

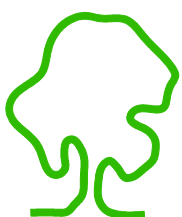
ALPINE GROUP LIMITED



YACHTHAVEN, HAYLING ISLAND

Remediation Verification Method Statement

January 2019
(Revised February 2019)



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Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	Data
Report Reference	RVMS/Alpine/1
Date	January 2019
Client	Alpine Group Limited
Report type	Remediation Verification Method Statement
Purpose	Condition 20 - 22 of Planning Consent APP/13/00317
Revisions	February 2019
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ALPINE GROUP LIMITED
YACHT HAVEN SITE, HAYLING ISLAND
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1. THE SITE AND PROPOSED DEVELOPMENT

- 1.1 The site comprises some 0.5 ha of currently disused partly industrial land adjacent to Chichester Harbour, previously used for a boatyard and subsequently for materials, vehicle and plant storage. The levels of much of the site were raised with fill as part of the earlier development. The site location is at Ordnance Survey Map reference SU 7289 0183. See Appendix A Figure 1 for the site location.
- 1.2 The eastern part of site lies on a variable thickness of made ground over Palaeocene Reading Beds (inter-bedded sands and clays). The site is not within a groundwater source protection zone.
- 1.3 It is intended to restore and redevelop the site partially for residential use and partly for use as a small boatyard with marina for leisure craft. The remainder of the site (the western part) will be returned to a natural habitat for environmental enhancement. See Appendix A Figure 2 Proposed Redevelopment.
- 1.4 The site has been subject to a number of site investigations between 2002 to 2018. Areas of contamination were identified and remediation was recommended. A verification report will be required in due course to confirm that the recommended remediation has been carried out in order to allow Conditions 20 - 22 of planning permission reference APP/13/00317 to be discharged.

2. SUMMARY OF IDENTIFIED CONTAMINATION

- 2.1 The risk of contamination was deemed significant as a consequence of:
 - The site's previous history and use as a commercial boatyard since the 1930s, including wartime use for camouflage paint testing and subsequently for materials and vehicle storage.
 - The extensive made ground covering the site.
 - A recent history of burning waste at the site.

- The proximity of the site to Chichester Harbour SSSI and to other environmentally sensitive areas.

2.2 The site investigations identified the following contamination:

- Heavy metal and Polycyclic Aromatic Hydrocarbon contamination was found in soil samples around the site, generally confined to the made ground and concentrated in areas where burning of waste has occurred. Asbestos was not found in the surface soil samples analysed, apart from one piece of asbestos cement found in a made ground sample from behind the foreshore.
- Groundwater sample analysis revealed minimal contamination, and this was initially taken as an indication that the risk of contamination leaching from the site into the Chichester Harbour SSSI was low. However, subsequent leachate testing of soil samples revealed a degree of contaminant mobility which could represent some risk to the SSSI.
- Soil gas monitoring at four boreholes across the site revealed some measurable concentrations of methane and raised concentrations of carbon dioxide at one borehole.
- Petroleum hydrocarbon was found in one inter-tidal mud sample from close to the existing boat repair business.
- A trace of Triphenyl tin was identified in one inter-tidal mud sample from the eastern end of the site. No other samples revealed evidence of anti-fouling substances.

3. RECOMMENDED REMEDIATION

3.1 The remediation recommendations were:

- Remove all deposited superficial waste together with demolition waste as part of site clearance. Concrete and brick from demolished buildings, etc., may be crushed and recycled on site for granular fill, road base, etc.
- All garden and soft landscaping areas to have the less suitable upper soil (made ground) removed and replaced with clean topsoil from an uncontaminated source to a depth of 0.6 m. The clean topsoil to be placed on a geotextile membrane and capillary breaker sand layer where the underlying ground is not natural undisturbed soil.
- The condition of soil exposed during site clearance, and in excavations, should be monitored during the work and any evidence of significant contamination should be investigated, treated and/or removed from site as necessary.

- As covered by the Construction Environmental Management Plan (CEMP), extra care should be taken during site redevelopment to ensure that no current site contaminants are displaced into the neighbouring SSSI and Ramsar sites. Guidelines should be in place prior to redevelopment commencing and adhered to throughout the construction phase.
 - In the wildlife areas, subject to the advice of the ecological and landscape consultees, the superficial waste deposits should be removed and the area should be enhanced with brash and wood piles, south facing soil banks (where practicable) and open compost heaps. Apart from the foregoing suggestions, the wildlife areas should be disturbed as little as possible.
 - To protect the foreshore from possible contamination leaching through the site soil, a sheet-pile barrier is to be installed behind the foreshore edge along the area of the site where contamination has been identified.
- 3.2 In addition to the above, additional investigations shall be carried out on the intertidal mud where the hydrocarbon and antifouling contamination was previously identified to confirm the extent of any contamination in this area.
- 3.3 It is proposed to take seven inter-tidal mud samples covering the area from the first location found to be uncontaminated in the west (FS3) to the site boundary in the east, including close to the two locations (FS1 and FS2) where contamination was previously identified. See Figure 3.
- 3.4 Analysis to include the hydrocarbons, anti-fouling substances, toxic/phytotoxic heavy metals, pH, etc. identified in the 2018 intertidal mud samples and elsewhere on the site.
- 3.5 This additional sampling may be carried out during the development of the remainder of the site, as the foreshore will not be affected until such time as the proposed marina pontoons are to be installed.
- 3.6 Remediation of inter-tidal mud is unlikely to be practicable, however, the options may be explored once the results of the additional sampling are known.

4. VERIFICATION METHOD STATEMENT

- 4.1 The purpose of the verification method statement is to set out the measures required to record the remediation work in progress and to enable the subsequent confirmation that the remediation has been carried out in accordance with the recommendations.
- 4.2 Removal of waste:

4.2.1 Most of the waste has already been removed from the site. The treatment of any remaining waste is to be as follows:

- Identify and photograph any piles of waste remaining.
- Walk over proposed wildlife areas and examine for previously unidentified waste deposits and superficial waste items. Subject to the advice of the ecological and landscape consultees, waste soil/made ground not obviously contaminated <0.5 m³ in volume may be ignored. Other waste items (not asbestos, containers of harmful fluid or otherwise hazardous) less than 0.5 kg may be considered trivial.
- Check for asbestos and wet/double bag and remove separately.
- Retain tickets from waste carriers removing waste from site, including mass removed and disposal location.

4.3 Replacement of made ground in proposed garden and soft landscaping areas.

- Record and photograph removal of made ground to a depth of 0.6 m.
- Retain consignment notes from any removal of made ground from the site, including mass removed and disposal location.
- Photograph placing of geotextile and capillary breaker sand layer.
- Confirm replacement soil is from an uncontaminated source and retain documentary evidence.
- Photograph placing (and compaction, where indicated) of replacement soil.
- Arrange independent check and confirmation on completion.

4.4 Observation of condition of exposed soil during the development work.

- Where exposed soil reveals significant evidence of contamination in the form of staining, unusual colouring, odour or potentially hazardous buried items, the exposure should be photographed and plotted on a site plan. Appropriate advice should be sought from a land contamination specialist.
- Subject to appropriate advice, the contaminated material may be chased out and removed from site. Consignment notes confirming material removed and disposal destination should be retained, together with any soil analysis certificates.
- Photographs and documentary evidence of the affected areas and the safe removal from site to be kept.

4.5 Contamination leaching barrier behind the foreshore.

- The installation of the sheet-pile contamination leaching barrier shall be photographed and recorded in a log confirming the daily progress. The log shall include confirmation that the piles have been driven to level (0.00 OD), or 0.5 m into the underlying natural stratum (clay), whichever is the deeper, and that the clutch waterproofing has been installed. The log shall be available for inspection during and on completion of the work.
- The extent of the completed work shall be recorded on an "as built" drawing.

4.6 The results of the intertidal mud sampling shall be presented in a report, including conclusions and any remediation recommended (if required).

5. SUMMARY

- 5.1 The documentation listed in Section 4 above, including photographs, drawings, waste load/disposal tickets/consignment notes and any specialist reports, shall be assembled to form the appendices of the Remediation Verification Report to provide confirmation that the remediation has been completed as specified in the Contamination Risk Assessments for the redevelopment of the site.



APPENDIX A

Figure 1: Site Location
Figure 2: Proposed Redevelopment
Figure 3: Additional Inter-tidal Mud Sampling



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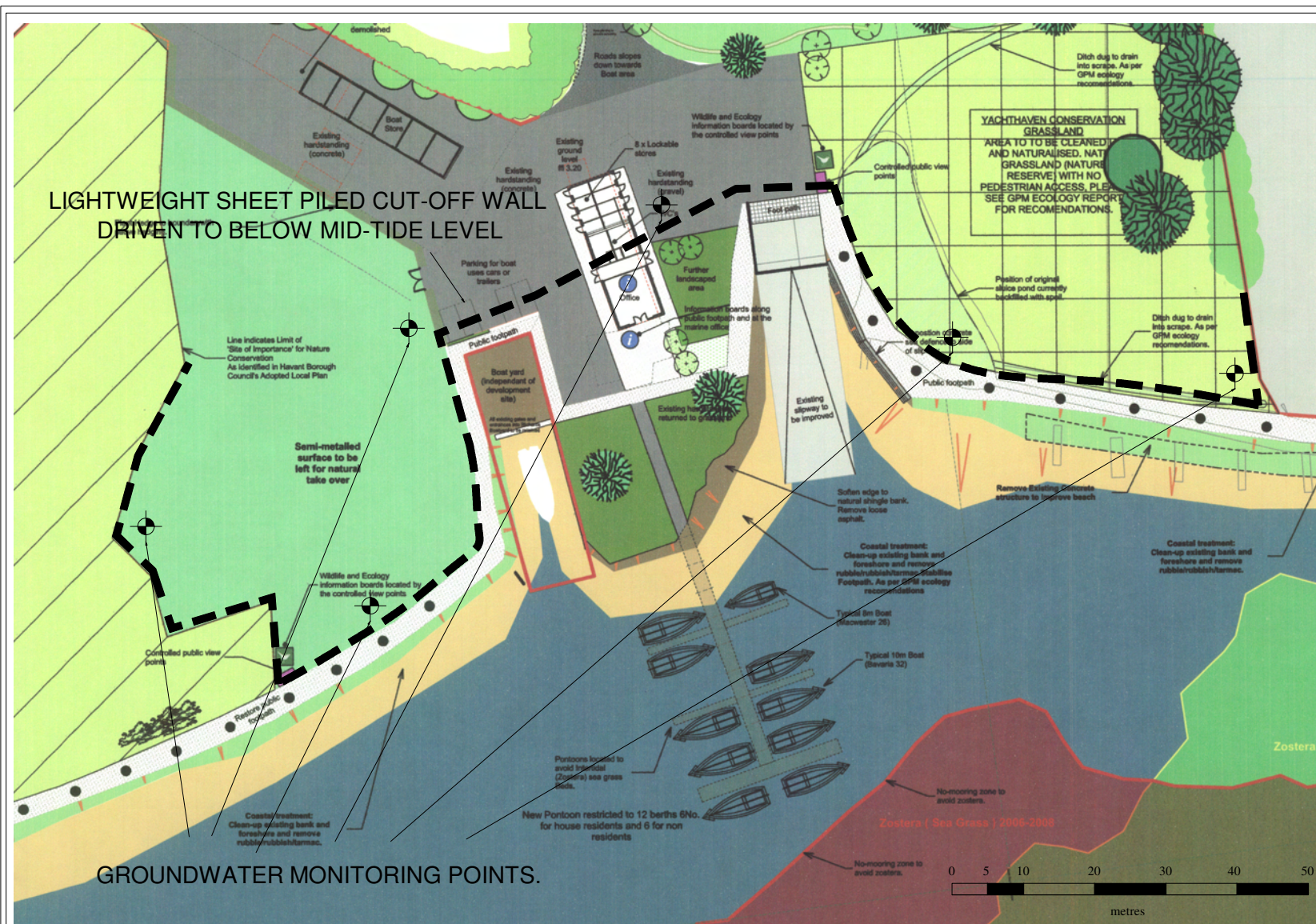


ALPINE GROUP LIMITED
Yacht Haven, Copse Lane, Hayling Island, Hants, PO11 0RH
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Figure 1: Site Location

Scale 1:25000

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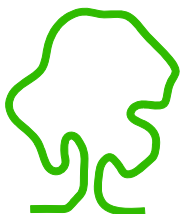
ALPINE GROUP LIMITED

YACHT HAVEN SITE, HAYLING ISLAND

Proposed Extended Barrier to Limit Contamination Leaching into Chichester Harbour

Scale as shown

November 2018



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