GEOSHIELD Verification Report

PROJECT REFERENCE:	GEO101436
REPORT NUMBER:	010
PROJECT:	GCL - Clarendon Road PHASE 3
PROJECT ADDRESS:	Clarendon Road

Hornsey

N8 0JU

MEMBRANE SPECIFICATION:	Gas membrane to specification BS8485 2015

Installed to CIRIA 735

Pudlo GP Ultra+ Gas Barrier

Pudlo GP Ultra Tape

Pudlo GP Ultra EXT Tape

Pudlo Liquid Gas Barrier

GEOSHIELD
Verification
PLAN

SPECIFICATION:

INFORMATION INCLUDED:

Material specification technical data sheets

5192204/P3_RemStrat Rev0.4

W257-PUD-D1-00-DR-S-02-1000

W257-PUD-D2-00-DR-S-02-1001

W257-PUD-D3-FN-DR-S-02–1002

W257-PUD-D3-XX-DR-S-02-1005

W257-PUD-D3-XX-DR-S-05-1000

W257-PUD-D4-00-DR-S-01-1006

W257-PUD-D4-BL-DR-S-02-1003

W257-PUD-DD-XX-DR-S-03-0001 to W257-PUD-DD-XX-DR-S-03-0024

W257-PUD-DD-XX-SK-S-03-0001 to W257-PUD-DD-XX-SK-S-03-0003

Information brought forward from the Pre Verification Plan. Any alterations to the orignaally

submitted design should be made aware to Geoshield

GEOSHIELD Verification Report

VERIFICATION OFFICER: Jake Purdie

VERIFICATION COMPANY: GeoShield Limited

Icon Business Park, 4100 Park Approach

Thorpe Park, LEEDS

West Yorkshire

LS15 8GB

CONTACT NUMBER: 07393712648

EMAIL ADDRESS: Jpurdie@Geoshield.co.uk

ORDER NUMBER:

PER VISIT: YES: ☑ NO: ☐ PROJECT: YES: ☐ NO: ☑

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CLIENT DETAILS

CLIENT CONTACT:	Rohallah De Sousa
CONTACTS ROLE:	Ground Construction Ltd
MOBILE PHONE:	02082387000
EMAIL ADDRESS:	RohallahDeSousa@GroundConstruction.com

CLIENT CONTACT:	
CONTACTS ROLE:	
MOBILE PHONE:	
EMAIL ADDRESS	
NOTES:	
NOTES:	
NOTES:	

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APPLICATION TEAM LEADERS

APPLICATOR NAME:	Ermal
COMPANY:	GCL - Site Engineer
APPLICATOR TEL:	07479553833
APPLICATOR EMAIL:	

APPLICATOR NAME:	Adrian Toderasc
COMPANY:	GCL
APPLICATOR TEL:	
APPLICATOR EMAIL:	

NOTES: Installers have been toolbox talked by Geoshield during Visit no.6.

NOTES: The application standard will be monitored throughout and during each

NOTES: future inspection visits.

NOTES: Further training will be provided if deemed necessary.

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AREA SURVEYED: Block D1 - Pour 5 + Pour 2.

Block D2 - All pours verified.

SITE CONDITIONS:

WEATHER: Overcast - wet.

TEMPERATURE: 11c.

MEMBRANE TEMPERATURE: N/A

RELATIVE HUMIDITY: N/A

TIME: 14:00 - 16:30. REPORT NUMBER: 010.

DATE: 15/02/2021

ACCOMPANIED Ermal - GCL Site Engineer

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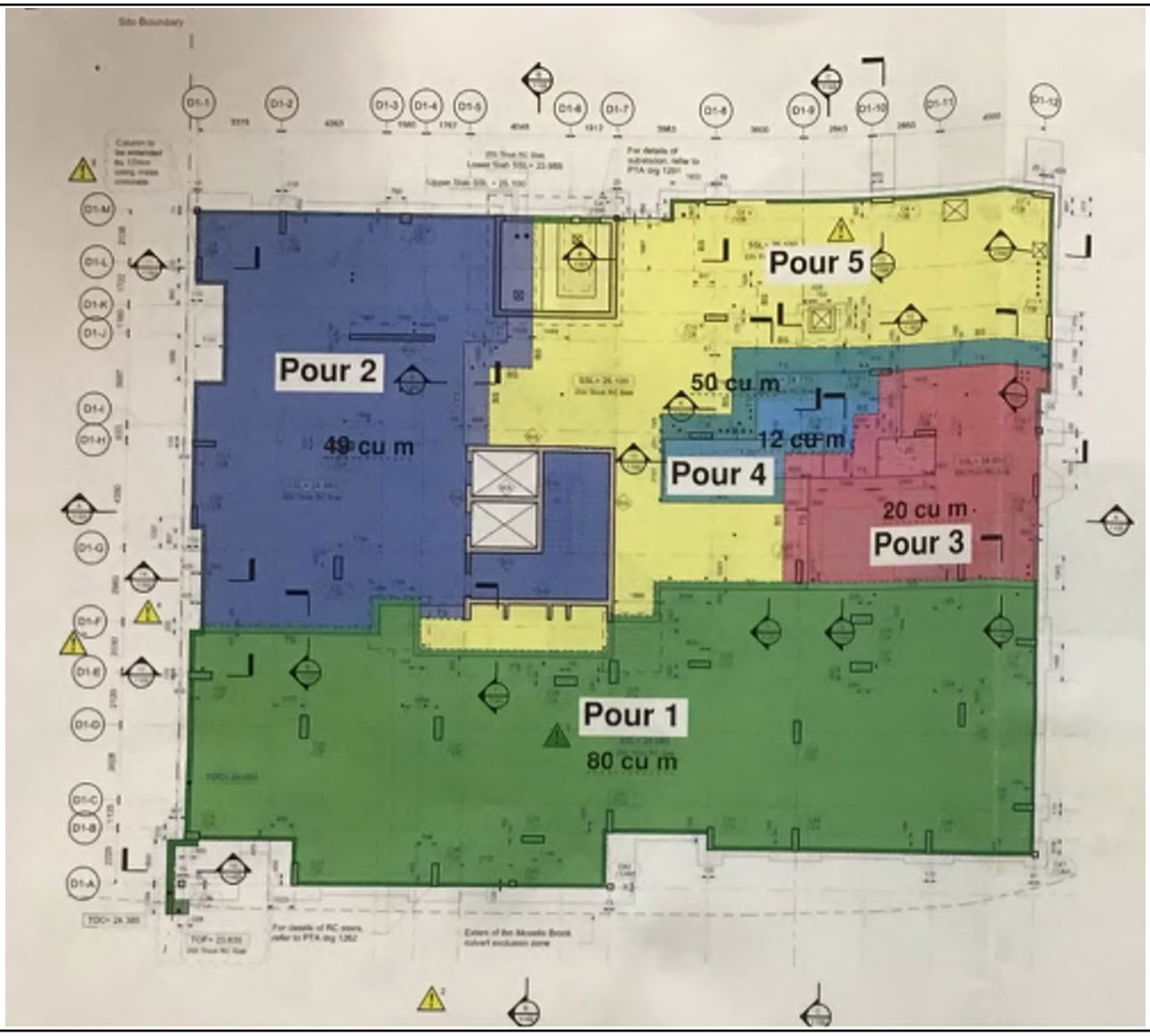
VERIFICATION LAYOUT



The pour sequence above shows where the areas have been inspected for block D1.

Pour 2 + 5 have been inspected and signed off during this visit.

Block D1 slab installation is now complete - termination detail remains to be verified.

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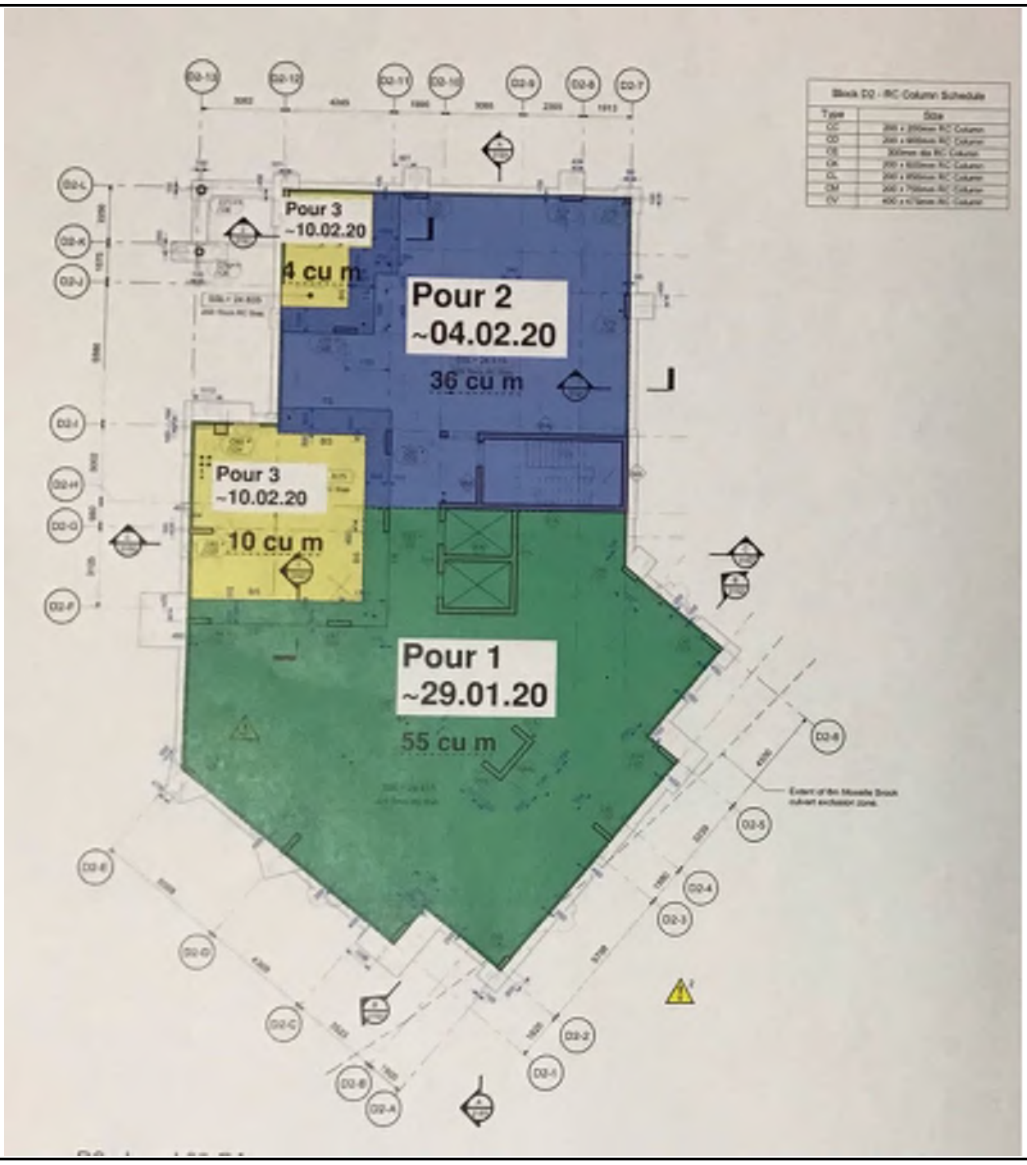
VERIFICATION LAYOUT



The pour sequence above shows where the areas have been inspected for block D2.

All pours shown have been inspected and signed off during this visit.

Block D2 slab installation is now complete - termination detail remains to be verified.

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OVERVIEW PHOTOGRAPHS

The photograph above shows the area of Pour 2+5 Block D1 was verified during this visit. The installers have installed the Pudlo GP Ultra+ Gas Barrier and sealed all details as per manufacturers specification.

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OVERVIEW PHOTOGRAPHS

The photograph above shows Block D2 slab area which has been completed and verified during this visit.

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VERIFICATION ITEM ONE

LOCATION/GRID LINE: Block D1 - Pour 2 and 5 and Block D2 slab area.

NOTES: Installation of Pudlo GP Ultra+ Gas Barrier.

The two photographs below show overviews of the welded laps of the Pudlo GP Ultra + Gas Barrier. The installers have used a hot air leister and roller to achieve a consistent 40mm weld.

The installers have used the 100mm lap present in the membrane, where the fleece is removed, to allow the weld to take place.

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VERIFICATION ITEM ONE

The photograph above demonstrates a pick and probe test being carried out to a

welded lap joint, within the verified on Block D2. All joints and laps have been verified

using a constant visual, pick and probe method, as well as an air lance integrity test.

3 x mis-welds identified during this visit, all of which have been remediated during visit.

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VERIFICATION ITEM TWO

LOCATION/GRID LINE: Block D2 slab.

NOTES: Sealed details.

The first photograph below shows an overview of a sealed pile head detail, within Block D2. The installers have sealed all pile head details within block D2, as per the design detail, using pudlo liquid gas barrier and pudlo ext tape.

The second photograph above shows examples of corner details and pipe penetration details, also sealed within the slab area of block D2. The installers have removed the fleece facing from the pudlo GP+ Ultra gas barrier, before applying any pudlo Ext tape.

The pipe penetrations and corner details have been sealed to manufacturers specification, with no holes or gaps being identified during the inspection visit.

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VERIFICATION ITEM TWO

The photograph above again portrays examples of sealed details within the slab verified on Block D2. The installers have again sealed the pipe penetration details as per manufacturers specification. They have also taken the membrane around the temporary shutter, where pipe penetrations may be inserted at a later date.

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VERIFICATION ITEM THREE

LOCATION/GRID LINE: Block D1 - Pour 2+5 & Block D2 slab.

NOTES: Faults found rectified during the visit.

The first photograph below shows a demonstration of where a fault was found in the welding of lap joints, during the air lance integrity testing. The fault is identified to the installation team, who rectified the error, during the site inspection visit.

The second photograph above shown the installer using the hot air leister tool to re-weld and seal the error identified in the previous photograph. The area is then tested once again, to ensure the previously identified fault is rectified.

Verified in accordance with CIRIA 735.

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VERIFICATION ITEM THREE

The photograph above demonstrates the installer from GCL repairing a hole found in the GP+ ultra gas barrier, on pour 5 of Block D1. Although the steel reinforcement bars had already been installed, the membrane could still be visually inspected, and the installers also had enough room to repair the hole found, as shown above.

GEOSHIELD LTD
TANKING, GAS AND HYDROCARBON BARRIER SYSTEMS
QUALITY ASSURANCE PROGRAMS AND INSPECTION SERVICES

INTEGRITY TESTING RECORD

AIR LANCE INTEGRITY TESTING (cont)

Detail of the Gas Membrane	Pudlo GP+ Ultra Gas Barrier
Detail of Tapes	Pudlo EXT Gas Resistant Self Adhesive tape.
Joints and lap design	Welded using hot air Leister.

TEST NUMBER:	FAILED OR PASSED	DETAIL, COMMENT AND RECOMMDATIONS
All Pudlo GP+ barrier.	Passed	3 x mis-welds identified - all sealed during visit.
All Pudlo EXT tape.	Passed	Good bond achieved with all Tape adhered to membrane

NOTES:

Application of Membrane to specification and conforming to manufacturing technical data.

AIR LANCE INTEGRITY TESTING

AIR LANCE TEST: ASTM D4437-08:2013 Inspects all seams for unbonded areas using a 4.8mm air nozzle held not more than 51mm away from the seam. 50 Psi is the minimum requirement. The air nozzle is directed on the upper edge seam, riffles indicate a unbonded seam. Each seam is numbered and failure marked with a F/1 F/2 classification and a description given

Air lance integrity test being carried out to welds.

Air lance test again being carried out.

Example of two welded joints air lance tested.

Air lance integrity test carried out to detail.

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REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
10/11/2020	001	No faults found	✔
12/11/2020	002	Damaged corner repaired	✔
01/12/2020	003	1. Damage to the membrane had been patched but the fleece	✔
		below had not been removed and therefore the seal wasn't very	✔
		strong. This patch was removed and the damage was repaired	✔
		correctly during this visit.	✔
		2. 3 x pile caps sealed using the Pudlo Liquid GB had been	✔
		chipped and therefore additional Liquid Gas Barrier had to be	✔
		applied to small areas.	✔
10/12/2020	004	1. Incorrect sealing of lap joints in membrane - taped not welded.	✔
		2. 3 x pipe penetrations not sealed.	✔
18/12/2020	005	No faults or defects identified during this visit.	✔
12/01/2021	006	1. Some pile caps incomplete as per the detail for sealing.	✔
		2. Several welded joints required re-welding to achieve a seal.	✔
		3. Corner details not sealed due to access required to the area.	✔

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REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
15/01/2021	007	1. 1 lap had not been welded correctly the installers have used	✔
		a hot air leister and roller to ensure that a 40mm weld has been	✔
		achieved.	✔
22/01/2021	008	1. One hole in the membrane identified. The installers have	✔
		patched the hole by removing the fleece around the hole and then	✔
		a hot air leister has been used to adhere EXT tape ove the hole.	✔
		2. A couple small areas in the laps of the Pudlo GP Ultra+ Gas	✔
		Barrier did not have a 40mm weld. Installers have re welded	✔
		these areas during this visit.	✔
		3. Some penetrations of the membrane have not been sealed	✔
		these will have to be sealed and verified during the next visit	✔
		(See verification item 3 - Report 8)	✔
29/01/2021	009	1. A couple pipe penetrations had been sealed but a sufficient lap	✔
		using the EXT tape had not been achieved. The installers have	✔
		applied additional patches of EXT tape during this visit.	✔

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REMEDIATION LOG

Date	Nr	Remediation Description	Y/N
		2. One fault was identified whilst inspecting a welded lap. The	✔
		intellects have used a hot air leister and roller to ensure there are	✔
		no gaps.	✔
		3. Incomplete works are still outstanding for Block D1 pour 2 and	✔
		5 as well as Block D2 I-L/7-12.	✔
15/02/2021	010.	1. 3 x mis-welds identified within welded lap joints - repaired during	✔
		the inspection visit.	✔

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GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DILECTIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES ☐ NO ☐

Gridline/Plot Sign off

Gridline/Plot Sign off	Block D1 - Core - Lower	✔
Gridline/Plot Sign off	Block D1 - Core - Middle and Upper	✔
Gridline/Plot Sign off	Pump Chamber Base	✔
Gridline/Plot Sign off	Block D2 - Core.	✔
Gridline/Plot Sign off	Block D1 Slab - Pour 1 (50%)	✔
Gridline/Plot Sign off	Pumping station.	✔
Gridline/Plot Sign off	Block D1 Slab - Pour 1 (Base installation only).	✔
Gridline/Plot Sign off	Block D1 slab - Pour 1 (100%)	✔
Gridline/Plot Sign off	D1 Substation.	✔
Gridline/Plot Sign off	Block D1 - Pour 2	✔
Gridline/Plot Sign off	Block D1 - Pour 3	✔
Gridline/Plot Sign off	Block D1 - Pour 4	✔

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GAS MEMBRANE TESTING

VISUAL:	YES	✔	NO		SMOKE TEST:	YES		NO	✔
COMPRESSED AIR:	YES		NO	✔	DILECTIC	YES		NO	✔
DESTRUCTIVE:	YES		NO	✔	OTHER:	YES	✔	NO	

Testing checklist attached: YES ☐ NO ☐

Gridline/Plot Sign off

Gridline/Plot Sign off	Block D1 - Pour 5	✔
Gridline/Plot Sign off	Block D1 - Substation wrapped	✔
Gridline/Plot Sign off	Block D2 - I-L/7-12	✔
Gridline/Plot Sign off	Block D2 slab complete.	✔
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GEOSHIELD Verification Report

VERIFICATION SUMMARY

This was the tenth visit to site where verification of the installation of the Pudlo GP Ultra+ Gas Barrier to Block D1 and D2 slab areas have now been completed.

The installers have welded all laps of the Pudlo GP+ Ultra gas barrier using a hot air leister and roller to complete the seal to manufacturers specification.

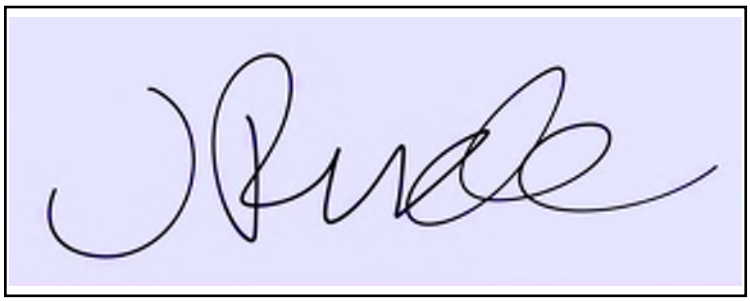
All piles and pipe penetrations have been sealed as per design details for this project. Air lance integrity test was carried out during this visit. 3 x mis-welds have been identified, all of which were patched and repaired during the visit.

Block D1 + D2 are now complete, only the termination detail remains to be verified.

Verified in accordance with CIRIA 735.

Installed in accordance with BS 8485:2019.

GEOSHIELD SIGNATURE:



DATE:	15/02/2021