RESPONSES TO QUESTIONS BY NSW COASTAL PANEL

RE: REPAIRS TO SEAWALL AT 28 & 28A CHILDE ST, BELONGIL
REF: DOC17/82318

Q1. Advise if it is intended to import new rock material for the works (or will the works solely comprise "re-stacking" of loose rock armour retrieved from the beach margins).

Response: It is proposed to repair the wall by primarily re-stacking of loose rock armour retrieved from the beach margins. If the accessible displaced rock is inadequate to properly repair the wall, then additional rock will be imported from local quarries.

Q2. Details of any existing consents or approvals relevant to the existing works.

Response: The walls have been in place since about 1974. It is understood that the walls were constructed by the Byron Erosion Trust.

In August 2016, the Supreme Court of NSW issued an injunction that the walls must remain in place and cannot be removed. These Orders were made in proceedings brought by multiple plaintiffs based on the long-documented impact of the Jonson Street structure on the downdrift beaches at Belongil.

Q3. Clarify arrangements for removal of material from the beach that is not part of a formed and approved structure both during the construction phase and over the life of the work, including where the proposed works result in failure of works on adjoining properties.

Response: The works are repair and primarily re-stacking of loose rock armour retrieved from the beach margins. From time to time, remnants of an old ti-tree log wall seaward of the rock seawall are exposed by erosion. If any of this material is encountered during the restacking or subsequent maintenance, these materials will be removed from site to a suitable tip. This will improve public safety and beach amenity.

a. **A detailed survey plan depicting the cadastre, proposed footprint of the structure, existing property boundaries (including the crown road reserve) and specifying all relevant dimensions of the proposed structure.**

Response: Additional details requested in a. have been added to the existing drawings that were previously provided. The revised drawings are attached as Attachment A.

b. **Sufficiently accurate cross sections of the proposed structure (including its proposed points of termination and/or method or tie if there are existing approved works on either side) and its location relative to the existing property boundaries (including the crown road reserve). Such cross sections to clearly specify all relevant dimensions (including crest, toe and existing beach levels)**

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Response: Cross section details and tie in details requested in b. have been added to the drawings that were previously provided. The revised drawings are attached as Attachment A.

The Supreme Court of NSW consent orders show the extent of the wall for the subject property to be repaired as extending in front of the adjacent properties (Figure 1). This overlap was provided to allow a smooth transition of the repaired walls into the adjacent walls to avoid a weak area at the boundaries or adverse impacts on the adjacent walls during or after repairs.

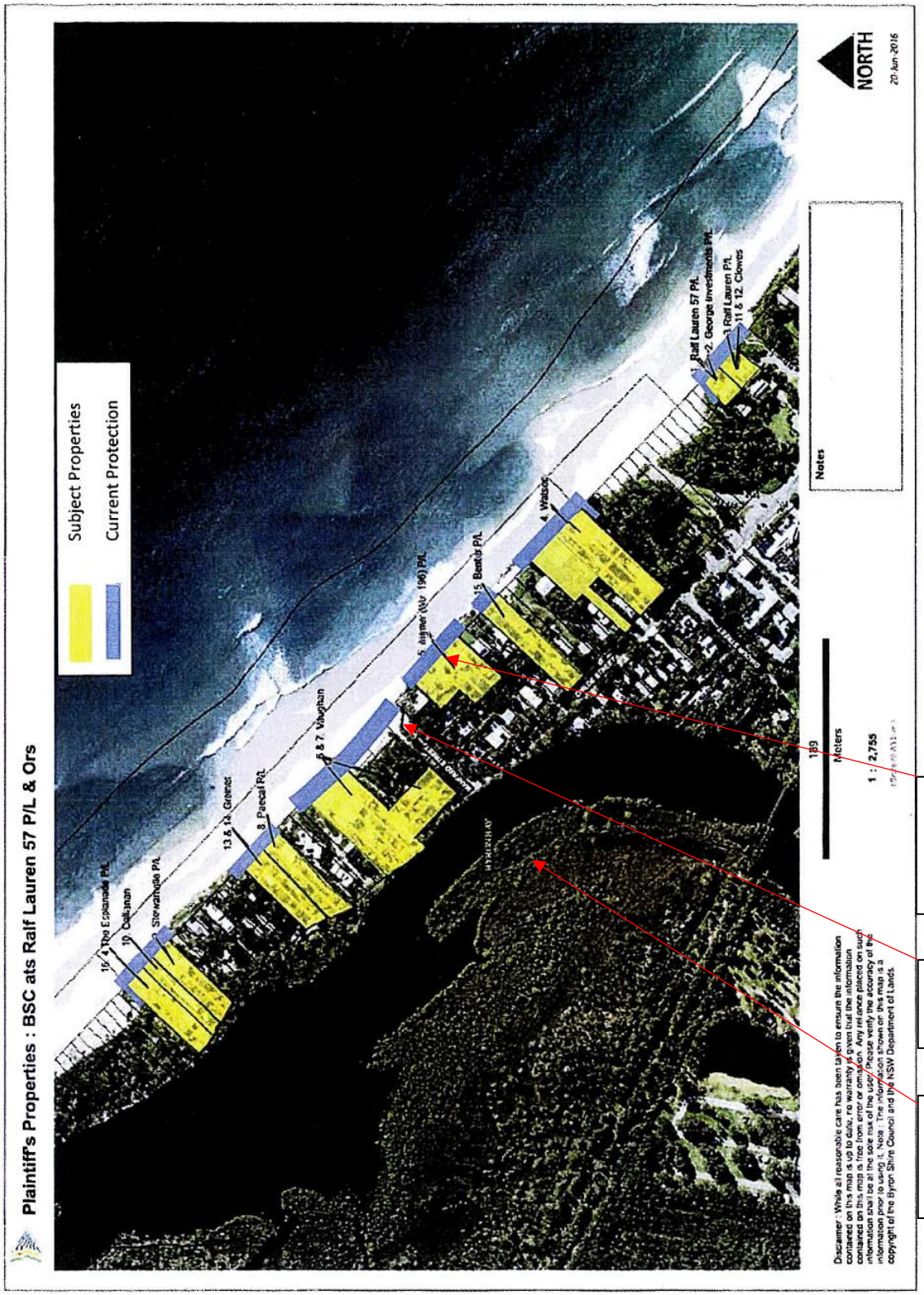


Figure 1 Schedule 1 from Court Orders with site, Manfred St and Belongil & wetland locations added.

c. Adopted engineering principles, codes or standards applied to the design of the structure;

Response: The works are "repair" of the present rock wall originally installed as an emergency structure over 40 years ago, in about 1974, and is presently still protecting the subject property. For this repair work, appropriate engineering knowledge, principles, codes and standards have been applied. The codes and standards include:

- Coastal Engineering Guidelines (Institution of Engineers, Australia, 2012)
- Guidelines for the design of maritime structures (Australian Standard AS 4997-2005)
- Manual on the Use of Rock in Coastal and Shoreline Engineering (CIRIA, 2007)
- Actions from Waves and Currents on Coastal Structures (International Standard ISO 21650:2007)

d. Adopted design probability and risk used in the design;

Response: To date the wall structure has been adequate to protect the properties and risk of failure will be significantly reduced by the repairs. There is low risk to the safety of humans and assets located landward of the structure. The site can be classified as being either Very Low or Low safety class according to ISO 21650:2007.

e. Ocean water levels;

Response: The existing wall has been adequate for the water levels at the site. Ocean levels and predicted sea level changes for the Byron Bay embayment have been well documented in recent reports for the nearby BSC rock seawall at the seaward end of Manfred St and along the seaward boundary of the private property to the NW of Manfred Streel (Umwelt 2013, WRL 2013). However, whilst ocean levels and predicted sea level changes would be necessary for full design, these works are "repair" of an existing structure not "design" of a new structure.

f. Wave heights;

Response: The existing wall has been adequate for the wave heights at the site. Wave heights for the Byron Bay embayment have been well documented in recent reports and specifically for the nearby BSC rock seawall at the seaward end of Manfred St and along the seaward boundary of the private property to the NW of Manfred Streel (Umwelt 2013, WRL 2013). However, whilst wave heights are necessary for full design, these works are "repair" of an existing structure not "design" of a new structure.

g. Toe scour levels;

Response: The existing wall have largely accommodated toe scour over its life. The typical scour levels are shown in the x-sections in drawings 003 and 005 (Attachment A).

h. Crest levels;

Response: The existing crest levels have been adequate and the repaired crest levels are shown in the x-sections in drawings (Attachment A).

i. The type of hydraulic stability assessment used to underpin the proposed design and parameters adopted;

Response: The boulders in the existing wall have provided adequate hydraulic stability over the life of the wall to date – over 40 years. Some of the larger boulders (>2.5t) have been displaced and will be replaced. Thus, the repaired wall will have adequate hydraulic stability.

j. **Any movement (or spread/migration) of the structure that could be anticipated over the proposed life of the works**.

Response: The existing wall is now well founded with the toe below -1m AHD due to past toe scour and subsidence. Once repaired, some rocks on the seaward face are anticipated to be displaced during erosion events > 1 in 10yr ARI and will need to be replaced on the face as routine maintenance. Such maintenance is required for any rock wall.

The engineering report should also detail how the proposed structure will tie in to existing structures to the north and south of the proposed development, and how the expected differences in engineering standards will be managed with respect to the considerations outlined in s55M of the *Coastal Protection Act* 1979.

Response: As per the response to Q3b, the structure will tie in to adjacent structures. Drawing BSR-CS3-007 has been updated to show the tie details in more clearly (Attachment A). This transition will minimize differences between adjacent structures.

Q4. Details of the proposed construction method, including access arrangements to the works site. (Note: the application should indicate the consent requirements for proposed access ways).

Response: As per drawing BSR-CS3-007, the construction will be as follows:

1. Pre-Construction
   - All approvals and notifications to be in place.
   - Safety fencing with signage is to be erected as per drawing 007 to restrict public access to the work and access areas.
   - Construction of a temporary construction track (along the unformed Esplanade). There are a number of suitable access options including from access track at the Old Jetty Site that is used for access by BSC for maintenance along Belongil Creek mouth or from Manfred Street or from Don Street.
2. Construction (5 days per week, 7am to 6pm)

- Access onto the fenced works area for equipment and materials will be by temporary construction track.
- The works shall be carried out in 10-15m sections starting from the NW end.
- Loose rocks above about -1m AHD that have been displaced from the wall face onto the beach to seaward of the wall will be restacked to the original stable slope of about 1V:1.5H with the repaired crest at +5m AHD with a 20-30t hydraulic excavator.
- Any unsuitable existing materials such as the ti-tree logs are to be removed from site.
- The crest and toe of the works shall be tapered smoothly into the adjacent crest and toe without interference with the existing structures.
- The existing stair access to the beach shall be repaired and safe access provided, in addition, at each end of the works to provide safe public access along the top of the wall.
- The wall is to be progressively surveyed and final "as constructed" drawings prepared.

3. Post-Construction
   - The beach is to be groomed and left in a clean condition free from rock or rubble.
   - The access track is to be removed and the area impacted by the track revegetated and restored to the original condition.
   - The safety fencing is to be removed.

Q5. Identification of any third parties required to provide owners' consent for works on, or access across their land.

Response: All work will be within The Esplanade owned by Council. Access is proposed across Council land, but if that access is not available then access is available from adjoining land owned by our client.

Q6. A description of coastal processes and hazards (within the meaning of the *Coastal Protection Act* 1979), including sea level rise (being projected sea levels which have been peer-reviewed and widely accepted by scientific opinion) and other associated climate change impacts (as relevant) predicted to affect the beach in the vicinity of the proposed works.

Response: The works are repair of an existing structure. The impact of the repair works on coastal hazards, as defined in the Coastal Protection Act 1979, will be:

a) beach erosion – no change from existing over life of structure as works are "repair" of an existing structure
b) shoreline recession - no change from existing over life of structure as works are "repair" of an existing structure
c) coastal lake or watercourse entrance instability – no change from existing over life of structure as works are "repair" of an existing structure. See also response to Q9.
d) coastal inundation – reduced risk of inundation of low coastal lands to landward of the repaired wall due to less likelihood of breach of the repaired wall. A breach of the wall would cause significant environmental impact on Belongil Spit.

e) coastal cliff or slope instability – reduced slope instability as existing wall will be repaired.
f) tidal inundation – reduced risk of tidal inundation and damage to Belongil Creek and wetlands as existing wall will be repaired. A breach of the wall would cause significant environmental impact on Belongil Creek and wetlands (see Figure 1)
g) erosion caused by tidal waters, including the interaction of those waters with catchment floodwaters - reduced risk of erosion by tidal waters and damage to Belongil Creek and wetlands as existing wall will be repaired.

Sea level rise and other associated climate change impacts (as relevant) predicted to affect the beach in the vicinity of the proposed works have been well documented in recent reports and specifically for the nearby BSC rock seawall at the seaward end of Manfred St and along the seaward boundary of the private property to the NW of Manfred Streel (Umwelt 2013, WRL 2013). As the works are repair of an existing protection structure, they would have no additional (incremental) impact beyond the status quo.

Q7. A description of the:

a. potential effect of such coastal processes and hazards on the proposed structure;

Response: To date, the existing wall has accommodated the effects of the coastal processes and hazards and its ability to resist these in the future will be improved by the proposed repairs and maintenance. The repairs will provide a public benefit due to improved and safer public access and beach amenity.

b. the likely impacts of the proposed structure on these coastal processes and hazards.

Response: WRL 2013 (Section 8.7.2) and Umwelt 2013 (Section 5.2.1) noted that as the Manfred Street wall (and other walls included in the appraisal) *"are a replacement for an existing protection structure, so they would have no additional (incremental) impact beyond the status quo."*

The same applies to the proposed works that are repairs to an existing structure and there will be no additional (incremental) impact beyond the status quo on the coastal processes or no increased additional (incremental) hazards to or from the wall. As per response to Q6 above there will be some reduction in hazards after the wall is repaired.

The description should:

b. include details of the extent to which the proposed structure will be exposed from lowered beach conditions over the course of its proposed life and how this will affect public access and beach usage.

Response: The wall is well founded with the toe below -1m AHD to accommodate such beach lowering. The proposed works are repairs to an existing structure and the repairs will

not result in any additional (incremental) impact on public access and beach usage. As repairs entail restacking of rocks displaced seaward, the repaired wall will provide improved public access and beach usage now and into the future.

d. provide estimates of the impacts of the proposed structure on the beach's sediment budget, including through storm erosion, underlying recession and projected sea level rise over the design life.

Response: The proposed works are repairs to an existing structure and the repairs will not result in any additional (incremental) impact on the beach's sediment budget, including through storm erosion, underlying recession and projected sea level rise over the design life.

Q8. An assessment of wave overtopping of the proposed structure and how this will be managed to ensure the safety of humans and assets located landward of the structure and the structural integrity of the protection works themselves. This assessment should include all relevant calculations to estimate the wave overtopping rates.

Response: The works are repair of an existing structure. The land level rises to landward of the existing wall (see drawings) and there is a retaining wall approximately along the seaward property boundaries (see drawings in Attachment A). The pathway behind the wall is accessed from the beach and will not be accessible during overtopping events. The assets protected by the wall are located above +9m AHD (see drawings). As a result, overtopping is not a threat to humans or assets.

Empirically, from observations during and after storms, overtopping volumes and hazards from overtopping have been calculated as low. WRL 2013 (P31) estimated the overtopping rate for the wall recently designed and constructed at Manfred Street as 10l/s/m for a 20 yr ARI for a crest of 6m, a similar effective height as the subject wall. Behind the retaining wall, overtopping will be spray only. The ability to resist overtopping will be improved by the repairs and maintenance.

For the recent wall constructed at and adjacent to Manfred Street WRL 2013 (Page 20) stated:

"ISO 21650:2007 provides the following commentary: "Temporary and small coastal structures would belong to the very low safety class. Larger coastal structures such as … exposed seawalls protecting infrastructure would belong to the low safety class. Breakwaters protecting an LNG terminal or a power station would belong to the normal safety class whereas a sea dyke protecting populated low land would belong to the high safety class."

Based on the above guidance, WRL considers the proposed interim works at the Belongil site as being either Very Low or Low safety class according to ISO 21650:2007."

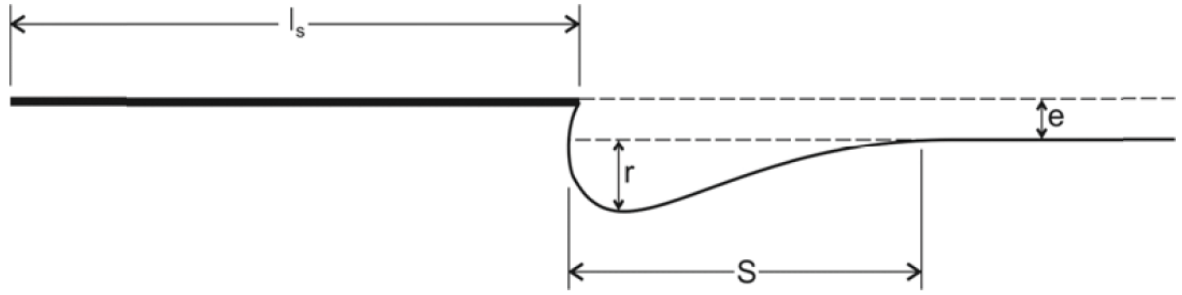
This applies equally to the subject site – the site can be classified as being either Very Low or Low safety class according to ISO 21650:2007. Thus, there is low risk to the safety of humans and assets located landward of the structure.

Q9. An assessment of end effects to both the north and south of the structure, or if contiguous with another structure, the impact on that structure, including but not limited to any 'tie-in' arrangements. This assessment should include a diagram illustrating the potential end effects of the structure.

a. Such diagram to be prepared in accordance with the methodology in *McDougal et al 1987* or other reputable methods or modifications and is to include a specification of the (S), (r), (e) and (l_s) values used and how they were determined. If the shape of the end effects calculated does not conform to the shape in *McDougal et al 1987* or other reputable methods, an explanation of the variation is to be provided.

b. Such assessment to include consideration of the cumulative impact of the structure, having regard to its proposed connection or interaction with end effect impacts of other existing structure within the active beach margins around the embayment

Response: McDougal et al 1987provided the following diagram for end effects of seawalls on a straight beach:



(Source: McDougal *et al,* 1987)

The proposed works are part of a near continuous seawall on a curved beach that stretches from the northernmost private property on Belongil Spit to Border Street. Southward of border Street, natural coffee rock forms a limiting structure as does the Jonson Street structure (WRL 2013). WRL (2013) calculated that the total length (l_s) is 1,727m. The subject wall is about 65m long (3.8%) of this length and is located about 360m from the downdrift end.

WRL 2013 (Section 8.7.2 - Off Site Impacts of Proposed Interim Beach Access Stabilisation Works) found that:

"The following statements regarding off site impacts apply to the proposed interim beach access stabilisation works:

- *They make up only a small proportion (< 10%) of hard structures on the beach;*
- *They are a replacement for an existing protection structure, so they would have no incremental (additional) impact beyond the status quo; and*

• They would reduce the likelihood of flanking failure to surrounding protection works."

Similarly, as the proposed repairs are to an existing section of the seawalls and is only 3.8% of the length of hard structures on the beach, the proposed repair works will have "*no additional (incremental) impact beyond the status quo"* on the magnitude of the variables, r and S, and the proposed repair works will "reduce the likelihood of flanking failure to *surrounding protection works".*

Q10. Details of the proposed long term inspection, monitoring, management and maintenance regime both for the structure itself, as well as the monitoring and mitigation of impacts of the structure, over the life of the structure, on the adjoining beach and surrounding areas. Include details of who is proposed to be responsible to implement each regime element as well as proposed conditions offered to ensure implementation.

Response: The applicant accepts that:

1. The proposed repair works should be maintained in a safe and workmanlike manner by the owner.
2. During the life of the wall, the wall should be inspected by a suitably qualified and experienced person after each erosion event that exposes the seaward face of the wall to below MHWS (presently 0.66m AHD). This inspection should compare the condition of the wall to the "as repaired" condition after the proposed repairs. Specifically, the inspection should:
   a) Identify any loose, broken or displaced rocks and:
      - any loose rocks should be repositioned to be in a well interlocked and stable orientation.
      - any broken rocks shall be replaced by a sound unbroken rock of similar size as the broken rock and placed in a well interlocked and stable orientation.
      - any displaced rocks should be removed and replaced in a similar position to the original position in a well interlocked and stable orientation.
   b) Check the crest level and seaward slope angle. Any subsidence or slope adjustment should be repaired to the original "as repaired" condition.

As the works will have no incremental (additional) impact beyond the status quo, monitoring and mitigation of impacts of the structure, over the life of the structure, on the adjoining beach and surrounding areas is not considered necessary.

REPORTS REFERENCED IN RESPONSES

McDougall WG, Sturtevant MA and Komar PD 1987. 'Laboratory and field investigations of the impact of shoreline stabilization structures and adjacent properties', Proceedings of Coastal Sediments '87, ASCE, pp 962–973.

Umwelt, 2013. Review of Environmental Factors for Interim Beach Access Stabilisation Works at Belongil, Byron Bay. Report 3209/RO1/Final.

University of NSW Water Research Laboratory, 2013. "Design of Interim Beach Access Stabilisation Works – Belongil, Byron Bay" WRL Technical Report TR 2013/08. Report for BSC

Worley Parsons 2013. "Byron Bay Erosion Protection Structures – Risk Assessment" Report for BSC

Signed

[redacted]

Leslie Angus Jackson
BE, FIE, CPEng, RPEQ
17/3/17

ATTACHMENT A

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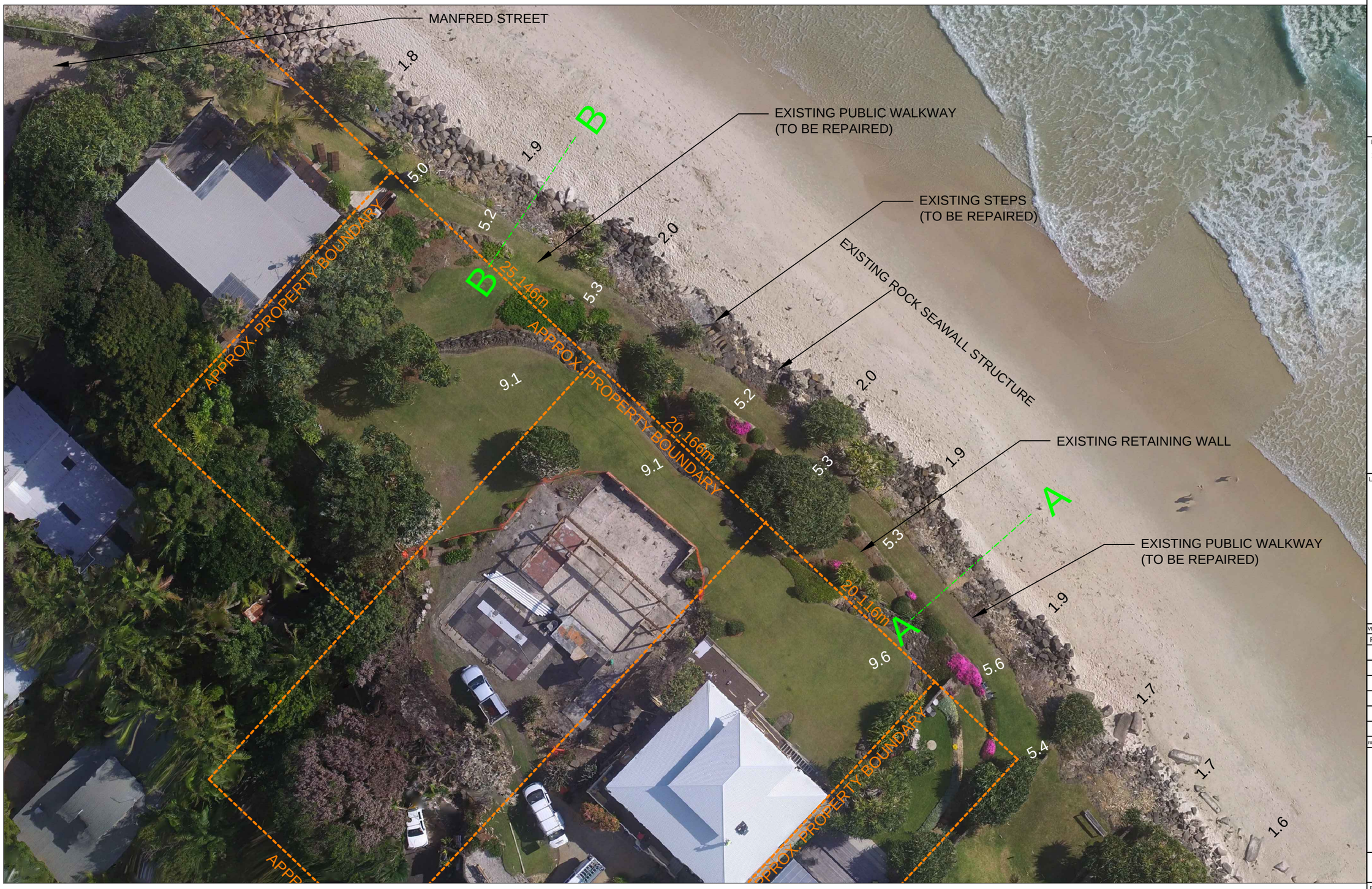
Belongil Seawall Repairs

28, 28A CHILDE STREET AND 8 THE ESPLANADE
(Lots 32, 33, 34, 35 and 36 in Section 2 of DP1623)

DRAWING REGISTER

17.03.2017



SITE PLAN

LOCALITY PLAN

NOTES

1. Survey Plan 28/10/16 - See Drawing 008

LEGEND

- Approximate Property Boundary
- X-Section
- Stair Access

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
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A	23/02/17	Updated Drawing	SK	AJ	AJ

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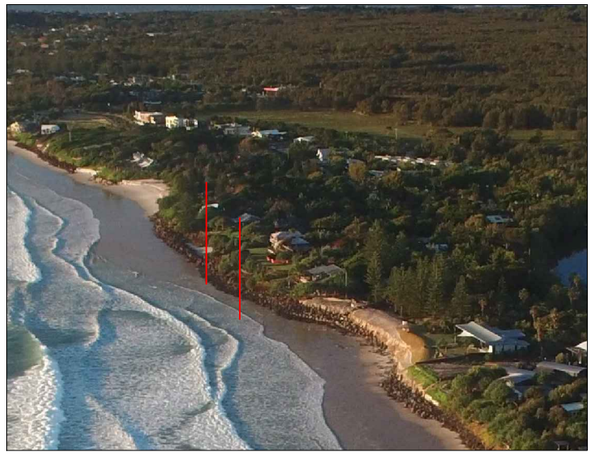
PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
PLAN VIEW (PRESENT

DRAWING No. BSR - CS3 - 002 | REVISION: A

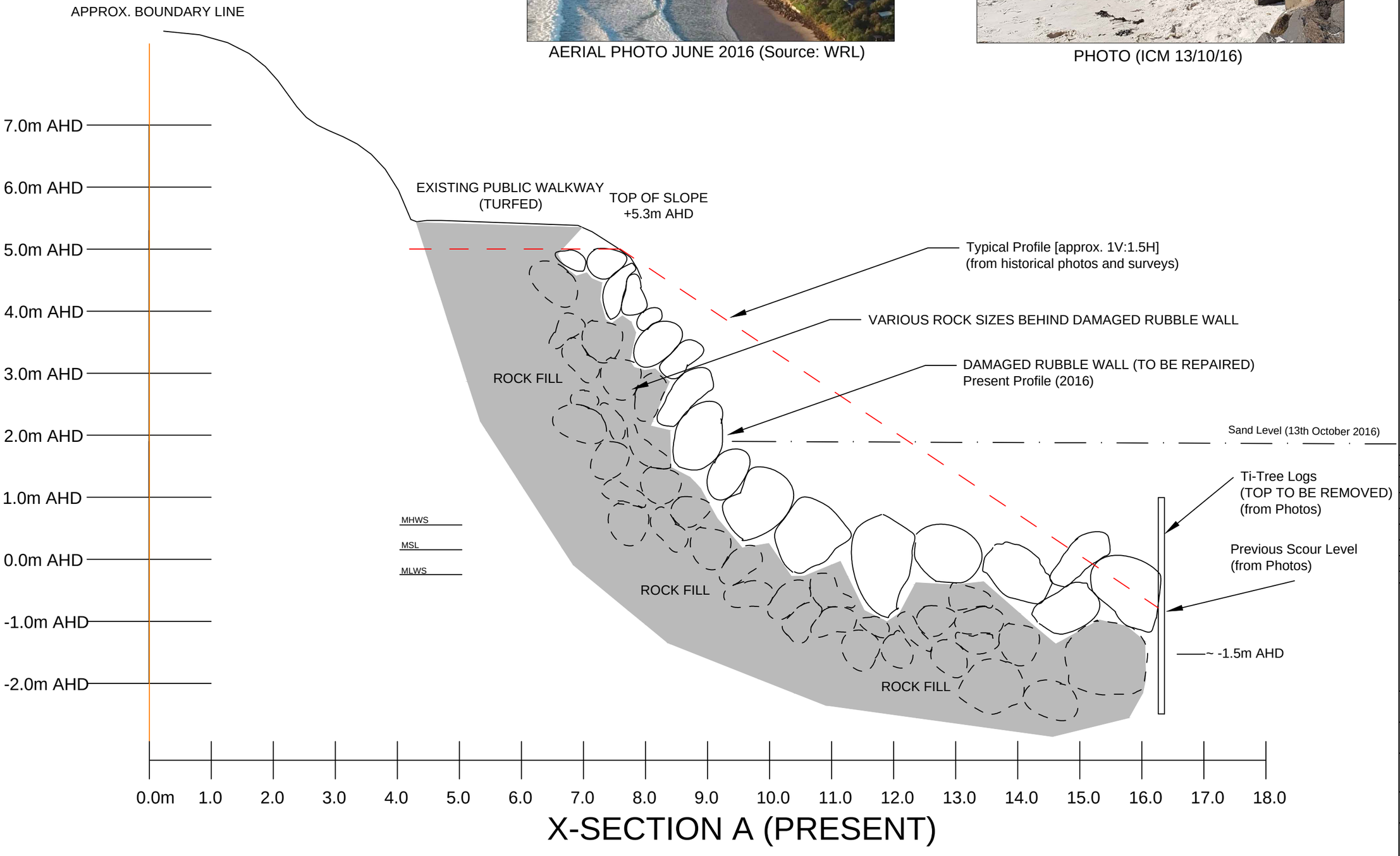
DRAWN : SK | CHECKED : AJ | APPROVED : AJ
RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017



AERIAL PHOTO JUNE 2016 (Source: WRL)

PHOTO (ICM 13/10/16)



X-SECTION A (PRESENT)

LOCALITY PLAN

NOTES

- Grey shaded area shows estimated location of rocks based on wall slump and volume displacement

LEGEND

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
A	23/02/17	Added Boundary Line	SK	AJ	AJ

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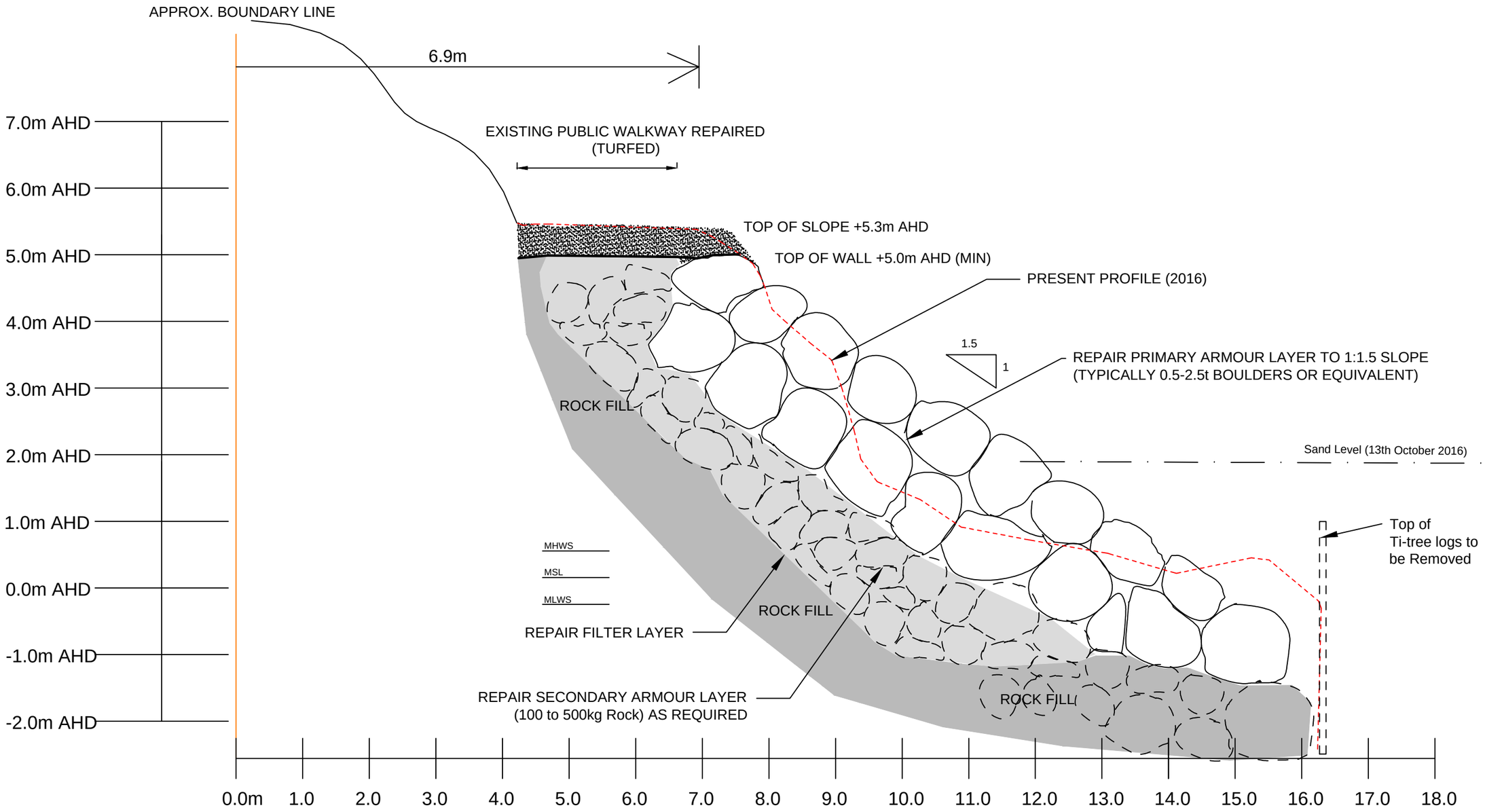
PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
X-SECTION A (PRESENT)

DRAWING No. BSR - CS3 - 003 | REVISION: A

DRAWN : SK | CHECKED : AJ | APPROVED : AJ
RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017



TYPICAL REPAIR PROFILE A

LOCALITY PLAN

NOTES

1. Repairs to be in accordance with Supreme Court of NSW Consent Orders 2010/426976 Dated 12/08/16

LEGEND

Present Profile (2016)

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
A	23/02/17	Amended Annotations	SK	AJ	AJ

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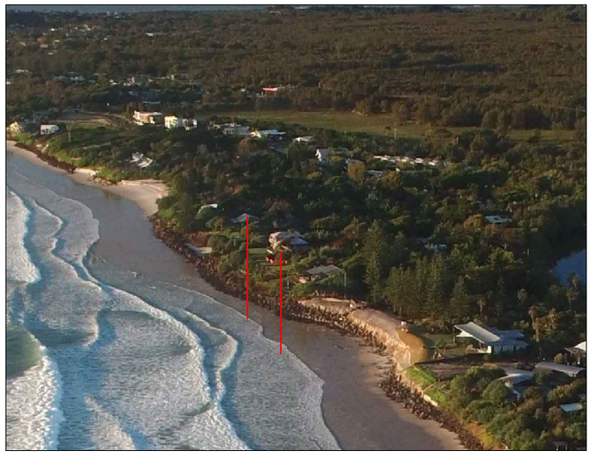
PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
REPAIR WORKS A

DRAWING No. BSR - CS3 - 004 | REVISION: A

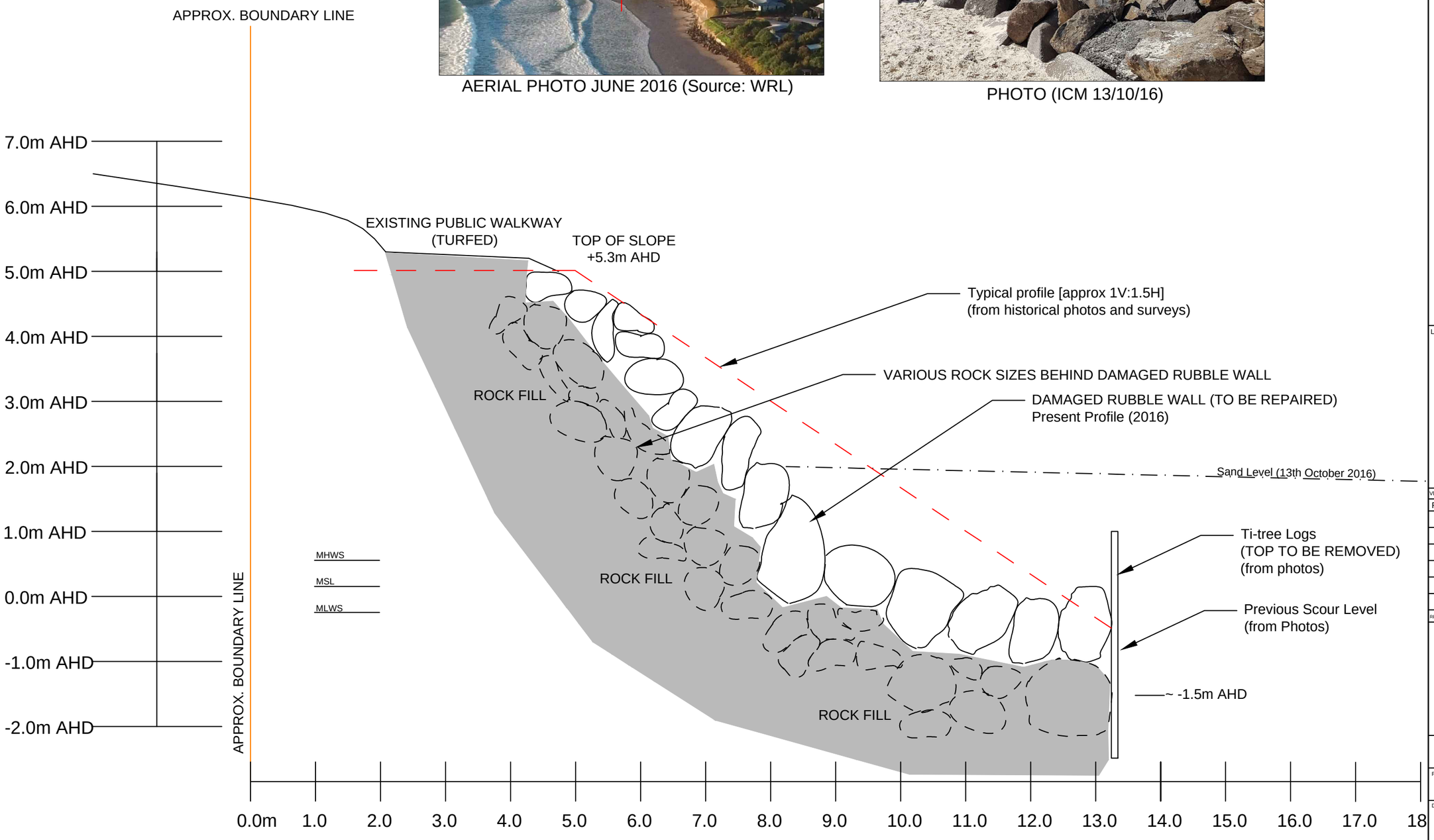
DRAWN : SK | CHECKED : AJ | APPROVED : AJ
RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017



AERIAL PHOTO JUNE 2016 (Source: WRL)

PHOTO (ICM 13/10/16)



X-SECTION B (PRESENT)

LOCALITY PLAN

NOTES

- Grey shaded area shows estimated location of rocks based on wall slump and volume displacement

LEGEND

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
A	23/02/17	Added Boundary Line	SK	AJ	AJ

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PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
X-SECTION B (PRESENT)

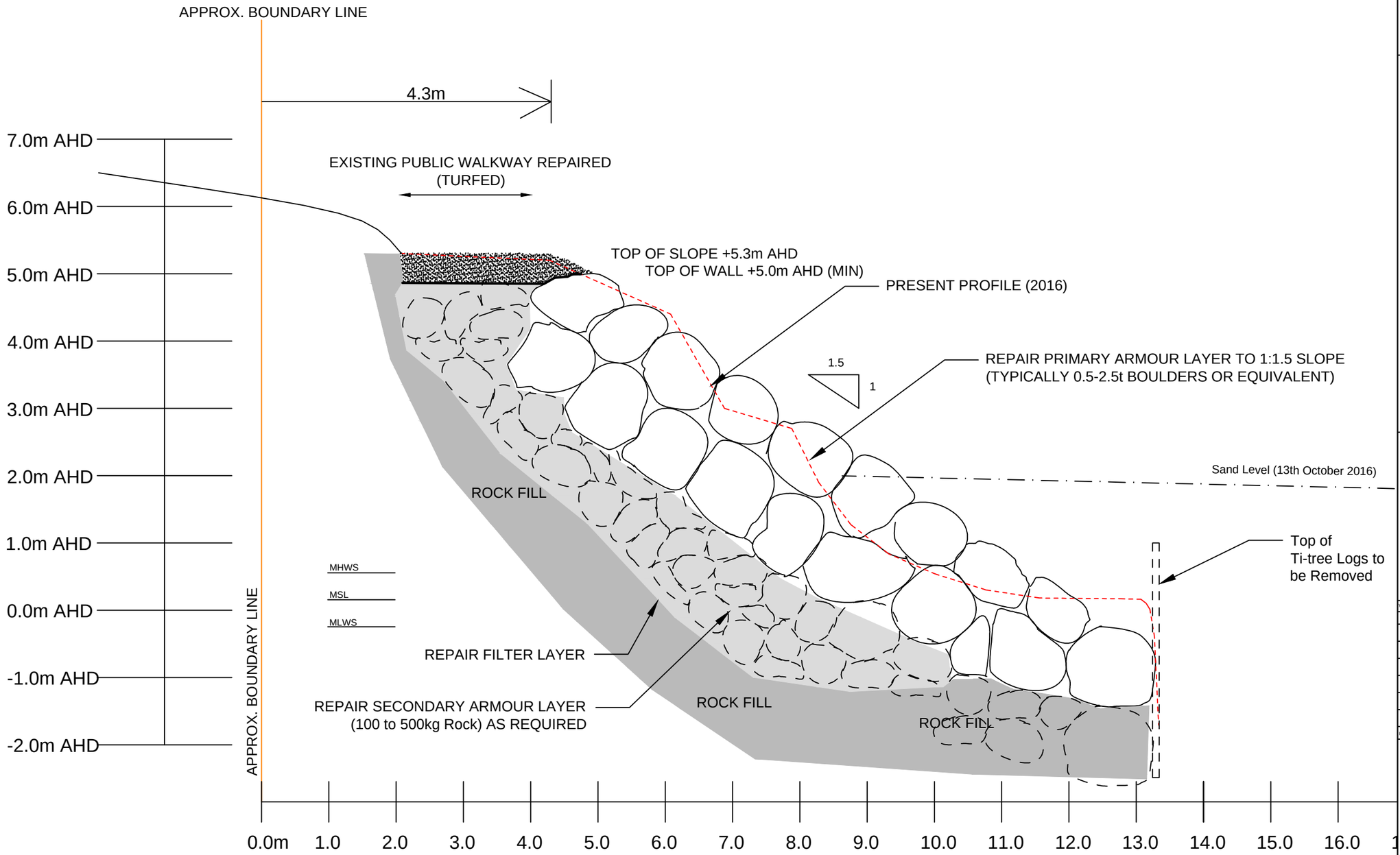
DRAWING No. BSR - CS3 - 005

REVISION: A

DRAWN : SK | CHECKED : AJ | APPROVED : AJ

RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017



TYPICAL REPAIR PROFILE B

LOCALITY PLAN

NOTES

1. Repairs to be in accordance with Supreme Court of NSW Consent Orders 2010/426976 Dated 12/08/16

LEGEND

Present Profile (2016)

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
A	23/02/17	Added Boundary Line	SK	AJ	AJ

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PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
REPAIR WORKS B

DRAWING No. BSR - CS3 - 006 | REVISION: A

DRAWN : SK | CHECKED : AJ | APPROVED : AJ RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017

CONSTRUCTION PLAN

LOCALITY PLAN

NOTES

1. Construction access to be from 'Old Jetty Site' - Construction access to be adequately fenced
2. Provide safe access to beach over repaired wall at each end.
3. Smooth transfer of crest and toe to adjacent walls (Typical)

LEGEND

- Safety Fence
- Approximate Property Boundary

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
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A	23/02/17	Updated Annotations	SK	AJ	AJ

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PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
CONSTRUCTION PLAN

DRAWING No. BSR - CS3 - 007 | REVISION: A

DRAWN : SK | CHECKED : AJ | APPROVED : AJ
RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017

REPAIR DESIGN

To determine the extent of repair works:

- An inspection of the walls covered under the consent orders was carried out by ICM engineers on 13/10/16 to ascertain the present condition.
- Historical photos and surveys held by ICM were reviewed to ascertain the previous condition.

REPAIR CONSTRUCTION METHOD STATEMENT

Works to repair the seawall structures are to be carried out as anticipated by the recent Supreme Court of NSW consent orders made 12/8/16. The proposed method of carrying out the works is as follows:

- Pre-Construction
  - All approvals and notifications to be in place.
  - Safety fencing and signage is to erected as per drawing 007 to restrict public access to the work and access areas.
  - Construction of a temporary construction track from either the sealed section of Manfred Street over the existing rock wall or, alternatively, the sealed section of Don Street along the southern boundary of 1 Don Street over the existing SFGC wall (covered with 1200gsm non-woven geotextile) onto the beach.
- Construction (5 days per week, 7am to 6pm. Estimated repair time 2 week)
  - Access onto the fenced works area for equipment and materials will be by temporary construction track.
  - The works shall be carried out in 10 -15m sections starting from the NW end.
  - Loose rocks above about -1m AHD that have been displaced from the wall face onto the beach to seaward of the wall will be restacked to the original stable slope of 1V:1.5H with the repaired crest at +5m AHD with a 20-30t hydraulic excavator.
  - Any unsuitable existing materials such as the ti-tree longs are to be removed from site.
  - The crest and toe of the works shall be tapered smoothly into the adjacent crest and toe without interference with the existing structures.
  - The existing access to the beach shall be repaired and safe access provided at each end of the works to provide public access along the top of the wall.
  - The wall is to be progressively surveyed and final “as constructed” drawings prepared.
- Post-Construction
  - The beach is to be groomed and left in a clean condition free from rock or rubble.
  - The access track is to be removed and the area impacted by the track revegetated and restored to the original condition.
  - The safety fencing is to be removed.
- Repair Costs
  - Preliminary Estimate = $165,000

MITIGATION OF IMPACTS

The works have been designed to avoid adverse impacts. Section 55M of the Coastal Protection Act requires that:

(a) *the works will not over the life of the works:*

(i) unreasonably limit or be likely to unreasonably limit public access to or the use of a beach or headland, or

(ii) pose or be likely to pose a threat to public safety, and

(b) satisfactory arrangements have been made (by conditions imposed on the consent) for the following for the life of the works:

(i) the restoration of a beach, or land adjacent to the beach, if any increased erosion of the beach or adjacent land is caused by the presence of the works,

(ii) the maintenance of the works.

With reference to the above conditions:

Re (a) (i);

- The proposed works are to make safe existing works by restacking of the wall to restore a stable slope without loose rocks that could be easily dislodged during erosion events.
- The proposed works will make public access safer by moving dislodged rock from the base of the existing wall and replacing these on the repaired slope.
- The completed repair works will improve public access along the beach.

Re(a) (ii);

- The proposed repair works will improve public safety by restacking loose rock. Thus, the repair works will not “pose a threat to public safety”.

Re (b) (i);

- The proposed repair works will restore a stable slope. Large loose rocks at the toe will be moved landward onto the steeper mid and upper slope of the wall. The footprint of the repaired wall will be smaller and will not extend as far seaward. The repaired wall face will also be less reflective during erosion events. As a result, any impacts on the beach and adjacent land will be the same, or less, than at present. Thus, the repairs will not cause “any increased erosion of the beach or adjacent land”.

Re (b) (ii);

The proposed repair works can and should be maintained by the landowners after each erosion event that impacts the wall.

LOCALITY PLAN

NOTES

LEGEND

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

REV.NO.	DATE	DESCRIPTION	BY	ENG.	APP.
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A	15/03/17	Ameneded Construction Notes	SK	AJ	AJ

International Coastal Management
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PROJECT NAME: BELONGIL SEAWALL REPAIRS

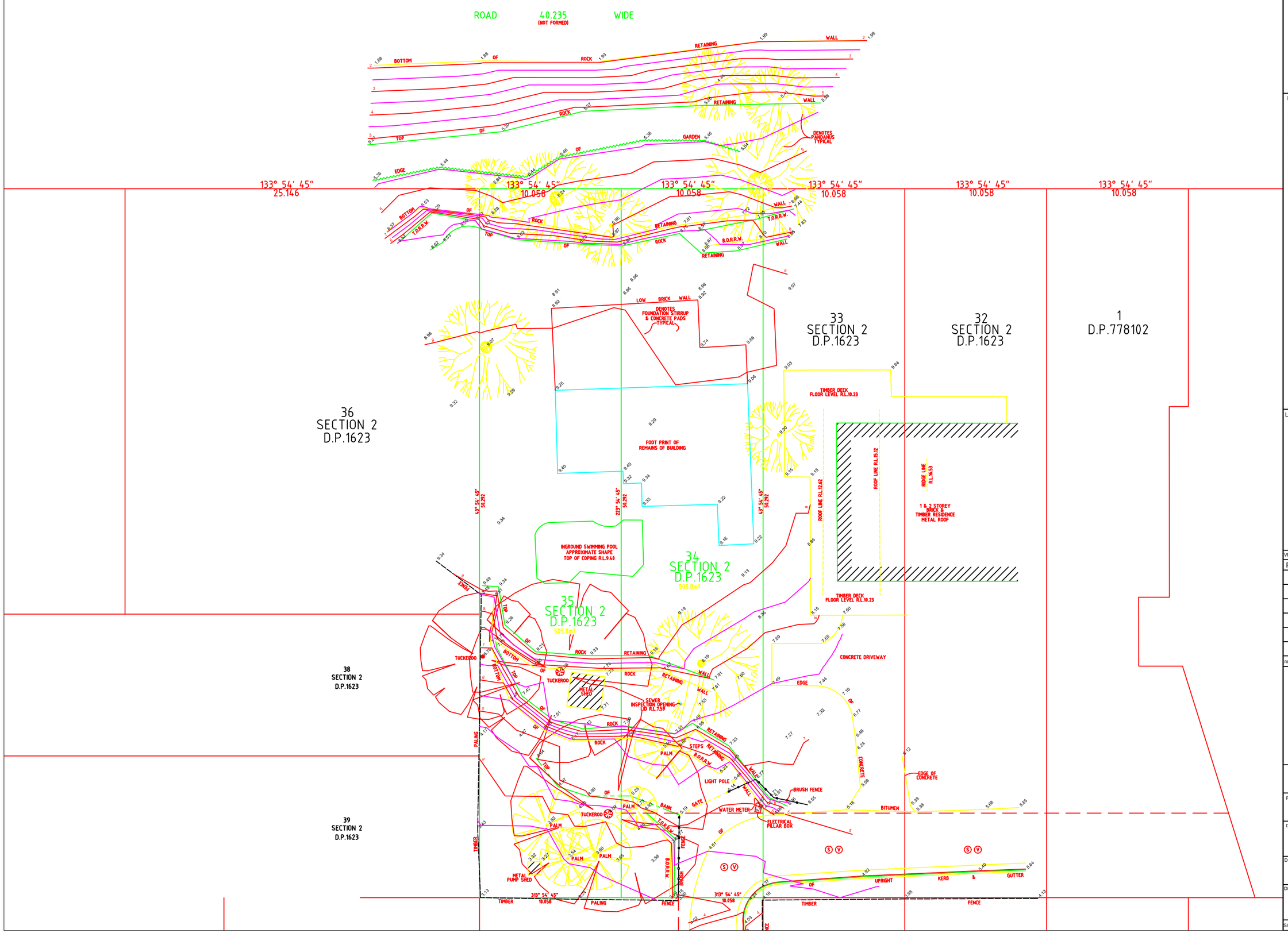
DRAWING TITLE: CONSTRUCTION NOTES

DRAWING No.: BSR - CS3 - 008 | REVISION: A

DRAWN : SK | CHECKED : AJ | APPROVED : AJ

RPEQ 2876

SIZE: A3 | SCALE : A3 | DATE : 17 Mar, 2017



LOCALITY PLAN

NOTES

1. 2016 Canty Survey Details
Plan of Detail Survey Lots 34 & 35, Section 2
DP1623, Childe Street, Byron Bay, Shire of Byron,
Parish of Byron, County Rous
Canty's Surveyors ABN 49 093 101 305
Datum - AHD
Survey Date - 28th October 2016
Reference - 0210/2
Drawn By. - Cameron Barnett
Checked By. - Scott Thompson

LEGEND

VERTICAL DATUM: AHD | HORIZONTAL DATUM: -

REVISION REGISTER

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PROJECT NAME
BELONGIL SEAWALL REPAIRS

DRAWING TITLE
CANTY SURVEY 2016

DRAWING No.	REVISION:
BSR - CS3 - 009	-

DRAWN : SK	CHECKED : AJ	APPROVED : AJ
		RPEQ 2876

SIZE: A3	SCALE : A3	DATE : 17 Mar, 2017