TECHNICAL NOTE

DATE:	06 November 2024	**CONFIDENTIALITY:**	Public
SUBJECT:	Site Monitoring Report – October 2024		
PROJECT:	Swanage Town Council – Shore Road	**AUTHOR:**	Sam Rhodes
REVIEWER:	Ben Ward	**APPROVER:**	David Roy

1 INTRODUCTION

1.1 WSP UK Ltd (WSP) was commissioned by Swanage Town Council (STC), 'the Client', to produce a supplementary technical note detailing the findings of a follow up defect walkover survey undertaken in October 2024. Areas of ground and retaining wall instability have been identified across the site over a number of years. It is not known when these defects were first identified by STC.

1.2 An initial defect survey was undertaken in June 2023, with a subsequent site monitoring report issued, providing a baseline list of defects identified across the site [1]. These risks were assigned a risk rating using a qualitative risk assessment methodology.

1.3 A description of the site locale and references to existing geotechnical information are presented within Section 1 of the Ground Stabilisation Feasibility Study [2].

1.4 References to supplementary information relating to buried services, UXO risk and topographical surveys are provided in Table 1 of the Ground Stabilisation Options Refinement Technical Note [3].

2 DEFECT WALKOVER SURVEY

SHORE ROAD AREA

2.1 The latest defect walkover survey was undertaken on the 8th October 2024, by a WSP Geotechnical Engineer. On the date of the inspection weather conditions were generally clear with intermittent showers.

2.2 The purpose of the walkover was to record the updated condition of defects identified during the initial defect survey in June 2023 [1], interim inspections undertaken in October 2023 [4], February 2024 [5], May 2024 [6] and the latest survey in completed in October 2024.

2.3 Information on any new defects which may have developed in the interim period were also documented.

2.4 Photos and measurements of each defect were taken and compared to the previous survey in order to determine the rate of deterioration of assets across the site. This would inform the revised risk rating assigned to each defect within the defect schedule.

2.5 The walkover survey comprised inspection of the following areas:

- The Spa;
- The Spa Beach Huts;
- Weather Station Field; and
- Sandpit Field.

2.6 Defect areas were categorised by location with the Spa and Spa Beach Hut areas denoted "A", Weather Station Field denoted "B", and Sandpit Field denoted "C", in the defect schedule. The defect schedule is presented as Appendix A of this technical note.

2.7 A total of 44 no. defects were identified during the site walkover. These typically related to, but not limited to the following:

- Retaining walls with vertical and/or horizontal cracking, bulging or bowing, excessive settlement or leaning;
- Hummocky areas where surface distress was identified in grassed areas and footways;
- Tension cracking forming in over steep vegetated slopes;
- Footway and stairway distress in the form of tension cracking, structural cracking, pavement settlement and heave; and
- Dilapidated surface drainage and retaining wall weepholes, blocked or semi-blocked by debris and siltation.

2.8 Of the 44 no. defects observed during the walkover survey, 37 no. related to retaining walls, four related to pavements and footways, two related to earthwork slopes, and one related to drainage systems.

2.9 Where identified, a characteristic image of each defect has been included within the defect schedule.

2.10 A link to a repository of images captured during the inspection shall be made available on request.

2.11 An updated defect risk rating has been assigned to each of the defects based on the October 2024 site walkover, presented in the defect schedule (see Appendix A). These values have been assigned based on a qualitative risk assessment (QRA), to give an approximation of risk levels at the time of the survey.

2.12 The QRA methodology used to derive defect risk ratings is presented as Appendix B.

2.13 Further information on these defects is presented within the defect schedule. The risk level from the previous surveys has been presented within the Defect Schedule to highlight changes in asset condition over time.

2.14 Recommendations on defects which require additional intervention measures are detailed within Section 4.

SHORE ROAD AREA – WEEPHOLE CONDITION

2.15 As part of the scope of this latest monitoring report, the Client requested that a review be undertaken of the existing weephole, and their condition, within the Spa and Spa Beach Hut Area. Based on this, the following observations were made:

<u>The Spa</u>

2.16 The original masonry walls were observed to have sporadically placed weepholes, where present at all. These typically comprised a square opening within the blockwork, with no formal pipework (clay, plastic etc.) for water to dispel from.

2.17 These would present issues with regard to maintenance, over and above manual removal of debris build up near the wall opening, as without a piped connection, any pressurized cleaning methods has the potential to wash out and destabilise material behind the back of the wall. Therefore, for weepholes of this construction, it is recommended that maintenance is limited to removal near surface debris and manual clearance techniques.

<u>The Spa Beach Huts</u>

2.18 Within the Spa Beach Hut area, generally more modern weepholes were observed with clay or PVC pipework, particularly through the concrete finished retaining walls. Where present these were generally in serviceable condition, however there was a lack of evidence of flow through a number of them, which could indicate a blockage further up the pipework.

2.19 With regard to maintenance, pressurized water cleaning of these weepholes would help improve the performance of the back of wall drainage systems and help reduce risk of further degradation in asset condition.

Additional Weepholes

2.20 A number of locations, particularly within the Spa Beach Hut Area, were identified to have significant water egress through joints and cracks within the retaining wall facing. This was evidenced by pooling of water at the base of the wall, as well as visual discolouration of the wall and mould/algae vegetation growing from the face.

2.21 In the medium to long term (2 years +), the installation of additional weepholes targeted at these particularly high-risk locations identified could provide additional preventative measures against deterioration or failure of these assets.

LAND TO REAR OF SEA BREEZE RESTAURANT

2.22 A visual inspection of the land to the rear of the Sea Breeze Restaurant and Swanage Visitors Centre was undertaken on 8th October 2024, as part of the Shore Road inspection works.

2.23 Previous visual inspections of the area were undertaken in October 2023, and February and May 2024. Photographic record of observations collected, available on Client request.

2.24 From the period between May and October 2024, no significant change was observed in the condition of the slope, retaining wall and rear structure walls.

3 MONITORING DATA

PREVIOUS SURVEYS AND INTERPRETATION (JUNE 2021 – MAY 2024)

3.1 For information regarding previous survey data and interpretation for the period of June 2021 to May 2024, refer to the May 2024 Site Monitoring Report [6].

SURVEY PERIOD (MAY - SEPTEMBER 2024)

3.2 No significant change was identified in the following inclinometers: BH01, BH06 and BH14.

3.3 Where Face A and Face B have been described below, the following definitions should be noted:

- Face A – Movement in the direction of the principal axis, with positive values relating to movements in the parallel to the direction of the downslope; and
- Face B – Movement perpendicular to the direction of the principal axis, with positive values relating to movements bearing 90 degrees to positive Face A readings, in the direction of perpendicular to the downslope.

3.4 The following points of note were observed in the latest round of inclinometer data:

BH03 – Inclinometer

3.5 In the Face A orientation, no significant change observed during the specified monitoring period.

3.6 A significant deflection in top 1.5m was observed in the Face B orientation from -0.5mm to -7.5mm. This is consistent with a lateral movements of due north at the site. No corresponding defects were identified based on this movement, and as the movement is perpendicular to the slope, it is considered low risk.

3.7 There is the potential for this to be erroneous due to issues with the reference grooves within the inclinometer when taking measurements. It is recommended this is checked during the next round of monitoring.

BH07 – Inclinometer

3.8 Face A deflection has decreased by 2mm between May and August, and within limits previously observed in the historical data for this location, therefore no significant change.

3.9 Following an erroneous reading recorded in April 2024, Face B readings between May and August 2024 remained within historical limits, with no significant change identified.

3.10 Significantly erroneous results were obtained from the inclinometer in BH07 during the September data collection. During the site walkover undertaken on the 8th October 2024, it was observed that the cover for BH07 was no longer present, and that damage had occurred to the top of the monitoring location. It is believed that the exposure of the pipework to the elements (i.e. rainfall and debris), as well as the potential for damage by human intervention was the likely cause for this unrepresentative data.

3.11 It is recommended that measures are taken to reinstate this location to its original condition, and to recommence monitoring as soon as possible.

BH10 – Inclinometer

3.12 Movement in the Face A orientation tended to an all-time maximum of 7.5mm in June 2024, reducing back to 3mm in latest round of measurement undertaken in late September 2024.

3.13 Since May 2024, a steady increase in deflection in the Face B orientation was observed from 5mm to 9mm. This may be indicative of some lateral instability in the underlying slope, however no significant change in asset condition was observed in the latest defect survey.

BH12 – Inclinometer

3.14 Face A – Deflection tended to an all-time maximum of 9mm in June 2024, before reducing to 1mm in September 2024. There appears to be no correlation between the increased movement and the groundwater monitoring being undertaken at the site, however due to the high volumes of rainfall experienced over the summer period (May – September), this may not have been captured due to the frequency of diver measurements.

3.15 It should be noted that no significant change in slope deformation was observed in the area adjacent to BH12 monitoring location.

3.16 No significant change was observed in the Face B orientation for this monitoring location, during the specified monitoring period.

BH016 - Inclinometer

3.17 No significant change was observed in Face A measurements within the specified monitoring period.

3.18 In the Face B orientation, deflections was observed with an 2mm difference in results oscillating month to month, with a similar deflection pattern within the data. This pattern is not likely to be as a result of slope movement, but more likely to be due to erroneous measurement taking or incorrect zeroing of instrumentation. It is recommended that this is checked during the next round of monitoring.

RECOMMENDATIONS

3.19 It is recommended that groundwater and inclinometer monitoring is continued alongside periodic site walkovers to ensure that site defects are appropriately risk managed, and areas cordoned off as necessary.

4 RECOMMENDATIONS

SHORE ROAD AREA

4.1 Following review of the latest defect survey and the monitoring information, the following general recommendations are given:

- Ongoing walkover surveys should be undertaken at regular intervals (i.e. two to three monthly), to assess the condition of defects identified, and any new defects which have since developed;
- After periods of heavy and prolonged rainfall, an inspection of listed defects should be undertaken by a suitability qualified person on behalf of the Client, to ensure all areas are still sufficiently safe to be opened to members of the public;
- Monthly groundwater and surface monitoring locations should continue, with BH02 and BH08 investigated and where possible recommissioned; and
- Areas identified as having high risk (risk rating equal to or greater than 9), should be visually inspected weekly, or after periods of heavy and prolonged rainfall, to ensure no rapid deterioration in the asset has occurred.

4.2 Based on the revised defect risk ratings, recommendations for defect specific mitigation measures are presented in Table 1. It should be noted that the mitigation measures recommended below should be considered supplementary to those stated in previous reports.

Defect B11 - Additional Commentary

4.3 Based on additional correspondence with the Client regarding defect B11, the following observations regarding the associated risks and risk profile of this defect were made:

- The defect failure mechanism is a shear failure between the lower wall and the upper coping stones, currently over a nine linear metre section of the wall;
- If failure occurs, upper wall section would impact pedestrian footpath, with the potential to cause harm to pedestrians and damage adjacent parked cars;
- No additional significant movement was measured during the October 2024 inspection, however a large volume of groundwater egressing through the crack in the wall was observed, and additional spalling of concrete facing material.
- Based on these observations we have reclassified the risk as “High”.
- It is recommended that weekly inspections of this defect are undertaken, between WSPs quarterly visits. The risk of asset degradation is greatest during periods of high rainfall, therefore it is recommended to undertake these inspections following such events.
- If further degradation in asset condition is observed, in particular, increased lateral movement of the upper coping stones, it is recommended to extend the barriers already in place at the corner of Walrond Road and Shore Road (for defect B4), to cordon off the area.
- This may also require closure of the pedestrian footpath and street parking on the adjacent road side, however consultation with asset maintainer Dorset Highways should be sought regarding this.

LAND TO REAR OF SEA BREEZE RESTAURANT

4.4 No significant change in condition of slope, wall or building structures was observed in the latest walkover survey.

4.5 It is recommended that monitoring and continued visual inspection of this area is undertaken as part of the wider Shore Road works, to assess the condition of the associated assets over time.

WEEPHOLE CONDITION

4.6 At the request of the Client, WSP have undertaken a high level survey of weepholes at the site. Based on this survey, it is recommended that existing weepholes across the Shore Road area are cleaned and cleared of debris. This should be done with a methodology appropriate to their construction, such to not advisedly affect their condition or the condition of the asset or backfill material.

4.7 The Client should review the requirement for additional weepholes. Should additional weepholes be considered to be required, instruction should be provided to WSP to be undertake an additional survey to identify suitable locations for installations, which may slow the degradation of the asset.

Table 1 – Recommended Defect Mitigation Measures

Defect Ref.	Defect Location	Defect Photo	Recommended Mitigation Measure
B11	Weather Station Field	 	• Continue to monitor regularly (weekly), or after significant rainfall events. • If further deterioration is observed, in particular increased lateral movement of the upper coping stones, the defect may require cordoning off. • This may also require closure of the foot path, and parking restrictions adjacent to footway. • Monitor alongside the results of BH07 inclinometer data. • Additional commentary provided within Section 4.3.
C12	Sandpit Field		• Continue to monitor propagation of tension cracks to the rear of recently planted area (previous bench locations).

REFERENCES

[1] WSP UK Ltd, “Site Monitoring Report - Shore Road (June 2023),” WSP, Bristol, UK, 2023.

[2] WSP UK Ltd, “Swanage Seafront - Ground Stabilisation Feasibility Study (Report No. 70094760-GEO-REV001),” WSP UK Ltd, Bristol, UK, 2022.

[3] WSP UK Ltd, “Swanage TC - Shore Road - Ground Stabilisation Options Refinement Technical Note – Hybrid Option,” WSP, Bristol, UK, 2023.

[4] WSP UK Ltd, “Site Monitoring Report - Shore Road (October 2023),” WSP, Bristol, UK, 2023.

[5] WSP UK Ltd, “Site Monitoring Report - Shore Road (February 2024),” WSP, Bristol, UK, 2024.

[6] WSP UK Ltd, “Site Monitoring Report - Shore Road (May 2024),” WSP, Bristol, UK, 2024.

[7] South West Geotechnical Ltd, “Swanage Seafront - Geotechnical Assessment (Report No. 12660),” South West Geotechnical, Devon, UK, 2021.

APPENDIX A – DEFECTS SCHEDULE (OCTOBER 2024)

Swanage Town Council - Shore Road - Asset Defect Schedule (October 2024)										May 2024 Risk Rating	October 2024 Risk Rating						
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
A1	The Spa	403068	79415		Vertical and horizontal cracking, bulging/horizontal sliding of failing wall section. Crack width 10 - 20mm. Bowing of wall face, up to 40mm. Loose blockwork, missing masonry, loss of mortar between blockwork. Crack length 1.2m wall height 1.2m Retained height 3.0m+.	Crack width increased to 25mm. Bowing of wall face up to 50mm. North facing wall completely sheared from east facing return. Additional bowing/shearing of masonary at bench level adjacent to return wall, with up to 70mm movement. Recommended that area is fenced/closed off. Return wall supports 3-5m of backfill. In the event of total failure, potential to cause significant harm to members of the public.	No significant change Note heras fencing present to separate area from public	No significant change	No significant change	High	3	Likely	3	High	9	High
A2	The Spa	403068	79423		Retaining wall height: 1.3m Retained height: 1.3m Horizontal cracking, crack width up to 10mm. Cracking along failed mortar joint.	Max crack width increased 15mm. Otherwise no significant change (NSC) observed.	No significant change	Slight increase increase in crack width observed. Otherwise, no significant change.	Max crack width increased from 15mm to approx. 17mm. Otherwise no significant change.	Low	2	Unlikely	1	Very Low	2	Low
A3	The Spa	403061	79407		Retaining wall height: 0.8m Retained height: 0.8m Vertical cracking and horizontal displacement of wall. Crack width, 40 - 60mm with loose and missing masonry. Evidence of previous repair attempt with cement mix.	Max crack width 80mm. Max translational movement of masonary (left and right hand side) 50mm. Otherwise no significant change, and low risk.	No significant change	No significant change	Loose masonry to the touch observed. No significant change.	Low	2	Unlikely	1	Very Low	2	Low

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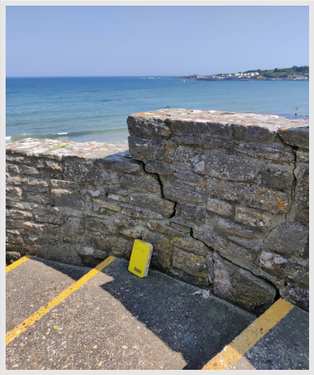
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
A4	The Spa	403060	79395		Retaining wall height: 1.0m Retained height: 1.0m Vertical cracking, width up to 30mm. No bowing/bulging of wall face observed. Pavement cracking at base of retaining wall mirroring cracking in retaining wall face.	Surveyed - No significant change.	Vertical cracking, width 40mm	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low
A5	The Spa	403051	79400		Retaining wall height: 0.9m Retained height: 0.2m Vertical and horizontal cracking, crack width up to 30mm. Appears lower section of wall has settled/rotated away from top section, causing failure of mortar joint and cracking in wall.	Surveyed - No significant change.	No significant change	No significant change	Repair to the mortar joints has been made since the last inspection. Risk of failure significantly reduced, however recommended to monitor asset condition in future surveys to ensure repair remains serviceable.	Low	1	Negligible	1	Very Low	1	Low
A6	The Spa	403060	79402		Retaining wall height: 0.9m Retained height: 0.9m Vertical cracking, crack width up to 20mm. Horizontal displacement of right side of wall 10mm from left side. Evidence of previous mortar joint repair, which has since re-failed.	Horizontal displacement of right side of wall increased to 15mm. Otherwise, no significant change, and low risk.	No significant change	No significant change	Horizontal displacement has increased in areas to a max. of 60mm. No significant change in risk profile for asset.	Low	2	Unlikely	1	Very Low	2	Low

Swanage Town Council - Shore Road - Asset Defect Schedule (October 2024)										May 2024 Risk Rating	October 2024 Risk Rating					
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
A7	The Spa	403058	79400		Pavement cracking and uneven ground. Differential settlement/transverse cracking in pavement with height up to 10mm. Longitudinal cracking, with width up to 2mm.	Surveyed - No significant change.	No significant change	Differential settlement/transverse cracking in pavement increased from 10mm to 30mm. No significant change to risk rating.	Differential settlement in pavement at maximum, increased from 30mm to 35mm. No significant change in asset risk. *Note: Extreme south sloping of pavement in this area, consider risk to pedestrians if this becomes more pronounced.*	Low	2	Unlikely	1	Very Low	2	Low
A8	The Spa	403052	79390		Retaining wall height: 1.0m Retained height: 1.0m Vertical and horizontal cracking, cracking width 30 - 60mm. Length of defect 0.7m. Evidence of minor previous patch repairs with cement mix.	No bowing observed. Surveyed - No significant change.	No significant change At end of wall vertical cracking noted 10-20mm in width	No significant change	Length of defect increased from 0.7m to 0.95m. No significant change in asset condition or risk rating.	Low	2	Unlikely	1	Very Low	2	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
A9	Spa Beach Huts	403028	79367		Retaining wall height: 0.9m Retained height: 0.9m Minor vertical cracking, missing masonry blocks and silted up and damaged back of wall drainage. Damage potentially due to running services through wall, post wall construction.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	2	Unlikely	1	Very Low	2	Low
A10	Spa Beach Huts	403054	79358		Retaining wall height: 1.25m Retained height: 1.25m Vertical cracking, crack height 0.9m, crack width up to 30mm. Damaged weephole / void at the base of the wall (see left of survey book).	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	2	Unlikely	2	Low	4	Low

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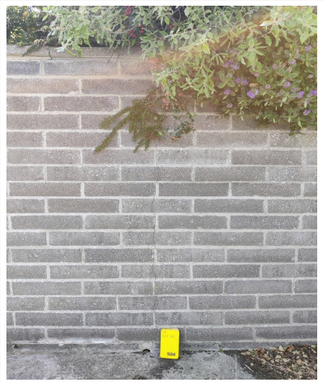
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)		Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
A11	Spa Beach Huts	403042	79361		Retaining wall height: 2.15m Retained height 2.15m Hairline vertical cracking full height of the wall, crack width ~1mm. Weephole silted up and 2/3 blocked by additional concrete pours, potentiall from previous remedial works.	Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	No significant change	No significant change Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.		Low	1	Negligible	3	High	3	Low
A12	Spa Beach Huts	403050	79369		Delapidated aco surface water drainage system. Drainage gratings broken, and invert fully silted up for the full length of the retaining wall.	Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	No significant change	No significant change Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.		Low	3	Likely	1	Very Low	3	Low

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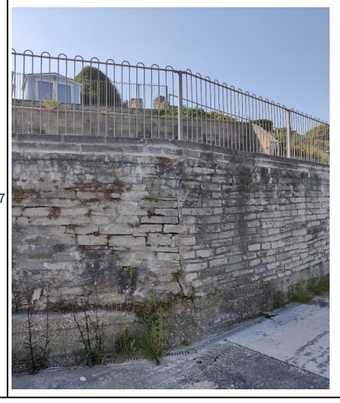
A13	Spa Beach Huts	403055	79380		Retaining wall height: 2.15m Retained height: 2.5m Horizontal hairline cracking, crack width 1mm. Cracking located 1.85m from existing ground level. Slight bulging/bowing at the mid span/mid height of retaining wall. Defect length: 8m.	Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	No significant change	No significant change. Could not survey due to lack of access to mid-terrace. From visual inspection in accessible location, no significant change observed.	Evidence of water ingress through the mortar joints, indicating perch groundwater behind wall could be present. No significant change in risk rating.	Low	2	Unlikely	1	Very Low	2	Low
A14	Spa Beach Huts	403062	79353		Retaining wall height: 1.2m Retained height: 0m Vertical and horizontal cracking. Crack length 1.1m, crack width up to 3mm. No loose masonry or missing blockwork. No bulging or bowing of the wall structure.	Surveyed - No significant change.	No significant change	No significant change. Vegetation (flowers) observed to be growing through the cracks in the masonry.	Slight bulging of <10mm observed. Vegetation previously observed has died back. No significant change in risk profile.	Low	2	Unlikely	1	Very Low	2	Low
A15	Spa Beach Huts	403060	79377		Retaining wall height: 2.55m Retained height: 2.55m Vertical cracking, crack length 1.3m, typical crack width between 3 - 10mm. Bulging/bowing at corner section of masonry wall. Loss of mortar between blockwork.	Horizontal crack width 20mm max. Vertical crack width 20mm max. Otherwise no significant change.	No significant change	No significant change. Water egress / pooling at base of the wall, however origin of this was unconfirmed. No immediate signs of water expelling from the wall face.	Visual evidence of water egress from behind the wall in the upper sections. Lower sections of the wall are dry, therefore assumed to not be due to rainfall. Pooling of water at the base of the walll believed to be due to delapidated drainage at toe of wall.	Low	3	Likely	2	Low	6	Medium

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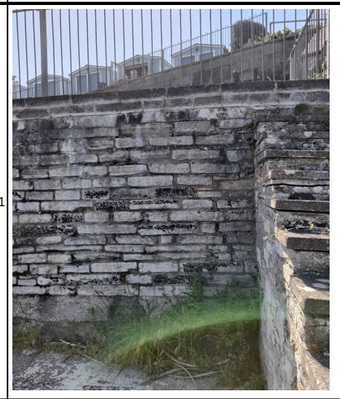
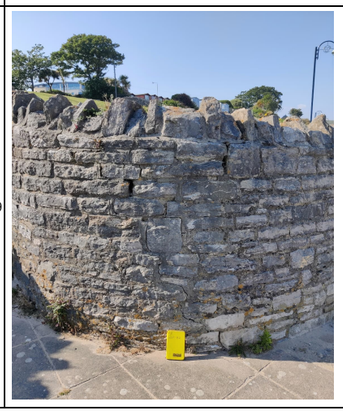
A16	Spa Beach Huts	403060	79381		Retaining wall height: 2.55m Retained height: 2.55m Horizontal and vertical cracking. Crack length 1.6m. Typical crack width 3 - 10mm. Bulging/bowing at the mid span of masonry wall.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	1	Negligible	2	Low	2	Low
A17	Spa Beach Huts	403062	79383		Retaining wall height: up to 2.2m Retained height: up to 2.5m. Horizontal cracking. Crack length 1.8m. Crack width 3 - 12mm. Horizontal movement of return wall causing cracking, potentially due to bulging/bowing from the main span.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low
B1	Weather Station Field	403050	79339		Pavement tension cracking, surface deformation and partial collapse. 2no. continuous cracks observed, 3.6m and 11m in length respectively. Multiple patch repairs with asphalt and cement/concrete mix. Ground uneven and with numerous cracks. Crack depths ranging between 5 - 10mm where repairs have not been completed.	Surveyed - No significant change. Slip/trip/fall hazard for members of the public (similar to defect ref. C7). Consider closing off access to footpath, or removing entirely.	Footpath now removed and replaced with grass	No significant change.	No significant change.	Low	1	Negligible	1	Very Low	1	Low

Swanage Town Council - Shore Road - Asset Defect Schedule (October 2024)										May 2024 Risk Rating	October 2024 Risk Rating					
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
B2	Weather Station Field	403042	79330		In the field area to the east of weather station, hummocky ground observed, with tension cracking in slope, bulging of surface.	Surveyed - No significant change.	No significant change	No significant change	At south east corner of field, a BH / inclinometer cap missing, with open pipework exposed. This is likely to cause erroneous recordings with regards to groundwater measurements. Review of data to be undertaken. Bulging of surface slope material remains, and hummocky ground building up behind wall running to the south.	Medium	3	Likely	2	Low	6	Medium
B3	Weather Station Field	403059	79309		Retaining wall height: 1.8m Retained height: 1.8m Vertical and horizontal cracking, crack width between 2 - 20mm, occuring at apex of wall curvature. No bulging or bowing of the wall observed.	Unable to survey position of maximum crack width due to information signage location. Otherwise no significant change observed.	No significant change	No significant change	No significant change	Low	2	Unlikely	2	Low	4	Low

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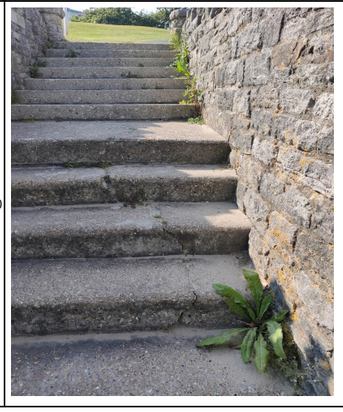
Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
B4	Weather Station Field	403055	79305		Retaining wall height: 1.8m Retained height: 1.8m Curved wall with 3no. sets of vertical cracking. From south face of retaining wall, cracks are at chainage CH 0, 2.0, and 5.5m. Total length of defect: 5.5m. CH 0m Defect: Vertical cracking, crack width typically 30 - 50mm. Missing blockwork at the head of the wall, with significant voids behind mid span of wall (potentially lost mortar or block work following movement). CH 2.0m Defect: Vertical cracking, max crack width typically 90 - 130mm, increasing with height of wall. Missing blockwork at top of wall. CH 5.5m Defect: Vertical cracking, crack width up to 10mm. Blockwork intact.	Survey of crack dimensions hampered by heras fencing panels, which could not be moved. Could not be surveyed accurately. No significant change in structure compared with previous survey. Maintain heras fencing panel around defect. Continue to monitor regularly.	Heras fencing forming exclusion zone. No direct measurements made, however general observations indicate further movement. Continue to monitor and maintain exclusion.	Heras fencing forming exclusion zone. No direct measurements made, due to presence of fencing panels. Continue to monitor and maintain exclusion.	No significant change. Continue to monitor and maintain exclusion zone.	High	3	Likely	3	High	9	High
B5	Weather Station Field	403054	79310		Vertical cracking on footpath/stepped access. Crack length 3m, typical crack width 1 - 2mm.	Additional cracking observed at bottom left stairs area. Crack widths similar to previous survey.	No significant change	Additional loss of material/concrete from steps, with voids/cracking up to 40-50mm observed. No significant change to risk level currently.	Additional cracking of pavement slabs observed. No significant change to risk profile.	Low	2	Unlikely	1	Very Low	2	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
B6	Weather Station Field	403045	79304		Retaining wall height: 1.0m. Retained height: 1.5m Vertical and horizontal cracking, crack length 0.8m. Typical crack width 40 - 60mm. Minor bowing of the wall at mid height.	Previously identified "minor bowing" appears more akin to shearing of top row of finishing stones of wall span, from the wall below. No significant change in crack widths from previous survey.	No significant change in crack widths Noted to be very wet with water issuing from between cracks	No significant change. No water observed expelling from the wall face, however weather conditions were dry on date of inspection.	Max crack width increased from 60mm to 90mm. Top of wall has sheared further outwards from lower wall. No significant change in risk profile.	Low	2	Unlikely	1	Very Low	2	Low
B7	Weather Station Field	403034	79304		Retaining wall height: 0.9m Retained height: 1.0m. Vertical cracking, from base to top of wall (i.e. 0.9m), crack width between 20 - 40mm.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
B8	Weather Station Field	403026	79304		Retaining wall height: 0.85m Retained height: 1m + Vertical and horizontal cracking, the full height of the wall (0.85m), with typical crack width of 20mm. Lower right side (east) of wall translational movement relative to rest of wall (<30mm).	Max crack width increased to up to 40mm. Otherwise no significant change - low risk.	No significant change	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low
B9	Weather Station Field	403017	79304		Retaining wall height: 1.0m Retained height: 1.0m Vertical cracking, running full height of the wall. Right of the crack (east side of the wall), 30mm translational movement of the wall relative to the west side. Pavement cracking adjacent to retaining wall observed from base of retaining wall.	Surveyed - No significant change.	No significant change	Crack width observed up to 20mm. No significant change to translation movement or pavement cracking adjacent to the wall.	No significant change	Low	1	Negligible	1	Very Low	1	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
B10	Weather Station Field	403040	79304		N/A	Retaining wall height: 0.9m Retained height: 1.0m. Vertical cracking, from base to top of wall (i.e. 0.9m), crack width up to 10mm.	No significant change	No significant change	No significant change	Low	2	Unlikely	1	Very Low	2	Low
B11	Weather Station Field	403040	79304		N/A	7.5m length of wall, between defect ref. B6 and B7: Shearing of top span of masonry from base of wall, up to 50mm. Movement in superficial material on retained side of weather station field seperating wall at weak/mortar joint location. Risk of collapse over time, and damage to pavement, members of the public, and cars parked on road adjacent to wall. Advise to continue monitoring regularly.	Shearing of top span of masonry from base of wall, increased to 70mm. Evidence of seepage through wall, along extents. Advise to continue monitoring regularly. Further deterioration may required foot path diversion.	Condition of asset as per February 2024 inspection. Lateral extents of the defect has increased from 7.5m to 9m. Advise to continue monitoring - should further degradation to asset condition be observed, a footpath diversion may be required.	Length of defect observed increased from 7.5m to 10m. Significant evidence of seepage egressing from behind the wall, between the upper and lower wall sections. Evidence of spalling of facing material in multiple locations. Continue to monitor, if further degradation occurs, or additional spalling of wall material, consider exclusion zone around affected section and footpath diversion.	Medium	3	Likely	3	High	9	High

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C1	Sandpit Field	403000	79294		Retaining wall height: 1.0m. Retained height: 1.0m Vertical cracking, full height of wall, typical crack width 5 - 30mm. Large bushes overhanging back of retaining wall, likely the cause of distress observed in the structure.	Displacement of east side of wall relative to the west up to 30mm. Otherwise no significant change - low risk.	No significant change	No significant change	Typical crack width increased from 30mm to 40mm. No significant change in asset risk.	Low	2	Unlikely	1	Very Low	2	Low
C2	Sandpit Field	403009	79294		Retaining wall height: 0.8m Retained height: 0.8m Vertical cracking full height of wall, typical crack width 5 - 20mm. Evidence of historic patch repair made previously.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
C3	Sandpit Field	403024	79295		Retaining wall height: 0.95m Retained height 1.0m Vertical cracking, full height of wall, crack width between 1 - 3mm.	Surveyed - No significant change.	No significant change	No significant change	No significant change	Low	1	Negligible	1	Very Low	1	Low
C4	Sandpit Field	403035	79295		Retaining wall height: 1.0m Retained height: 1.2m Vertical cracking, full height of wall. Crack width 20 - 40mm.	Small void at base of wall due to loss of mortar/masonry. Likely lost from translational movement of the wall. Otherwise no significant change.	No significant change	No significant change	Masonry appears to have been lost / fallen off of wall face in section surrounding the crack (see latest images for comparison). Slight increase in asset risk, however still low due to general condition and retained height.	Low	2	Unlikely	2	Low	4	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
C5	Sandpit Field	403058	79290		Retaining wall height: 1.25m Retained height 1.25m Vertical and horizontal cracking, typical crack width 20 - 30mm. Transverse movement of the wall, mortar joint failure from masonry blockwork moving apart.	Vertical and horizontal cracking increased from 20-30mm to 40-50mm. Otherwise health of asset unchanged. Low risk.	No significant change	No significant change	No significant change	Low	2	Unlikely	2	Low	4	Low
C6	Sandpit Field	403054	79280		Retaining wall height: 0.6m Retained height: 1.5m+ Vertical cracking full height of the wall. Typical crack width between 10 - 15mm. Overgrown bushes and vegetation acting on the back of the wall the likely cause of deterioration of the retaining structure.	Typical crack width increased to 15-25mm. Otherwise no significant change - low risk.	No significant change	No significant change	No significant change. Asset partially obscured by vegetation.	Low	2	Unlikely	2	Low	4	Low

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Defect Ref.	Defect Location	Easting (m)	Northing (m)	Sample Photo of Defect	Initial Defect Description (June 2023)	Defect Description (Oct 2023)	Defect Description (Feb 2024)	Defect Description (May 2024)	Defect Description (October 2024)	Risk Level	Likelihood (Number)	Likelihood	Effect (Number)	Effect	Risk Level (Number)	Risk Level
C7	Sandpit Field	403057	79248		Multiple areas of pavement cracking and surface deformation (one example shown face left). Distress in asphalt behind lower slope retaining walls observed where rotation of lower wall was seen (see defect C13). Additional areas of distress in pavement seen where up slope area is oversteepened and not effectively restrained by retaining structure or otherwise, see defect C12.	Defect has been repaired, asphalt has been re-laid in area following slip/trip/fall incident. Bench removed from area. Area to be checked in follow up surveys to ensure defect does not reoccur.	No significant change	No significant change	No significant change Current pavement repair has held.	Low	1	Negligible	1	Very Low	1	Low
C8	Sandpit Field	403056	79252		Retaining wall height: 1.3m Retained height 3.0m + 6 l.m of terraced masonry blocks which were observed to be overturning with over steepened slope behind. Blocks likely installed to prevent shallow slip failure of material above, however global stability of slope borderline.	Blocks further overturned. Further ravelling of slope material. A 1 m section of toe has a paving stone/blockwork missing. Unsupported toe area has an increased risk of slip/localised slope failure. Regular inspection of area recommended to inspect condition. Consider replacing stone/blockwork to provide support to the face.	No significant change	2no. Replacement blockwork paving slabs installed on the base row. Southern one has already overturned with voiding behind the rear face of panel observed. Advise to continue monitoring these slabs. If these significantly overturn or come loose they could present a trip hazard to pedestrians.	Southern paving slab referred to within May 2024 defect schedule has been repaired/reinstated. Continue to monitor, however risk profile remains same from May 2024 inspection.	Medium	2	Unlikely	3	High	6	Medium
C9	Sandpit Field	403056	79246		Retaining wall height: 0.6m Retained height: 3m + 7.5 l.m of retaining wall blocks partially overturned at toe of retaining wall. Insufficient embedment of blocks at toe, and oversteepened slope behind overloading wall.	Surveyed - No significant change.	Slabs appear to have rotated further outward, consider removal or replacement	Further overturning of southern most slab and newly replaced slab observed. Consider removal and reinstatement with greater toe embedment.	Southern most slab has been repaired/replaced and levelled. Continue to monitor. No significant change in risk profile.	Medium	3	Likely	2	Low	6	Medium

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C10	Sandpit Field	403052	79239		3 l.m of tension cracking observed in oversteep section of slope. Width of tension crack approx 200mm, and 250mm depth in areas.	Tension crack width Otherwise no significant change. Continue to monitor on ongoing basis.	No significant change	No significant change.	No significant change. Due to heavy vegetation, quantifying the crack width of asset difficult. From general visual inspection, asset condition has not changed since previous inspection.	Medium	3	Likely	2	Low	6	Medium
C11	Sandpit Field	403055	79235		Retaining wall height: 0.3m Retained height: 3m+ 2 lm section of retaining wall at the rear of benches, has overturned by 30 degrees from vertical. Large overgrown vegetation acting immediately behind the rear of wall, likely cause of issue.	Overturning of retaining wall increased to 45 degrees from vertical. Low risk, however continue to monitor. Risk of causing hazards related to slips/trip/falls, particularly adjacent to bench + pedestrian walkway.	Evidence of increased tilt - continue to monitor.	Evidence of increased tilt compared to Feb 2024	No significant change	Low	2	Unlikely	1	Very Low	2	Low
C12	Sandpit Field	403055	79202		3no. Failed retaining wall which use to house benches. Retaining wall height: 0.6m Retained height 2.5 - 3.5m + Masonry wall fully overturned and collapse of the main wall span. Partial collapse of the return walls either side of each retaining wall. Bulging and hummocking of stone slab at ground level, and signs of distress in adjacent asphalt where retaining walls have failed, indicating greater/deeper global failure occuring.	2nd/Middle retaining wall: - Increased ravelling of shallow material observed. -Shallow slip developing above overturned masonry. Considering heras fencing, cordoning off. Retaining Walls 1 + 3: Surveyed - No significant change observed.	Infilled with sleepers and planting - tension cracking noted above this section and above adjacent retaining walls. Continue to monitor. It is advised that the remaining bench is removed in this section.	Remaining bench has been removed. In addition to Feb 2024 observations, footway adjacent to the bench area has been re-paved. Tension cracking in the slope above the bench areas still observed - advise to continue monitoring.	No significant change from May 2024 inspection. Continue to monitor top slope, as there is still significant signs of slope distress.	Medium	3	Likely	2	Low	6	Medium

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C13	Sandpit Field	403057	79207		Retaining wall height: 1.0m Retained height: 0.3m Minor tilt/overturning observed in section of masonry wall. Area of overturning matches asphalt repairs and scarring work indicating link between the two. Defect length 22 lm.	Surveyed - No significant change.	No significant change. Footway resurfaced.	No significant change.	No significant change.	Low	2	Unlikely	2	Low	4	Low
C14	Sandpit Field	403039	79146		Retaining wall height: 1.25m Retained height: 1.25m Lack of mortar joints connecting this section of wall, therefore potential reconstruction of wall section with dry stone wall technique. Mid height bulging/bowing of the wall likely due to large bushes/trees directly overhanging the back of the wall. Defect length approx 6 lm.	Significant bow in the wall, due to large bushes/trees directly overhanging back of the wall. Bow/overturn measured as 7 degrees to the vertical. Recommended that trees are coppiced, to remove load from back of the wall, and limit damage to wall without killing tree. Killing or removing the tree would cause the decay/rotting of root system, which is likely providing some intergrity to the wall structure.	No significant change.	Tree behind affected area of wall has been coppiced, reducing load on the back of the wall. No change to the condition of the wall. Reduction in risk rating considered due to removal of tree/load from rear face of wall.	No significant change.	Low	1	Negligible	2	Low	2	Low

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C15	Sandpit Field	403041	79295		N/A	N/A	N/A	Retaining wall height: 0.9m Retained height 0.9m Vertical cracking, full height of wall, hairline cracking of width up to 2mm.	No significant change	Low	1	Negligible	1	Very Low	1	Low
C16	Sandpit Field	403053	79295		N/A	N/A	N/A	Retaining wall height: 1.0m Retained height 1.0m Vertical cracking, full height of wall, cracking up to 50mm.	No significant change	Low	1	Negligible	1	Very Low	1	Low

APPENDIX B – QUALITATIVE RISK ASSESSMENT METHODOLOGY

QUALITATIVE RISK ASSESSMENT (QRA) METHODOLOGY

Qualitative risk assessments are a method of measuring relative risk, based on ranking or descriptive categories. It is an industry standard means of determining a level of risk and is therefore considered appropriate and sufficient for use at this site.

LIKELIHOOD OF FAILURE

The likelihood of failure for each defect shall be assessed with consideration to findings defect and walkover surveys, and results from any previous Ground Investigation Reports.

Table 1 – Qualitative Risk Assessment; Likelihood

Score	Likelihood	Chance of occurrence (%)
5	Almost certain	>70
4	Probable	50-70
3	Likely	30-50
2	Unlikely	10-30
1	Negligible	<10

EFFECT OF FAILURE

The effect should a failure occur within a defect has been considered with reference to:

- Wall or slope geometry;
- Volume of failed material;
- Proximity to roads and pedestrian footways; and
- Potential to cause damage to infrastructure or harm to members of the public, within the site boundary.

Effect is commonly categorised based on the impact to cost or time, including damage to property and personnel injury.

Table 2 - Risk Assessment; Effect

Score	Effect	Cost or Time
4	Very High	Multiple fatalities and/or unserviceable damage to property
3	High	Fatality or injury to people or major damage to property
2	Low	Minor injury to people or minor damage to property
1	Very Low	Negligible damage
0	None	No effect

RISK LEVEL

A Risk Rating can subsequently be calculated using the adopted principle of Risk = Likelihood x Effect. Each risk rating corresponds to the respective Risk Level, ranging from low to very high risk.

Table 3 - Risk Assessment; Risk Level

Score	Risk Level
13-20	Very High
9-12	High
5-8	Medium
0-4	Low