

Memo Title	Southlands Flood Storage Assessment
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1. Introduction

DBL Property seek the services of Turnbull Engineering to assess the flood storage capacity of the industrial site located at 28 McPherson Street, Banksmeadow. The assessment assists by informing consent conditions placed on the development in regard to compensatory flood storage works at the site.

We are informed that additional flood storage capacity was provided during construction of the original Southlands development site which encompasses 26 McPherson Street, 28A McPherson street, 28B McPherson Street and 28 McPherson Street (the subject site). The additional flood storage occurred due to marginal over cutting in selected areas across the Southlands basin. Accordingly, we have sought to review the actual compensatory storage provided at Southlands, compared to the originally approved design.

This report documents the outcomes of that assessment.

1.1. Project Objectives

The project objectives are to:

- Assess the additional flood storage capacity by evaluating the difference between the Southlands design and the as-built conditions at the site following construction.
- Determine if the site maintains the existing flood storage capacity as required by Condition B17 of SSD 9691.

2. Background Information

The subject site was formerly part of a property owned by Orica known as Southlands. In 2012 (with later modifications) the Southlands Remediation and Redevelopment project was approved by the NSW Minister for Planning. The subject site was identified in that approval as a portion of a compensatory flood basin and is defined as Lot 9 DP 1205673. Lot 9 has therefore not been developed other than for landscaping works and is the subject of restrictions on title allowing future development subject to the flood storage being maintained. Orica are seeking to develop the site using a suspended concrete platform in order to maintain the existing flood storage volume.

Overview of the Approved Development

The SSD approval allows for:

- site preparation works, including vegetation removal, proof rolling and capping across the site
- the inclusion of a 100mm barrier layer across the site under the deck area (34,355 m² as noted on Architectural plans, Axis Architecture)
- the construction of a suspended concrete platform to support the warehouse buildings and hardstand/ car parking areas above the natural ground surface, including a crossover over easement to McPherson Street
- the construction and use of Building 1 and Building 2 comprising warehouse (industrial) and ancillary office/commercial spaces

3. Flood Storage Capacity Assessment

3.1. Provided Data

To facilitate the assessment of differences in flood storage capacity provided at the site, several datasets, reports and drawings (shown in Table 1) were provided by DBL Property.

Table 1 Data Collation Summary

Data	File Name	Data Type	Data Source	TE Comments
Southlands Civil Works Package Drawings	2014.05.12 Consolidated Set For Construction	PDF	Cardno – original civil designers	
Original Design Bulk Earthworks Survey	SOUTHLANDS BULK EARTHWORKS	AutoCAD dwg	ENVIROPACIFIC – original civil contractors	
Original Design Survey	3D MODEL	AutoCAD dwg	ENVIROPACIFIC	Proposed design levels for subject site
As Built Survey Drawing	10240B FINISHED SURFACE LEVELS FINAL REV 2	PDF	C.M.S Surveyors	
As Built Survey	10240B FINISHED SURFACE LEVELS REV 2	AutoCAD dwg	C.M.S Surveyors	
As Built Survey	YN210094_Soutlands_Supertin ascon survey rev02_20150506	12da	C.M.S Surveyors	Survey of subject site as built
Recent Survey Drawing	78746_rev b	PDF	Rygate Surveyors	
Recent Survey	78746_traingles	AutoCAD dwg	Rygate Surveyors	Recent site survey of Lot 9
Flood Impact Assessment	Appendix F_Flood Impact Assessment	PDF	BMT	Flood Impact Assessment Report produced by BMT

3.2. Flood Storage Capacity Calculations

To assess the changes in flood storage capacity at the site, volume calculations were completed in 12d to determine the volume of fill (m^3) below a specified level (referenced in mAHD) for each of the provided models. The level used to conduct these calculations was the 1% AEP flood level of 4.1mAHD, as specified in the BMT Flood Impact Assessment Report. This calculation was conducted using the smallest area of the provided survey models to prevent the inclusion of any null values in the analysis. Figure 1 below shows the difference output of the as-built model minus the design model TINs.



Figure 1 - Difference output as-built model minus design model

As shown above in Figure 1, the northern 1/3 portion of the site shows lower site elevations when comparing the design TIN and the as-built TIN. However, it is noted that the blue area localised to the far northern boundary appears to be due to an anomaly in the design TIN, rather than a +1.25m reduction in site levels. To further understand the discrepancy, the Design and As-built plans were consulted to confirm the TIN levels. This analysis is shown below in Figure 2.

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Figure 2 - As-Built Survey and Design Plan Levels

As shown above in Figure 2, the As-built survey indicates that levels at the boundary location are approximately 0.2m lower than the Design levels.

The flood storage calculations for both As-built and Design TINs, and their difference is presented below in Table 2.

Table 2 Flood Storage Calculation Results

Survey Model	Storage Volume (m ³)
Design	25324
As Built	28521
Difference	3197

Note: Storage volume taken as total calculated fill volume below the 1%AEP flood level (4.1mAHD)

As shown above in Table 2, the analysis indicates that the actual post-construction conditions provide an additional 3197m³ of flood storage capacity (approximately 13% over compensation) when compared with the design, providing evidence that further excavation works were conducted during original construction to increase the overall flood storage capacity of the site. However, noting that the localised discrepancy on the Design Tin may overestimate the additional volume figures by approximately 300 m³.

3.2.1. Flood Storage reduction due to the approved development at 28 McPherson Street

As discussed in Section 2.1, the new development involves site preparation works, including vegetation removal, proof rolling and capping across the site, a new 100mm barrier layer and construction of a suspended concrete platform (and piers). The impacts on flood storage for the site are presented below in Table 2.

Table 3 Flood Storage reduction due to proposed development

Proposed Development works	Estimated Storage Volume (m ³)
Vegetation removal and proof rolling¹	-687
Capping (100mm) (in the area on the underside of the deck)	3435
Piers²	200
Total Flood Storage reduction	2948

¹Assumes a nominal 20mm of subgrade compaction due to root ball removal and proof rolling

² Assumes 400 piers, 800mm diameter and approximately 1m in height (up to 1% AEP flood level)

3.3. Conclusion

This assessment has reviewed the additional flood storage capacity at the Southlands site. The findings indicate an additional flood storage capacity of approximately 2900-3200m³ when comparing the Design plan levels and the As-built survey levels.

The additional flood storage off-sets the approved SSD 9691 development which removes approximately 2950m³.



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