Helena River Foreshore Definition

Adjacent to Hazelmere Enterprise Area
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Prepared for
HASSELL

Prepared by
AECOM Australia Pty Ltd
3 Forrest Place, Perth WA 6000, GPO Box B59, Perth WA 6849, Australia
T +61 8 6430 2000  F +61 8 6430 2999  www.aecom.com
ABN 20 093 846 925

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Table of Contents

Executive Summary i

1.0 Introduction 1
  1.1 Objective 1
  1.2 Background 1
  1.3 Data Collection 1
  1.4 Existing Zoning 2

2.0 Identification of Biophysical Factors 5
  2.1 Extent of Riparian Vegetation 5
  2.2 Soil Types that support Riparian Vegetation 5
  2.3 Floodway and Floodplain 5
  2.4 Soil types that are prone to erosion 5
  2.5 Landforms important to water course function 8
  2.6 Valuable habitat areas 8
  2.7 Land Use Pressures 8
  2.8 Archaeological and ethnographic sites 9
  2.9 Wetlands 9

3.0 Recommendation for Proposed Ultimate Foreshore Reserve 11

Appendix A
  DIA – Register of Aboriginal Sites ................................................................. A

Appendix B
  Top of River Valley - Topographic Information ........................................... B
Executive Summary

The objective of this report is to present the findings of investigations associated with defining the ultimate River Foreshore for the Helena River adjacent to the proposed Hazelmere Enterprise Area (HEA). In particular, the report will be used in discussions with the Department of Water in order to facilitate ‘approval in-principle’ of the ultimate foreshore reserve which will be incorporated into a Draft District Structure Plan.

The HEA is to the south of Helena River, and so only the reserve adjacent to the HEA is considered in this report, that is the southern foreshore between the Midland – Forrestfield railway line bridge and Roe Highway.

AECOM is currently preparing a District Stormwater Management Strategy for the HEA to support HASSELL and City of Swan in the development of a District Structure Plan for the same area. In order to ensure that adequate protection and consideration is given to the Helena River adjacent to this area, a Foreshore Reserve has been defined in accordance with the Waters and Rivers Commission Report No. RR16 Determining foreshore reserves (2001).

The biophysical criteria considered in the development of the ultimate foreshore reserve include:

- Vegetation.
- Hydrology.
- Soil type/Geology.
- Erosion.
- Topography.
- Habitat.
- Landuse.
- Heritage.
- Wetlands.

There is an existing reserve over the Helena River adjacent to the proposed HEA, and the modifications to the reserve are in the form of increased areas as a result of the considerations of biophysical criteria above. In particular the following modifications resulted from the aforementioned considerations:

- Allow for delineation between low density residential area and ultimate foreshore reserve in the form of either a road or shared path.
- Allow for continuity in vegetation buffers and potential habitat creation in a linear form adjacent and parallel to the riverbank.
- Allow for flood fringe identified through flood mapping.
- Allow for a buffer in locations susceptible to erosion.
- Allow for delineation of top of valley through assessment of topography and cross-section information.

The resulting ultimate river foreshore is proposed to be incorporated into a draft District Structure Plan for the HEA and will ultimately form a reservation within which appropriate authorities can adequately protect the health of the Helena River.
1.0 Introduction

1.1 Objective

The objective of this report is to present the findings of investigations associated with defining the River Foreshore for the Helena River adjacent to the proposed HEA. In particular, the report will be used in discussions with the Department of Water in order to facilitate ‘approval in-principle’ of the foreshore reserve which will be incorporated into a Draft District Structure Plan.

The HEA is to the south of Helena River, and so only the reserve adjacent to the HEA is considered in this report, that is the southern foreshore between the Midland - Forrestfield railway line bridge and Roe Highway.

1.2 Background

AECOM is currently preparing a District Stormwater Management Strategy (DSMS) for the HEA to support HASSELL and City of Swan in the development of a District Structure Plan for the same area. In order to ensure that adequate protection and consideration is given to the Helena River adjacent to this area, a Foreshore Reserve has been defined in accordance with the Waters and Rivers Commission Report No. RR16 Determining foreshore reserves (2001).

The Helena River was dammed with the construction of Mundaring Weir in the 1890’s. This resulted in a drastically different hydrological regime to that seen prior to European settlement, with significantly reduced flows and sediment transport. The land adjacent to the river was predominantly used for sheep and cattle farming up to the 1920’s, when disease resulted in the closure of many farms and the slaughter of stock, according to the Swan River Trust’s Swan and Canning Rivers Foreshore Management Strategy. The majority of the land directly adjacent to the Helena River in HEA is still used for rural purposes, with some apparent cropping occurring within the bounds of the river itself.

1.3 Data Collection

A site visit was undertaken by Ryan Warrington and Luke Cummins of AECOM which included the following considerations:

- Locate existing defined flow paths entering the Helena River foreshore.
- Inspect (where possible) locations of areas susceptible to erosion.
- Confirmation of vegetation boundaries predicted by desktop studies using aerial photography.

In addition to the data collected during the site inspection, the following information has been used in this investigation:

- Metropolitan Region Scheme – 1 : 25 000 Map Sheet 16 – Western Australian Planning Commission.
- Aerial Photography – SkyView.
- LiDAR topographic survey – obtained through HASSELL.
- Local Planning Scheme 17 – City of Swan – 2008.
1.4 Existing Zoning
The existing Metropolitan Region Scheme (MRS) defines a Parks and Recreation boundary over the Helena River, as does the current City of Swan’s Local Planning Scheme 17 (LPS17). Figure 1 shows LPS17 with the dark green indicating Regional Reserve Parks and Recreation and the lighter green adjacent representing General Rural.

The working District Structure Plan is shown in Figure 2 and shows the lots east of Amherst Road adjacent to the Helena River remaining as General Rural and the lots west of Amherst Road adjacent to the Helena River proposed to be amended from General Rural to Low Density Residential. The current Foreshore Reserve shown in this plan is a starting point and will be amended based on the findings of these investigations.
Figure 1 - City of Swan Local Planning Scheme 17 at HEA

CITY OF SWAN INTERMAPS

Information shown on this map, whilst believed to be correct at the time of compilation, must be verified with the relevant data source and the City of Swan accepts no responsibility for its accuracy or any matter arising from its use.

Dark Green Area is Parks and Recreation Reserve

Light Green Area is General Rural

Thursday, 17 June 2010
Figure 2 - Draft District Structure Plan at HEA – starting point for incorporating Foreshore Reserve considerations
2.0 Identification of Biophysical Factors

2.1 Extent of Riparian Vegetation
The aerial photograph, in conjunction with the site visit, was used to define the extent of riparian vegetation, and areas of potential vegetation regeneration. A combination of the following considerations was used to define the extent:

- Existing native vegetation which are considered to be useful in habitat and wildlife corridors, protection from erosion, additional ‘polishing’ zones for water quality and nutrient stripping.
- Cleared areas where re-establishing vegetation may be beneficial to the health of the waterway, and crucial to creating ecological corridors and habitat.

2.2 Soil Types that support Riparian Vegetation
Figure 3 indicates the soil and geology of the area. The soils of interest are:

- The bed of the Helena River shown as CM₂ which is Clay: Hard when dry, alluvial of origin.
- The areas adjacent to the Helena River bed shown as MgS which is Guildford Formation Pebbly silt, strong brown silt of alluvial origin.

The soil mapping indicates that the historical river bed extended well beyond its current obvious bounds, although this is typical of these types of rivers where development occurs adjacent to the river and land is filled and disturbed, and vegetation is cleared. This also highlights the effect of reduced flows and sediment transport resulting from damming of the Helena River in the late 1890’s.

It is not considered practical to extend the foreshore boundary out to follow the historical river bed (as indicated by the alluvial soils Clay and Guildford Formation Pebbly Silt), however the soil extents needs to be considered as part of the process.

2.3 Floodway and Floodplain
Mapping associated with a flood study which was undertaken in 1986 was provided by the Department of Water. The physical extent of both the floodway and flood fringe were also provided and these are depicted in Figure 4.

There are several areas of flood fringe indicated in the DoW mapping which are not in the current Parks and Reserve boundary shown in the current Draft Structure Plan and these are proposed to be included in the foreshore reserve.

2.4 Soil types that are prone to erosion
The soil mapping shown in Figure 3 was used to assess where soils are prone to erosion. The areas of Clay and Pebbly silt (strong brown silt) are not considered to be highly susceptible to erosion. There are areas, however, where the Bassendean Sand (very light grey at surface, yellow at depth) encroach close to the river bed, and these areas may require additional buffers to ensure there is sufficient protection and land allocated to vegetation such that erosion is less likely to occur.
Figure 3 - ENV Report Soil and Geology
Figure 4 - Floodway and Flood Fringe
2.5 Landforms important to water course function

Aerial photography, LiDAR topographic survey and the findings of the site inspection were used to identify features including steep slopes, drainage lines and low-lying storage areas which are considered to be important to the function of the Helena River and need to be included in the reserve to ensure their protection.

In particular, the following issues were identified:

- Some bank sections of the Helena River were relatively steep and appropriate buffers need to be applied for both bank stability and public safety issues.
- Existing drainage lines entering the Helena River foreshore have been identified, and are proposed to remain in the proposed Structure Plan. Areas have been allocated to allow for end of line treatment areas and revegetation (or protection of existing vegetation) prior to discharge directly into the river.
- Low lying areas which coincide with DoW mapping of flood fringe are considered to be critical to the health of the river and as such will be included where they are currently excluded from the Draft Structure Plan foreshore reserve boundary.

2.6 Valuable habitat areas

Limited information is available on fauna within this area, however the considerations where made in terms of likely habitat and opportunities for the creation of habitat. In particular, where existing vegetation appears to have been cleared, creating isolated zones, the area has been allocated to allow for the corridor to be reconnected where practical.

2.7 Land Use Pressures

Given that the majority of the directly adjacent land is remaining as General Rural, there is not likely to be increased pressure on the system due to this land use.

There is a portion of General Rural which is proposed to be changed to Low Density Residential which may increase both stormwater runoff and public access to the foreshore (potentially increasing disturbance). Considerations that need to be made to account for these impacts include:

- Sufficient allowance for runoff from residential areas such that areas susceptible to erosion are protected.
- Clear delineation of foreshore reserve from residential areas such that minimal disturbance to foreshore occurs, this can be in the form of a shared path or a road.

Further away from the directly adjacent lots, south of Stirling Crescent, the area is proposed to be rezoned to include the following land uses:

- A small portion of Medium Residential.
- Light Industrial.
- General Industrial (as existing).

A critical consideration for this landuse change as the lots are developed is water quality to the Helena River as a receiving system. The District Stormwater Management Strategy will provide guidance on the allocation of areas within the lots and within the road reserve to allow for adequate water quality measures, and adequate areas also need to be allocated within the foreshore reserve for:

- Protection of existing vegetation and areas which provide ‘polishing’ function and natural water quality treatment.
- The creation of new areas of water quality treatment.
Ensuring protection from erosion associated with increased flow velocities.

2.8 Archaeological and ethnographic sites

A search was undertaken on the Department of Indigenous Affairs Aboriginal Heritage Inquiry System and 15 records were found in the immediate area. There were many more found across the HEA site, however the search was focused on the foreshore boundary location rather than the wider study area for the DSMS. The results of the search have been included in Appendix A.

Of particular interest are the sites on Permanent Register:

- **Site 3758 Helena River** covers a large area encompassing the Helena River and in excess of 1km north and south. It is listed as Ceremonial, Mythological, Repository/cache and is a closed site so the actual coordinates are not provided. As the exact location is not known, it is difficult to consider where modifying the foreshore reserve boundary would impact on this site.

- **Site 4005 Central Ave/Bushmead Road and Site 4385 Bushmead Road Complex** are both listed as Artefacts/Scatter. They are within the industrial area to the south of the foreshore reserve and are not expected to be impacted by any modifications to the foreshore reserve.

- **Site 4006 Hump Paddock** is listed as Artefacts/Scatter and is the only site which is currently within the foreshore reserve. Any modifications at this location should ensure that the site is maintained within the foreshore reserve.

- **Site 4009 Railway Dump and 4010 Metro Meats** are both listed as Artefacts/Scatter and are located to the north of the existing foreshore reserve and so are not expected to be impacted by any modification to the foreshore reserve.

2.9 Wetlands

The location and classification of geomorphic wetlands were included in the assessment of the foreshore. Much of the land within HEA is classified as wetland, based on Geomorphic Wetland mapping obtained from Landgate, although the majority is sub-classified as multiple use wetlands. However, a large section of the Helena River flood valley is classed as conservation category wetland, with some adjacent sections of resource enhancement that have been included in the foreshore reserve in accordance with geomorphic wetland classification objectives. A plan of wetland mapping throughout HEA is provided in Figure 5.
Figure 5 - Geomorphic Wetland Mapping
3.0 Recommendation for Proposed Ultimate Foreshore Reserve

The ultimate foreshore reserve shown in Figure 5 is the result of consideration of the biophysical criteria listed above. The map has been annotated to show the decision making process that was involved in creating the reserve.

In addition to the information above, topographic information has been provided in more detail in Appendix B, including a plan and cross-sections showing the river valley and the location of the ultimate foreshore reserve on the cross-sections.

The ultimate foreshore reserve shown in Figure 6, Figure 7 and Figure 8 is proposed to be incorporated in the Draft Structure Plan being prepared by HASSELL, which will be referred to the Department of Water at the appropriate timing. It should be noted that wetland mapping has been superimposed on Figure 8 as it was particularly relevant to the foreshore reserve in this area, but has not been included on the other figures.
Figure 6 - Proposed Ultimate Foreshore Reserve (1 of 3)
Figure 7 - Proposed Ultimate Foreshore Reserve (2 of 3)
Boundary defined based on change of slope at top of river valley to protect conservation category wetland.

Followed the existing Parks and Reserve cadastre boundary, which extends further than the top of river valley and allows sufficient area to stabilise riparian vegetation.

Followed existing Parks and Reserve cadastre boundary around lake to include conservation category wetland.

Resources enhancement wetland in this area requires consideration for future land use planning.

Figure 8 - Proposed Ultimate Foreshore Reserve (3 of 3)
Appendix A

DIA – Register of Aboriginal Sites
Search Criteria

15 sites in a search box. The box is formed by these diagonally opposed corner points:

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Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

Copyright

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Site Assessment Group (SAG)

Sites lodged with the Department are assessed under the direction of the Registrar of Aboriginal Sites. These are not to be considered the final assessment.

Final assessment will be determined by the Aboriginal Cultural Material Committee (ACMC).

Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code “closed” or “vulnerable”. Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. ‘5000000:Z50’ means Easting=5000000, Zone=50.
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Appendix B

Top of River Valley - Topographic Information