



Government of South Australia

Department of Environment,
Water and Natural Resources

CPB/013/13

Date: 9 November 2017

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Andrew Cameron
Chief Executive Officer
Yorke Peninsula Council
Maitland SA 5573

Attention: Stephen Goldsworthy, Operations Manager

Re: Beach management adjacent the Black Point boat ramp

Dear Andrew,

I write regarding the management of the beach adjacent the Black Point boat ramp. Following our on-site meeting on 5 October 2017 with representatives of the Black Point Progress Association, it was agreed that the Coastal Management Branch of the Department of Environment, Water and Natural Resources (DEWNR) would provide advice to Yorke Peninsula Council (Council) on the coastal processes and management options for the site.

Background

This ramp was constructed in 2014 to replace the previous boat ramp, which was a small concrete ramp across the beach, at approximately beach level, in the same location. I understand that the residents were seeking an upgrade of the local boat launching facilities as the previous ramp was causing problems with launching and retrieval at low water and/or for larger boats. The Council's 2013 development application for the new ramp was referred to the Coast Protection Board (Board) for assessment. The Board did not object to the development proposal, but the response included the following:

"The coastline at this location, while relatively sheltered, is subject to coastal erosion and this risk will increase with future sea level rise due to global warming. The risk of erosion is evident by the placement of protection works south of the proposal, to protect adjacent shacks. The application information (Coppock and Associates, p5, Nov 12) states that 'the ramp location appears to be close to a neutral point in regard to sand transportation within the bay, and there is little historical evidence of build-up/erosion of beach sand over the existing ramp'. The potential build-up of sand is likely to be seasonal but this is difficult to confirm without historical records."

"The Board is of the opinion that the scale of the ramp is likely to affect coastal processes."

The Board directed conditions of approval related to the Council's responsibilities for management of the development and its impacts on the coast:

- Sand monitoring and management is to be undertaken in accordance with a sand monitoring and management plan, which is to be prepared to the reasonable satisfaction of the Coast Protection Board.
- Beach monitoring poles must be installed either side of the boat ramp prior to construction.
- Excavation and construction shall be carried out in a manner which minimises environmental impacts on adjacent marine environments. Turbidity and sedimentation from construction activities shall be monitored at all times and remedial actions undertaken immediately should significant environmental harm become apparent. This may involve cessation of the offending activity.
- Any mechanical and electrical equipment and power outlets should be safe from flooding and therefore be raised in accordance with the Coast Protection Board's recommended floor level of 3.80m AHD.
- Landscaping with local native coastal species shall be established to soften the appearance of the development (to an extent), encourage coastal biodiversity, catch rubbish from entering the marine environment, enhance the existing car park and potentially integrate with the "proposed memorial wall by others".
- Landscaping associated with this development shall use local native coastal species. The Native Vegetation Council should be contacted should the applicant require specific species lists.

Observations on beach response to the boat ramp

The beach at the north-western end of the Black Point settlement, where the boat ramp is built, has a thin (up to 0.75m) layer of sand over a clay base, backed by soft cliffs. To the south-east, the cliffs fall in height and sand dunes back a deeper, sandy beach.

Following construction of the new boat ramp, it has become apparent that there is a net south-eastward littoral movement of sand in the vicinity of the boat ramp. Since its construction, this has led to a gradual draw-down of sand on the south-eastern side of the ramp, with a corresponding increase in the beach level on the updrift, north-western side.

There appears to be a seasonal variation in the direction of sand drift, with summer weather patterns tending to cause a north-westward drift of sand which raises beach levels on the south-eastern side of the ramp. However the north-westward rate of drift is not sufficient to match the south-eastward drift, resulting in a net loss on the south-eastern side of the ramp, which has progressively increased each year since the ramp's construction.

The change in beach level on the south-east could be as much as approximately 0.75m, based on marks on the uprights of a beach shelter about 35m south-east of the ramp. The beach level is currently low enough to expose a layer of reportedly soft clay for some tens of metres south-eastward along the beach.

To date, the loss of sand from the beach has not led to erosion of the cliff or dune at the top of the beach. The primary issue is a loss of recreational amenity caused by the sand loss.

Further eastward, on the point, there are quite large areas of bare sand, which indicate accretion over a short period, as there is little colonising vegetation to be seen.

Survey data and analysis

DEWNR established several beach profiles at Black Point, some towards the south-east were first surveyed in 1975. The location and reference numbers of these profiles can be seen in Figure 1. Several profiles were resurveyed on 16 October 2017 and the collated data from these profiles (from north-west to south-east: 560023, 560011, 560007, 560006, 560005) can be seen in Figures 2 to 6. In addition, a high-resolution survey of the area surrounding the boat ramp was also surveyed in October 2017 (terrestrial; and hydrographic) to establish a baseline digital elevation model at the site (Figure 7).

The nearest profile to the ramp (560023, 166m south-east of the ramp) was established in 2005 and only resurveyed in 2017. It indicates that there has been a beach volume loss along that profile of 4m^3 , which is a relatively small loss of sand.

The next profile (560011, 250m south-east of the ramp) shows a beach volume loss between 1995 and 2017 of 5m^3 .

The other profiles surveyed appear to be sufficiently far from the ramp as to be unaffected by it. Profile 560005 shows erosion on the dune face but stability over the beach and nearshore area. The others show little trend in beach behaviour.

Assessment

Based on the above information and observations, it is apparent that net south-eastward alongshore sand drift is leading to a slow run-down of beach volumes immediately adjacent the new Black Point boat ramp. The ramp itself is accumulating sand on its north-west side, which is contributing to the volume imbalance. There is some evidence of sand bypassing the ramp on the seaward end, but not in sufficient amounts to retain beach equilibrium on the south-east side of the ramp. The sand may also be moving some distance south-east in the nearshore zone before coming ashore, thus not contributing to beach levels immediately south-east of the ramp.

The accumulation of sand north-west of the ramp is relatively small and limited in volume by the size of the ramp. It is likely to be too small in volume to restore beach levels on the south-east of the ramp to previous levels.

There are seasonal variations in the direction of sand drift, with some recovery of the beach adjacent the boat ramp apparent over the warmer months, with a net north-westerly alongshore drift. This drift doesn't match the dominant south-easterly drift, as observed in the period since the ramp's construction.

The survey data, although of relatively coarse resolution, has been assessed to estimate beach volume changes. It indicates that the net loss of beach volume south-east of the boat ramp is in the order of $1,500 \text{ m}^3$ over approximately 300m of beach ($5\text{m}^3/\text{m} \times 300\text{m}$).

Assuming the beach in the vicinity of the ramp was in dynamic equilibrium before 2014, this could average roughly 500m³ loss per year since then.

An alternative calculation, looking at the likely maximum beach level above the clay layer of 0.75m, as indicated by the marks on the beach shelter, is also possible. The profiles indicate that the beach is losing volume over a 25m width. If this has occurred over 300m, the volume loss is estimated as $25 \times 300 \times 0.75 = 5,625\text{m}^3$. This is likely to be somewhat of an overestimate and should be considered an upper bound to the volume loss.

It is likely that sand is accumulating at the point at the eastern end of the settlement. Based on the analysis of the survey data, there would be sufficient volumes available at the point to replenish the beach to the south-east of the ramp to improve beach amenity. A single replenishment of 2,000 to 3,000m³ should be sufficient to last several years, although this will be dependent on the weather.

Conclusions and Recommendations

1. Since the construction of the new Black Point boat ramp in 2014, there has been a relatively slow loss of beach volume to the south-east of the ramp.
2. This loss is caused by a net south-easterly littoral drift of sand, which is interrupted by the ramp acting as a groyne across the beach.
3. To date, the loss is not having an impact on broader foreshore stability or affecting built assets. The impact is primarily on recreation and amenity.
4. The loss is in the order of 500 – 1,900m³ per year. More precise estimates are not possible with the current survey data.
5. If it is decided to replenish the beach adjacent the boat ramp to improve amenity, it is recommended that the sand be sourced from the beach at the eastern extremity of Black Point.
6. Should this be conducted, a replenishment volume of 2,000-3,000m³ would be adequate to raise beach levels along the affected area and allow an assessment of the utility of such a measure.
7. As the purpose of the replenishment would be for amenity purposes, it is unlikely that the Coast Protection Board would provide grant funding for the task. The Board's 2017-18 budget has been committed to its works programme.
8. However, the Board can provide the Council with authorisation to undertake the replenishment works, in accord with Schedule 14 Part 1 (1) (e) of the *Development Regulations 2008*. This authorisation means that a development application would not be needed. A request for authorisation can be submitted to me by email and should include information on the volume of sand to be moved, diagrams of the collection and deposition areas, the timing of work and the proposed methodology. It's recommended that any such application is prepared in consultation with Coastal Management Branch staff.

9. DEWNR and the Board are also able to provide advice and technical support to the Council.

For further information on this matter, please email me at murray.townsend@sa.gov.au.

Yours Sincerely,



**DR MURRAY TOWNSEND
MANAGER, COASTAL MANAGEMENT
CLIMATE CHANGE GROUP**

Black Point
Boat Ramp Survey 16/10/2017



0 Kms
1:12,000

Produced by Coastal Management
Department of Environment, Water and Natural Resources

Data Source Coastal Survey Unit
Compiled 19 October, 2017
Projection Transverse Mercator
Datum Geocentric Datum of Australia, 1994

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Figure 1: Beach profile locations at Black Point

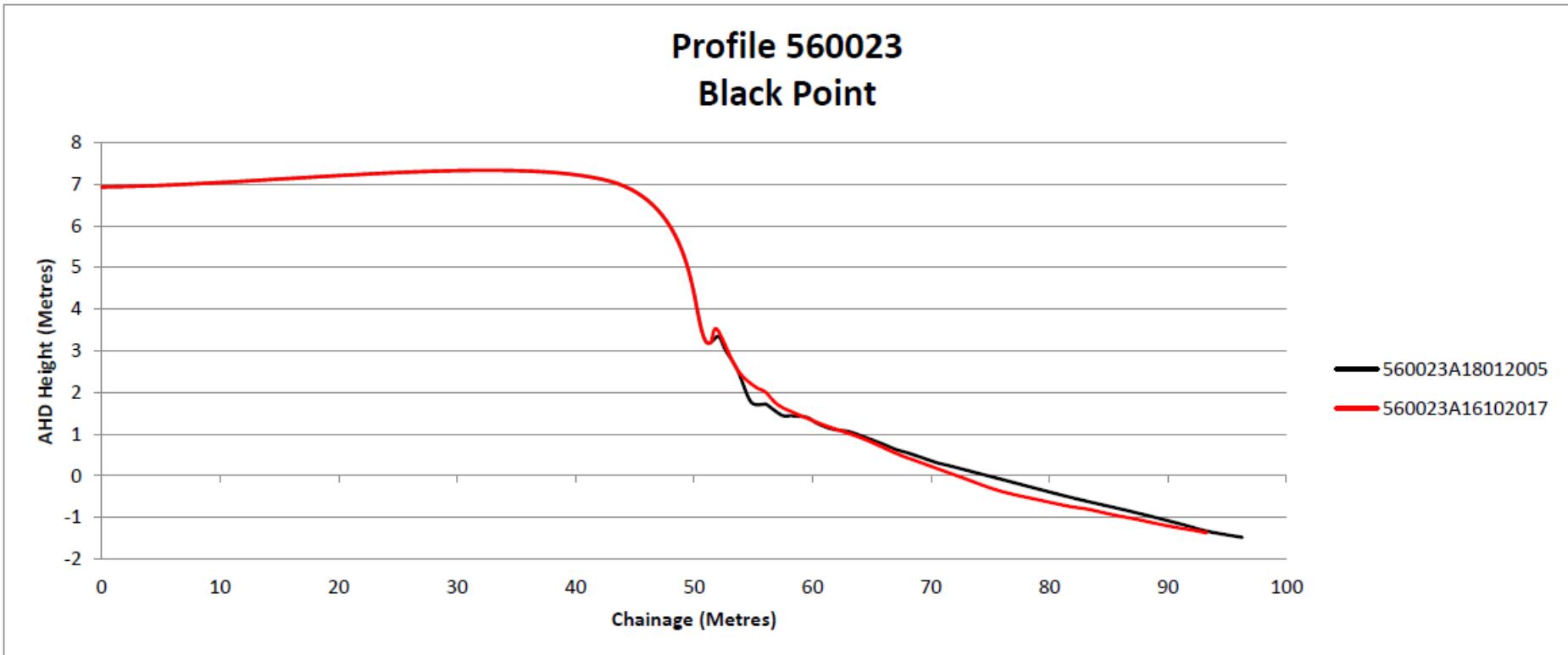


Figure 2: Black Point Profile 560023

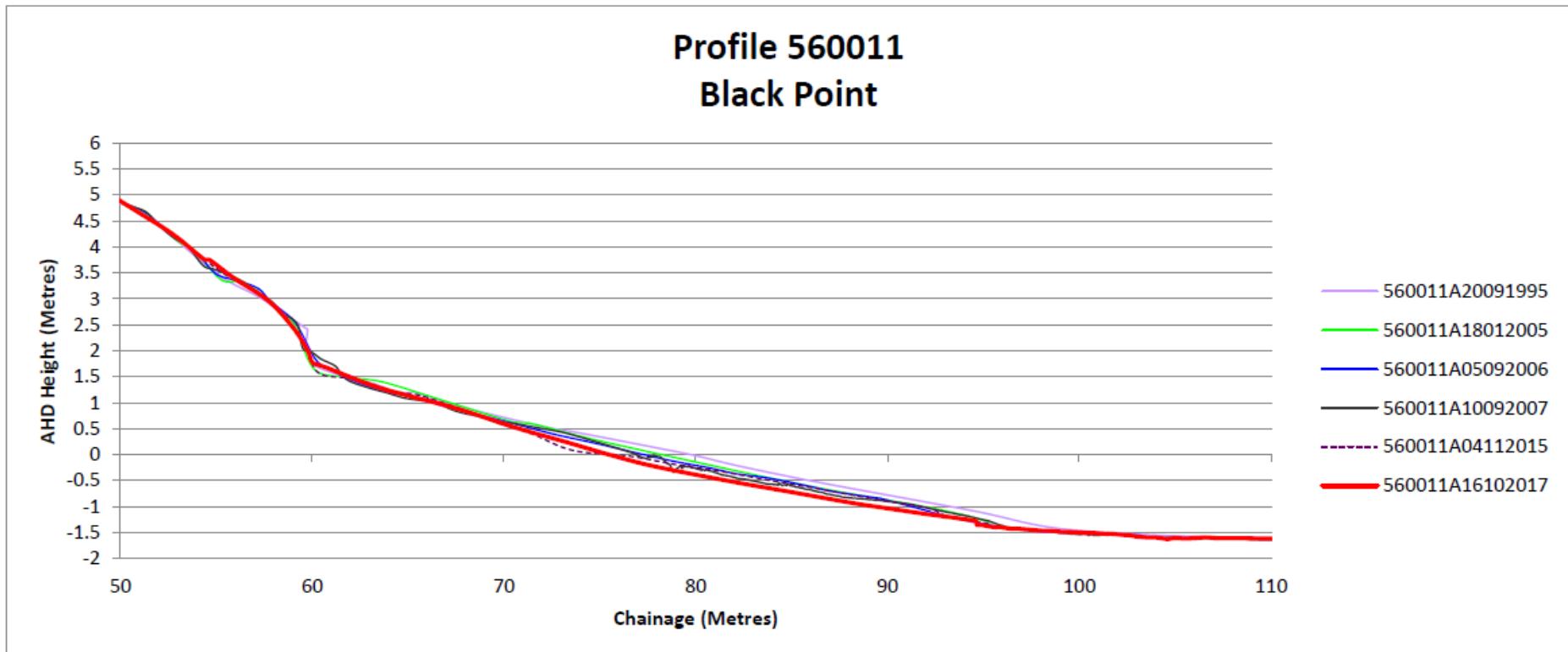


Figure 3: Black Point Profile 560011

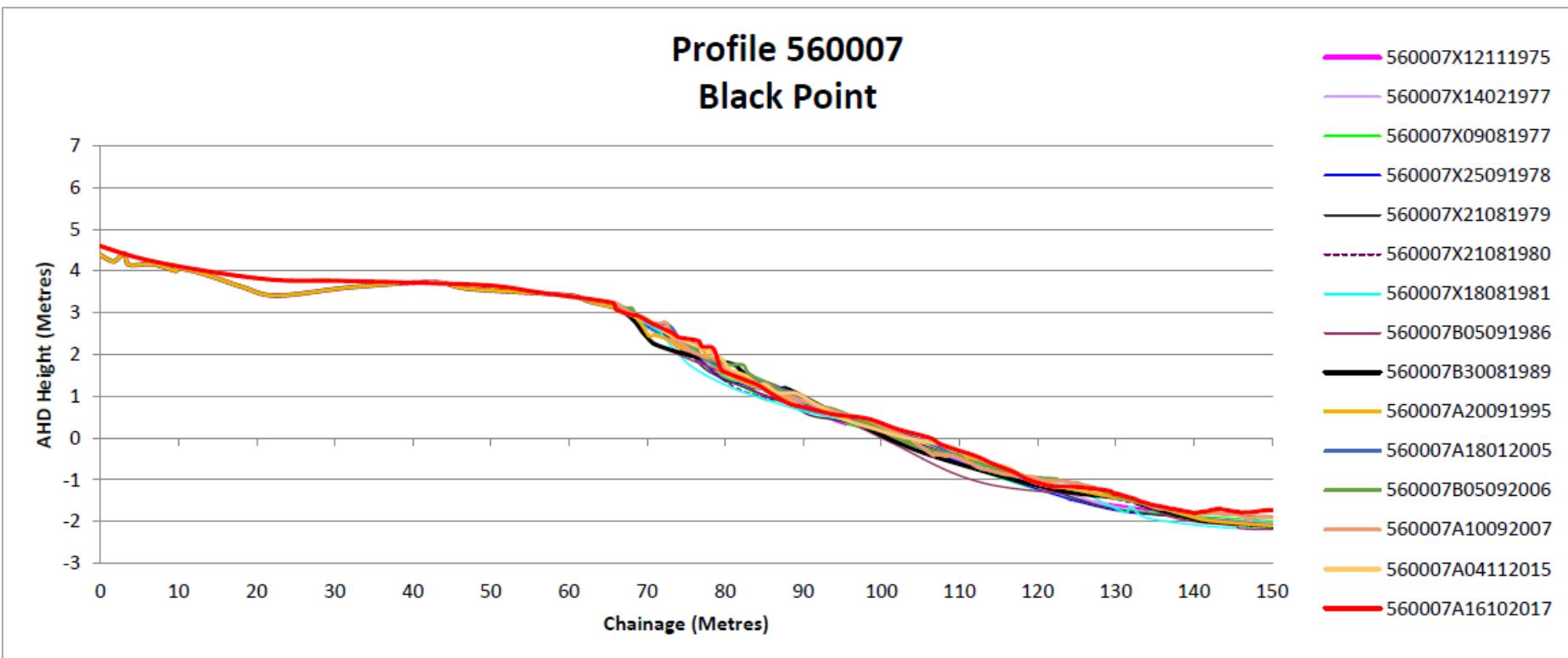


Figure 4: Black Point Profile 560007

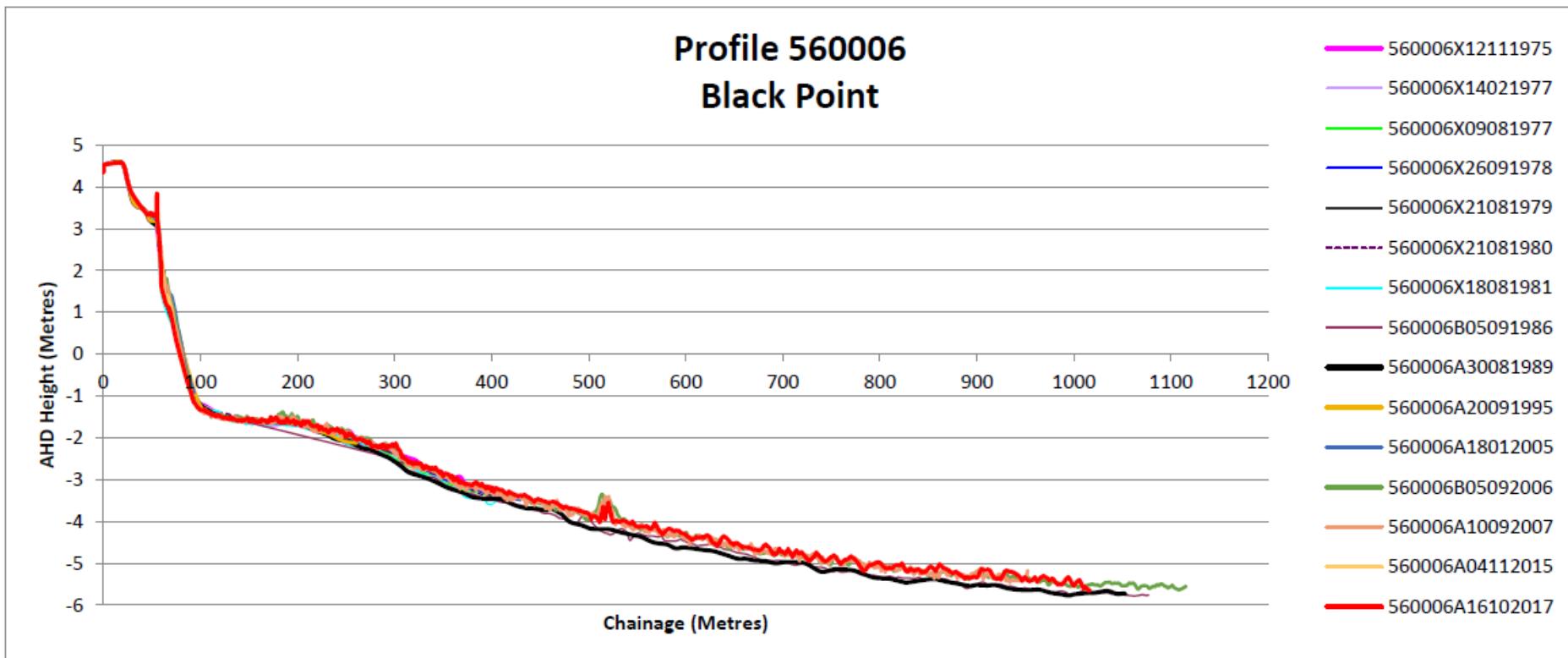


Figure 5: Black Point Profile 560006

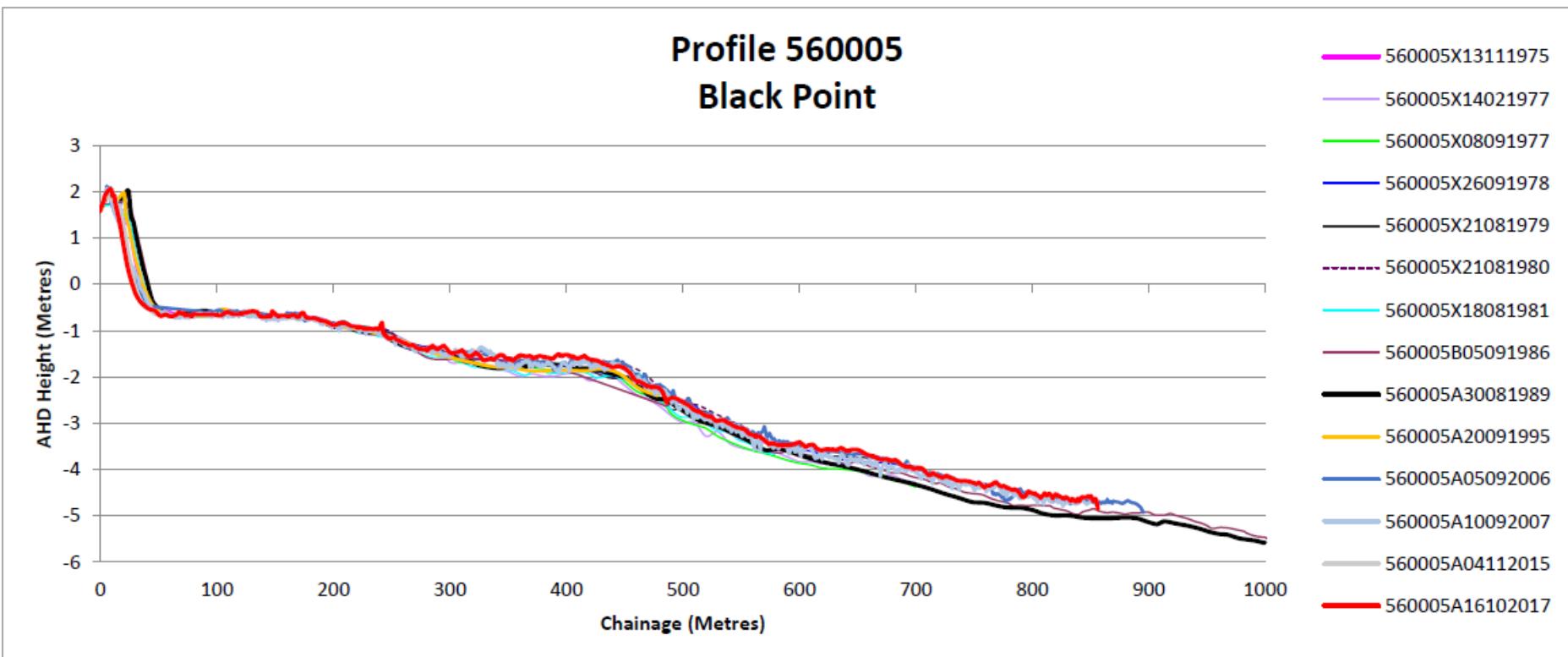


Figure 6: Black Point Profile 560005

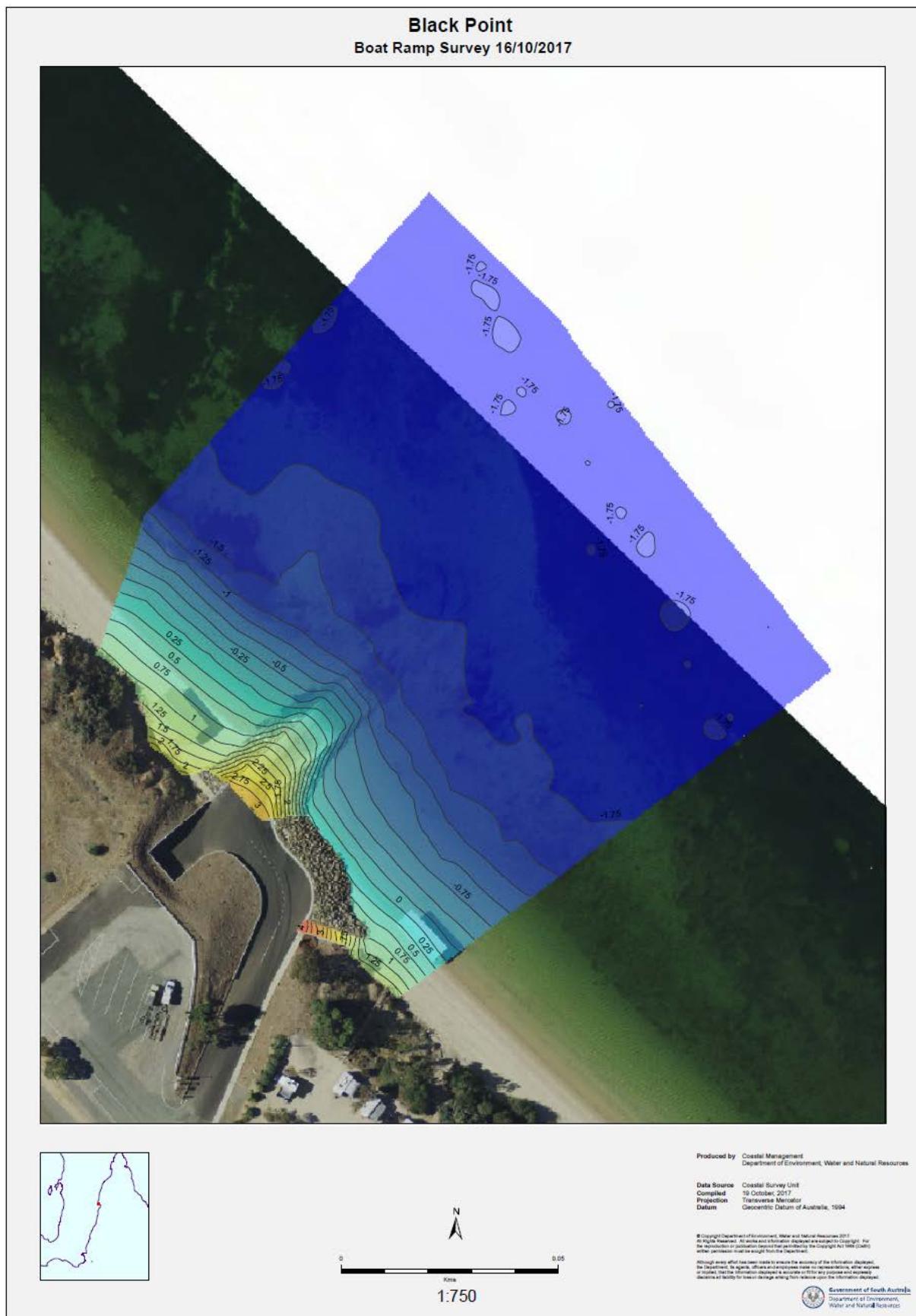


Figure 7: Black Point boat ramp survey model, 16 October 2017