regrowth paperbark forest. The northern half of the pond will be filled with material from the site and capped. The capped area can be turfed, but would not be reforested to avoid tree roots penetrating the cap. This leaves an area of at least 6,000 square metres in the middle of the site that is quite open, above the 100 year ARI flood level, and may well be suitable as a solar farm.

A solar energy system in combination with the continuing use of the site as a pump station is the preferred short term option (subject to a cost benefit analysis).

Tweed Shire Council has recently issued a tender for a solar energy system at its works depot and regional art gallery. The tender documents for the works depot project have been supplied as a separate attachment to this report to assist Council should this option be pursued.

Council Works Depot

For some time Council has been considering moving its existing Bayshore Drive works depot to a different location, outside of Byron Bay. The current depot is only 1.8 hectares in area. The subject land is 2.1 hectares in area, is flood free in a 1 in 100 ARI event, has good access to water and sewer services, has good transport access and adjoins Crown land that may be able to be used in conjunction with a depot.

The negatives about this option are that:

- approximately 0.43 hectares on the eastern edge has been identified as having high environmental values and is adjacent to coastal wetlands and the Cape Byron Marine Park
- a further 0.6 hectares (approximately), which is currently the southern half of the wastewater pond, will be reshaped and de-sludged to remain as a freshwater wetland (in accordance with the RAP and the ecologist's recommendation). This may be suitable for an E zone (or an environmental overlay) at some time in the future (long term) but that would depend upon the success of the rehabilitation
- it would preclude any part of the site being used for sporting fields should this be required in the future.

Therefore, even if all of the “non-environmentally significant” parts of the site were to be used for a depot, it would be only 1.1 hectares in area. This may not be large enough. Using this land as a depot would also mean that there would be no land available for sporting fields in the short or long term on this site.

Although the depot option cannot be ruled out and needs further investigation, it would probably only work if it could be undertaken in conjunction with the use of the Crown land to the south. Given that the area of disturbed Crown land immediately south of the subject land is about 2 hectares, it should be investigated for use as a depot independently of the subject land.

Based on available information, this option is not recommended.

Rural with No Dwelling

This option assumes that Council will partly remove the wastewater pond and all pumps and infrastructure, and remediate the site to an agricultural standard. The subject land would not have a dwelling entitlement under LEP 2014, but could be used for a suite of uses permitted in the RU2 zone (including grazing and crop production). It accumulates all the costs associated with the remediation without any significant increase in value to offset those costs. The small size of the site and its separation from other agricultural areas also count against this option. The existing RU2 zone over most of the site is appropriate but use of the site for agriculture or horticulture is not appropriate.

This option is not recommended.

Environmental Conservation

The eastern edge of the site has high environmental values, albeit the parts closest to the STP are highly disturbed, full of weeds and in need of rehabilitation. In 2008, GHD commented that this option could include:

...expanding the existing endangered ecological communities within and adjacent to the subject site. Possible habitat may include littoral rainforest or sub-tropical rainforest on a floodplain or Koala habitat. However, ecological investigation levels for contaminated sites are more stringent for habitat rehabilitation than residential land uses due to the sensitivity of vegetation to absorbing and being affected by contamination. If the preferred rehabilitation method for the site included an impervious clay cap (which is common in disused landfill sites), then deep rooted plants cannot be established as they break the cap and allow water to penetrate. Shallow rooted native plants could be used but this would require ongoing maintenance to ensure that deep rooted trees did not invade the site over time. On balance it is likely that site remediation with the establishment and maintenance of endangered ecological communities is likely to be very expensive and may not be successful.

When the RAP is implemented, the eastern edge of the site should be rehabilitated consistent with a vegetation management plan to blend in with the local vegetation communities. This area, which is currently represented by the Deferred Matter (DM) on the LEP map, is likely to be included in an “E zone” or an environmental overlay at some time in the future. The southern half of the wastewater pond will be reshaped and de-sludged to remain as a freshwater wetland. This may be suitable for an E zone (or an environmental overlay) at some time in the future (long term) but that will depend on the success of the rehabilitation.

The main works area and the filled and capped northern half of the wastewater pond are not likely to be suitable for habitat rehabilitation for the reasons outlined in 2008.

This option is only recommended for the eastern edge of the site and the southern half of the wastewater pond, assuming the RAP is implemented.

Public Recreation

In 2008, GHD nominated the subject site as suitable for public recreation (and the overall preferred option) because it “is located immediately to the east of Stan Thompson Oval and has the potential to significantly benefit the sporting clubs that play there already. The site is also in close proximity to the proposed residential expansion area of Bayside Brunswick, which will provide additional users for an enlarged sports field.”

The *Northern Shire Sporting Fields – Strategy* adopted by Council in 2008, concluded: “As part of Council’s strategic planning for the site post decommissioning, Council consider the use of the land for sporting fields. Any investigations and feasibility studies undertaken for the site should not preclude this option.”

Two things have changed since 2008. The first is that Council has acquired and developed a piece of land at Shara Boulevard, Ocean Shores as a sports facility (soccer field). This became available for use in late 2016. This field is well located to service the northern shire residents, and includes change rooms and toilets. The second is that the RAP has established the extent of contamination across the Brunswick Heads STP land, and the preferred solution (in conjunction with retaining a pump station) will provide reduced opportunity for active recreation sports fields. A junior soccer field requires a flat, rectangular area of at least 5,000 square metres. If the northern part of the pond and the main works area are filled and reshaped into a uniform, flat area that is then capped and top-dressed, it would be sufficient for a single junior soccer field and might be large enough for the 6,400 square metres required for a senior size field.

Removal of the STP fences will immediately provide a small “edge” area for the existing sports fields, but this will be of limited value. The key factor will be how the balance of the site is filled, capped and shaped. It could be formed into a shape suitable for a sports field at the outset, even if that use may not be envisaged in the short term. The site could also provide for more passive recreation such as dog walking, but this would be limited to those parts of the site not being rehabilitated for conservation values. The RAP states that the site will be remediated for “passive recreational uses”. *The final landform comprising a level ground surface of RL4.5m AHD, slightly draining to the southern portion of the effluent lagoon, which is to remain.* This is consistent with the preferred landform for the highest and best use of the site.

The site has some potential for passive recreation, including the shade trees at its edges, and may provide some additional opportunities for “add-on” areas to the existing sports fields. The site could also provide for passive recreation such as dog walking.

It also has the capacity to provide an additional soccer field if the northern half of the pond and the works area are filled, capped and shaped with this end use in mind. Public recreation could also be used in combination with other uses including a solar farm. The very northern end of the site may be suitable for a small solar farm. There is also the potential to undertake land uses in sequence, as a solar farm installed in the short term does not prohibit the site being used for a sports field or passive recreation in the long term. The sewer pump station to be retained at the northern end should be screened with landscaping to reduce its impact on existing and future surrounding land uses.

Conclusion

This report revisits the three main land use options for the Brunswick Heads STP that were examined in 2008, and documents what has changed since that time. Since it was decommissioned, Council has proceeded to use the site as a sewer pump station but is yet to undertake the remediation required to prepare the site for the preferred public recreation use. The site was zoned mostly RU2 Rural Landscape under Byron LEP 2014 and a range of public recreation uses are permitted in this zone.

Council is now finalising its RAP for the site and its future use. The pump station will be retained and the vegetated eastern edge of the site will eventually evolve into an “E zone” (or environmental overlay). This does not significantly influence the land use options. The RAP recommends that the southern half of the wastewater pond be de-sludged and rehabilitated as a freshwater wetland. It can be assumed that in the long term this rehabilitated area will also evolve into an E zone (or environmental overlay).

The remainder of the site still has a range of possible uses that could be undertaken in combination or in sequence. If the northern part of the pond is filled and capped and the main works area is cleared of equipment and capped then there is still enough area to construct an additional soccer field, even with the pump station and freshwater wetland in place. However, this option requires the auditor to confirm that the filled and capped area has been remediated to a standard suitable for active sporting use, and that the area has been shaped to allow the field to be constructed (with a level and consistent surface). Council may also not be ready (financially) for additional sporting fields in this location because of its recent investment in sports fields at Shara Boulevard.

Given that the site will be used as a pump station in the short and long term then a solar energy system should be considered as a use to offset the costs of pumping sewage to the Brunswick Valley STP. Depending on its size, it could also sell back into the grid as green power. This could be done after the STP infrastructure is removed and the site is remediated. The best location is on the cleared land at the northern end and centre of the site. If located correctly, it could co-exist with the likely E zone area on the riverfront and the freshwater wetland proposed on the southern half of the wastewater pond. It would be above the flood planning level.

If the cost/benefit analysis of the solar farm is not satisfactory then passive recreation of the filled and capped area could be considered a “fall back” position until a sports field is warranted.

Based on available information, use of the site for a Council depot is not supported because there is insufficient land, ecological constraints and limitations on the future option of a sports field. Disturbed Crown land immediately south of the site may be more suitable in size and shape for a depot.

The highest and best use of the site in the long term (assuming the site is appropriately remediated and shaped) is a combination of habitat (eastern edge and freshwater wetland) with a sports field, sewage pump station and small solar farm. In the short term, it is a combination of habitat (eastern edge and freshwater wetland restoration), sewage pump station and large solar farm.

If the site cannot be cost effectively remediated to a standard suitable for a sports field then land not required for a solar farm could be allocated to passive recreation such as dog walking.

All of the above uses could be carried out in the existing RU2 Rural Landscape zone. It is not recommended that the RE1 Public Recreation zone be applied in the foreseeable future.

Short and long term options are summarised below:

Short Term = Sewer pump station + habitat (E zone, etc) + large solar farm + passive recreation

Long Term = Sewer pump station + habitat (E zone, etc) + small solar farm + sports field

Figure 7 and Figure 8 depict the potential use of the site in the short and long term.



Figure 7: Potential short term use of the site



Figure 8: Potential long term use of the site