

HERITAGE IMPACT ASSESSMENT

In terms of Section 38(8) of the NHRA for the

Proposed Development of the Houdenbek Dams, Western Cape

HWC Ref: 1809305AS0904E

Prepared by Heritage CTS



CEDAR TOWER
SERVICES

For

EnviroAfrica

November 2018



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EXECUTIVE SUMMARY

1. Site Name:

Farm Houdenbek 415, Witzenberg Municipality

2. Location:

East of the Groot Winterhoek Wilderness Area in proximity to the Olifants River. Centroid: -32.9976 / 19.4491

3. Locality Plan:



Figure 1: Location of the proposed development

4. Description of Proposed Development:

This application is for the proposed Harmony and Toeka dam project. The water for the proposed Toeka and Harmony dams will be used for the irrigation of a new fruit orchard development on the property. The areas selected for the 75 ha orchards will be on legally disturbed land which has been ploughed in the last 10 years and as such, is not subject to EA.



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5. Heritage Resources Identified:

Toeka Dam

No archaeological resources were located and no archaeologically modified stone was found.

Harmony Dam

Well preserved rock art was located in a large, ± 120m long sandstone overhang/shelter located on the eastern bank of the small, unnamed perennial stream. Large numbers (several thousand) of Later Stone Age (LSA) lithics, including chips, chunks, modified and unmodified flakes were counted, on the weathered gritty floodplain sands immediately in front of the shelter.

6. Anticipated Impacts on Heritage Resources:

Toeka Dam

This area is not a sensitive archaeological landscape. No archaeological resources were found on the site which is an old apple orchard and has been extensively cultivated in the past.

Harmony Dam

Rock art sites (Harmony 1 & Harmony 2) including associated archaeological resources (i.e. high density stone artefacts) and *in-situ* archaeological deposit have, collectively been rated as having *high* (Grade IIIA) (local) archaeological significance. Facing west, in shadow, and protected by vegetation the rock art/imagery is well preserved and comprises both representational art (Harmony 2) and highly symbolic art (Harmony 1). There is no graffiti, and only minimal percolation of natural salts from behind the painted surfaces. **Construction of the proposed Harmony Dam and full supply level will have a severe, negative impact on the archaeological resource.** Full supply level flags have been placed immediately in front of the sandstone shelter, a mere 2-3 meters from the wall of the shelter.

A 40-50m no-go buffer around each site (HMY1 and HMY2) is proposed as this will also allow for the protection of the archaeological deposit within the rocky overhang as well as the rock art.

7. Recommendations:

Toeka Dam

No mitigation required. There is no objection to the proposed establishment of this dam.



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Harmony Dam

It is recommended that:

- The recommended no-go buffer area of 40-50m for sites HMY1 and HMY2 be implemented and that Option 3 be approved
- The Rock Art Guide document attached below be included in the EMPr for the construction phase of this project and that all construction and farm staff be informed of its contents
- A Heritage Agreement in terms of section 42 of the NHRA be signed between the landowner and HWC to ensure that this significant archaeological site is protected and conserved.

8. Author/s and Date:

Jenna Lavin

20 November 2018

Cedar Tower Services (Pty) Ltd t/a CTS Heritage

34 Harries Street, Plumstead, Cape Town, 7801

Tel +27 21 013 0131 **Email** info@ctsheritage.com **Web** <http://www.ctsheritage.com>



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1. INTRODUCTION

1.1 Background Information on Project

This application is for the proposed Harmony and Toeka dam project. The water for the proposed Toeka and Harmony dams will be used for the irrigation of a new fruit orchard development on the property. The areas selected for the 75 ha orchards will be on legally disturbed land which has been ploughed in the last 10 years and as such, is not subject to EA.

1.2 Description of Property and Affected Environment

Toeka Dam

The site for the proposed Toeka Dam comprises old agricultural land. According to Mr Hein Juries (pers. comm.) of the Farm Sandrivier, the proposed dam site has lain fallow for about 2 years, but prior to that (for at least 25 years), the entire area was planted out with apple orchards. And before that, according to Mr Juries, onions were grown on the site. Remnants of old apple orchards can be seen in the north eastern sector and are also evident on GoogleEarth. This site is therefore already severely transformed.

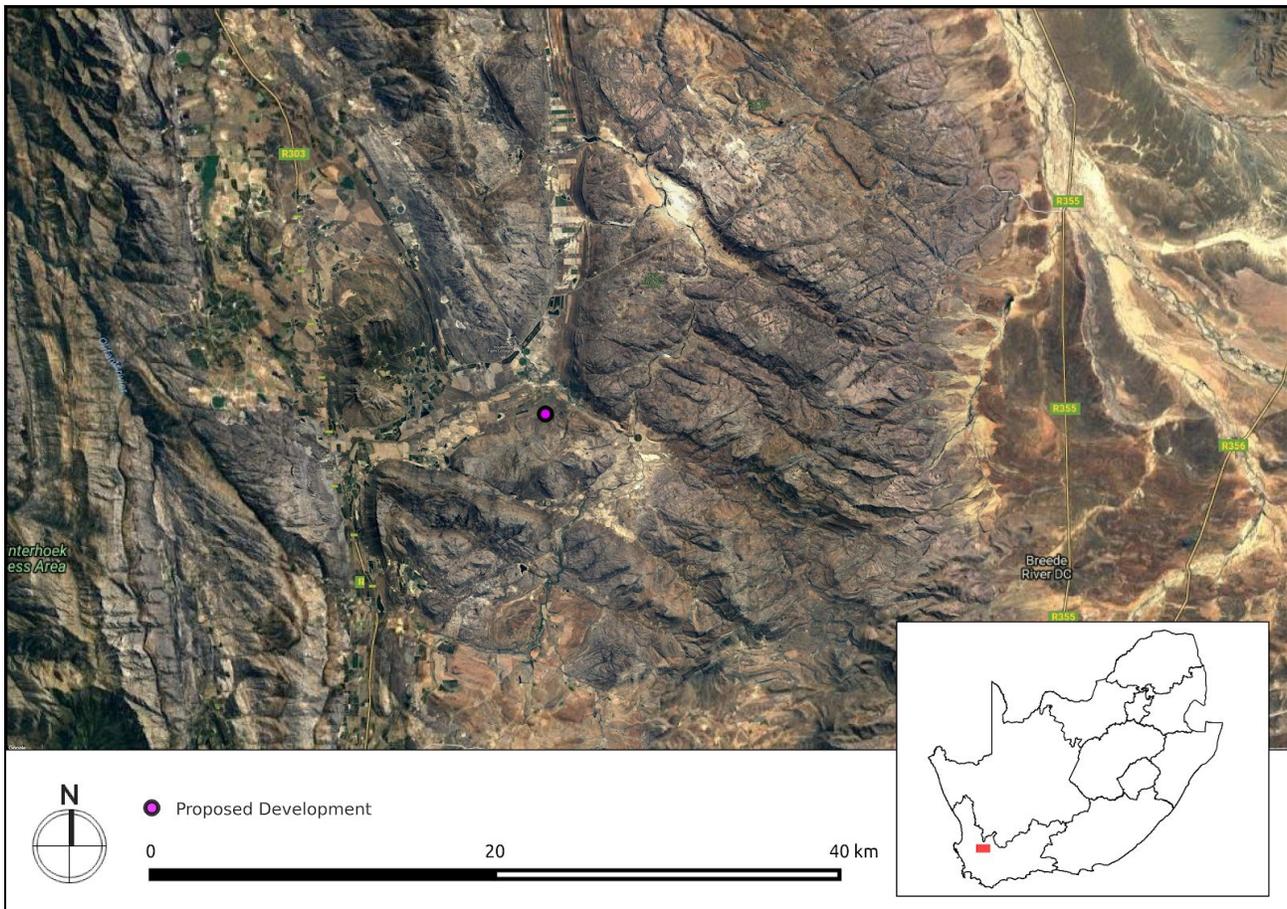
The proposed development site is located in wide, level valley, and covered in dense natural grasses, weeds, sporadic bushes and a few trees. There is barely any surface stone covering the subject property, which is on a substrate of weathered quartzitic sands. Existing infrastructure comprises farm fencing and fence poles. Several old gravel tracks cross the site. At least 4 deep drainage channels (for runoff), have been excavated on the property. There is also some erosion in the north western portion, where a number of deep soil pits have been excavated, where the proposed dam wall will be constructed. There are no significant landscape features on the proposed development site.

Harmony Dam

The proposed 5ha site is located at the foot of narrow, deeply wooded/vegetated kloof. The steep, east facing rocky slopes are covered in dense Protea trees, while mostly Fynbos vegetation covers the steep west facing slopes. A small perennial stream cuts through the middle of kloof, either side which is covered in very thick riparian vegetation, on a substrate of fairly loose, but gritty, weathered floodplain sands. The northern portion of the proposed dam site, above the proposed dam wall, comprises old agricultural lands. A long, prominent, sandstone overhang/shelter (a significant landscape feature) is located on the eastern bank of the stream.



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Map 1a: The proposed development area

2. METHODOLOGY

2.1 Purpose of HIA

The purpose of this Heritage Impact Assessment (HIA) is to satisfy the requirements of section 38(8), and therefore section 38(3) of the National Heritage Resources Act (Act 25 of 1999).

2.2 Summary of steps followed

- A Desktop Study was conducted of relevant reports previously written
- An archaeologist was contracted to conduct an assessment of archaeological resources likely to be disturbed by the proposed development. The site visit took place in October 2018.
- The identified resources were assessed to evaluate their heritage significance
- Alternatives and mitigation options were discussed with the Environmental Assessment Practitioner



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Map 1b: The proposed development area

2.3 Assumptions and uncertainties

- The *significance* of the sites and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.
- It should be noted that archaeological and palaeontological deposits often occur below ground level. Should artefacts or skeletal material be revealed at the site during construction, such activities should be halted, and it would be required that the heritage consultants are notified for an investigation and evaluation of the find(s) to take place.



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However, despite this, sufficient time and expertise was allocated to provide an accurate assessment of the heritage sensitivity of the area.

2.4 Constraints & Limitations

No constraints or limitations were experienced.

3. HISTORY AND EVOLUTION OF THE SITE AND CONTEXT

3.1 Previous Heritage Impact Assessments

While there have been no archaeological field assessments completed in the immediate vicinity of the proposed dams, the kloofs to the east of the proposed developments have been thoroughly surveyed by eCRAG, the eastern Cederberg Rock Art Group, for rock art sites (Map 2a). Five rock art sites have been identified within the 10km inclusion zone for this project. While these sites are very significant, it is unlikely that the proposed development of these dams will impact on significant rock art in this area as the underlying geology for the dams falls within the shales of the Gydo and Witpoort Formations. All the rock art sites documented thus far in the area have been made on outcrops of sandstone. The only other known heritage sites within the 10km inclusion zone are two Provincial Heritage Sites (old National Monuments). None of these known heritage resources will be impacted by the proposed development.

The proposed Harmony Dam will be created through the establishment of a 270m wall standing 13m high along an existing stream. Once established, the Harmony Dam is anticipated to cover approximately 5ha in extent and have a capacity of 250 000m³. This is the smaller of the two dams and lies in an existing stream. The proposed Toeka Dam will be created through the establishment of a 636m wall standing 14m high along an existing stream. Once established, the Toeka Dam is anticipated to cover approximately 35ha in extent and have a capacity of 2 000 000m³. The proposed Toeka Dam will be located in an area that has previously been cultivated (see Figure 1d and 5b) and as such, it is very unlikely that this proposed development will impact on significant *in situ* archaeological resources.

Both proposed farm dams will not significantly alter the character of the surrounding cultural landscape as they are situated on existing cultivated farmland. The walls for the dams will be created by shallow excavations of topsoil in the footprint of the dams.



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Palaeontology

Both the proposed Harmony and Toeka Dams fall within areas of very high palaeontological sensitivity (Map 2). The proposed Harmony Dam lies within the Witpoort Formation. This formation is known for diverse lagoonal biota of fish (placoderms, acanthodians, sharks, several subgroups of bony fish, lampreys *etc*), arthropods (eg eurypterids), rich vascular plant flora (lycopods, progymnosperms *etc*), seaweeds, charophytes, low diversity trace assemblages, including *Spirophyton*. The proposed Toeka Dam lies within the Gydo Formation. This formation is part of the Ceres Sub-group and is known for diverse shelly invertebrate biotas dominated by brachiopods, echinoderms, trilobites and molluscs (with several other minor groups), diverse trace fossils, rare fish remains (acanthodians, placoderms, sharks, bony fish) & primitive vascular plants (psilophytes, lycopods) and microfossils.

3.2 Geomorphology, climate, vegetation

Toeka Dam

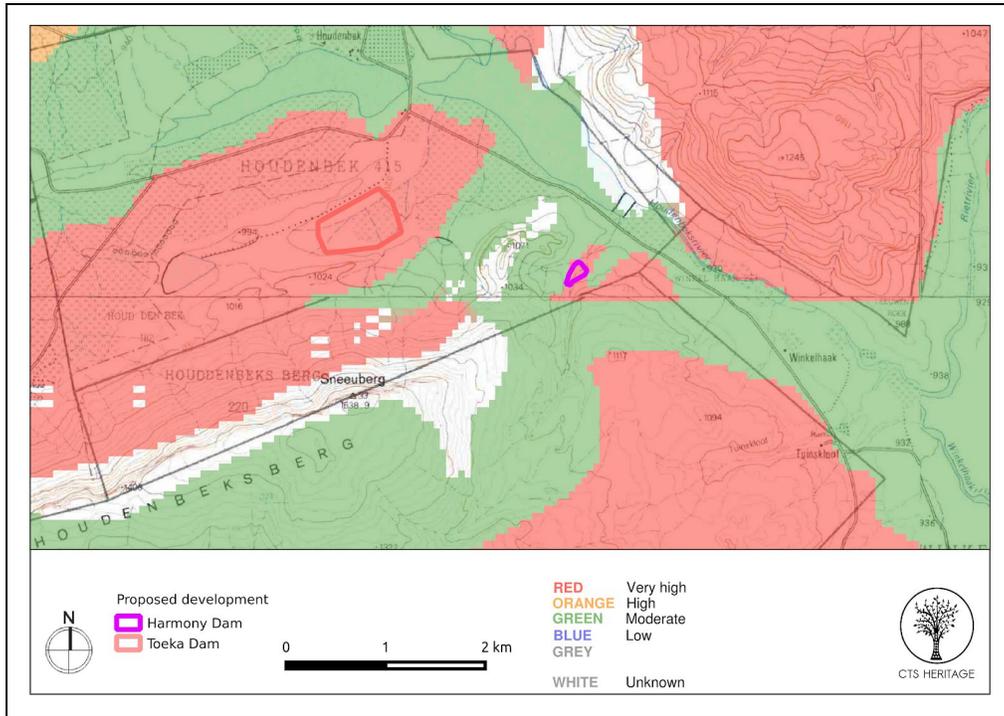
The proposed development site is located in wide, level valley, and covered in dense natural grasses, weeds, sporadic bushes and a few trees. There is barely any surface stone covering the subject property, which is on a substrate of weathered quartzitic sands.

Harmony Dam

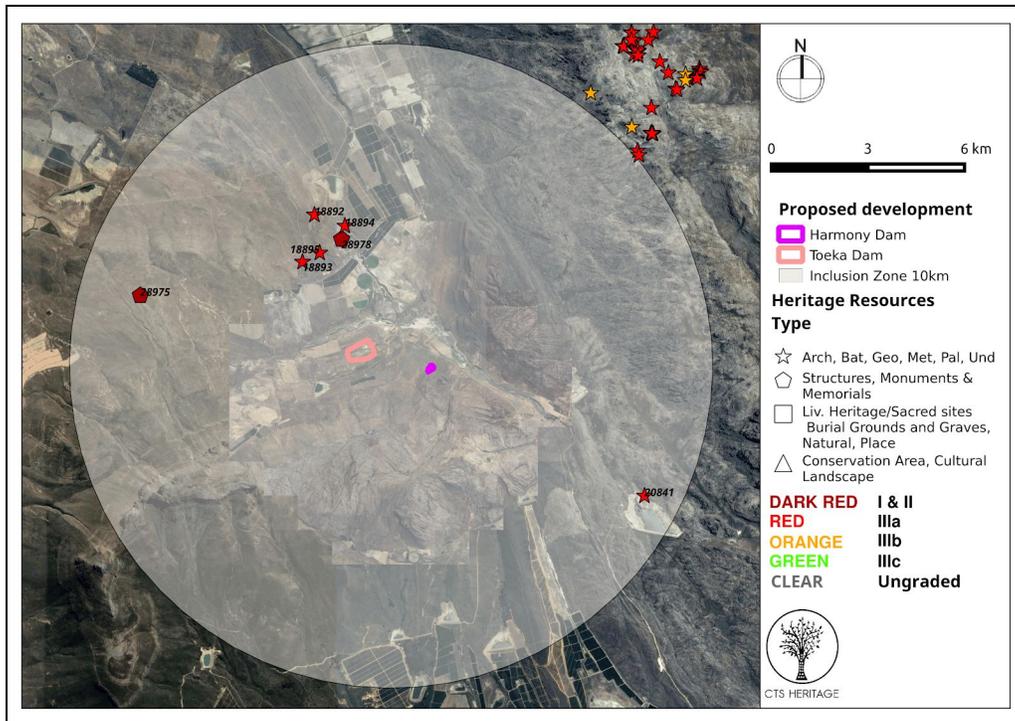
The proposed 5ha site is located at the foot of narrow, deeply wooded/vegetated kloof. The steep, east facing rocky slopes are covered in dense Protea trees, while mostly Fynbos vegetation covers the steep west facing slopes. A small perennial stream cuts through the middle of kloof, either side which is covered in very thick riparian vegetation, on a substrate of fairly loose, but gritty, weathered floodplain sands. The northern portion of the proposed dam site, above the proposed dam wall, comprises old agricultural lands.



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Map 2: Palaeontological sensitivity of the proposed development area



Map 3: Spatialisation of heritage assessments conducted in proximity to the proposed development



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4. IDENTIFICATION OF HERITAGE RESOURCES

4.1 Summary of findings of Specialist Reports

The walls for the dams will be created by shallow excavations of topsoil in the footprint of the dams. From an archaeological perspective, the area designated for the Toeka Dam has already been heavily cultivated, no rock art outcrops fall within this zone and surface archaeological material which may be found there is not in situ. We therefore do not recommend further heritage studies for the Toeka Dam. However, a possible outcrop falls within the Harmony Dam which may contain archaeological resources such as rock art.

4.2 Heritage Resources identified

Toeka Dam

No archaeological resources were located during a fairly brief field assessment of the proposed Toeka Dam. There is barely any surface stone covering the site, which comprises a severely transformed landscape. The only surface stone noted was layered or packed alongside sections of some of the drainage channels which cut through the site. No archaeologically modified stone was found.

Harmony Dam

Well preserved rock art was located in a large, ± 120m long sandstone overhang/shelter located on the eastern bank of the small, unnamed perennial stream. Large numbers (several thousand) of Later Stone Age (LSA) lithics, including chips, chunks, modified and unmodified flakes were counted, on the weathered gritty floodplain sands immediately in front of the shelter. Both bladelet and cylindrical cores were found, including modified retouched points and at least two adzes. Several miscellaneous grindstone pieces and a hammerstone were also counted. No scrapers, backed pieces, ostrich eggshell, beads, or pottery was found. The majority of the lithics are in very fine grained lydianite/indurated shale, but tools in silcrete, quartz and CCS were also seen. One re-used Middle Stone Age (MSA) quartzite flake was found.

Table 2: Artefacts identified during the field assessment within the dam area

Point ID	Site No	Site Name	Description	Co-ordinates	Grading	Mitigation
	HMY1	Harmony 1	Rock art site	S32° 59.966' E19° 27.697'	Grade IIIA	Dam must be moved, 40-50m buffer
	HMY2	Harmony 2	Rock art site	S32° 59.928' E19° 27.727'	Grade IIIA	Dam must be moved, 40-50m buffer
	HMY3	Harmony 3	Artefacts	S32° 59.733' E19° 27.795'	Grade IIIC	None

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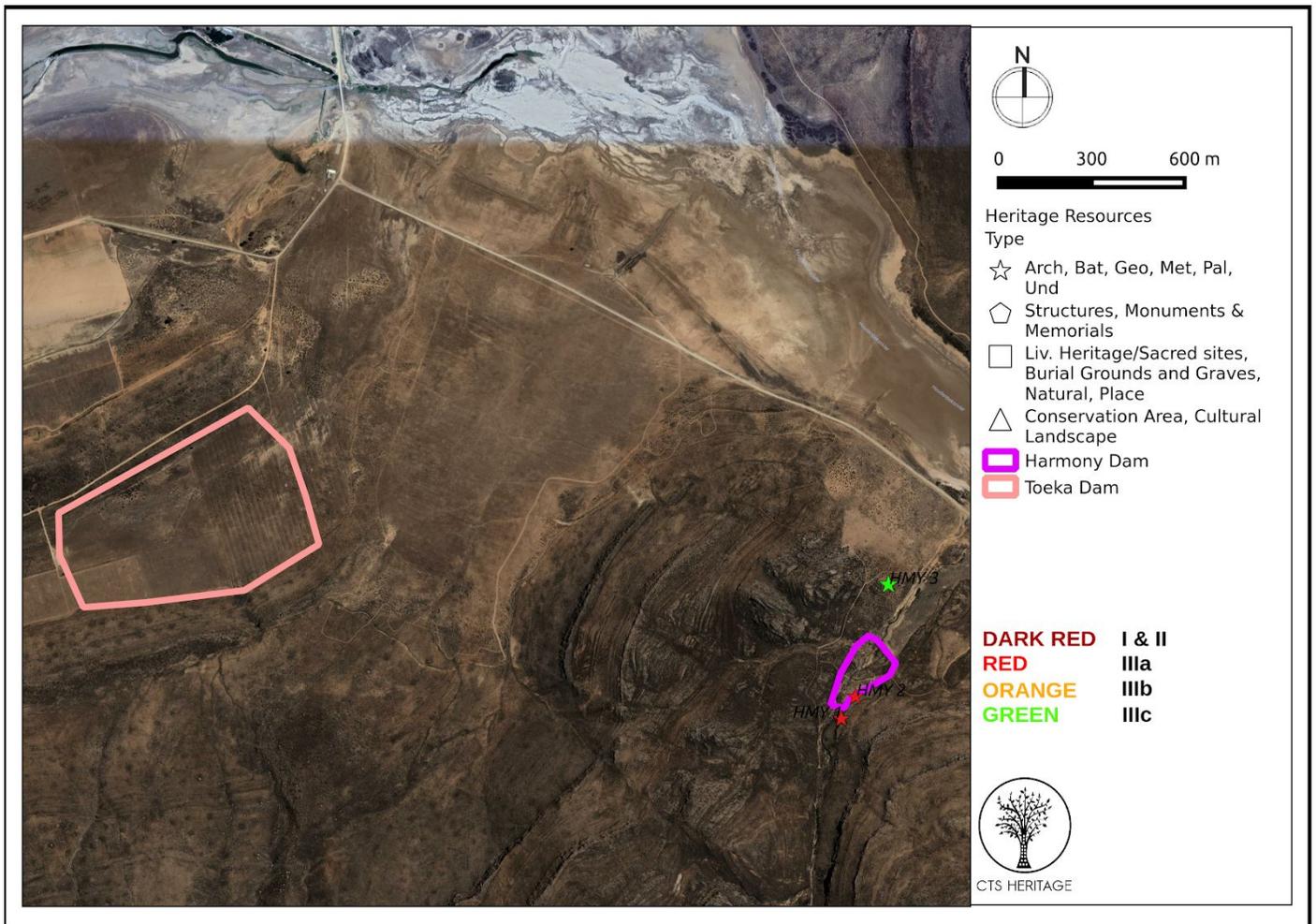
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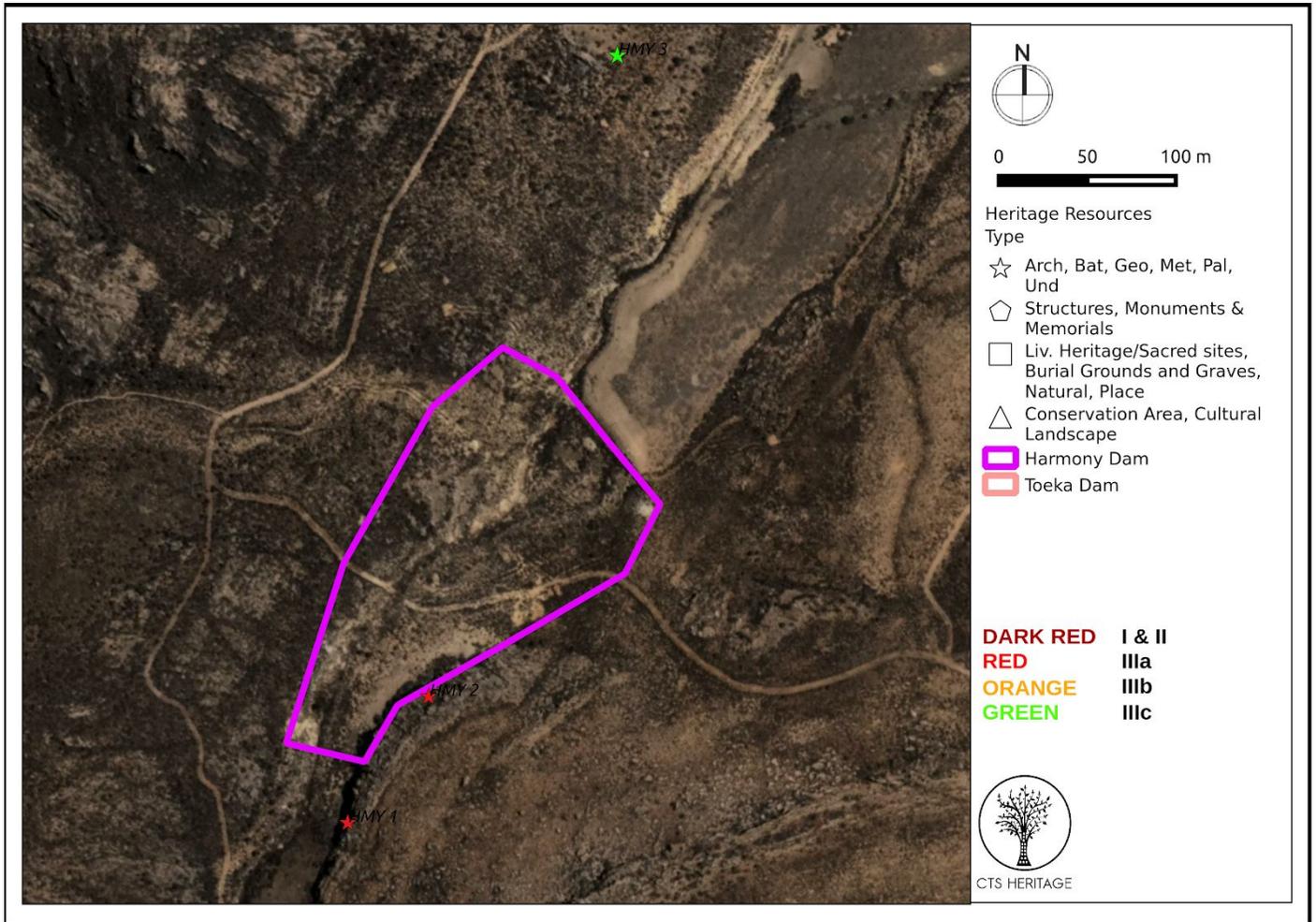
Palaeontology

The walls for the dams will be created by shallow excavations of topsoil in the footprint of the dams. As the establishment of these proposed dams will not require any excavation into fossiliferous bedrock, it is unlikely that significant palaeontological resources will be impacted by the proposed development.

4.3 Mapping and spatialisation of heritage resources



Map 4a: Heritage resources in the vicinity of the proposed development



Map 4b: Heritage resources in the vicinity of the proposed development

5. ASSESSMENT OF THE IMPACT OF THE DEVELOPMENT

5.1 Assessment of impact to Heritage Resources

Toeka Dam

This area is not a sensitive archaeological landscape. No archaeological resources were found on the site which is an old apple orchard and has been extensively cultivated in the past.

Harmony Dam

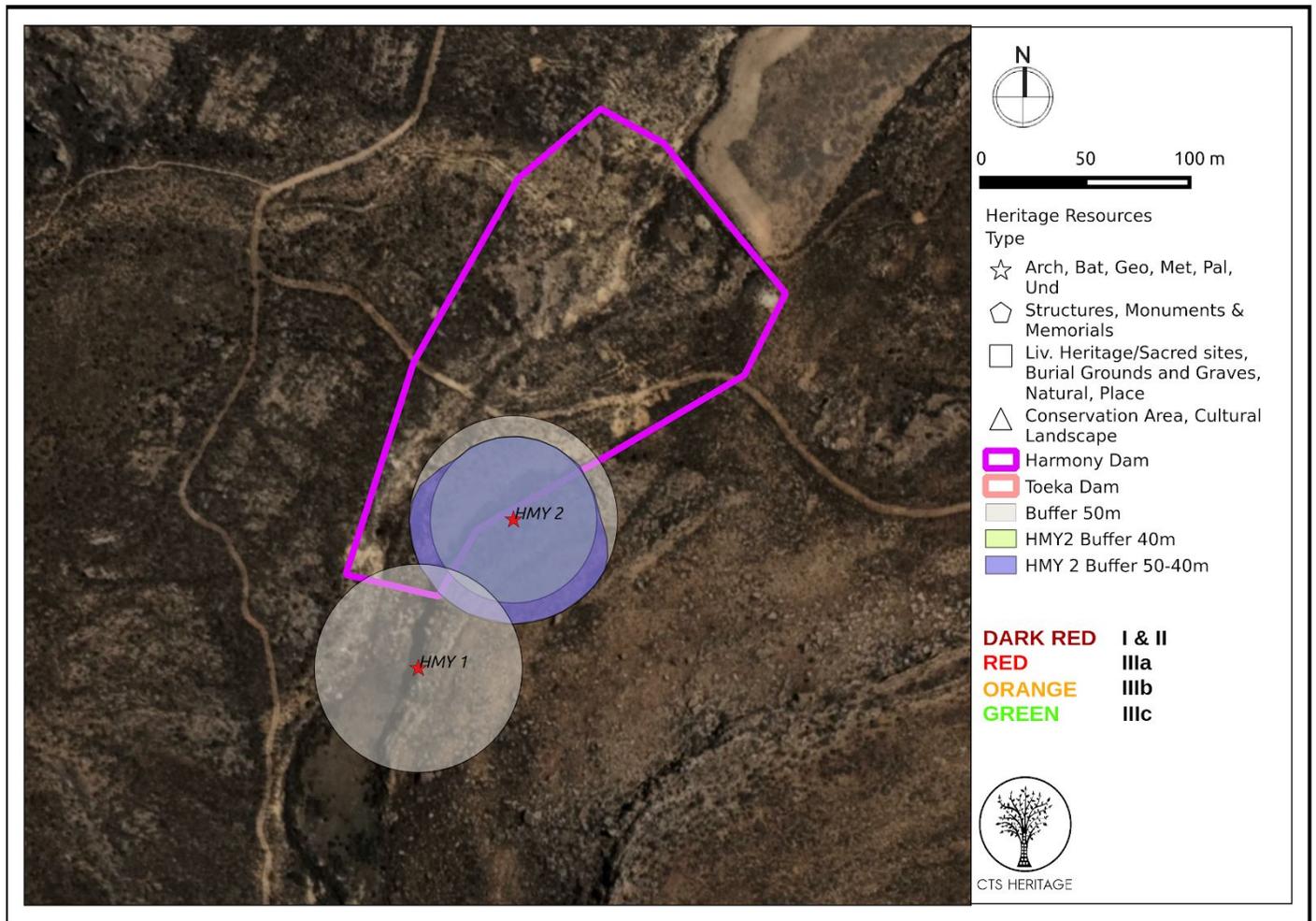
Rock art sites (Harmony 1 & Harmony 2) including associated archaeological resources (i.e. high density stone artefacts) and *in-situ* archaeological deposit have, collectively been rated as having *high* (Grade IIIA) (local)



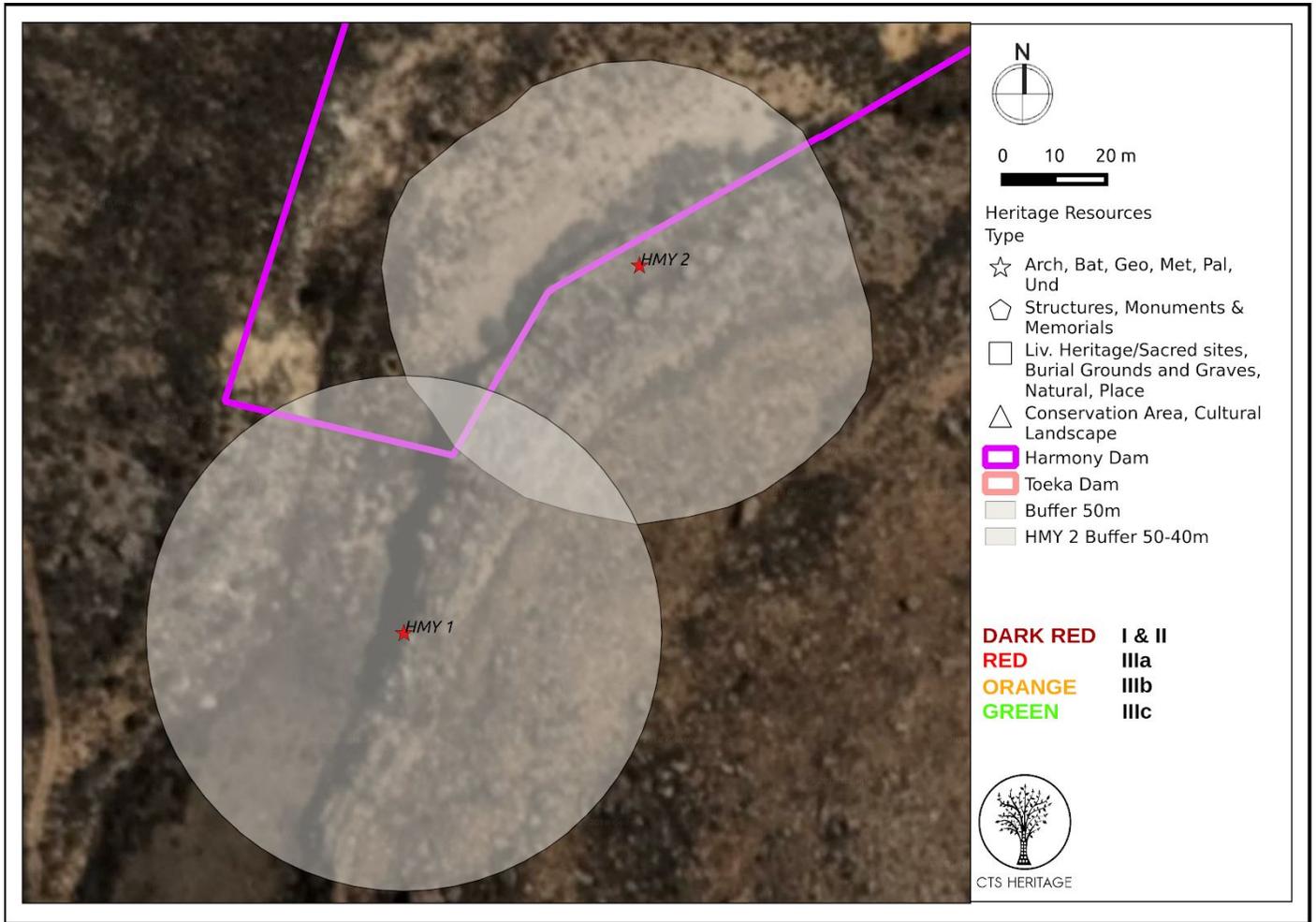
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archaeological significance. Facing west, in shadow, and protected by vegetation the rock art/imagery is well preserved and comprises both representational art (Harmony 2) and highly symbolic art (Harmony 1). There is no graffiti, and only minimal percolation of natural salts from behind the painted surfaces. **Construction of the proposed Harmony Dam and full supply level will have a severe, negative impact on the archaeological resource.** Full supply level flags have been placed immediately in front of the sandstone shelter, a mere 2-3 meters from the wall of the shelter.

A 40-50m no-go buffer around each site (HMY1 and HMY2) is proposed as this will also allow for the protection of the archaeological deposit within the rocky overhang as well as the rock art.



Map 5a: Heritage resources in the vicinity of the proposed development with proposed no-go buffer areas



Map 5b: Heritage resources in the vicinity of the proposed development with proposed no-go buffer areas

5.2 Sustainable Social and Economic Benefit

The applicant, Harmony Trust, is planning to further develop an existing 100% black-owned BBEEE farming entity, reference T2213/2003. Harmony Trust has been in the agricultural sector and trading successfully for the past 12 years with their neighbouring partner and mentor, Morester Boerdery.

Their plan is to grow and irrigate an additional 75ha of fruit orchards and therefore the development of the dams for irrigation purposes is required to ensure the long term economic viability and sustainability of this project. The success of this project is expected to create a number of permanent jobs within the agricultural sector.



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5.3 Proposed development alternatives

Two site locations for the proposed Harmony Dam were considered and investigated prior to the identification of the rock art. Two locations were identified as possible locations, and referred to as:

Alternative A, Harmony 266 (Preferred site alternative):

Harmony 266 on RE Houdembek 415 is considered the preferred alternative based on the available runoff, cost effectiveness as well as storage capacity. The proposed dam would have a larger footprint when considering Alternative B (Harmony 269, not preferred) but the preferred site would not sacrifice potential production land. Alternative A (Harmony 266, preferred alternative) would have lower wall heights requiring less disturbance resulting in more efficient storage ratios and overall better economic. This proposed site also has a gravitation advantage as water will be able to flow via gravitation from the outlet to the proposed orchards and a pump station will not be required.

Alternative B Harmony 268 (Not preferred site alternative):

Harmony 268 on RE Vaalbokskloof 211 (Alt B - not preferred) is not considered feasible as it will not be cost effective. Due to the topography of the site, the dam does not have enough storage capacity. In addition, a higher wall will be required. The associated stream will not provide enough runoff and the locality does not have a gravitational advantage when getting water from the dam to the proposed orchards for irrigation. Alternative B also falls on the neighbouring farm which is not ideal as land owner consent would be required and compensation would have to be arranged.

As a result of the findings of the archaeological assessment, additional alternatives were proposed. These alternatives provided a new layout for the preferred alternative taking cognisance of the recommended 40-50m no-go buffer area for sites HMY1 and HMY2.

Option 1: Original Design (Alternative A - preferred above)

Option 2: Wall of the dam moved further north. This option is not preferred as the capacity of this dam is too small to be viable.

Option 3 (preferred): Wall moved north, but also curved to increase capacity

Option 4: Original dam position, but with additional wall erected to the south in order to secure the heritage resources. In this option, the buffer zones remain un-impacted, but the additional cost of the wall makes this option unviable.



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Map 6: Site Layout Plan indicating the proposed alternatives A and B

Of the four options proposed, Option 3 is preferred. This new preferred layout will ensure that the significant heritage resources identified are not negatively impacted by the proposed dam as the maximum dam height will be below the 40-50m recommended no-go buffer zone (Figure 7a to 7d).



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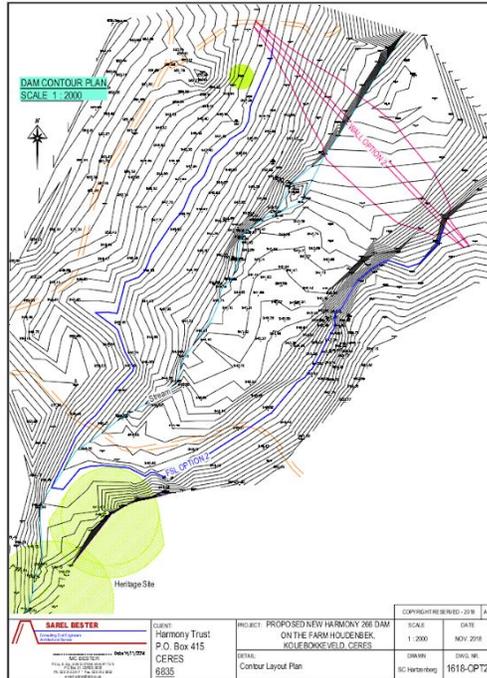
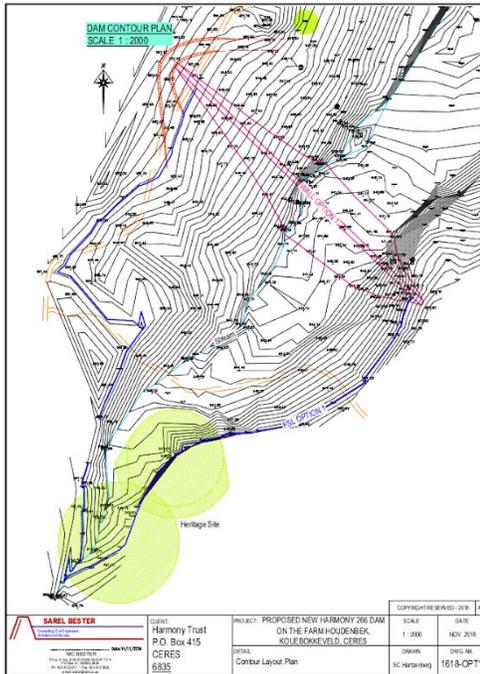


Figure 7a and b: Site Layout Plan indicating the proposed Options 1 and 2

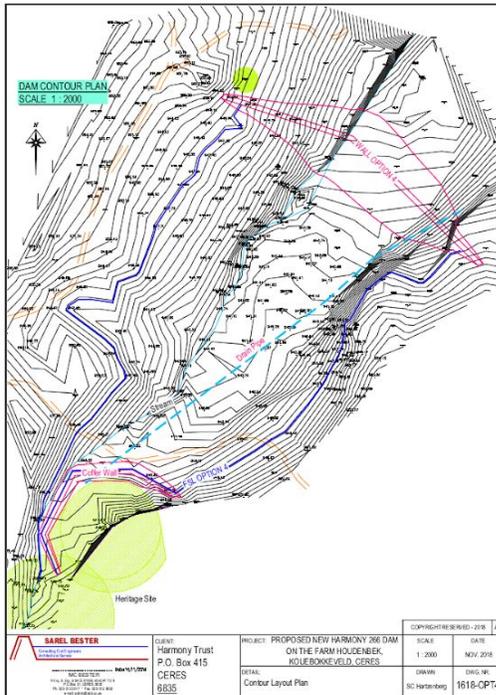
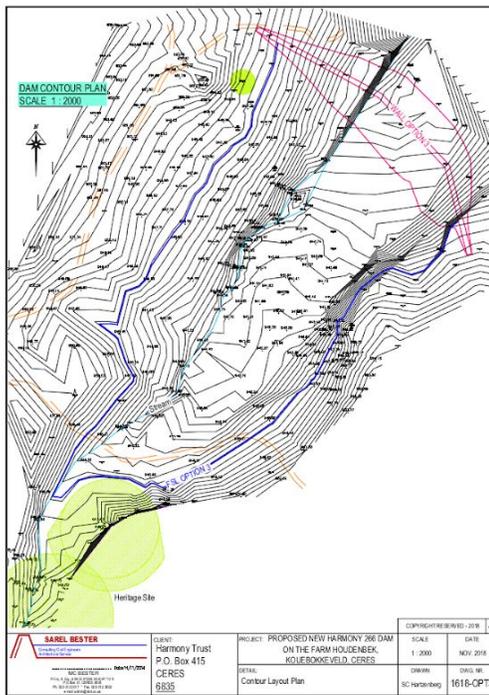


Figure 7c and d: Site Layout Plan indicating the proposed Options 3 (preferred) and 4

Cedar Tower Services (Pty) Ltd t/a CTS Heritage
 34 Harries Street, Plumstead, Cape Town, 7801
 Tel +27 21 013 0131 Email info@ctsheritage.com Web <http://www.ctsheritage.com>



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6. RESULTS OF PUBLIC CONSULTATION

The public consultation process will be undertaken by the EAP during the EIA.

7. CONCLUSION

This application is for the proposed Harmony and Toeka dam project. The water for the proposed Toeka and Harmony dams will be used for the irrigation of a new fruit orchard development on the property. An archaeological field assessment identified three archaeological sites of significance in proximity to the proposed Harmony Dam.

The walls for the dams will be created by shallow excavations of topsoil in the footprint of the dams. As the establishment of these proposed dams will not require any excavation into fossiliferous bedrock, it is unlikely that significant palaeontological resources will be impacted by the proposed development.

Overall, there is no objection to the proposed development of the Toeka and Harmony Dams on condition that the recommendations outlined below are implemented.

8. RECOMMENDATIONS

Toeka Dam

No mitigation required. There is no objection to the proposed establishment of this dam.

Harmony Dam

It is recommended that:

- The recommended no-go buffer area of 40-50m for sites HMY1 and HMY2 be implemented and that Option 3 be approved
- The Rock Art Guide document attached below be included in the EMPr for the construction phase of this project and that all construction and farm staff be informed of its contents
- A Heritage Agreement in terms of section 42 of the NHRA be signed between the landowner and HWC to ensure that this significant archaeological site is protected and conserved.



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APPENDICES



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APPENDIX 1: Archaeological Assessment



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APPENDIX 2: Rock Art Guide