

**Balmichael WTW, Arran
Archaeological Mitigation**

Data Structure Report

by Douglas Gordon

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Rathmell
Archaeology Ltd

Quality Assurance

This report covers works which have been undertaken in keeping with the issued brief as modified by the agreed programme of works. The report has been prepared in keeping with the guidance of Rathmell Archaeology Limited on the preparation of reports. All works reported on within this document have been undertaken in keeping with the Institute for Archaeologists' Standards and Policy Statements and Code of Conduct.

Signed

Date

In keeping with the procedure of Rathmell Archaeology Limited this document and its findings have been reviewed and agreed by an appropriate colleague:

Checked

Date

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Contents

Introduction	3
Background	3
Current conditions	5
Monitoring of 2011 SI works	5
Project Works	6
Findings.....	6
Discussion	10
Recommendations	10
Conclusion	10
References	11
Appendix 1: Registers.....	12
Context Register	12
Photographic Register	13
Appendix 2: Discovery & Excavation in Scotland	14
Contact Details	15

Figures

Figure 1: Line of Pipe Trench Monitored	7
Figure 2a: General Shot of Study Area from the North.....	8
Figure 2b: Pipe Trench from South.....	8
Figure 3a: Trench Section from the West.....	9
Figure 3b: Pipe Trench Spur from the East	9

Introduction

1. This Data Structure Report has been prepared for Scottish Water Shared Services in respect to the archaeological works for the outfall pipe at their Balmichael Water Treatment Works on Arran. This outfall pipe is an element of a larger development that has received planning consent by North Ayrshire Council (N/11/00247/PP) which has been conditioned to require archaeological works (Condition 8). These archaeological works were designed to mitigate any adverse impact on the archaeological remains within the development area.
2. The West of Scotland Archaeology Service who advises North Ayrshire Council on archaeological matters has provided guidance on the structure of archaeological works required on this site.
3. Rathmell Archaeology Limited has been appointed by Scottish Water Shared Services to undertake the development and implementation of archaeological mitigation works for the proposed Water Treatment Works extension at Balmichael WTW, North Ayrshire. This stage of monitoring was agreed in a Written Scheme of Investigation (Rees 2011).
4. This Data Structure Report details the findings from this stage of monitoring, background information and guidance on the consequences of the archaeological resource to subsequent development.
5. All work was undertaken according to the terms of the Written Scheme of Investigation (Rees 2011) and in accordance with West of Scotland Archaeology Service Standard Conditions, the Institute for Archaeologists' Standards and Policy Statements and Code of Conduct and Historic Scotland Policy Statements.

Background

6. During the construction of Balmichael WTW in 1999 the site was subject to a 2% intrusive archaeological evaluation and an open area excavation. These works were conducted by FIRAT Archaeological Services with the evaluation being undertaken during May 1999 and the excavation running from June to August 1999.
7. The archives for these projects remain with FIRAT Archaeological Services and only the information released by them has been consulted. The reporting and post-excavation stages of the project were not concluded in 1999 and are currently restarted; an agreement was reached in 1999 that no Data Structure Report would be prepared after on-site works, with only a final report being prepared.
8. Two separate texts are available for the evaluation and mapping for the southern four trenches. The evaluation was the vehicle that identified the subsequent excavation areas, being focused on the northern plant building and a cairn in the southern area:

"The presence of preserved archaeology in five of the eleven evaluation trenches (Trenches 2, 6, 7, 9 and 10) proved that the Bridge Farm site was indeed archaeologically sensitive." FIRAT, 13

9. The excavations, in the absence of a Data Structure Report, are less clearly reported on. No report on the stratigraphy has been circulated for the excavations, other than a text based summary in *Discovery & Excavation in Scotland 1999*.

"The site had a blanket covering of peat and a buried agricultural soil of probable Bronze Age date which sealed extensive ard marks containing considerable quantities of charred material considered to represent manuring of small of the small prehistoric field. The ard marks were located between two low knolls.

On top of the western knoll ... was a knapping floor of predominantly pitchstone with some flint ... Some 20 sherds of pottery were also recovered from the knapping floor ...

The negative features were difficult to interpret due to site formation processes

and no obvious structures could be identified with certainty in the field.

On the knoll at the NE of the site beside the road a fine late 18th/ early 19th-century lime kiln was excavated – apparently the first of its kind to be excavated in Scotland. ... The kiln has now been preserved for display to the public.” Discovery & Excavation in Scotland 1999, 65

10. Reports (some in draft or summary style) are available for Soils, Pottery and Lithics, none have supporting illustrations. Registers have been circulated for Photography, but not for Finds, Samples or Drawings. No context summaries have been circulated. A Master Map of the excavation area has been circulated, but this is a composite and does not show some critical boundaries (such as the limits of (040)).
11. From the available reports it is clear that the vast bulk of significant artefacts (lithics and pottery) were recovered from the buried soil horizon (040) on the NW knoll:

“The absence of artefacts in the cultivated soils is in striking contrast to the dense concentration of struck pitchstone and flint in 040. The well-defined limits to this area of stone flaking waste indicates a lack of major disturbance since its deposition with no transfer of struck flakes into the area of cultivated soils.” Carter *et al* 1999, 5

“The vast bulk of the lithic assemblage was recovered from context 040, a buried soil containing dense quantities of lithic material and some pottery and contained 1551 of the 1649 lithics (94.06%).” Donnelly undated, 24
12. Indeed the Soils report helpfully characterises the prehistoric landscape, explaining this concentration on the northwest knoll within the site:

“Podzolisation occurred relatively early in north and west Scotland, certainly before the Neolithic period in Arran, so early human activity at Bridge Farm probably encountered a well-developed freely-draining podzol on the knolls with peat limited to poorly draining groundwater gleys in lower lying areas. The contrast between the dry knolls and wet depressions would have been greater than it is at present, making the knolls an obvious focus for activity like that indicated by the scatter of pitchstone and flint. The present-day uniform cover of shallow peat over the whole area masks this underlying variability in drainage status.” Carter *et al* 1999, 4
13. In the absence of a Data Structure Report or any other stratigraphic report it is difficult to assess the validity of the negative (excavated) features within the main excavation area. However, the Soils report in discussing the soil formation processes did pass some comment on the confidence that could be ascribed to the excavated features:

“No clear groups of features could be identified in the field that might suggest coherent structures. Individual feature morphology ranges from highly irregular (probably natural) to regular (possibly man-made). On balance it may be concluded that there is no positive evidence for any man-made deliberate cut features in the excavated area.” Carter *et al* 1999, 6
14. While this should not be taken as a definitive statement of confidence, it strongly suggests that the character of the soils on-site were such that excavators struggled to differentiate between natural and anthropic features. Certainly Carter *et al* seem to side towards recognising that the majority of the negative features were more likely to be natural in origin. This opinion is made more robust with the knowledge that Carter attended site during the excavation works.
15. In addition to the discoveries of the main excavation area, discussed above, there are hints from the photo register that the originally proposed excavation of the possible cairn exposed by Trench 2 was carried out. The subsequent failure to mention this cairn (which lay in the southeast corner of their site), suggests that this proved to not be archaeologically significant.

Current conditions

16. The current water treatment works, built in 1999, stands in a landscaped compound to the west of The String (B880). The site access road enters the southern end of the site running north the main building which has a concrete apron to the south. The main building is built out over falling ground of a stream valley to the north
17. To the immediate east of the main building, is a concrete structure retaining ground adjacent to The String. This retained ground was overgrown, and contained the remains of the limekiln excavated prior to the construction by FIRAT. The ground was fenced from the road, but this fence had failed; an intact well maintained fence stands at the top of the retaining structure.
18. The more normal edge between the compound and The String is a fence and hedgerow boundary with an engineered slope falling into the compound; this slope is more pronounced the closer you move to the main building. The access road as it leaves The String is level.
19. To the south of the main building are a group of small structures that cap the boreholes. The water treatment works is contained within modern fencing, and in general all visible surfaces appear to have been engineered with the exception of the very far western edge of the compound.
20. To the immediate south of the main compound is a portion of boggy ground through which access runs to the agricultural land to the west. This is bounded to the south by a line of mature trees that stand on a slight bank, which becomes more pronounced as it runs off to the west. To the south of the bank is an open drain within which runs a minor watercourse.

Monitoring of 2011 SI works

21. During January 2011 Rathmell Archaeology (Rees 2011) undertook monitoring on the excavation of test pits, boreholes and service location trenches to improve the comprehension of the residual archaeological potential of the water treatment site. The archaeological monitoring failed to identify any significant archaeological features or artefacts within the core development area.
22. Within the existing compound all test-pits (bar Test-Pit 5) exposed engineered made ground which had clearly disrupted any pre-works strata. This disruption continued to the south with the exposure of buried waste (Test-Pit 7), engineered ground (Test-Pit 2) and re-deposited sediment (Test-Pit 1). Only Test-Pits 4 and 5 appeared to have relatively undisturbed natural sequences, although Test-Pit 5 is known to be within the FIRAT excavation area.
23. Coupled with these test-pit results is the reality that the original development of this ground was preceded by a full site evaluation (2% in extent) followed by the area excavation of all areas that were identified as archaeologically significant. The coverage of these mitigation works clearly addressed the southern portions of ground that were subsequently used as a contractor's compound, burial of waste and for underground infrastructure.
24. On balance the monitoring works concluded that it was unlikely that there were any significant archaeological strata that had both avoided the original programme of mitigation and the subsequent construction across the bulk of the site. Therefore, we recommended that no further archaeological works are appropriate with regard to the continuing development of the enclosed Water Treatment Works site including the southern compound, subject to the following exceptions:
 - ❖ the immediate flanks of the north-west knoll where the pitchstone knapping site was previously excavated retains a residual potential for significant archaeological features. This is identified on a precautionary basis and should be taken to extend some 5m out from the excavated portion of the knoll in all directions;

- ❖ there is a continuing need to conclude the reporting of the original 1999 works to communicate the findings of the original mitigation. This is a liability on the now defunct West of Scotland Water; and
 - ❖ any works outwith the fenced enclosures goes beyond our robust archaeological knowledge and hence may encounter significant archaeological features.
25. The development proposal took cognisance of the findings and recommendations from this phase of works and used this to structure an appropriate assessment of impact with a view to avoiding unnecessary impacts and mitigating unavoidable consequences.
26. In conclusion, only the outfall pipe running south from the fenced compound was considered to have the potential to expose archaeological material.

Project Works

27. The programme of works comprised the archaeological monitoring of topsoil stripping down to subsoil along the line of the outfall pipe in the field to the immediate south of the Water Treatment Works extension to Balmichael WTW, Arran, North Ayrshire. The field gently slopes westward, with the northern portion of the study area obviously being poorly drained.
28. The ground breaking was carried out with a 13 ton 360 excavator. All works complied with the Written Scheme of Investigation (Rees 2011b), with works being carried out on the 12th - 13th June 2012.
29. All works complied with the Institute for Archaeologists' Standards and Policy Statements and Code of Conduct and Historic Scotland Policy Statements.

Findings

30. The outfall pipe was situated in the field to the immediate south of the existing WTW. The line of the pipe trench measured 208m in length and was aligned north to south running to the Ballymichael Burn. At +181.6m from the north end a spur extended westward for 50m.
31. The pipe trench was 700mm wide and was stripped to between 300mm and 400mm deep. Within the trench the strata revealed was a saturated black brown clay peat (001) with occasional large stone inclusions over laying mid brown sand (002). (001) was present within the trench from the north end at +0m to +87.7m within the trench, after this point the topsoil (006) is a mid brown sandy humic soil with occasional sub rounded and sub angular small to medium sized stones.
32. Within the base of the trench between +89m and +180m several linear features (004) were uncovered, these features were aligned east to west and measured 300mm wide and 700mm long within the trench and were 350mm deep. The fill consisted of rounded and sub rounded medium sized stones. A second type of linear feature was uncovered within the last twenty metres of the pipe trench at its southern end. This feature (005) was aligned north to south, measuring 300mm wide and a mixed topsoil and subsoil fill with a black plastic pipe running the length of the feature.
33. The pipe trench spur had the same stratigraphy as the southern portion of the main pipe trench (006) over (002), with the exception of a dark black brown peat deposit at the eastern end of the spur.

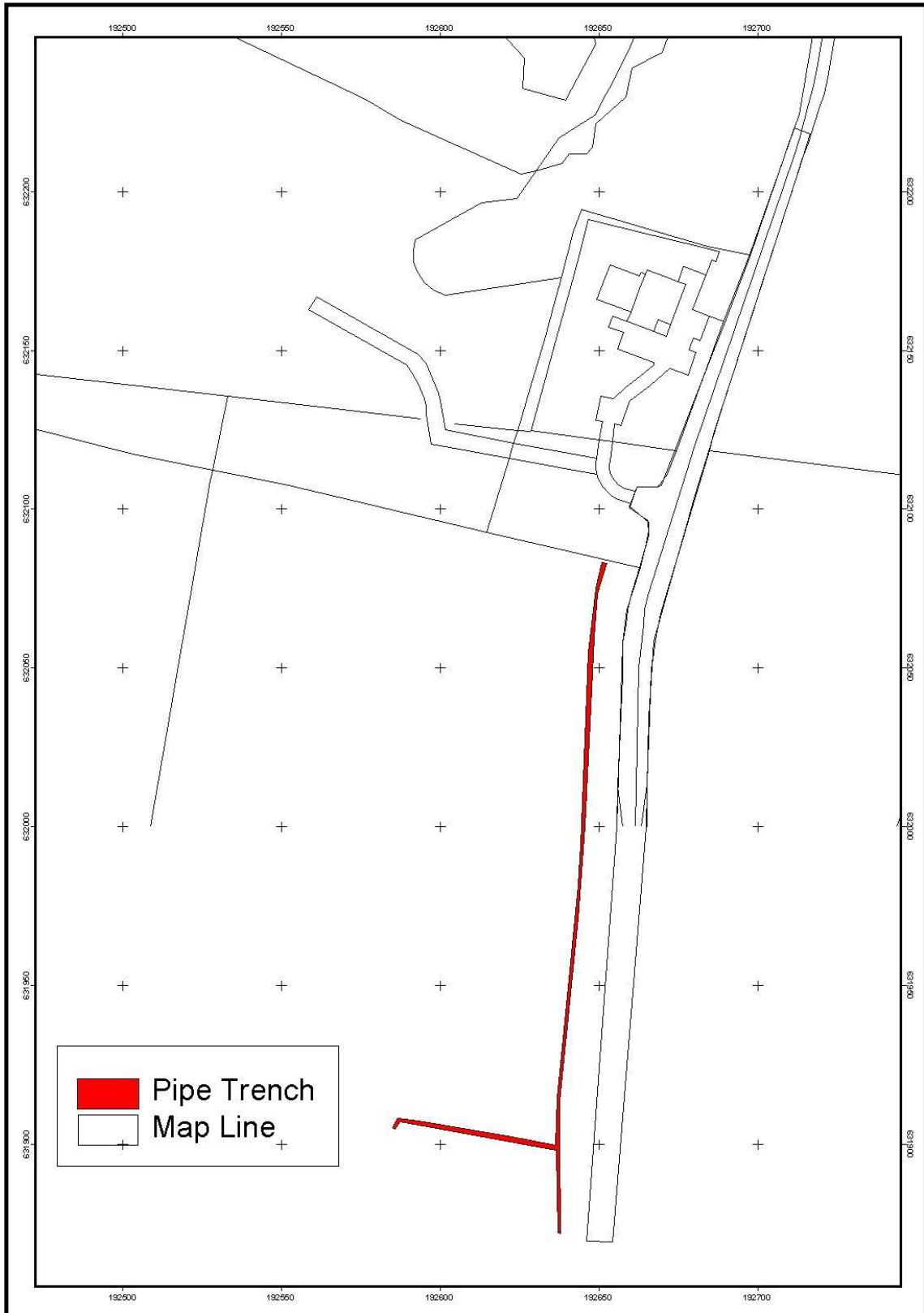


Figure 1: Line of Pipe Trench Monitored



Figure 2a: General Shot of Study Area from the North



Figure 2b: Pipe Trench from South



Figure 3a: Trench Section from the West



Figure 3b: Pipe Trench Spur from the East

Discussion

34. No significant archaeological features were uncovered in the course of the monitoring works and no anthropic material was recovered other than that which related to the 20th century use of the site. Close inspection of the upcast spoil along the route also failed to identify any lithics within this spoil.
35. Overall the initial ground conditions of brown clay peat (001) over the northern 87m of the trench replicates the ground inspected by the SI monitoring (Rees 2011a) in the southern portion of the fenced site area. This sediment appears to reflect boggy ground between the raised knolls upon which clustered the significant archaeological material excavation in 1999. Hence the absence of archaeological material within this sediment is not unreasonable, especially as the works moved further south from the knolls.
36. Any potentially significant archaeological features or deposits were investigated. The only features uncovered (004) and (005) were field drains, (004) being rubble drains from the 18th or 19th century. That these drains only appeared 89m from the northern end of the trench means they coincide with the change to (006) - the mid brown sandy humic soil. This suggests that these drains were only inserted in the less peaty areas and/or the process of drainage and soil improvement from ploughing has transformed the soil within this area.
37. The second type of field drain, (005), is clearly a modern plastic field drain and probably dates from the 20th century.

Recommendations

38. The archaeological monitoring did not reveal any significant archaeological features or artefacts within the line of the outfall pipe trench line.
39. Those features that were exposed were agricultural in nature. The archaeological monitoring (Rees 2011a) of the site investigation works carried out in 2011 also did not reveal any neither did the archaeological monitoring of the site investigation works.
40. On balance, given the findings of both the 2011 and 2012 archaeological monitoring we recommend that no further on site works are required. Further no archaeological materials were recovered from either this stage of monitoring or from monitoring the SI works that require post-excavation analysis.
41. The archaeological works of 1999-2000 (Baker 1999), uncovered features and artefacts of significant archaeological worth. As detailed within the agreed Written Scheme of Investigation (Rees 2011b) the post-excavation analysis and reporting of these materials needs to be concluded. We recommend a Post-Excavation Research Design is now prepared and submitted to the planning authority and their archaeological advisors for this 1999 material for their agreement in accordance with the Written Scheme of Investigation.
42. The appropriateness and acceptability of our recommendations rest with North Ayrshire Council and their advisors, West of Scotland Archaeology Service.

Conclusion

43. Archaeological monitoring was carried out on behalf of Scottish Water Shared Services on the line outfall pipe running to the south of the proposed extension to Balmichael Water Treatment Works, Arran, North Ayrshire. These archaeological works were designed to mitigate the impact from the site investigation works on the archaeological remains within their development area to the agreement of the West of Scotland Archaeology Service.
44. No significant archaeological material was observed during the course of the archaeological works and the only anthropic material observed was that relating to twentieth century construction and use of the site. Previous archaeological monitoring

carried out by Rathmell Archaeology Ltd for the site investigation works also found no significant archaeological material.

45. The archaeological potential of the development area appears to have been fully explored during 1999 by FIRAT Archaeological Services prior to the original construction of the works. The post excavation works of which to date are still forthcoming.

References

- | | | |
|-----------------|---------|--|
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| Baker, F | 1999 | <i>Archaeological Evaluation at NR 92653215 (centred) Bridge Farm, Machrie Moor, Isle of Arran Summary Report and Excavation Proposal</i> unpublished commercial report by FIRAT Archaeological Services |
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| Rees, T | 2011a | <i>Balmichael WTW, North Ayrshire: Archaeological Watching Brief, Data Structure Report</i> , Rathmell Archaeology Ltd |
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Appendix 1: Registers

Context Register

Context No.	Type	Description	Interpretation
001	Deposit	Black/Brown Clay Peat, with occasional large stone inclusions. Up to 250mm in depth.	Topsoil
002	Deposit	Mid brown sand	Subsoil
003	Deposit	Black/Brown highly humic peat, up to 270mm in depth.	Peat Deposit
004	Feature	Linear feature approximately. 300mm wide with rounded and sub-rounded stone fill, approximately 350mm deep. Aligned E-W	Rubble Drain
005	Deposit	Linear feature approximately. 300mm wide with mixed top soil and subsoil fill and black plastic pipe present. Aligned N-S	Modern Field Drain

Photographic Register

Image No.	Print		Slide		Digital	Description	From	Date
	Film No.	Neg. No.	Film No.	Neg. No.				
001	-	-	-	-	001	General shot of site.	N	12/06/12
002	-	-	-	-	002	General shot of drainage trench.	N	12/06/12
003	-	-	-	-	003	Middle section of drainage trench.	S	12/06/12
004	-	-	-	-	004	Trench section showing (006) and (002).	W	12/06/12
005	-	-	-	-	005	South-end of drainage trench.	S	12/06/12
006	-	-	-	-	006	South-end of drainage trench.	N	12/06/12
007	-	-	-	-	007	Shot of drainage trench spur.	W	12/06/12
008	-	-	-	-	008	General shot of drainage trench spur.	E	12/06/12
009	-	-	-	-	009	General shot of drainage trench spur.	W	12/06/12
010	-	-	-	-	010	General shot of drainage trench.	S	12/06/12
011	-	-	-	-	011	Section of drainage trench spur, showing (006) and (002).	N	13/06/12
012	-	-	-	-	012	Section of drainage trench spur, showing (006),(002) and (003)	N	13/06/12

Appendix 2: Discovery & Excavation in Scotland

LOCAL AUTHORITY:	North Ayrshire
PROJECT TITLE/SITE NAME:	Balmichael WTW
PROJECT CODE:	RA10069
PARISH:	Kilmory
NAME OF CONTRIBUTOR:	Douglas Gordon
NAME OF ORGANISATION:	Rathmell Archaeology Limited
TYPE(S) OF PROJECT:	Monitoring
NMRS NO(S):	NR93SW97
SITE/MONUMENT TYPE(S):	None
SIGNIFICANT FINDS:	None
NGR (2 letters, 6 figures)	NR 926 321
START DATE (this season)	12 th June 2012
END DATE (this season)	13 th June 2012
PREVIOUS WORK (incl. DES ref.)	DES 1999, 65
MAIN (NARRATIVE) DESCRIPTION: (may include information from other fields)	<p>Archaeological monitoring was carried out on behalf of Scottish Water Shared Services on the line outfall pipe running to the south of the proposed extension to Balmichael Water Treatment Works, Arran, North Ayrshire. These archaeological works were designed to mitigate the impact from the site investigation works on the archaeological remains within their development area to the agreement of the West of Scotland Archaeology Service.</p> <p>No significant archaeological material was observed during the course of the archaeological works and the only anthropic material observed was that relating to twentieth century construction and use of the site. Previous archaeological monitoring carried out on site investigation works also found no significant archaeological material.</p>
PROPOSED FUTURE WORK:	None
CAPTION(S) FOR ILLUSTRS:	None
SPONSOR OR FUNDING BODY:	Scottish Water Shared Services
ADDRESS OF MAIN CONTRIBUTOR:	Unit 8 Ashgrove Workshops, Kilwinning, Ayrshire KA13 6PU
E MAIL:	contact@rathmell-arch.co.uk
ARCHIVE LOCATION (intended/deposited)	Report to West of Scotland Archaeology Service and archive to National Monuments Record of Scotland.

Contact Details

46. Rathmell Archaeology can be contacted at our Registered Office or through the web:

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47. The West of Scotland Archaeology Service can be contacted at their office or through the web:

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Glasgow	f.: 0141 287 9259
G2 4PF	e.: enquiries@wosas.glasgow.gov.uk

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