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KEY:

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- MAJOR CONTOUR
- MINOR CONTOUR



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A E I CO ARISO OF RBSL A RTC T RES OL S

Contaminant	RTC (mg/l)
TPH aliphatic C10-C12	>sat
TPH aliphatic C12-C16	>sat
1,2-Dichloroethane	4.80E+00
1,1,1-Trichloroethane	>sat
Tetrachloroethene	>sat
Trichloroethene	2.85E+01
Vinyl chloride	3.38E-01
Dichloromethane	1.98E+03
Cis-1,2 Dichloroethene	7.40E+01
Trans-1,2 Dichloroethene	8.91E+01
1. Where the lower of the vapour or aqueous saturation limits has been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented 2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation 3. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins 4. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).	

4. Comparison of RBSLs and RTC

As an objective of these works was to establish whether the RBSLs were health protective, the commercial RBSLs and RTC have been compared. This comparison is presented in the tables in this section of the report. As per the approach adopted for the residential and recreational RTC, within the tables within this section, the lower of the RBSL/RTC has been bolded. Therefore where the RBSL has been bolded, it is protective in comparison to the RTC:

- If the RBSL and the RTC are equal, the RBSL is bolded.
- If the RTC is lower than the RBSL, the RTC is bolded⁹.
- If the RBSL is lower than the RTC, the RBSL is bolded.

Where the RTC are greater than the RBSL or the RTC are equal to the RBSL, the values have been marked as final to illustrate that the RBSL is protective. Where the RTC are lower than the RBSL, further site specific modifications could be considered to establish whether the RTC is unnecessarily conservative and these have been marked as draft. Further site specific modifications have not been considered at the present stage.

The RBSL should be used in all cases, except where the RTC is bolded. In this event, the relevant RTC should therefore be adopted.

The background soil concentration and Soil Code have not been considered within the metals RTC presented and therefore the values presented for metals may not be protective of phytotoxic

⁹ In some cases there may be two RTC, where one RTC is higher than the RBSL and the other lower: one may be bolded and the other not and therefore they remain as draft.

effects. The soft landscaping areas should therefore be suitably designed at the remediation design stage, once such areas are defined.

4.1 Comparison of commercial RBSLs and RTC (shallow soil)

The commercial RBSLs and RTC for a shallow soil source are compared in Table 4.1 below.

Table 4.1 – Comparison of commercial RBSLs and RTC for shallow soil (0.65m below FFL)

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sand (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/Final
Arsenic	5.00E+02	6.35E+02	6.35E+02	final
Chromium	5.00E+03	3.65E+02	3.65E+02	draft
Cadmium	1.40E+03	2.43E+02	2.43E+02	draft
Mercury (inorganic)	4.80E+02	3.71E+03	3.71E+03	final
Nickel	5.00E+03	1.99E+03	1.99E+03	draft
Selenium	8.00E+03	1.30E+04	1.30E+04	final
Lead	7.50E+02	5.45E+03	5.45E+03	final
Vanadium	1.60E+04	7.59E+03	7.59E+03	draft
Copper	-	1.15E+05	1.15E+05	draft
Zinc	-	9.18E+05	9.18E+05	draft
Benzo(a)pyrene	2.90E+01	2.47E+01	2.48E+01	draft
Benzene	5.00E+00	1.78E+01	9.98E+01	final
Toluene	1.16E+03	4.18E+05 a	4.22E+05 a	final
Ethylbenzene	1.22E+05	1.83E+05 a	1.87E+05 a	final
Xylene	1.21E+05	2.93E+05 a	3.27E+05 a	final
TPH aromatic C7-C8	1.84E+03	4.18E+05 a	4.22E+05 a	final
TPH aromatic C8-C10	9.13E+02	6.21E+04 a	6.62E+04 a	final
TPH aromatic C10-C12	2.65E+04	6.83E+04 a	6.84E+04 a	final
TPH aromatic C12-C16	6.49E+04	6.84E+04 a	6.57E+04	final
TPH aliphatic C6-C8	>1.00E+06	≤1.00E+06 a	≤1.00E+06 a	draft
TPH aliphatic C8-C10	1.59E+05	1.69E+05 a	1.70E+05 a	final
TPH aliphatic C10-C12	1.63E+05	1.71E+05 a	1.71E+05 a	final
TPH aliphatic C12-C16	1.69E+05	1.71E+05 a	1.71E+05 a	final
TPH aromatic C16-C21	5.14E+04	2.85E+04	2.85E+04	draft
TPH aromatic C21-C35	5.14E+04	2.85E+04	2.85E+04	draft
TPH aliphatic C16-C21	>1.00E+06	≤1.00E+06	≤1.00E+06	draft
TPH aliphatic C21-C35	>1.00E+06			draft
Total TPH (Phase 1)	8.14E+04	Not calculated (see note 8)		
Total TPH (Process Area)	4.43E+04			
Total TPH (North Tank Farm)	2.59E+04			

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sand (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/Final
Total TPH (South Tank Farm)	3.72E+04			
1,2-Dichloroethane	2.00E+00	4.01E-01	2.15E+00	draft
1,1,1-Trichloroethane	5.77E+05	4.43E+02	3.14E+03	draft
Tetrachloroethene	1.05E+03	1.03E+02	7.88E+02	draft
Trichloroethene	8.40E+01	7.48E+00	5.49E+01	draft
Vinyl chloride	4.00E+00	4.50E-02	1.74E-01	draft
Dichloromethane	1.65E+03	1.58E+02	7.34E+02	draft
Cis-1,2-Dichloroethene	2.73E+02	8.70E+00	5.30E+01	draft
Trans-1,2 Dichloroethene		1.38E+01	8.77E+01	draft
Notes				
a) based on a value produced from following the approach outlined in SR4 for substances at saturation				
1. It is assumed that no visible free product is present within the top 1.0m of soil The presence of free product should be assessed in accordance with information in the S106 (Ref. 1).				
2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation				
3. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins				
4. In the S106 (Ref. 1), only one value was presented for 1,2-dichloroethene of 273 mg/kg				
5. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.				
6. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach				
7. No RTC was produced for total TPH as this will be considered further at validation stage				
8. Asbestos has not been considered here as it is being considered in a separate report				
9. Additivity for TPHs and PAHs to be undertaken in line with guidance in this report				
10. In the S106 (Ref. 1), “-“ was presented for the RBSLs for copper and zinc for a commercial land use				
11. The values for metals may not be protective of phytotoxic effects				

4.2 Comparison of commercial RBSLs and RTC (deep soil)

The commercial RBSLs and RTC for a deep soil source are compared in Table 4.2 below.

Table 4.2 – Comparison of commercial RBSLs and RTC for deep soil (1m below FFL)

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
Benzo(a)pyrene	None	>sat	>sat	final
Benzene	5.00E+00	7.10E+01	1.52E+02	final
Toluene	3.89E+02	>sat	>sat	final
Ethylbenzene	None	>sat	>sat	final
Xylene	None	>sat	>sat	final

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
TPH aromatic C7-C8	6.17E+02	>sat	>sat	final
TPH aromatic C8-C10	5.47E+02	>sat	>sat	final
TPH aromatic C10-C12	None	>sat	>sat	final
TPH aromatic C12-C16	None	>sat	>sat	final
TPH aliphatic C6-C8	None	>sat	>sat	final
TPH aliphatic C8-C10	None	>sat	>sat	final
TPH aliphatic C10-C12	None	>sat	>sat	final
TPH aliphatic C12-C16	None	>sat	>sat	final
TPH aliphatic C16-C21	None	Not calculated (see note 3)		
TPH aliphatic C21-C35	None			
TPH aromatic C16-C21	None			
TPH aromatic C21-C35	None			
Total TPH (Phase 1)	8.20E+04	Not calculated (see note 9)		
Total TPH (Process Area)	3.50E+04			
Total TPH (North Tank Farm)	1.40E+04			
Total TPH (South Tank Farm)	3.48E+04			
1,2-Dichloroethane	6.50E-01	1.73E+00	2.75E+00	final
1,1,1-Trichloroethane	3.25E+03	>sat	>sat	final
Tetrachloroethene	3.68E+02	3.98E+02	1.06E+03	final
Trichloroethene	2.80E+01	2.88E+01	7.07E+01	final
Vinyl chloride	1.60E+00	1.54E-01	2.14E-01	draft
Dichloromethane	6.65E+02	6.77E+02	9.76E+02	final
Cis-1,2-Dichloroethene	9.10E+01	3.51E+01	6.70E+01	draft
Trans-1,2 Dichloroethene		5.34E+01	1.11E+02	draft
Notes				
1. Where the lower of the vapour or aqueous saturation limits have been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented				
2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation				
3. TPH >C16 are not considered to be volatile according to the Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG). Consequently the inhalation of vapour pathways have not been considered and therefore no RTC value has been presented here				
4. “None” indicates theoretical RBSL greater than solubility limit				
5. In the S106 (Ref. 1), only one value was presented for 1,2-dichloroethene of 91 mg/kg				
6. ‘Total’ TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.				
7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach				

Contaminant	S106 RBSL (mg/kg)	RTC 1% Sandy loam (mg/kg)	RTC 3% Sandy loam (mg/kg)	Draft/final
8. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins				
9. No RTC was produced for total TPH as this will be considered further at validation stage				
10. Asbestos has not been considered here as it is being considered in a separate report				
11. Additivity for TPHs and PAHs to be undertaken in line with guidance in this report				
12. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).				

4.3 Comparison of commercial RBSLs and RTC (groundwater)

The commercial RBSLs and RTC for a groundwater source are compared in Table 4.3 below.

Table 4.3 – Comparison of commercial RBSLs and RTC for groundwater (1m below FFL)

Contaminant	S106 RBSL (mg/l)	RTC (mg/l)	Draft/Final
Benzo(a)pyrene	None	>sat	final
Benzene	6.00E+00	1.15E+01	final
Toluene	2.29E+02	>sat	final
Ethylbenzene	5.06E+02	>sat	final
Xylene	6.07E+02	>sat	final
TPH aromatic C7-C8	9.70E+01	>sat	final
TPH aromatic C8-C10	None	>sat	final
TPH aromatic C10-C12	None	>sat	final
TPH aromatic C12-C16	None	>sat	final
TPH aromatic C16-C21	None	Not calculated (see note 6)	final
TPH aromatic C21-C35	None		final
TPH aliphatic C6-C8	None	>sat	final
TPH aliphatic C8-C10	None	>sat	final
TPH aliphatic C10-C12	None	>sat	final
TPH aliphatic C12-C16	None	>sat	final
TPH aliphatic C16-C21	None	Not calculated (see note 6)	final
TPH aliphatic C21-C35	None		final
1,2-Dichloroethane	8.20E-01	4.80E+00	final
1,1,1-Trichloroethane	9.89E+02	>sat	final
Tetrachloroethene	1.15E+02	>sat	final
Trichloroethene	1.30E+01	2.85E+01	final
Vinyl chloride	3.00E-01	3.38E-01	final
Dichloromethane	6.24E+02	1.98E+03	final

Contaminant	S106 RBSL (mg/l)	RTC (mg/l)	Draft/Final
Cis-1,2 Dichloroethene	6.80E+01	7.40E+01	final
Trans-1,2 Dichloroethene	6.80E+01	8.91E+01	final
Notes			
1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation			
2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins			
3. "None" indicates theoretical RBSL greater than solubility limit			
4. In the S106 (Ref. 1), only one value was presented for 1,2-Dichloroethene of 68 mg/l.			
5. Where indoor and outdoor values were presented by RBCA, these have been integrated in line with SNIFFER (2003). Where both indoor and outdoor values derived by RBCA were greater than the saturation limit, >sat has been presented. Where indoor values were presented by RBCA, and the outdoor values were >sat, only the indoor values have been presented. Therefore >sat indicates that the theoretical RTC is greater than solubility limit.			
6. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered			
7. The potential presence of free product should be assessed in accordance with information in the S106 (Ref. 1).			

5. Conclusions and Recommendations

5.1 Commercial RTC

5.1.1 Conclusions

RTC have been derived for a shallow and deep soil source for a commercial land use. As can be seen in Section 4, some RTC were higher than the RBSL and thus the RBSLs would be protective and suitable for use.

In other cases, the RTC were lower than the RBSL and therefore may not be protective of human health based on the assumptions underpinning the RTC. In such cases the RTC have been marked as draft and may require further assessment.

5.1.2 Recommendations

The lower of the RTC/RBSL is recommended for use in order to be protective for the receptor at the site. It is also recommended that the land use assumptions used to develop the CSM are compared to the development plans to establish whether the RTC are suitable for use. For instance, a less permeable soil type than the sand/sandy loam used within the RTC modelling, may result in a higher RTC and less remediation being required. Information regarding the application of the RTC/RBSL is understood to be presented within the remedial strategy and validation plans (as appropriate).

Should exceedances of the RTC/RBSL be reported, it is recommended that the guidelines outlined in the validation plan (in preparation) are followed.

A number of approaches could be considered for those contaminants where the RTC is lower than the RBSL. The recommended approaches include:

- consideration of building development plans on plot specific basis (e.g. areas of hard standing) versus exceedances of RTC/RBSL;

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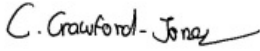
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Scope

This Redevelopment Remediation Works Completion Certificate (RRWCC) has been prepared with reference to the following agreements:

- Section 106 Agreement dated 8 February 2008 between Neath Port Talbot Borough Council (NPTCBC), St Modwen Developments Limited (SMD), St Modwen Properties Plc (SMP), BP Oil Llandarcy Refinery Limited (BPLR) and Coed Darcy Limited (CDL); and
- Remediation and Maintenance Agreement dated 23 May 2008 (RMA) between SMD, SMP and CDL.

Unless advised otherwise, definitions used in this RRWCC can be found in the Section 106 Agreement and/or the RMA.

This RRWCC has been prepared for Phase 70 in response to the receipt of a written request from SMD pursuant to clause 4.3 of the RMA. The phase boundary and intended use on which this RRWCC is based were notified to the Monitor by letter, a copy of which is provided in **Appendi A**.

The intended use for Phase 70 has been declared as commercial. The phase boundary for Phase 70 is the land edged red on drawing 5041216-REM-DWG-1951, a copy of which is provided in **Appendi A**. The approximate location of Phase 70 in relation to the Development Boundary is shown in **Figure** below. Phase 70 covers an area of approximately 42,880m².

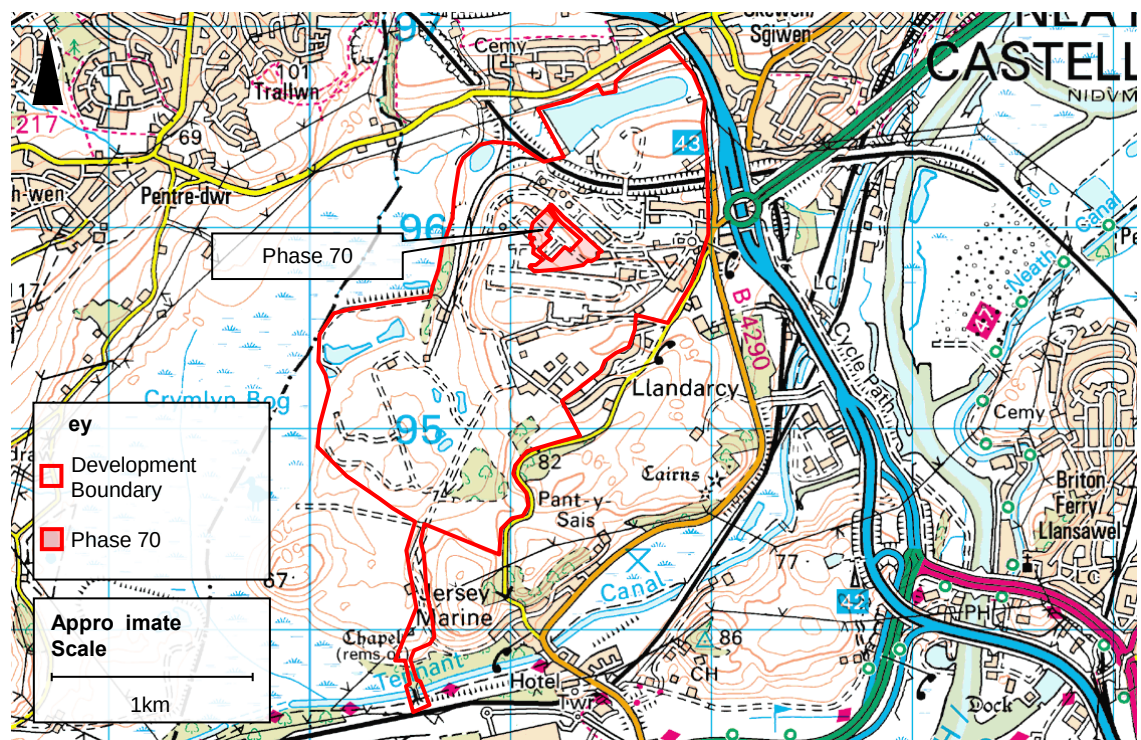


Figure Location plan

A development layout is yet to be confirmed for Phase 70, however an outline layout is shown on the current masterplan drawing reference 1332/400/MP/SK/TERT Revision H, a copy of which is also provided in **Appendi A**.

With reference to the masterplan drawing it should be noted that Phase 70 is situated within an area of proposed residential development, whereas it has been declared as a commercial phase. However, with reference to the Monitor's Deed of Appointment, the Monitor is obliged to certify the phase against the intended use that is declared by the developer, irrespective of what is shown on the masterplan. Nevertheless it should be noted that further remediation works will be required if the Phase is to be developed for residential purposes.

In accordance with the requirements of the Monitor's Deed of Appointment, this RRWCC shall:

- Describe the remedial action which in the Monitor's professional opinion has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 70; and
- Certify whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed for Phase 70 in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use.

A copy of Schedule 8 of the Section 106 Agreement is provided in **Appendi B**.

Bac ground

Objectives of the Redevelopment Remediation Works

Part One of Schedule 8 of the Section 106 Agreement outlines the purpose and objectives of the redevelopment remediation works as follows:

- The purpose and objectives of the redevelopment remediation works are the carrying out of all such remedial action over and above that actually carried out as part of the RAP Works that is necessary in order to make each part of the property suitable for its intended use. A part of the property will only be suitable for its intended use if and when the Phase Works Completion Date (PWCD) is declared in respect of that part of the property.
- This objective will be deemed to be met for the purposes of the Section 106 Agreement and the RMA on the date specified in a notice from CDL declaring the PWCD for the phase. The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended use for the phase has been completed.

Part Two of Schedule 8 of the Section 106 Agreement places a number of obligations on SMD as the Developer. The main obligations pertinent to this phase are as follows:

- The Developer shall carry out or procure the carrying out of all Remedial Action necessary in order to achieve the purpose and objective as outlined in Part 1 of Schedule 8 of the Section 106 Agreement. The design and specification of any remediation shall take account of the principles and objectives and the design assumptions for the RAP Works and shall not prejudice the achievement and future sustainability of these principles and objectives.
- In order to determine the need for Remedial Action in the first place it is necessary to undertake an appropriate site assessment. This assessment needs to take account of the site history, potential and/or actual measured extent of contamination and the associated implied risk. Only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

- The RBSLs set out in Tables 1 and 2 [in Schedule 8 of the Section 106 Agreement] and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level (FFL) to which quality standards are achieved), as the same may be varied in accordance with this Schedule 8, shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.

It should be noted that SMD has procured the services of Atkins Ltd. to assist in discharging the above obligations.

Tables 1, 2, 3 and 4 from Schedule 8 of the Section 106 Agreement are reproduced below for reference.

Table Summary of Soil RBSLs

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
<u>METALS & METALLOIDS</u>						
Arsenic	64	500	64	-	-	-
Cadmium	2.6	1400	2.6	-	-	-
Chromium	130	5000	200	-	-	-
Mercury	1	480	1	-	-	-
Nickel	50	5000	75	-	-	-
Selenium	3	8000	3	-	-	-
Lead	337	750	337	-	-	-
Vanadium	416	16000	640	-	-	-
Copper	200	-	200	-	-	-
Zinc	478	-	478	-	-	-
<u>ORGANIC SPECIES</u>						
Benzene	0.12	5	13	0.4	5	48
Benzo(a)pyrene ²	0.9	29	0.9	none	none	none
Toluene	36	1160	8110	52	389	none
Ethylbenzene	41	122000	4740	140	none	none
Xylenes	32	121000	7940	58	none	none
1,2-Dichloroethane	0.04	2	4.5	0.1	0.65	6

<i>Contaminant</i>	<i>Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg)¹</i>			<i>Land-Use Specific RBSL Soil below 1m depth (mg/kg)</i>		
	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>	<i>Residential</i>	<i>Commercial</i>	<i>Recreational</i>
Dichloromethane	5	1650	241	84	665	6220
Tetrachloroethene	11	1050	641	34	368	1780
Trichloroethene	1	84	193	2	28	269
Vinyl Chloride	0.01	4	0.7	0.04	1.6	16
1,2 Dichloroethene	4	273	632	7	91	881
1,1,1-Trichloroethane	154	577000	27900	160	3250	none
TPH Aromatic EC>C7-C8	125	1840	21337	146	617	none
TPH Aromatic EC>C8-C10	94	913	4025	257	547	none
TPH Aromatic EC>C10-C12	118	26515	4589	1394	none	none
TPH Aromatic EC>C12-C16	131	64875	4799	none	none	none
TPH Aromatic EC>C16-C21	82	51449	3639	none	none	none
TPH Aromatic EC>C21-C35	1130	51449	3639	none	none	none
TPH Aliphatic EC>C6-C8	8335	8517587	606191	none	none	none
TPH Aliphatic EC>C8-C10	112	158890	12075	158	none	none
TPH Aliphatic EC>C10-C12	3204	163360	12094	none	none	none
TPH Aliphatic EC>C12-C16	4513	169032	12117	none	none	none
TPH Aliphatic EC>C16-C21	94174	3429944	242573	none	none	none
TPH Aliphatic EC>C21-C35	94820	3429944	242573	none	none	none
Total TPH (Phase 1) ³	1717	81413	9061	9182	81956	None
Total TPH (Process Area) ³	2601	44344	10830	4098	35014	None
Total TPH (North Tank Farm) ³	1104	25875	9419	3802	13974	None
Total TPH (South Tank Farm) ²	1015	37230	6349	2792	34797	None
<u>ASBESTOS</u>						
Sum of all Types of ACM	200	300	200	200 ⁴	-	-

otes

“-” value not applicable to scenario

- "none" RBSL value exceeds soil saturation limits and free phase assessment appropriate
- 1 Lower value of human health RBSL or Soil Code value if higher than background LCL value (applicable to metals & metalloids only)
 - 2 Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
 - 3 'Total' TPH RBSL derived for an area of development, based on individual RBSLs provided and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach
 - 4 Refer to Section 106 Agreement for specification of relevant depth ranges

Table Summary of RBSLs for groundwater

Contaminant	Land-Use Specific RBSL (mg/l)		
	Residential	Commercial	Recreational
TPH Aliphatic EC>C6-C8	none	none	none
TPH Aliphatic EC>C8-C10	none	none	none
TPH Aliphatic EC>C10-C12	none	none	none
TPH Aliphatic EC>C12-C16	none	none	none
TPH Aliphatic EC>C16-C21	none	none	none
TPH Aliphatic EC>C21-C35	none	none	none
TPH Aromatic EC>C7-C8	20	97	none
TPH Aromatic EC>C8-C10	22	none	none
TPH Aromatic EC>C10-C12	none	none	none
TPH Aromatic EC>C12-C16	none	none	none
TPH Aromatic EC>C16-C21	none	none	none
TPH Aromatic EC>C21-C35	none	none	none
Benzene	0.7	6	198
Benzo(a)pyrene	none	none	none
Toluene	47	229	none
Ethylbenzene	102	506	none
Xylenes	43	607	none
1,2-Dichloroethane	0.2	0.82	45
Dichloromethane	150	624	none
Tetrachloroethene	22	115	none

Land-Use Specific RBSL (mg/l)

Contaminant	Residential	Commercial	Recreational
Trichloroethene	2.6	13	813
Vinyl Chloride	0.06	0.3	18
1,2-Dichloroethene	15	68	none
1,1,1-Trichloroethane	193	989	none

Notes

“none” theoretical RBSL greater than solubility limit

Table Scale of Aesthetic Criteria

Class	Visual	Olfactory
0	No visible staining of soil, no visible suspect ACM	No detectable odour on soil
1	Occasional staining of soil, no visible suspect ACM	Faint odour on soil
2	Frequent staining of soil	Distinct but not strong odour on soil
3	Occasional heavy staining of soil	Strong odour on soil
4	Heavy staining of soil	Strong odour discernable in ambient air
5	Visible hydrocarbon product	Overwhelming Odour

Notes

Visible suspect ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.

Table Minimum Validation Testing Frequencies

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported quarried material	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples
Imported soil from verified greenfield site	1 per 250m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported soil from characterised brownfield site1	1 per 25m ³ ex situ, composite of 5 sub-samples	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples
0.5-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth	n/a	Regular grid of 1 per 400m ² , sample over 0.5m depth
>1m below FFL in-situ	n/a	Regular grid of 1 per 100m ² , sample over 1m depth	Regular grid of 1 per 400m ² , sample over 0.5m depth
Stockpiled excavated site materials for re-use	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples	1 per 400m ³ ex situ, composite of 5 sub-samples
Face of remedial excavations <1m deep	1 per 10m, minimum of 1 per face, worst case VO sample	n/a	1 per 15m, minimum of 1 per face, worst case VO sample
Face of remedial excavations >1m deep	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample	1 per 15m ² , minimum of 1 per face, worst case VO sample
Along redundant service excavations	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample
Soil treated ex-situ and homogenised	1 per 200m ³ , composite of 5 regular sub-samples	1 per 200m ³ , composite of 5 regular sub-samples	1 per 500m ³ , composite of 5 regular sub-samples

otes

- “1” Validation suite to reflect prior use of the originating brownfield site and the design and purpose of the relevant area of Coed Darcy.
- “VO” Visual/olfactory (i.e. aesthetic) observation

Remediation Action Plan (RAP) Works

In addition to the requirements of the redevelopment remediation works, the Developer must also complete a series of statutory remedial works which are referred to as the RAP Works. The requirements for the RAP Works are outlined in Schedule 7 of the Section 106 Agreement.

It is intended that this report, which is the RRWCC, will be complemented by a RAP Works Completion Statement (RAPWCS) in order to provide the information required by CDL to enable the PWCD to be declared.

Details of the scope of works and associated validation completed to satisfy the RAP requirements pertinent to this phase are reported separately in RAPWCS ref. 49310747/BRRP00156/Cert 70a.

1.3

Information Sources

A summary of the information sources that the Monitor has been provided with in relation to Phase 70 is provided below in **Table 5**. Unless otherwise stated, the Monitor has relied solely on these information sources as the basis for issuing this RRWCC. Upon a review of the information sources, in the Monitor's reasonable professional opinion, such information and the manner in which it was obtained appears sufficiently up to date, reliable and robust to justify such reliance. No verification of the data has been completed by the Monitor unless noted in the following sections.

Electronic copies of the information sources are provided in **Appendix C**.

Table 5 Information Sources

<i>Ref.</i>	<i>Document Reference</i>	<i>Format</i>	<i>Title</i>	<i>Author</i>	<i>Date Received</i>
1	39991-044-785-FR1287	Report	Whole Site Investigation BP Llandarcy Refinery	URS	August 2005
2	44382742/BRRP0001	Report	BP Llandarcy Refinery Desk Study	URS	July 2007
3	5041216-OSW-RPT-0001486	Report	Validation Report Monitor Phase 70 Revision 1	Atkins	October 2015
4	5041216-OSW-TN-0001486	Technical Note	Phase 70 Response to Monitor RFI 0151	Atkins	October 2015
5	5041216-REM-RPT-1455	Report	Derivation of Soil Remediation Target Criteria for Newly Identified Volatile Organic Compounds	Atkins	September 2015

1.4

Requests for Information (RFIs) Issued by the Monitor

The Monitor has raised one RFI in relation to Phase 70, as summarised in **Table 6** below. A copy of the RFI is provided in **Appendix D**. Copies of the responses received are included in the information sources provided in **Appendix C**.

Table 6 RFIs

<i>RFI Ref.</i>	<i>Title</i>	<i>Associated Atkins Document</i>	<i>Date Raised</i>	<i>Complete</i>	<i>Comments</i>
150	Review of Atkins' Validation Report for Monitor Phase 70	Atkins Validation Report for Monitor Phase 70 ref. 5041216-OSW-RPT-0001486	June 2015	Yes	Response to RFI and updated validation report received

DESCRIPTION OF THE REMEDIAL ACTION

The following section provides a description of the remedial action that has been carried out for the purposes of completing the redevelopment remediation works in relation to Phase 70. This section of the report is structured as follows:

1. Site Assessment
2. Remediation Strategy
3. Redevelopment Remediation Works
4. Validation

Site Assessment

As discussed above, the Section 106 Agreement requires the Developer to undertake an appropriate site assessment which needs to take account of the site history, potential and/or actual measured extent of contamination and the associated implied risk. The Section 106 Agreement also states that only by developing a thorough understanding of both potential and actual contamination will it be possible to confirm that all necessary Remedial Action is likely to have been completed. This obligation should be satisfied through completion of an appropriate desk study and intrusive investigation.

Desk Study

From the information presented in Atkins' validation report (Information Source 3) it is evident that Atkins has reviewed the findings of previous site investigations and desk studies to develop an understanding of both potential and actual contamination within Phase 70. The following is of note.

Phase 70 is an irregular shaped parcel of land within the central part of the former refinery surrounding Phases 29 and 33. With reference to the historical maps presented in **Appendix E** it can be seen that various refinery infrastructure was situated within Phase 70, as follows:

- No. 1 Crude Oil Distillation Unit (CDU) in the north west of Phase 70;
- No. 2 CDU in the south of Phase 70;
- The boiler house workshop on the north eastern boundary of Phase 70;
- An electrical substation to the south of Phase 70;
- Sump separator 'A' to the south east of Phase 70;
- No. 2 VnG Unit in the north of Phase 70; and
- A stabiliser at the southern extent of Phase 70.

The north eastern boundary of Phase 70 was bordered with an Edelenu Dewaxing and Extraction Plant, the Main Boiler House, the Central Substation and the New Boiler House. The south west of the phase is bordered by a Catalytic Cracking Plant and Deoderiser. The southern extent of the Phase, Separator A, the Substation and the Boiler Workshop are designated as a Special Process area, indicating a potentially higher risk of contamination.

With regards geology Atkins reports that the British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition indicates that this part of the refinery is underlain by Till (Diamicton), a heterogeneous glacial deposit overlying Carboniferous, Pennant Sandstone Formation,

specifically the Hughes Member. There are no recorded faults shown to cross beneath Phase 70.

With regards hydrogeology, Phase 70 lies within the catchment of the River Neath, which is situated approximately 1km east of the site. The underlying sandstones are classified as a Secondary A Aquifer, which are defined by the Environment Agency as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flows to rivers'

Groundwater within Phase 70 is generally situated within the underlying bedrock and flow is considered to be radial from a recharge area located within the adjacent Phase 33 and within bedrock to the north-northeast.

Intrusive Investigations

A number of historical site investigations were undertaken by URS on behalf of the operator of the former refinery as reported in URS' site investigation report FR1287 (Information Source 1). These investigations included 41 exploratory holes within Phase 70.

Between January 2015 and March 2015 Atkins undertook a further site investigation which included the excavation of 321 trial pits within Phase 70. This site investigation was carried out after the removal of historical structures within this area. Details of these site investigations are presented in Atkins' validation report (Information Source 3).

Logs from the trial pits and boreholes indicate ground conditions to be consistent with the reported geology discussed above. Generally the soils comprised made ground, underlain with glacial soils over sandstone bedrock. Bedrock was predominantly encountered as a weathered zone comprising clayey angular tabular sandstone gravel, cobbles and boulders. Trial pits were terminated on competent bedrock at ground level in two locations in the southwest of Phase 70.

Land contamination is reported to have been evident within the soils in the form of staining and odours. Laboratory analysis identified no exceedances of the adopted thresholds for a commercial end use. Loose asbestos fibres at concentrations in excess of 1% were reported in three locations. In addition localised deposits of visible ACM were noted.

Atkins reports that historical monitoring from boreholes within Phase 70 indicated the prevalence of mid to heavy end hydrocarbons across Phase 70. There were no exceedances for groundwater RBSL for commercial land use in historical samples taken.

Groundwater across Phase 70 was generally found to lie within the underlying bedrock with some localised perched groundwater within the shallow soils.

Remediation Strategy

Schedule 8 of the Section 106 Agreement sets out the minimum remedial action required depending on the intended use and the groundwater regime. The intended use for Phase 70 has been declared as commercial and groundwater is primarily in rock, i.e. there is limited soil material over bedrock, little perched groundwater is present in that soil and the water table is normally first encountered in bedrock. However, the remediation scenarios presented in the Section 106 Agreement do not include a scenario for a commercial end-use where groundwater is in rock, only a commercial end-use where groundwater is in soil.

Atkins therefore proposed that the scenario for a commercial end-use where groundwater is in soil should be amended such that the depth to which the soils must meet the necessary requirements is defined by the surface of the underlying bedrock, rather than being defined by the depth to seasonal groundwater (the Section 106 Agreement specifies a depth of 2m below FFL or 0.5m below the likely lowest seasonal groundwater elevation for a commercial end-use where groundwater is in soil). All other requirements would remain the same.

The Monitor is satisfied with this approach, in that it meets the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement.

Therefore, with reference to the requirements that are specified in Schedule 8 of the Section 106 Agreement, amended as detailed above, the minimum requirements are as follows:

- The RBSLs and the aesthetic criteria, remediation quality and scope (including the depth below FFL to which quality standards are achieved) shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 of the Section 106 Agreement (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.
- All oil saturated soils and soil containing free product other than minor sheens shall be removed from ground level down to the surface of the underlying bedrock.
- All soils must meet the RBSL for TPH to at least 1m below FFL.
- All soils must meet in bulk, considering both dispersed fibres and pieces of asbestos containing material (ACM), the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.
- Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.
- Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

Furthermore, Schedule 10 of the Section 106 Agreement sets out additional generic remedial requirements, the following of which are relevant to Phase 70:

- Irrespective of the intended use of each phase or part thereof, all existing buried services at the property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity. Where backfill to new underground services may become a pathway for residential pre-transfer date contamination, appropriate control measures such as land drainage or venting measures shall be installed so as to appropriately protect remediated and/or developed areas
- Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks. Suitable measures may include, but not be limited to, the installation of land drains and/or the raising of the site ground levels such that groundwater will not be able to influence shallow soil quality.
- To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement.

For the avoidance of doubt, the minimum remediation standards set out above therefore assume that the first half metre below FFL will comprise such imported material in all circumstances of residential and commercial end-use.

Based on the above requirements and the data collected during the site investigations undertaken from January to March 2015, Atkins proposed further investigation and/or remediation works in the following areas:

- Locations where physical obstructions such as concrete had prevented the investigation of underlying soils;
- Locations where free phase product had been observed;
- Locations where elevated aesthetic scores had been recorded; and
- Areas where pipework had been identified.

The Monitor considered the above approach to be acceptable in accordance with the requirements of the Section 106 Agreement.

Redevelopment Remediation works

The redevelopment remediation works that have been completed for Phase 70 are described in Atkins' validation report (Information Source 3) and can be summarised as follows:

- Further investigation and where necessary remediation works within areas not included in the original site investigation, namely within the vicinity of Road 1 along the northern boundary of Phase 70 and within the southern part of Phase 70;
- Further investigation and remediation in locations where unacceptable visual/olfactory observations had been recorded;
- Removal of redundant pipework;
- Removal of historical structures comprising buried concrete; and
- General re-profiling of the soils, including the removal of approximately 62,000m³ of material to create the current ground profile.

The Monitor attended site and was generally satisfied that the works were being carried out appropriately and that the requirements of the Section 106 Agreement were likely to be achieved.

It should be noted that the remediation works that have been carried out were focused on addressing specific areas of concern that had been identified during the site investigation, rather than a more general turnover of soils as has been seen on a number of previous Phases elsewhere on site. Whereas these previous Phases involved a general turnover of soils, allowing a more comprehensive inspection of the soils and increased confidence over the presence of contamination, the trial pit based approach adopted on this Phase means there is an inherent risk that contamination may have been missed. Nevertheless, the testing frequencies specified in the Section 106 Agreement are relatively conservative. Furthermore the Section 106 Agreement does not specify the exact manner in which the works should be undertaken, so the Developer has not contravened any requirements in this respect. The Monitor is therefore satisfied that the works have been undertaken in accordance with the requirements of the Section 106 Agreement.

Validation

With reference to the remediation requirements discussed in Section 2.2 of this report, the following discussion aims to demonstrate whether or not the requirements of the Section 106 Agreement have been achieved.

It should be noted that in the absence of a detailed layout for the proposed development and confirmed FFLs, it has been assumed that the ground levels following the completion of the redevelopment remediation works represents FFL minus 1m. A topographical record of the ground levels upon which this certificate is based are shown on drawing 5041216-ATK-DR-C-REM-2076 Rev P2 a copy of which is provided in **Appendix F**.

Aesthetic Criteria and the Removal of Oil Saturated Soils

The Section 106 Agreement, amended as described in Section 2.2 of this report, requires that for a commercial phase all oil saturated soils and soil containing free product other than minor sheens shall be removed from ground level down to the surface of the underlying bedrock.

Atkins' validation report (Information Source 3) states that during the site investigation undertaken from January to March 2015, which comprised 321 trial pits, soils were logged in accordance with the aesthetic criteria listed in **Table** of this report. Soils achieving an aesthetic classification of '5' (visible hydrocarbon product and/or overwhelming odour) were deemed to comprise oil saturated soils and/or soil containing free product and were therefore unsuitable for retention.

Atkins reports that visual/olfactory evidence of contamination was noted in 237 trial pits and that scores of '5' were recorded in five trial pits. Atkins reports that four of these trial pits were located in the northwest of Phase 70, and one in the south.

Following these site investigations a series of remediation works were carried out as discussed in Section 2.3 of this report. This included the removal of the impacted soils that had been identified. During these remediation works a further nine locations with visual/olfactory scores of '5' were identified. Atkins reports that impacted soils were removed from seven of the locations and but that reinvestigation of the remaining two locations indicated visual/olfactory classifications of 3/3 and the soils were considered to be suitable for retention.

Following the completion of the remediation works, Atkins states that the maximum visual/olfactory observation for the remaining soils is '4' and that no oil saturated soils or soil containing free product are present within Phase 70. This is considered to be acceptable in accordance with the requirements of the Section 106 Agreement.

In summary, the Monitor is satisfied that oil saturated soils and soil containing free product appear to have been removed from Phase 70.

Soil Chemical Quality and Testing Frequencies

The Section 106 Agreement, amended as described in Section 2.2 of this report, requires that all soils must meet the RBSLs at the specified depths and in particular the RBSL for TPH to at least 1m below FFL. It should be noted that in addition to the RBSLs specified in the Section 106 Agreement, Atkins has also developed Remediation Target Concentrations (RTCs). These RTCs are intended to be health protective and it has been agreed with NPTCBC that where the RTCs are more conservative than the RBSLs, then the RTCs shall take precedence. A summary of the RBSLs and RTCs is presented in **Appendix** .

With regards to the requirement to achieve the RBSL for TPH to at least 1m below FFL, given that the ground profile upon which this certificate is based represents FFL minus 1m, this requirement is not considered to be relevant to this phase and therefore only the RBSL/RTCs for deep commercial soils have been considered.

Compliance with the RBSLs/RTCs

Atkins' validation report (Information Source 3) states that during the site investigation undertaken from January to March 2015, which comprised 321 trial pits, a total of 745 soil samples were collected for laboratory analysis. Atkins reports that analysis of the soil samples indicated that the soils achieved the necessary RBSL/RTCs for deep soils in a commercial setting and were therefore considered suitable for retention.

It should be noted that during the remediation of the adjacent Phase 33, an area of soils impacted by a number of compounds measured as tentatively identified compounds (TICS) were identified at the boundary between Phase 33 and Phase 70. These compounds were 2-methylphenol, 4-methylphenol 2-methylnaphthalene, dimethyl disulphide, methyl ethyl disulphide and diethyl disulphide.

RBSL/RTCs did not exist for these compounds and therefore Atkins derived specific screening criteria as permitted by the Section 106 Agreement. Further details are presented in Atkins' report 5041216-REM-RPT-1455 (Information Source 5). The Monitor and NPTCBC were satisfied that the derived RTCs were appropriate.

Atkins reports that the impacted soils were removed from the area at the boundary of Phase 33 and Phase 70 and that validation was undertaken on the basis of a visual/olfactory assessment followed by soil sampling and laboratory analysis. Atkins reports that 30 soil samples underwent laboratory analysis and the compounds listed above were not detected.

Validation of Imported Soils

Atkins reports that two areas within Phase 70 had previously been excavated to bedrock and backfilled with validated imported soils. These works had been undertaken during the remediation of the adjacent Phase 31.

Atkins reports that the imported soils comprised stockpiled site-won material including 2,531m³ from Stockpile 66 which was tested at a sampling frequency of 1 per 50m³ and 6,250m³ from Stockpile 107 which was tested at a sampling frequency of 1 per 93m³. These testing frequencies exceed the specified testing frequency of 1 per 400m³ for stockpiled excavated site materials for re-use as specified in the Section 106 Agreement.

Atkins reports that a single exceedance of the asbestos RBSL was detected within Stockpile 107 and therefore this material was placed at depth. Otherwise the testing indicated that the soils were suitable for re-use.

Testing Frequencies

The Section 106 Agreement also requires that the soils must be tested in accordance with the specified minimum validation testing frequencies set out in **Table** in this report. With reference to that table, the following testing frequency is considered to be relevant to Phase 70:

- In situ soils are to be tested on a regular grid at a minimum frequency of 1 per 400m², irrespective of the depth below FFL.

Atkins reports that soil samples were collected from 321 trial pits excavated across Phase 70, the area of which is approximately 42,880m². This equates to a testing frequency of 1 per 134m² which is compliant with the minimum testing frequency specified in the Section 106 Agreement of 1 per 400m².

It should be noted that the testing frequency that has been achieved significantly exceeds the minimum testing frequency for a commercial phase. The reason for this is that at the time of the site investigation the intention was for Phase 70 to be declared as a residential phase in

accordance with the masterplan. However, it was later decided to declare the phase for a commercial end-use.

It was noted by the Monitor that the trial pit location plan drawing 5041216-REM-DWG-1954 rev. P2 provided in Atkins' validation report (Information Source 3) indicated a lack of trial pits along the northeast edge of Phase 70 and a reduced frequency of trial pits to the southwest. Atkins confirmed that the further investigations were undertaken in the northeast of Phase 70 to increase the testing frequency. Atkins also states that the reason for the lack of trial pits in the southwest was because soils had been removed to expose the underlying bedrock and this area was therefore validated by means of a visual/olfactory inspection.

Summary

In summary, the Monitor is satisfied that the soils within Phase 70 meet the necessary chemical quality requirements as specified in the Section 106 Agreement. It should however be noted that if the development layout and proposed FFLs differ significantly from the assumed FFLs, or if the intended use should change, then further remediation works will be required.

Groundwater Quality

In addition to the RBSLs for soils, the Section 106 Agreement also specifies RBSLs for groundwater as detailed in **Table** in this report.

As noted previously in this report, groundwater within Phase 70 is considered to lie within bedrock. Atkins' validation report states that water strikes were recorded in 43 of the 321 trial pits excavated from January to March 2015. However the majority of these were considered to represent perched groundwater. Atkins states that eight of the water strikes were recorded on competent bedrock or within a zone of weathered sandstone gravel at depths ranging from 1.0m and 4.1m bgl. Atkins does not report any groundwater sampling.

It is noted that laboratory analysis of groundwater samples collected during the historical site investigations undertaken by URS indicated the presence of mid to heavy end hydrocarbons, however there were no exceedances of the groundwater RBSLs for a commercial end use in the samples analysed.

In summary, the Monitor is satisfied that whilst groundwater samples do not appear to have been collected during the recent site investigations, given the depth to groundwater in comparison to the proposed FFLs it is considered unlikely that groundwater would impact shallow soils in the final development. Therefore no further remediation works or control measures are considered necessary in relation to groundwater within Phase 70.

Measures to Prevent Contamination Migration

The Section 106 Agreement states that where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring.

As discussed in Section 2.1.1 of this report, groundwater flow within Phase 70 is considered to be radial from a recharge area located within the adjacent Phase 33 and within the bedrock to the north-northeast. Given the absence of free phase product and oil saturated soils within Phase 70, the recontamination of down gradient areas is considered unlikely.

Furthermore, impacted soils have been removed along the boundary of Phase 70 and Phase 33 which provides further confidence that the likelihood of cross boundary contamination has been minimised.

In summary the Monitor is satisfied that there appears to be minimal risk of migration in ground of hazardous gas or contaminated liquid into our out of Phase 70. Therefore no further control measures are considered necessary to prevent the recontamination of soils.

Asbestos

The Section 106 Agreement, amended as described in Section 2.2 of this report, requires that all soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and that any visible ACM encountered during construction in the first 1m below FFL must be removed.

Given that Atkins' validation report (Information Source 3) states that the ground profile upon which this certificate is based represents FFL minus 1m, it is not considered necessary for the soils to meet the specified requirements in relation to asbestos. Despite this, the soils have been assessed for the presence of asbestos and the following is of note.

Atkins reports that during the site investigation undertaken from January to March 2015, which comprised 321 trial pits, a total of 264 soil samples were screened for asbestos. Suspected asbestos was detected in 169 samples. Quantitative analysis indicated elevated concentrations in excess of 1% in samples from three locations. In addition, Atkins reports that localised deposits of visible ACM were noted in these areas.

As a result of these observations the areas were fenced off to avoid further disturbance. Atkins states that at the time of writing these soils remain in situ within Phase 70.

Despite the elevated concentrations of asbestos and the presence of visible ACM, Atkins also states that these asbestos impacted soils are considered to be acceptable for retention in accordance with the requirements of the Section 106 Agreement because it is assumed that the existing ground level represents FFL minus 1m.

With reference to the topographical survey drawing 5041216-ATK-DR-C-REM-2076 rev. P2 a copy of which is provided in **Appendix F**, the two impacted areas and the location of the protective fencing are evident in the northwest part of Phase 70. The fence lines are shown in black and it can be seen that ground levels rise up where the soils have not been excavated. The levels indicated on the drawing suggest that there is up to a 5m level difference down to the surrounding soils. Given this, the Monitor questions whether or not these ground levels truly represent FFL minus 1m.

However, despite stating the soils are considered suitable for retention, Atkins also states that the areas will be subject to a separate assessment once the final development proposals are confirmed. For example, in addition to the works reported in Atkins' validation report it is understood that a licensed contractor has been employed to hand pick asbestos from the surface of the affected areas to remove visible ACM. It was reported that six bags of ACM were removed from Phase 70.

Furthermore, from discussions with Atkins it is understood that rather than leaving the asbestos containing materials in situ, as suggested in the validation report, it is likely that the soils would be removed when Phase 70 is redeveloped. This would be necessary if for example if Phase 70 were to be developed for residential end use, as indicated on the current masterplan. If this were to be the case, then it would be necessary to remediate these asbestos impacted soils in accordance with the requirements of the Section 106 Agreement.

The Monitor would welcome further remediation of these soils, however it is understood that the preferred option may be to dispose of the impacted soils at depth within woodland areas elsewhere on the Llandarcy site.

If the soils were to be placed at depth, then this would not necessarily contravene the requirements of the Section 106 Agreement in terms of the redevelopment remediation requirements for public open spaces, however, the Monitor suggests that Atkins and/or the

developer would need to ensure any such operation would not contravene the relevant regulations in respect of the disposal of waste. In particular, the relevant party would need to seek exemption from the waste regulations by applying the CL:AIRE Code of Practice.

Given that the public open spaces into which these materials would be placed have already been certified by the Monitor as being suitable for a public open space end use, the Monitor would have no ongoing responsibility to monitor such works and furthermore, any such works that would be subject to the waste regulations and the CL:AIRE Code of Practice is considered to be outside the scope of the Monitor and would need to be addressed with the relevant regulatory authorities.

Notwithstanding the above, given that it has been stated that the asbestos impacted soils which remain within Phase 70 are located below FFL minus 1m, the Monitor is obliged to certify the Phase as being compliant with the requirements of the Section 106 Agreement. Nevertheless, the concerns noted above should be recorded and any further works to dispose of the asbestos impacted soils should be undertaken appropriately, in accordance with the relevant regulations.

As for the rest of Phase 70, Atkins reports that following the site investigation in January to March 2015, a series of remediation works were undertaken across Phase 70 as discussed in Section 2.3 of this report. Atkins states that no visible ACM was encountered during these works. Atkins also reports that nine soils samples were screened for the presence of asbestos and that suspected asbestos was identified in five of the nine samples. All five samples underwent quantitative analysis. Whilst there is no specified RBSL for commercial soils at depths greater than 1m below FFL, the RBSL for asbestos in shallow soils for commercial end use is 300mg/kg (0.03%). Atkins reports that the concentrations of asbestos in all five samples were below this threshold. Atkins also reports that a further site investigation was undertaken in the southern part of Phase 70 during which 13 soil samples were screened for the presence of asbestos. No suspected asbestos was identified.

In summary, the Monitor is satisfied that if the current ground profile truly represents FFL minus 1m, then the soils are suitable for retention in a commercial setting in accordance with the requirements of the Section 106 agreement. However the matters raised above in respect of the elevated concentrations of asbestos and visible ACM should be noted.

Seepages

The Section 106 Agreement, amended as described in Section 2.2 of this report, states that where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour.

With reference to Atkins' validation report (Information Source 3) it is stated that minor oil seepages and sheens were initially observed emanating from the exposed bedrock in the west of Phase 70. Atkins reports that these were monitored over a period of three months and were noted to have ceased. Therefore the implementation of control measures to prevent discharge was not considered necessary. Furthermore, given the depth of groundwater in relation to the FFL, it is considered unlikely that any such seepages would discharge at surface.

The Monitor is satisfied that no further control measures are required in relation to the management of seeps, sheens and iron rich discharges in accordance with the requirements of the Section 106 Agreement.

Removal of Buried Services

The Section 106 Agreement states that irrespective of the intended use, all existing buried services shall be removed.

Atkins reports that pipework was encountered in 14 locations during the site investigation undertaken during January to March 2015. Atkins reports that the pipelines were encountered at depths ranging from 0.3m bgl to 2.0m bgl. Atkins also notes that free phase product was observed in two of the pipelines.

Atkins reports that the pipelines were removed from 12 of the 14 locations. The remaining two pipelines are reported to be constrained by the asbestos impacted soils discussed in Section 2.4.5 of this report. It will not be possible to remove these pipelines until the overlying asbestos impacted soils have been dealt with. However, further inspection of the pipelines has been undertaken which confirmed that the pipelines comprise isolated sections with an absence of free phase product. Atkins states that the pipelines are not considered to represent active pathways for the migration of contamination.

Atkins does not report the discovery of any other buried services within Phase 70.

The Monitor is satisfied that the buried services encountered during the site investigations, which comprised disused pipework, appear to have been dealt with appropriately. However, given the nature of the site investigation it is considered possible that other buried services could have been missed and may still be present within Phase 70.

Recontamination of Soils

The Section 106 Agreement states that wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top 1m below FFL such that any of the relevant RBSLs and/or aesthetic criteria may be exceeded, then all necessary steps should be taken to mitigate these risks. This may involve the installation of land drains and/or the raising of the site ground levels.

Observations during the works indicate groundwater levels to be significantly below the proposed FFL and therefore the risk of recontamination of the top 1m of soils is considered unlikely. As such, the Monitor is satisfied that the installation of land drains and/or the raising of the site ground levels is not necessary in relation to this phase.

Fill to Achieve FFL

The Section 106 Agreement requires that the build-up of the final elevation after completion of the redevelopment remediation works must comprise a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 1 or better for commercial use.

Atkins' validation report (Information Source 3) states that the post-remediation ground levels upon which this certificate is based generally represent FFL minus 1m. A topographical record of these ground levels is provided on drawing 5041216-ATK-DR-C-REM-2076 rev. P2 a copy of which is provided in **Appendix F**.

Given that the top 1m of soils, including the top 0.5m of quality controlled imported fill materials, are yet to be placed, this requirement of the Section 106 Agreement is yet to be met for Phase 70.

It should be noted that if there is any significant change in the development proposals or the proposed FFLs then reconsideration of the information contained within this certificate may be necessary. Furthermore, any subsequent import of material and/or removal of material from the phase following certification will need to be controlled by the Local Planning Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

CERTIFICATIO

Redevelopment Remediation or s

The following section aims to confirm whether or not in the Monitor's professional opinion the redevelopment remediation works have been satisfactorily completed in accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the intended use. **Table** provides a list of the minimum remedial action required for a commercial phase where groundwater is in rock, as described in Section 2.2 of this report, and summarises whether or not each requirement has been achieved.

Table Certificate Summary

<i>Requirement</i>	<i>Status</i>	<i>Comments</i>
The RBSLs and the aesthetic criteria, remediation quality and scope (including the depth below FFL to which quality standards are achieved) shall be achieved for each part of the property at the minimum validation frequencies set out in Clause 8 of Part 3 of the Section 106 Agreement (as applicable depending upon whether such part of the property is intended for use as residential, commercial or recreational land) as a minimum base level standard.	Complete	Refer to Section 2.4 of this report.
All oil saturated soils and soil containing free product other than minor sheens shall be removed from ground level down to the surface of bedrock.	Complete	Refer to Section 2.4.1 of this report.
All soils must meet the RBSLs at the specified depths.	Complete	Refer to Section 2.4.2 of this report.
All soils must meet the RBSL for TPH to at least 1m below FFL.	Not applicable	Refer to Section 2.4.2 of this report. The top 1m of soils is yet to be placed.
Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.	Complete	Refer to Section 2.4.4 of this report.

Requirement	Status	Comments
All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.	Not applicable	The top 1m of soils is yet to be placed, however reference should be made to Section 2.4.5 of this report for further details in respect of asbestos impacted soils which remain in situ.
Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.	Complete	Refer to Section 2.4.6 of this report.
Irrespective of the intended use of each phase or part thereof, all existing buried services at the property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity. Where backfill to new underground services may become a pathway for residential pre-transfer date contamination, appropriate control measures such as land drainage or venting measures shall be installed so as to appropriately protect remediated and/or developed areas.	Partially complete	Refer to Section 2.4.7 of this report. Two sections of pipeline remain in situ beneath asbestos impacted soils. The pipelines comprise isolated sections with an absence of free phase product and are not considered to represent active pathways for contamination migration.
Wherever there is a risk that following construction of the Urban Village groundwater or organic phase liquid may contaminate soils within the top one metre below FFL such that any of the relevant RBSLs and/or aesthetic criteria specified in Schedule 8 may be exceeded, the Developer shall ensure that all necessary steps are taken to mitigate these risks. Suitable measures may include, but not be limited to, the installation of land drains and/or the raising of the site ground levels such that groundwater will not be able to influence shallow soil quality.	Complete	Refer to Section 2.4.8 of this report.

Requirement	Status	Comments
To provide a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hardsurfaced areas, the Developer shall build up the final elevation after completion of the RAP and redevelopment remediation works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end-use and meeting aesthetic type 0 for residential use and type 1 or better for commercial use as specified in Schedule 8 of the Section 106 Agreement. For the avoidance of doubt, the minimum remediation standards set out above therefore assume that the first half metre below FFL will comprise such imported material in all circumstances of residential and commercial end-use.	Not applicable	The top 1m of soils is yet to be placed. Refer to Section 2.4.9 of this report.

Preventative Measures

In addition to preparing the RAPWCS and RRWCC, the Monitor is also obliged, if requested by CDL, to review any certificate or other documentation produced to CDL by or on behalf of the Developer purporting to confirm that Preventative Measures have been completed or are not required in relation to any phase or part thereof providing CDL in writing of its professional opinion as to:

- whether the author is suitably qualified to issue the certificate; and
- whether the certificate contains or reflects any manifest error, omission or bias, etc. and certifies that the land is fit for its purpose.

The Monitor has not received any such documentation or requests in relation to Phase 70.

Ground Gas

The Section 106 Agreement states that a proprietary and appropriate ground gas resistant membrane and appropriate venting system shall be installed in all structures that will be entered by people and any structure where there is a potential for gas accumulation if ground gas is present.

Atkins is yet to undertake a detailed ground gas assessment for Phase 70 but this will be necessary in order to specify appropriate gas and vapour protection measures. Such measures will need to be agreed with the relevant regulatory authorities prior to installation.

Conclusions

RRWCC

This RRWCC confirms that in the Monitor's professional opinion, and on the basis of the information provided within the information sources as well as observations made by the Monitor on site during the remediation works, the Monitor is satisfied that the Phase 70 redevelopment remediation works appear to have been completed in general accordance with the purpose, objectives and requirements of Schedule 8 of the Section 106 Agreement, having regard to the specified intended uses, and that the purpose, objectives and requirements of

Schedule 8 of the Section 106 Agreement are likely to continue to be met for the foreseeable future without the need for further remedial action in relation to or affecting the area within the phase boundary.

It should be noted that Phase 70 is hereby certified as a commercial phase, which differs from the residential end-use shown on the current masterplan. If Phase 70 is developed as a residential phase then further redevelopment remediation works may be required. The scope of such works will need to be agreed with the Local Authority as the Monitor will have no formal on-going role to control subsequent works once this RRWCC has been issued.

C

The PWCD will be declared once CDL is satisfied that the remediation necessary for the specified intended uses for the phase has been completed. This report, which is the RRWCC, will be complemented by a RAPWCS in order to provide the information required by CDL to enable the PWCD to be declared.

Limitations

With reference to the masterplan drawing it should be noted that Phase 70 is situated within an area of proposed residential development, whereas it has been declared as a commercial phase. It should be noted that further remediation works will be necessary if the Phase is to be developed for residential purposes.

As discussed in Section 2.4.5 of this report, elevated concentrations of asbestos and visible ACM have been identified within Phase 70. The impacted soils remain in situ. It has been stated that the soils are considered to be acceptable for retention in accordance with the requirements of the Section 106 Agreement because it is assumed that the existing ground level represents FFL minus 1m. However, the Monitor questions whether or not the current ground levels truly represent FFL minus 1m.

It is stated that the area would be subject to further assessment once the final development proposals are confirmed, and this will be necessary if the FFLs or intended use differ from those assumed in this certificate. Furthermore, it is understood that the option of disposing of the impacted soils within woodland elsewhere on the Llandarcy site is being considered. The developer will need to ensure that any such operation does not contravene the relevant regulations in respect of the disposal of waste. In particular, the relevant party would need to seek exemption from the waste regulations by applying the CL:AIRE Code of Practice. Such matters are considered to be outside the scope of the Monitor.

It should also be noted that the asbestos impacted soils are underlain by two disused pipelines which were identified during the site investigations. These pipelines are not considered to represent an active pathway for contamination, but they would need to be removed to comply with the requirements of the Section 106 Agreement if Phase 70 is redeveloped.

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ST. MODWEN DEVELOPMENTS LIMITED - a ST. MODWEN company

Registration England 892832

Park Point, 17 High Street, Longbridge, Birmingham, B31 2UQ

T: 0121 222 9400 **W:** www.stmodwen.co.uk

21st May 2015

Our ref:

Coed Darcy Limited
Dumfries House
Dumfries Place
Cardiff
CF10 3ZF

Dear Sirs

Coed Darcy
Monitor Phase 70
Request for Phase Works Completion Date

We hereby give our written request seeking the declaration of the Phase Works Completion Date for Monitor Phase 70 of Coed Darcy as required under Clause 4.6 of the Remediation Agreement made between Coed Darcy Limited, St. Modwen Developments Limited and St. Modwen Properties PLC dated 23rd May 2008.

The Phase 70 boundary is shown on the attached Drawing No. 5041216-REM-DWG-1951.

The "Intended Use" for Phase 70 is assumed as that of proposed commercial end use.

As required by the Remediation Agreement, we have copied this letter to the Monitor.

Yours faithfully

Neil Williams

For and on behalf of St. Modwen Developments Limited

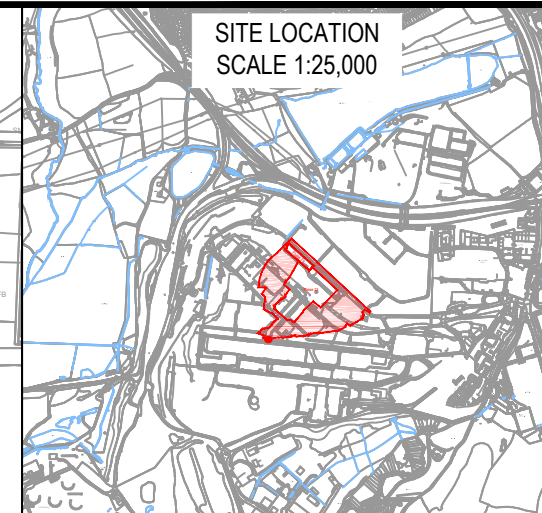
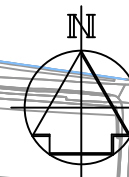
Cc Rhys Mander, Llancoed House, Coed Darcy, Neath, SA11 8AZ

St. Modwen Properties PLC

Head Office & Registered Office: Sir Stanley Clarke House, 7 Ridgeway, Quinton Business Park, Birmingham, B32 1AF

T: [0121] 222 9400 **W:** www.stmodwen.co.uk

Registration: England 349201



SITE LOCATION
SCALE 1:25,000

KEY

MONITOR BOUNDARY PHASE 70

REVISIONS	Drawn By	Checked By	Date

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

Atkins Limited

Telford Office Cornerstone House Stafford Park 13 Telford TF3 3AZ Tel 01952 201234 Fax 01952 200981	©	Birmingham Office The Axis, 10 Holliday Street Birmingham West Midlands B1 1TF Tel 0121 483 5000 Fax 0121 483 5252
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THIS DRAWING IS NOT TO BE SCALED

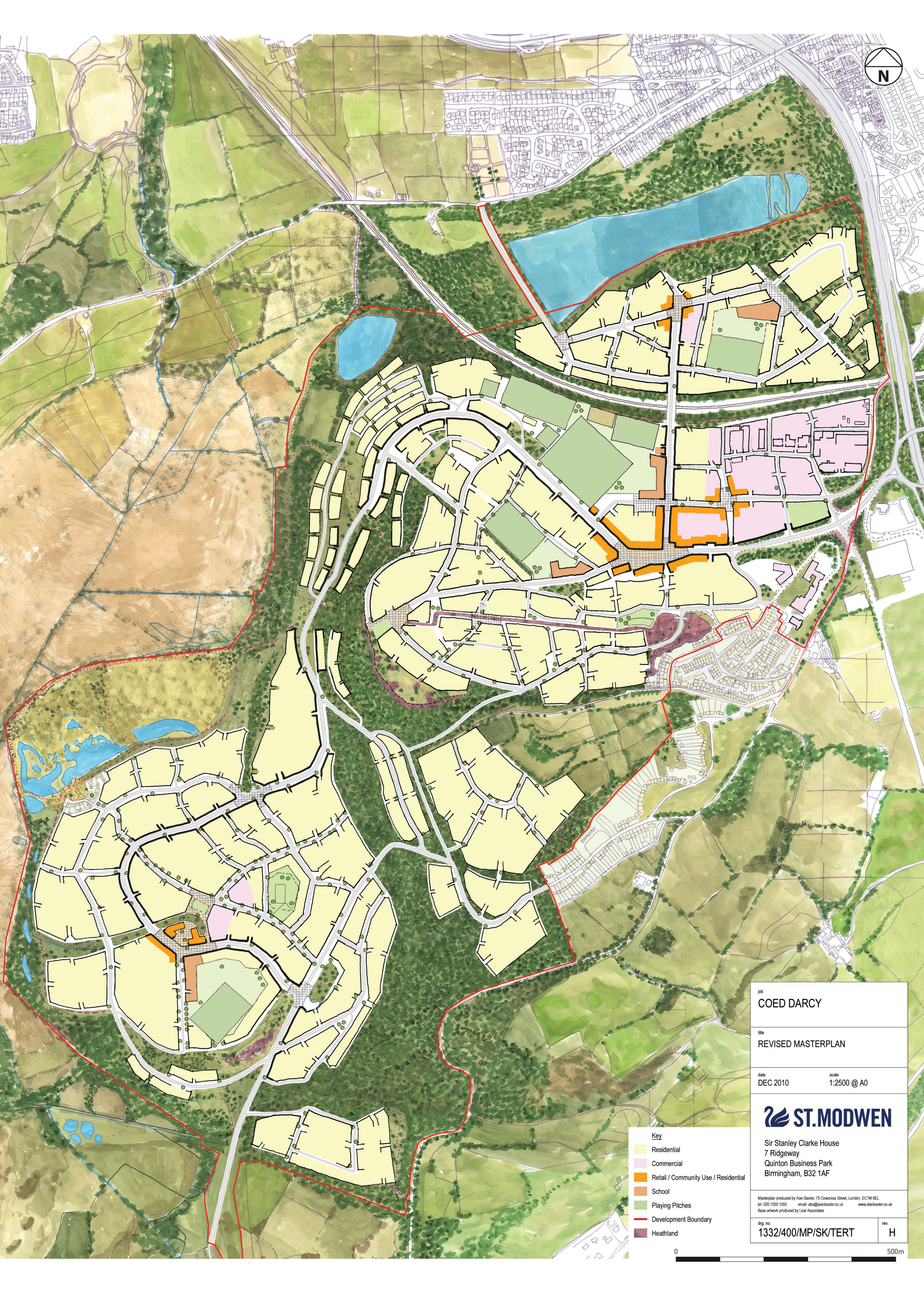
CLIENT **ST.MODWEN**

PROJECT COED DARCY

DRAWING TITLE
MONITOR BOUNDARY PHASE 70

SCALES	DRAWN	CHECKED	CO-ORD CHECK
1:2500	JSD	CS	
	DATE	DATE	DATE
	05.05.15	05.05.15	

DRAWING NO	SHEET	PLOT DATE	REV
5041216-REM-DWG-1951	A3	30.10.15	-



- Key**
- Residential
 - Commercial
 - Retail / Community Use / Residential
 - School
 - Playing Pitches
 - Development Boundary
 - Heathland

job COED DARCY	
title REVISED MASTERPLAN	
date DEC 2010	scale 1:2500 @ A0
 ST.MODWEN	
Sir Stanley Clarke House 7 Ridgeway Quinton Business Park Birmingham, B32 1AF	
Masterplan produced by Alan Baxter, 75 Cowcross Street, London, EC1M 6EL tel: 020 7250 1555 email: aba@alanbaxter.co.uk www.alanbaxter.co.uk Base artwork produced by Lear Associates	
drp. no. 1332/400/MP/SK/TERT	rev. H



***A E I B SC E LE OF T E
SECTION A REE E T***

SCHEDULE 8

Redevelopment Remediation Works

Purpose, objectives and requirements of the Redevelopment Remediation Works

Part 1

1. Purpose and objectives of the Redevelopment Remediation Works

- 1.1 The purpose and objectives of the Redevelopment Remediation Works are the carrying out of all such Remedial Action over and above that actually carried out as part of the RAP Works that is necessary in order to make each part of the Property suitable within the meaning of paragraph 1.2 below for its Intended Use or such other use as may be determined from time to time.
- 1.2 A part of the Property will only be suitable for its Intended Use or such other use as may be determined from time to time if and when the Phase Works Completion Date is declared in respect of that part of the Property.

Part 2

2. Developer's obligations regarding Redevelopment Remediation Works

- 2.1 The Developer shall carry out or procure the carrying out of all Remedial Action necessary in order to achieve the purpose and objectives set out in Part 1 of this Schedule.
- 2.2 The design and specification of the Redevelopment Remediation Works shall take appropriate account of the principles and objectives (as set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Schedule 7 hereto) and the design assumptions of the RAP Works and shall not prejudice the achievement and future sustainability of these principles and objectives of the RAP Works or the RAP Works themselves.
- 2.3 The Redevelopment Remediation Works may reduce the reliance on the RAP Works to achieve the principles and objectives of the RAP Works set out in sub-paragraph 1.3 (including 1.3.1-1.3.5 thereof) of Schedule 7 hereto but must not increase that reliance.
- 2.4 The RBSLs set out in Tables 1 and 2 below and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level to which quality standards are achieved) as also set out in Part 3 below, as the same may be varied in accordance with this Schedule 8, shall be achieved for each part of the Property at the minimum validation frequencies set out in clause 8 of Part 3 (as applicable depending upon whether such part of the Property is intended for use as residential, commercial or recreational land) as a minimum base level standard.
- 2.5 Without prejudice to the requirement to achieve the RBSLs set out in Tables 1 and 2 as a minimum base level standard, the Developer shall ensure that all necessary remediation targets are developed and used to determine the extent and quality of remediation appropriate to the development design and purpose of the Urban Village and the Pre-Transfer Date Contamination.
- 2.6 The Developer shall promptly notify CDL and the Monitor if at any time it or any person acting on its behalf identifies a substance present at, in, on or under the

Property, or has reasonable cause to suspect such presence, for which no RBSL is specified in Tables 1 or 2 of Part 3 below in which case the following procedure shall apply:

- 2.6.1 As soon as reasonably practicable after serving a notice under paragraph 2.6 above, the Developer shall prepare proposals for soil and groundwater RBSLs for the substance identified that are consistent with the purpose and objectives of the Redevelopment Remediation Works as set out in Part 1 of this Schedule and the standards of prevailing Environmental Law and shall provide a copy of such proposals to CDL the Monitor and the Authority. Any such proposal shall contain a detailed statement of the health risk assessment and general methodology from which the proposed RBSLs have been derived.
 - 2.6.2 Not earlier than 10 Working Days after submitting its proposals to CDL the Monitor and the Authority in accordance with sub-paragraph 2.6.1 above, the Developer shall submit a written request to the appropriate Environmental Authorities, copied at the same time to CDL the Monitor and the Authority, for approval of the use of the proposed RBSLs. The Developer shall provide to the appropriate Environmental Authorities with its request copies of the health risk assessment and general methodology referred to in sub-paragraph 2.6.1 above and a copy of this Agreement clearly drawing attention to the purpose, objectives and requirements of the Redevelopment Remediation Works set out therein and the proposed changes thereto.
 - 2.6.3 Each of the Developer, CDL and the Monitor shall be free at any time to make such submissions to the appropriate Environmental Authorities in relation to the Developer's proposals as they see fit, provided such submissions are made in writing and copied to each other and the Authority at the same time.
 - 2.6.4 The Developer shall ensure that the Redevelopment Remediation Works achieve compliance with any RBSLs approved in writing by the appropriate Environmental Authorities pursuant to this paragraph 2.6, as if they were also set out in Tables 1 and 2 of Part 3 of this Schedule.
- 2.7 The Developer may at any time propose variations to the requirements of clauses 3 to 8 inclusive of this Schedule 8 below to the appropriate Environmental Authorities and to the Authority pursuant and to the extent required to comply with the Planning Permission to take account of changes of circumstances since the date of this Agreement, provided no variation shall be proposed that is in any way prejudicial to the achievement of the purpose and objectives of the Redevelopment Remediation Works as set out in Part 1 above and, in particular, the achievement of the RBSLs set out in Tables 1 and 2 above (as previously amended in accordance with paragraph 2.6 above if applicable) and provided further that
- 2.7.1 Any such proposals shall be submitted in writing to CDL the Monitor and the Authority at least 10 Working Days before they are submitted to any Environmental Authority;
 - 2.7.2 Any such proposal submitted to any Environmental Authority shall be copied to CDL the Monitor and the Authority at the same time;
 - 2.7.3 The Developer shall enclose a copy of this Agreement with any such proposal made to any Environmental Authority clearly drawing attention to the

purpose, objectives and requirements of the Redevelopment Remediation Works set out therein and the proposed changes thereto;

- 2.7.4 Each of the Developer, CDL and the Monitor shall be free to make such submissions to the appropriate Environmental Authorities in relation to the Developer's proposals as they see fit, provided such submissions are made in writing and copied to each other and the Authority at the same time.
 - 2.7.5 Subject to paragraph 2.7.6 no such proposed variation shall be implemented unless, it has been approved in writing by the appropriate Environmental Authorities in accordance with the requirements of this clause 2.7.
 - 2.7.6 If the Developer has only oral approval (or non objection) to a proposed variation from the relevant Environmental Authorities, no such proposed variation shall be implemented unless the Developer notifies the relevant Environmental Authorities in writing (copied at the same time to CDL the Monitor and the Authority) that it proposes to proceed with the implementation of the proposed variation to the Redevelopment Remediation Works 10 Business Days after the date of such notice and no written objections of any relevant Environmental Authority are received within such 10 Business Day period in respect of the same.
 - 2.7.7 Any reference in this Agreement to the Redevelopment Remediation Works shall be to the Redevelopment Remediation Works as varied in accordance with this paragraph 2.
- 2.8 The Developer shall, and shall procure that any person acting on its behalf in relation to any aspect of the Redevelopment Remediation Works required by this Schedule 8 shall, at all times comply with the requirements of Schedule 10 (General Remediation Requirements).

Part 3

Table 1 – Summary of Soil RBSLs

Contaminant	Land-Use Specific Soil RBSL Surface to 1m below FFL (mg/kg) ¹			Land-Use Specific RBSL Soil below 1m depth (mg/kg)		
	Residential	Commercial	Recreational	Residential	Commercial	Recreational
METALS & METALLOIDS						
Arsenic	64	500	64	-	-	-
Cadmium	2.6	1400	2.6	-	-	-
Chromium	130	5000	200	-	-	-
Mercury	1	480	1	-	-	-
Nickel	50	5000	75	-	-	-
Selenium	3	8000	3	-	-	-
Lead	337	750	337	-	-	-
Vanadium	416	16000	640	-	-	-
Copper	478	-	478	-	-	-
Zinc	200	-	200	-	-	-
ORGANIC SPECIES						
Benzene	0.12	5	13	0.4	5	48
Benzo(a)pyrene ²	0.9	29	0.9	none	none	none
Toluene	36	1160	8110	52	389	none
Ethylbenzene	41	122000	4740	140	none	none
Xylenes	32	121000	7940	58	none	none
1,2-Dichloroethane	0.04	2	4.5	0.1	0.65	6
Dichloromethane	5	1650	241	84	665	6220
Tetrachloroethene	11	1050	641	34	368	1780
Trichloroethene	1	84	193	2	28	269
Vinyl Chloride	0.01	4	0.7	0.04	1.6	16
1,2 Dichloroethene	4	273	632	7	91	881
1,1,1-Trichloroethane	154	577000	27900	160	3250	none
TPH Aromatic EC>C7-C8	125	1840	21337	146	617	none
TPH Aromatic EC>C8-C10	94	913	4025	257	547	none
TPH Aromatic EC>C10-C12	118	26515	4589	1394	none	none
TPH Aromatic EC>C12-C16	131	64875	4799	none	none	none
TPH Aromatic EC>C16-C21	82	51449	3639	none	none	none
TPH Aromatic EC>C21-C35	1130	51449	3639	none	none	none

TPH Aliphatic EC>C6-C8	8335	8517587	606191	none	none	none
TPH Aliphatic EC>C8-C10	112	158890	12075	158	none	none
TPH Aliphatic EC>C10-C12	3204	163360	12094	none	none	none
TPH Aliphatic EC>C12-C16	4513	169032	12117	none	none	none
TPH Aliphatic EC>C16-C21	94174	3429944	242573	none	none	none
TPH Aliphatic EC>C21-C35	94820	3429944	242573	none	none	none
Total TPH (Phase 1) ³	1717	81413	9061	9182	81956	none
Total TPH (Process Area) ³	2601	44344	10830	4098	35014	none
Total TPH (North Tank Farm) ³	1104	25875	9419	3802	13974	none
Total TPH (South Tank Farm) ²	1015	37230	6349	2792	34797	none
ASBESTOS						
Sum of all Types of ACM	200	300	200	200 ⁴	-	-

“-“ value not applicable to scenario

“none” RSBL value exceeds soil saturation limits and free phase assessment appropriate

¹ Lower value of human health RBSL or Soil Code value if higher than background LCL value (applicable to metals & metalloids only)

² Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach

³ ‘Total’ TPH RBSL derived for an area of development, based on individual RBSLs provided and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach.

⁴ See text below for specification of relevant depth ranges

Table 2 – Summary of RBSLs for Groundwater

Contaminant	Land-Use Specific RBSL (mg/l)		
	Residential	Commercial	Recreational
TPH Aliphatic EC>C6-C8	none	none	none
TPH Aliphatic EC>C8-C10	none	none	none
TPH Aliphatic EC>C10-C12	none	none	none
TPH Aliphatic EC>C12-C16	none	none	none
TPH Aliphatic EC>C16-C21	none	none	none
TPH Aliphatic EC>C21-C35	none	none	none
TPH Aromatic EC>C7-C8	20	97	none
TPH Aromatic EC>C8-C10	22	none	none
TPH Aromatic EC>C10-C12	none	none	none
TPH Aromatic EC>C12-C16	none	none	none
TPH Aromatic EC>C16-C21	none	none	none
TPH Aromatic EC>C21-C35	none	none	none
Benzene	0.7	6	198
Benzo(a)pyrene	none	none	none
Toluene	47	229	none
Ethylbenzene	102	506	none
Xylenes	43	607	none
1,2-Dichloroethane	0.2	0.82	45
Dichloromethane	150	624	none
Tetrachloroethene	22	115	none
Trichloroethene	2.6	13	813
Vinyl Chloride	0.06	0.3	18
1,2-Dichloroethene	15	68	none
1,1,1-Trichloroethane	193	989	none

“none”= theoretical RBSL greater than solubility limit

3. Scale of aesthetic criteria

Table 3 – Scale of aesthetic criteria

Class	Visual	Olfactory
0	No visible staining of soil, no visible suspect ACM	No detectable odour on soil
1	Occasional staining of soil, no visible suspect ACM	Faint odour on soil
2	Frequent staining of soil	Distinct but not strong odour on soil
3	Occasional heavy staining of soil	Strong odour on soil
4	Heavy staining of soil	Strong odour discernable in ambient air
5	Visible hydrocarbon product	Overwhelming Odour

3.1 Visible suspect ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.

3.2 All references in Table 1 above to depths to which minimum RBSLs are to be achieved are expressed below, relative to FFL following completion of construction of the intended Urban Village.

4. Residential End-Use where Groundwater is Primarily in Rock

4.1 This remediation scenario is intended to refer to residential end-use in areas where there is limited soil material over bedrock, little perched groundwater is present in that soil, and the water table is normally first encountered in bedrock. Areas of the Property with these characteristics include the more elevated parts of the former process area and of the southern tank farm. The minimum Remedial Action required in this scenario is as follows:

4.2 All oil saturated soil should be removed.

4.3 All soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs at the relevant depth relative to FFL and the aesthetic criteria Class 2 or better at greater than 1m below FFL.

4.4 The aesthetic quality of soils shall be Class 1 or better for at least the first metre below FFL.

4.5 Soils where there is visible ash and clinker, or metal concentrations above RBSLs, are to be removed so that none is retained within the first metre below FFL in garden areas.

4.6 Where it is not practicable to address groundwater contamination within bedrock this must be controlled, e.g. where seeps, sheens and iron staining discharge from the bedrock. Acceptable methodologies for remediation may include, but are not limited to, the use of land drainage via interceptors. Control measures should result in no visible discharge at surface and little or no odour observable.

4.7 All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces

of ACM, the appropriate ACM RBSL, or to meet the requirements of relevant Environmental Authorities, whichever is the more conservative.

5. Residential End-Use where Groundwater is in soil

- 5.1 This remediation scenario is intended to refer to residential end-use in areas where there is sufficient soil material over bedrock to commonly contain perched groundwater such that the water table is normally first encountered in soil. Areas of the Property with these characteristics include the lower parts of the former process area and of the southern tank farm and the north site tank farm. The minimum Remedial Action required in this scenario is as follows.
- 5.2 All oil saturated soils and free product shall be removed.
- 5.3 Soils must be remediated so as to meet the RBSLs for TPH, BTEX and PAHs to a minimum depth of 0.5m below the likely seasonal minimum groundwater depth following development of the intended Urban Village. This depth is to be established by consideration of all available groundwater level monitoring data relevant for each area. All soil must meet aesthetic criteria Class 2 or better to the same depth.
- 5.4 All soil must meet aesthetic criteria Class 1 or better to at least 1m below FFL.
- 5.5 Soils where there is visible ash and clinker or metal concentrations above RBSLs to be replaced to at least 1m below FFL.
- 5.6 All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces of ACM, the appropriate ACM RBSL, or the requirements of relevant Environmental Authorities, whichever is the more conservative, to a minimum depth of 2m below FFL.
- 5.7 Where there is a risk of the migration in ground of hazardous gas or vapour or contaminated liquid into remediated areas, the Developer shall take all necessary measures appropriate to prevent this occurring, including monitoring whatever measures are put in place after their installation to continue to demonstrate their effectiveness. Such measures could include the installation of interception trenches and management of discharge from these.
- 5.8 Where necessary, seeps, sheens and iron rich discharges from the bedrock must be permanently controlled such that there is no visible discharge at surface and little or no odour detectable. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

6. Commercial End-Use where Groundwater is in soil

- 6.1 This remediation scenario is intended to refer to commercial end-use in areas where there is sufficient soil material over bedrock to commonly contain perched groundwater such that the water table is normally first encountered in soil. The area identified for commercial development in the Masterplan is the lower part of the former process area, which in general terms has these characteristics. Based on the Masterplan, no commercial developments are currently envisaged where groundwater is primarily encountered only in rock; in the event such development is proposed, Remedial Action consistent with the standards specified below would be required, adapted as necessary to local conditions.

- 6.2 All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2 m FFL or 0.5 m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.
- 6.3 All soils must meet the RBSL for TPH to at least 1m below FFL.
- 6.4 All soils must meet in bulk, considering both dispersed fibres and pieces of ACM”, the RBSL for ACM to at least 1m below FFL and any visible ACM encountered during construction in the first 1m below FFL is to be removed.
- 6.5 Where there is a risk of the migration in ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.
- 6.6 Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.

7. Public Open Space

- 7.1 The Developer shall remediate areas of the Property which will not be developed for residential or commercial end-uses based on those areas falling into one of the following three broad categories of land-use:
- 7.1.1 Well managed parks and public gardens;
- 7.1.2 More lightly managed areas where public access is encouraged;
- 7.1.3 Areas to which access is discouraged but occasional access and/or trespassing is possible.
- 7.2 The degree of protection that will need to be afforded to people will be largely dependent upon how the access to these areas is encouraged/discouraged and managed. For guidance only, access may be discouraged by physical barriers such as fencing, or vegetation, or actively managed by the provision of walkways along which controlled access is encouraged. The topography of the site may encourage children to use bikes, potentially causing rutting of the ground surface and exposing soils at depth. Detailed designs in this regard will be prepared by the Developer approved by CDL and agreed with the Environmental Authorities to (i) protect human health considering the reasonably anticipatable use of the land (ii) achieve the relevant RBSLs (recreational RBSLs being provided in Table 1 above) to an appropriate depth and (iii) include an appropriate scheme of validation testing.

8. Validation

- 8.1 As a minimum validation of RBSL's will be required to include:
- 8.1.1 Determining the necessary extent of remedial excavations: this will be the responsibility of the Developer;

- 8.1.2 Quality assurance of imported materials, including testing of imported materials for contamination if it is intended to use reclaimed aggregates, top soil, etc: this will be the responsibility of the Developer, however, CDL may elect to validate such materials in-situ, once they are finally placed for construction;
- 8.1.3 Quality assurance of soils treated on the site for re-use: this will be the responsibility of the Developer, however, CDL will validate such materials in-situ, once they are finally placed for construction, and;
- 8.1.4 Quality assurance of soils for which no remedial works are identified: this will be the responsibility of the Developer, however, CDL will validate such materials.

8.2 As a minimum, sampling at the following frequencies should be undertaken.

Table 4 - Minimum Validation Testing Frequencies.

Testing for the Validation Suite at the following frequency:	Shallow Soils (Residential <1m FFL)	Deeper Soils (Residential >1m below FFL)	Soils (Commercial all relevant depths)
Imported quarried material	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples	1 per 1000m ³ ex situ, composite of 5 regular sub-samples
Imported soil from verified greenfield site	1 per 250m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples	1 per 500m ³ ex situ, composite of 5 regular sub-samples
Imported soil from characterised brownfield site ¹	1 per 25m ³ ex situ, composite of 5 sub-samples	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples
0.5-1m below FFL in-situ	Regular grid of 1 per 50m ² , sample over 0.5m depth	n/a	Regular grid of 1 per 400m ² , sample over 0.5m depth
>1m below FFL in-situ	n/a	Regular grid of 1 per 100m ² , sample over 1m depth	Regular grid of 1 per 400m ² , sample over 0.5m depth
Stockpiled excavated site materials for re-use	1 per 50m ³ ex situ, composite of 5 sub-samples	1 per 100m ³ ex situ, composite of 5 sub-samples	1 per 400m ³ ex situ, composite of 5 sub-samples
Face of remedial excavations <1m deep	1 per 10m, minimum of 1 per face, worst case VO sample	n/a	1 per 15m, minimum of 1 per face, worst case VO sample
Face of remedial excavations >1m deep	n/a	1 per 10m ² , minimum of 1 per face, worst case VO sample	1 per 15m ² , minimum of 1 per face, worst case VO sample
Along redundant service excavations	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample	1 per 20m of trench, worst case VO sample
Soil treated ex-situ and homogenised	1 per 200m ³ , composite of 5 regular sub-samples	1 per 200m ³ , composite of 5 regular sub-samples	1 per 500m ³ , composite of 5 regular sub-samples

¹ Validation suite to reflect prior use of the originating brownfield site and the design and purpose of the relevant area of Coed Darcy.

VO = visual / olfactory (ie aesthetic) observation

- 8.3 The quality of all material placed as fill and/or remaining in-situ post-construction of the Urban Village must as a minimum meet the relevant RBSLs and aesthetic standards at the frequencies set out above (in either case as the same may be amended in accordance with this Schedule).
- 8.4 In all circumstances, CDL and/or the Monitor may at its discretion take additional samples if it has reason to suspect that material may not meet the relevant RBSLs and

aesthetic standards (in either case as the same may be amended in accordance with this Schedule).

- 8.5 All validation samples obtained by CDL and/or the Monitor whether according to the above frequencies or on a discretionary basis must on analysis be of the same or better quality than the relevant RBSLs and meet or exceed the relevant aesthetic criteria (in either case as the same may be amended in accordance with this Schedule).

A E I C I FOR ATIO SO RCES

***A E I RE ESTS FOR
I FOR ATIO RFI***

Contract Name:	Coed Darcy Monitor	RFI No:
Contract Number:	GNP/NJR/13773-2	Date Raised: 25 June 2015
Subject:	Review of Atkins' Validation Report for Monitor Phase 70	
To:	Michelle Lee	Atkins
Cc:	Mike Poland	Atkins
From:	Rhys Mander	AECOM

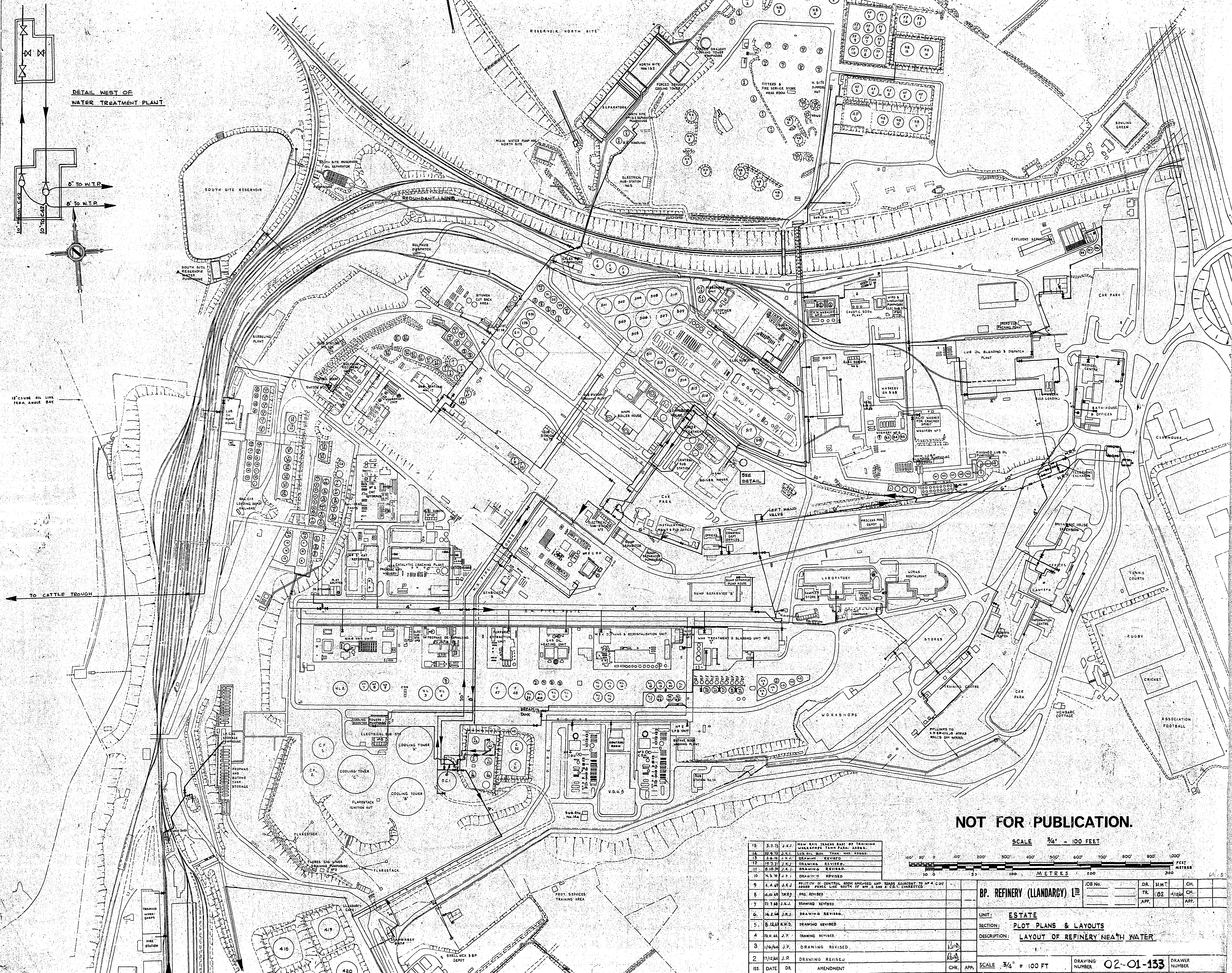
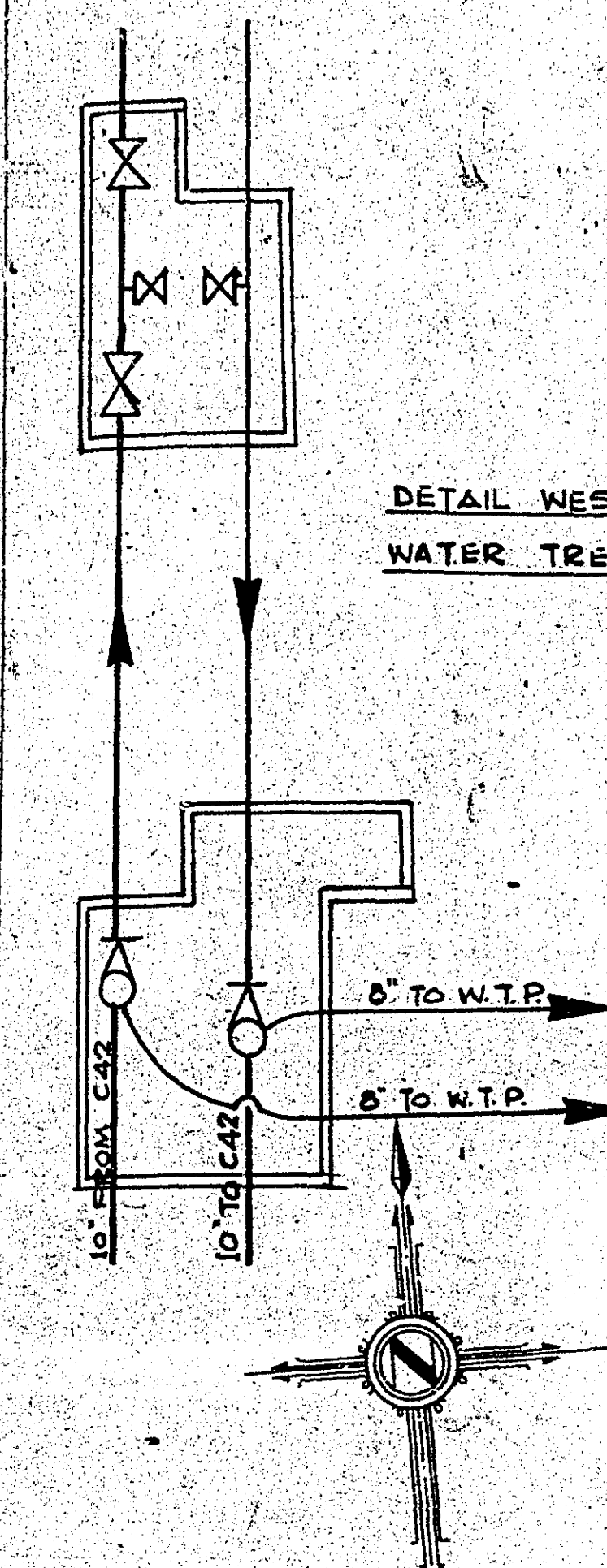
Comments

The following queries are raised in relation to Atkins' Validation Report for Monitor Phase 70 (report ref. 5041216-OSW-RPT-0001394):

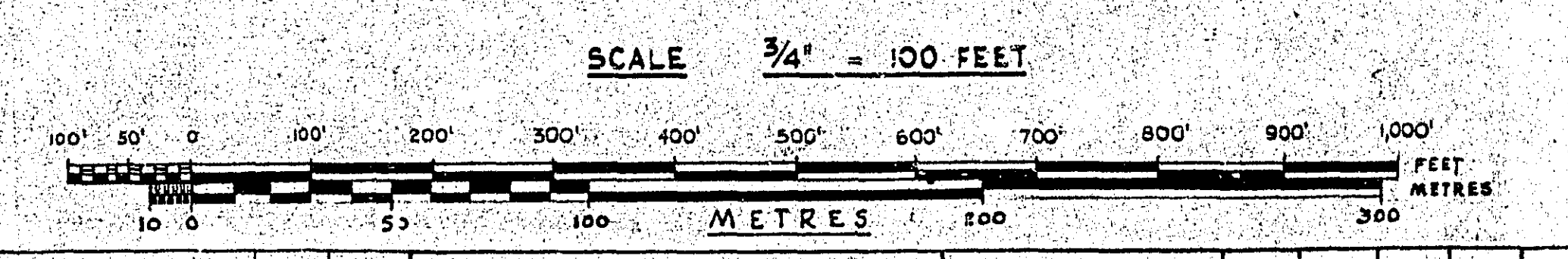
- With reference to the phase boundary drawing it is noted that there is a gap between Phase 70 and Phase 31, which has already been certified.
- Section 1.1 - The report states that the intended use is commercial whereas the masterplan indicates that the phase shall comprise residential plots. Should the intended use change after the Monitor's RRWCC has been issued, then it should be noted that further validation and possibly further remediation work is likely to be required.
- Section 2.2 - The historical land use has not been fully described. For example the electrical substation to the east and stabiliser building to the south are not mentioned.
- Section 2.4.2 - No mention is made of other surface water bodies in the surrounding area including Crymlyn Bog and the Containment Area lagoons.
- Section 3.1.1 – The report states that historical ground investigations included the excavation of 36 exploratory holes within the Phase. However it is unclear from Drawing 5041216-REM-DWG-1953 exactly which of the exploratory holes are being referred to as there appears to be more than 36 locations shown within the phase boundary.
- Section 5.1 - This section states that 326 machine excavated trial pits were completed across the Phase however this does not correspond to the number presented on Drawing 5041216-REM-DWG-1954. Trial pit names are also not visible on this drawing.
- Section 5.2 - This section states that two trial pits were terminated on bedrock at ground level. However trial pit logs show more than two to have been terminated at ground level. The logs do not show a different reason for termination of these other trial pits.
- Section 5.2 - Pipework containing free product was encountered at TPE3701, but the report only makes mention of this in TPE3632.
- Section 5.3 - This section states that 764 soil samples were submitted for analysis but 757 results are presented. The samples also appear to have been analysed for only 259 trial pits rather than the 326 trial pits excavated.
- Elevated concentrations of Aliphatics >C5-C6 are marked in red on the presented results but this is not discussed in the report.
- No MCERTs have been included in this report.
- It is noted that further remediation works are required in order to satisfy the requirements of the Section 106 Agreement. It should be noted that the RRWCC will only be issued once these works have been completed and appropriately validated.
- The finalised validation report will need to include a topographical record of the ground profile pre-investigation, at the base of the remediation excavation and the finished ground profile.

Date: 25 June 2015

A E I E HISTORICAL A S

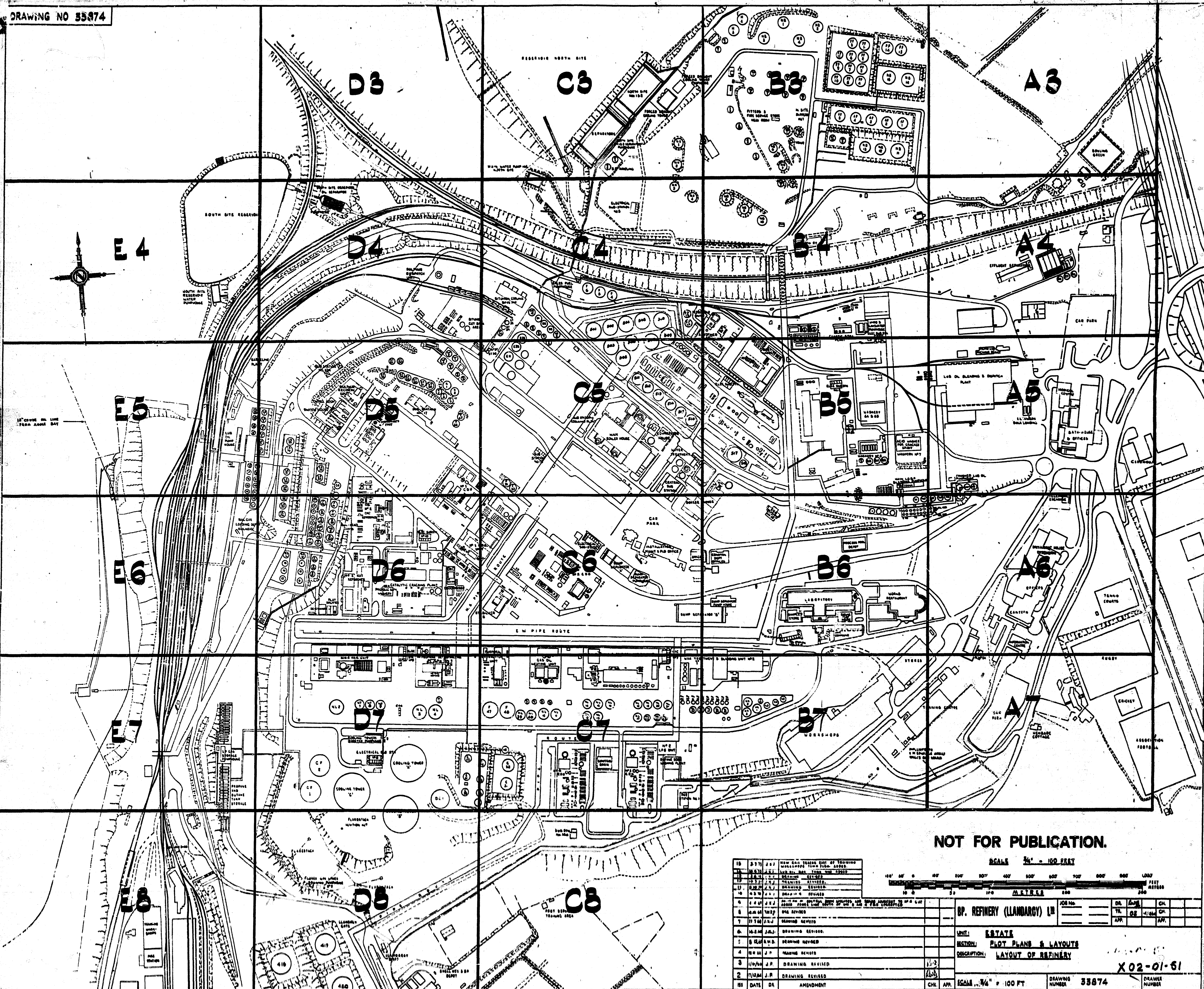


NOT FOR PUBLICATION.



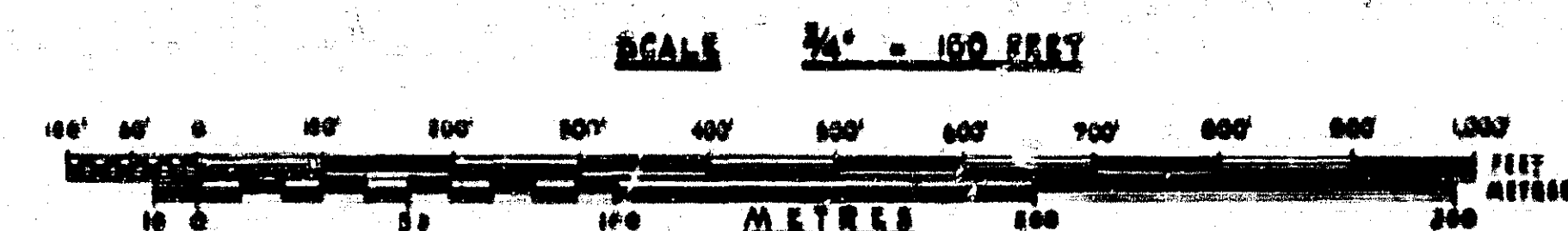
15	3.7.71	J.K.J.	NEW RAIL TRACKS EAST OF TRAINING WORKSHOPS TANK PARK ADDED.
14	22.9.70	J.K.J.	LUB OIL BLENDING TANKS ADDED.
13	3.6.70	J.K.J.	DRAWING REVISED.
12	12.7.71	J.K.J.	DRAWING REVISED.
11	8.10.70	J.K.J.	DRAWING REVISED.
10	24.3.70	J.K.J.	DRAWING REVISED.
9	4.4.69	J.K.J.	REVISION TO CENTRAL ROAD ADDED AND ROAD ADJACENT TO NO. 4 COR. ADDED FENCE LINE SOUTH OF NO. 3 AND A.C.B. CORRECTED.
8	10.10.68	J.K.J.	ORIG. REVISED.
7	21.7.68	J.K.J.	DRAWING REVISED.
6	14.2.68	J.K.J.	DRAWING REVISED.
5	3.12.67	R.W.D.	DRAWING REVISED.
4	23.11.66	J.P.	DRAWING REVISED.
3	1/6/64	J.P.	DRAWING REVISED.
2	7/12/64	J.P.	DRAWING REVISED.
1	DATE	DR.	AMENDMENT

BP. REFINERY (LLANDARCY) LTD		JOB NO.	DR.	H.M.T.	CH.
UNIT: ESTATE		TR.	OS	4/7/64	CH.
SECTION: PLOT PLANS & LAYOUTS		APP.			APP.
DESCRIPTION: LAYOUT OF REFINERY NEATH WATER					
SCALE 3/4" = 100 FT		DRAWING NUMBER	02-01-133		
		DRAWER NUMBER			

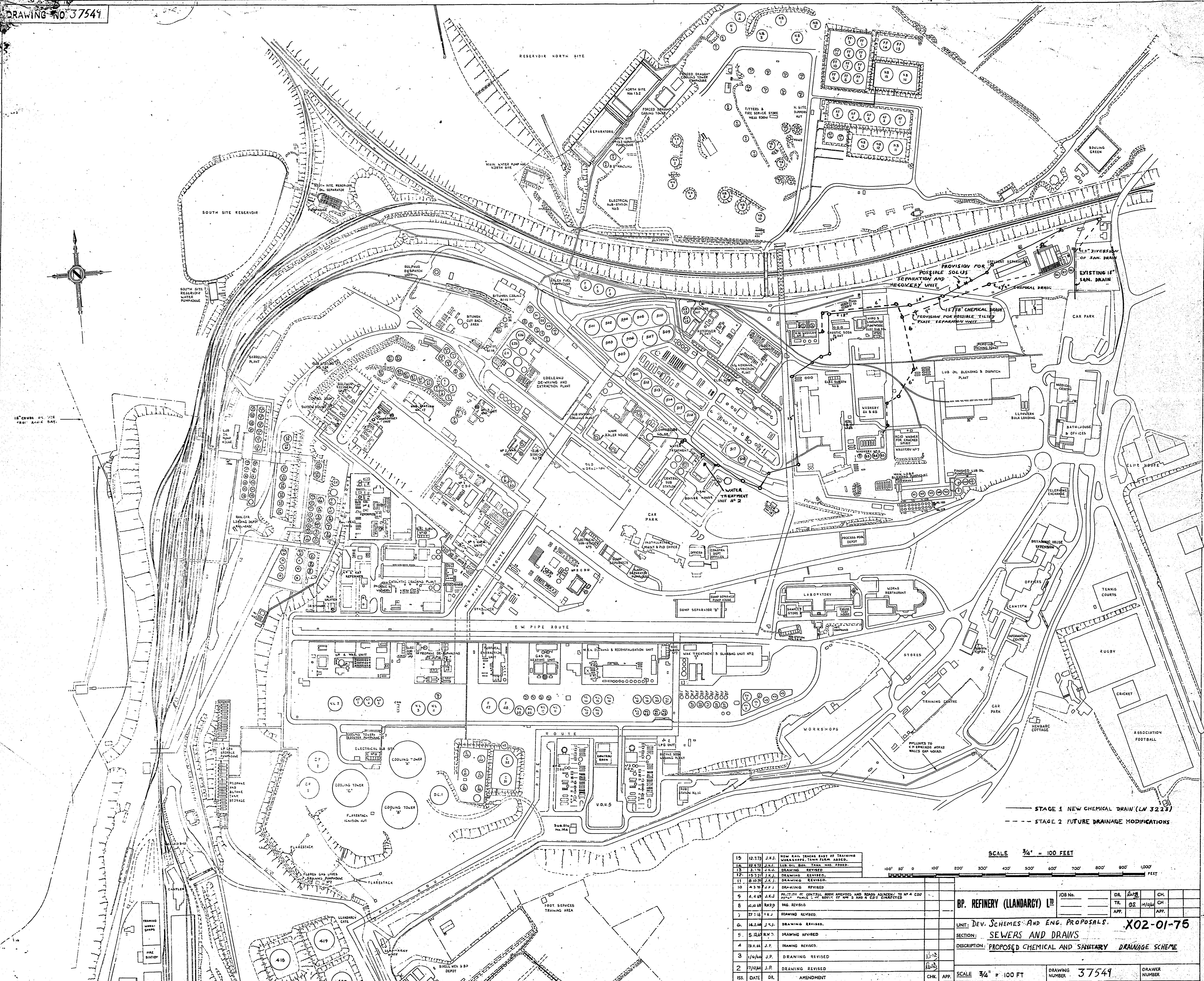


NOT FOR PUBLICATION.

NO	DATE	BY	DESCRIPTION
1	5/31/51	J.P.	NEW GAS TANKS EAST OF TANKING WORKSHOPS FROM TANK AREA
2	6/24/51	J.P.	DRAWING REVISED
3	7/1/51	J.P.	DRAWING REVISED
4	7/1/51	J.P.	DRAWING REVISED
5	7/1/51	J.P.	DRAWING REVISED
6	7/1/51	J.P.	DRAWING REVISED
7	7/1/51	J.P.	DRAWING REVISED
8	7/1/51	J.P.	DRAWING REVISED
9	7/1/51	J.P.	DRAWING REVISED
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13	7/1/51	J.P.	DRAWING REVISED
14	7/1/51	J.P.	DRAWING REVISED
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66	7/1/51	J.P.	DRAWING REVISED
67	7/1/51	J.P.	DRAWING REVISED
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69	7/1/51	J.P.	DRAWING REVISED
70	7/1/51	J.P.	DRAWING REVISED
71	7/1/51	J.P.	DRAWING REVISED
72	7/1/51	J.P.	DRAWING REVISED
73	7/1/51	J.P.	DRAWING REVISED
74	7/1/51	J.P.	DRAWING REVISED
75	7/1/51	J.P.	DRAWING REVISED
76	7/1/51	J.P.	DRAWING REVISED
77	7/1/51	J.P.	DRAWING REVISED
78	7/1/51	J.P.	DRAWING REVISED
79	7/1/51	J.P.	DRAWING REVISED
80	7/1/51	J.P.	DRAWING REVISED
81	7/1/51	J.P.	DRAWING REVISED
82	7/1/51	J.P.	DRAWING REVISED
83	7/1/51	J.P.	DRAWING REVISED
84	7/1/51	J.P.	DRAWING REVISED
85	7/1/51	J.P.	DRAWING REVISED
86	7/1/51	J.P.	DRAWING REVISED
87	7/1/51	J.P.	DRAWING REVISED
88	7/1/51	J.P.	DRAWING REVISED
89	7/1/51	J.P.	DRAWING REVISED
90	7/1/51	J.P.	DRAWING REVISED
91	7/1/51	J.P.	DRAWING REVISED
92	7/1/51	J.P.	DRAWING REVISED
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95	7/1/51	J.P.	DRAWING REVISED
96	7/1/51	J.P.	DRAWING REVISED
97	7/1/51	J.P.	DRAWING REVISED
98	7/1/51	J.P.	DRAWING REVISED
99	7/1/51	J.P.	DRAWING REVISED
100	7/1/51	J.P.	DRAWING REVISED



BP. REFINERY (LANBARGY) 12		JOB NO.	DR.	CHK.
UNIT: ESTATE		TR.	DR.	CHK.
SECTION: PLOT PLANS & LAYOUTS		APP.	APP.	APP.
DESCRIPTION: LAYOUT OF REFINERY		X 02-01-51		
SCALE: 1/4" = 100 FT	DRAWING NUMBER: 33874	DRAWER NUMBER		



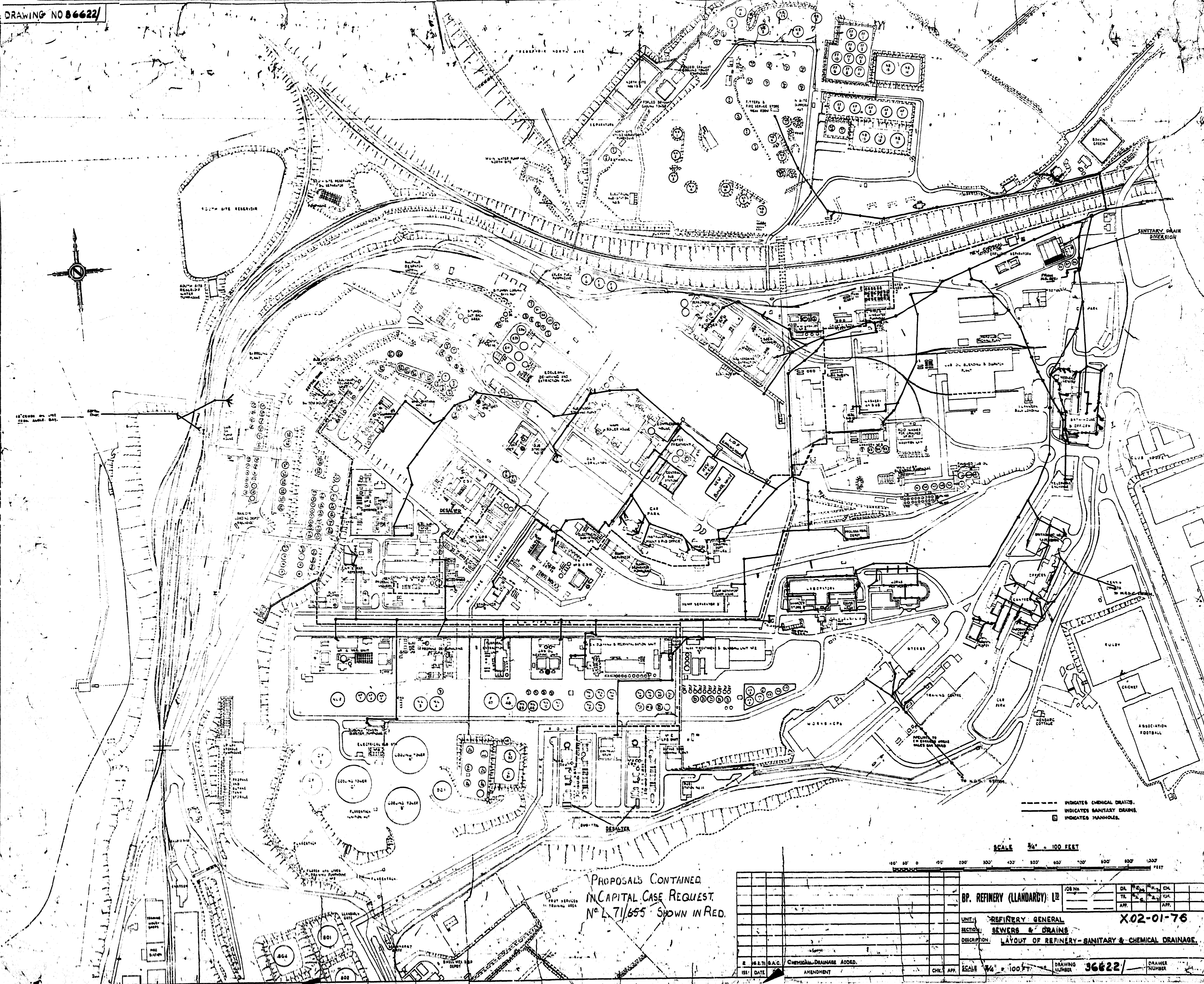
— STAGE 1 NEW CHEMICAL DRAIN (LN 3223)
 - - - STAGE 2 FUTURE DRAINAGE MODIFICATIONS

SCALE 3/4" = 100 FEET

15	12.7.73	J.K.J.	NEW RAIL TRACKS EAST OF TRAINING WORKSHOPS, TANK FARM, ADDED.
14	22.9.72	J.K.J.	LUB OIL BKG. TANK HAS ADDED.
13	3.1.72	J.K.J.	DRAWING REVISED.
12	10.7.71	J.K.J.	DRAWING REVISED.
11	8.10.70	J.K.J.	DRAWING REVISED.
10	4.3.70	J.K.J.	DRAWING REVISED.
9	4.4.69	J.K.J.	POSITION OF CONTROL ROOM AMPLIFIED AND ROADS ADJACENT TO NO. 4 CDU ADDED. FENCE L. OF ROAD OF NO. 3 AND 4 CDUs CHANGED.
8	6.10.68	R.M.D.	DWG. REVISED.
7	27.1.68	J.K.J.	DRAWING REVISED.
6	16.2.66	J.K.J.	DRAWING REVISED.
5	5.12.65	R.M.D.	DRAWING REVISED.
4	23.8.64	J.P.	DRAWING REVISED.
3	1/6/64	J.P.	DRAWING REVISED.
2	7/12/64	J.P.	DRAWING REVISED.
155	DATE	DR.	AMENDMENT

BP. REFINERY (LLANDARCY) LTD. JOB No.
 UNIT: DEV. SCHEMES AND ENG. PROPOSALS. X02-01-75
 SECTION: SEWERS AND DRAINS
 DESCRIPTION: PROPOSED CHEMICAL AND SANITARY DRAINAGE SCHEME

SCALE 3/4" = 100 FT. DRAWING NUMBER 37549. DRAWER NUMBER



PROPOSALS CONTAINED
IN CAPITAL CASE REQUEST
Nº L 71/655 SHOWN IN RED.

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