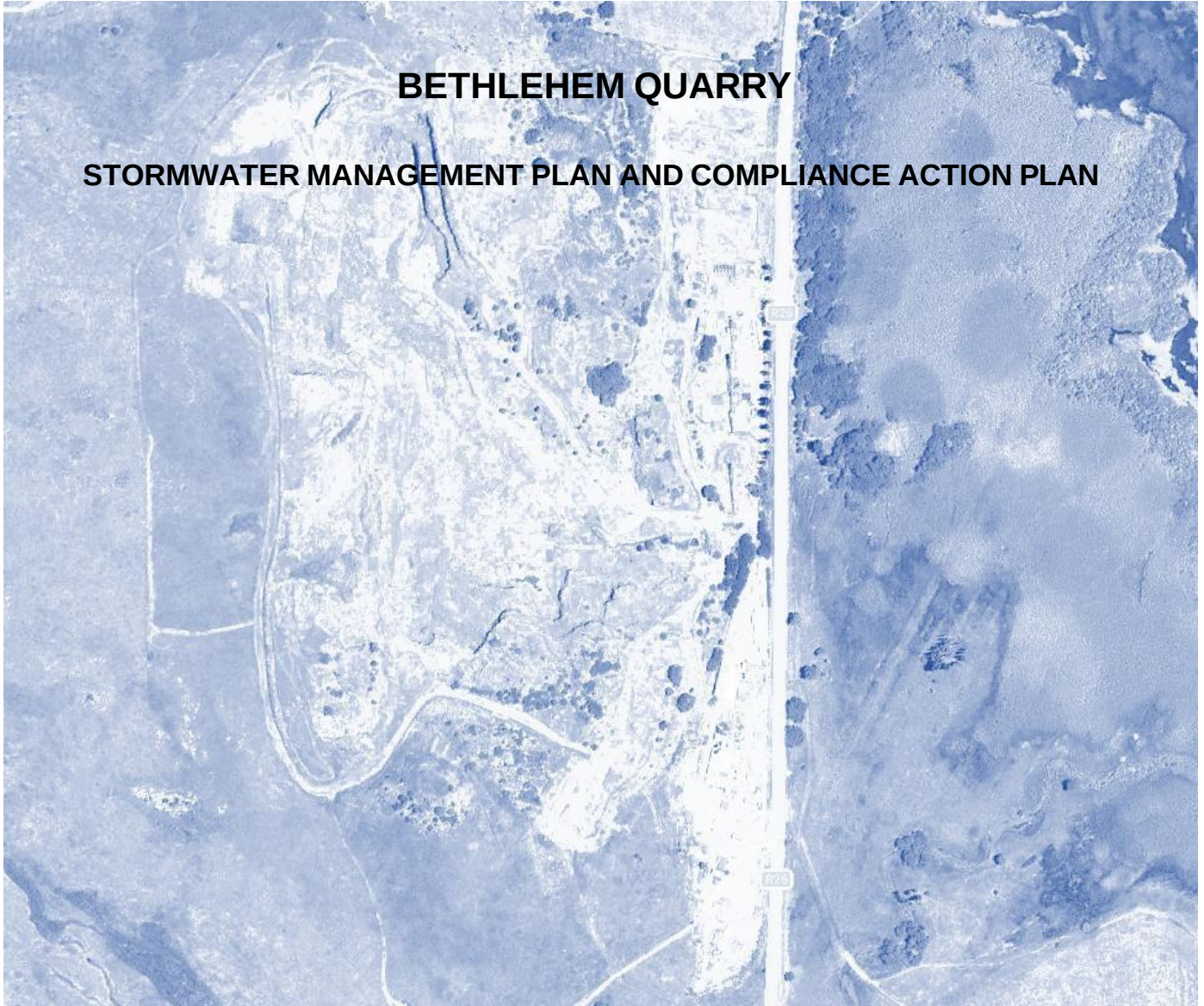


BETHLEHEM QUARRY

STORMWATER MANAGEMENT PLAN AND COMPLIANCE ACTION PLAN



Prepared by: ZTD GROUP (Pty) Ltd



23 Elsie Road
Roodepoort
1724

Contact Person: Takudzwa Dodzo

Tel: +27 76 773 1684

Cell: 076 773 1684

Email: taku@ztdgroup.co.za

Prepared for: Afrimat CM KZN Central
(Proprietary) Limited



15 Bloekom Street,
Vryheid,
3100

Contact Person: Thabiso Shinga

Tel: 034 980 9233

Cell: 067 416 5966

Email: thabiso.shinga@afrimat.co.za

DOCUMENT CONTROL RECORD

Document prepared by:

ZTD Group (Pty) Ltd

23 Elsie Road
Roodepoort
1724

T: +27 76 773 1684

E: taku@ztdgroup.co.za

W: www.ztdgroup.co.za

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1.0 INTRODUCTION

1.1 Appointment and Purpose

ZTD Group (Pty) Ltd was appointed by Afrimat CM KZN Central (Pty) Ltd to prepare a new standalone Stormwater Management Plan (SWMP) and compliance action plan for the Bethlehem Quarry in the Free State. This report has been prepared as a new report rather than as an update of the older MSBR report. The older report has been consulted only as historical information and does not control the findings or recommendations of this report.

The purpose of this report is to provide a practical, auditable stormwater and environmental controls plan that can be used by the Mine Manager and environmental team to address the Department of Mineral and Petroleum Resources pre-compliance concerns and to guide close-out of non-compliances relating to stormwater, sediment, dust and waste management.

1.2 Scope of Work

- Review the Department notice and identify the stormwater, dust, EMPr and waste-related compliance requirements;
- Undertake a site-based review of current conditions using the 3 June 2026 inspection undertaken by Rodney Chiwanga of ZTD Group;
- Define the clean and dirty water management areas and the minimum stormwater control philosophy for the quarry;
- Identify required channels, berms, cut-off drains, sediment traps, retention/treatment facilities and maintenance measures;
- Provide a compliance response matrix and implementation action plan with evidence requirements; and
- Provide monitoring templates and record requirements for daily dust control, stormwater inspection, maintenance and water quality close-out.

1.3 Department Notice and Compliance Drivers

The Department notice records that an inspection was conducted on 27 November 2025 and that the Department had reasonable grounds to believe that Afrimat had contravened NEMA and NEMWA. For the purposes of this SWMP, the relevant findings and requests are summarised as follows:

- No proper stormwater management system was observed on site and stormwater was not properly directed, resulting in runoff that could cause contamination;
- The company was requested to install channels, berms, cut-off drains and sediment traps to control, divert and contain stormwater;
- Dust control and dust suppression were found to be inadequate, and effective dust suppression methods must be implemented regularly;
- Daily dust monitoring must be carried out and records must be kept to demonstrate active dust control efforts;
- Waste must be stored in containers and managed to prevent spills, leakage, windblown waste, nuisance, visual impacts, odour, vectors, pollution and harm to health;
- The empr used by the company was considered outdated and not aligned with what was happening on site; and
- An updated environmental impact assessment report and empr must be submitted within the period specified by the department.

1.4 Site Inspection and Evidence Base

ZTD Group inspected the site on 3 June 2026. The inspection produced a geotagged photographic record showing, among other matters, roadside areas requiring berms, aggregate storage areas requiring stormwater control, minimal retention systems, ponding on roadways and work areas, runoff from disturbed areas, contaminated runoff to downstream areas, retention pond enlargement requirements, drainage channels required around work areas, septic tank works and oil collection areas.

The photographic record is included in Appendix C as a photo action register. This report uses the site photographs as compliance evidence and as the basis for assigning corrective actions. A final issue of this report should be supported by a current survey/as-built plan and updated water quality results.

1.5 Limitations

- This report is a draft for client review and regulator response planning.
- The conceptual design recommendations are based on available drawings, previous catchment delineations, site photographs and the 3 June 2026 inspection. A current topographical survey should be used to finalise hydraulic sizing.
- This report does not replace an amended Environmental Impact Assessment Report, EMPr, water use licence amendment or other statutory approval that may be required by the competent authority.

- Where discharge of water is proposed or occurs, water quality testing and authorisation requirements must be confirmed before discharge.
- All works must be checked for constructability, safety, traffic interaction and operational constraints before implementation.

1.6 Objectives

- Separate clean and dirty stormwater at source;
- Prevent polluted or sediment-laden water from entering water resources or leaving the site uncontrolled;
- Provide sufficient conveyance and containment for the 1:50 year stormwater management design standard applicable to clean and dirty water systems;
- Reduce erosion and sediment transport from haul roads, stockpiles, exposed slopes and operational areas;
- Support practical dust suppression using captured dirty water where lawful and appropriate;
- Improve waste, oil and sewage controls where these interact with stormwater; and
- Create an implementation and monitoring system that can be closed out with photographs, inspection sheets, water quality results, maintenance records and dust logs.

1.7 Project Team

Table 1-1: Project Team

Role	Organisation	Contact / Responsibility
Client	Afrimat CM KZN Central (Pty) Ltd	Client Contact: Thabiso Shinga Tel: +27 67 416 5966 Email: thabiso.shinga@afrimat.co.za
End User	Bethlehem Quarry	Mine Manager: Violet Sheshe Bethlehem Quarry, Die Plaas, 94 Wolhuterskop Bethlehem District, Bethlehem, 9700
Consultant	ZTD Group (Pty) Ltd	Project Director: Takudzwa Dodzo PrEng Cell: +27 76 773 1684 Email: taku@ztdgroup.co.za
Site Inspection	ZTD Group (Pty) Ltd	Site Inspector / Field Support: Rodney Chiwanga Inspection date: 3 June 2026

2.0 LEGAL AND GUIDELINE FRAMEWORK

The legal and guideline framework below is used to define the minimum stormwater, sediment, dust and waste management outcomes required for the quarry. The final compliance strategy must also be aligned with the approved mining right, water use authorisations, EMPr and any written instructions issued by the competent authority.

2.1 Primary Legislation and Regulatory Instruments

Table 2-1: Legislation and Regulations

Instrument	Relevance to this Report
National Environmental Management Act, 1998 (Act 107 of 1998)	Provides the compliance and enforcement framework, including section 31L compliance notices, and links the quarry to its approved environmental authorisation/EMPr obligations.
National Environmental Management: Waste Act, 2008 (Act 59 of 2008)	Requires waste to be managed so that it does not cause pollution or harm to health; waste storage must prevent spillage, leakage, windblown waste, nuisance and vectors.
National Water Act, 1998 (Act 36 of 1998) and GN 704	Requires mining-related water systems to protect water resources, including clean/dirty water separation, capacity of clean and dirty water systems and prevention of polluted water entering water resources.
National Environmental Management: Air Quality Act, 2004 and National Dust Control Regulations	Provides the framework for dust control and dustfall monitoring where applicable. The Department notice also specifically requires daily dust monitoring records and active dust control evidence.
National norms and standards for the storage of waste	Relevant to the waste storage, used oil, contaminated material and housekeeping controls required around operational areas.

2.2 Design Guidelines and Standards

- I. DWS Best Practice Guideline A1: Small-Scale Mining;
- II. DWS Best Practice Guideline A5: Water Management for Surface Mines;
- III. DWS Best Practice Guideline G1: Storm Water Management;
- IV. DWS Best Practice Guideline H3: Water Reuse and Reclamation;
- V. South African Guidelines for Sustainable Drainage Systems;
- VI. SANRAL Drainage Manual, 6th Edition;

- VII. SANS 10400 where applicable to drainage associated with buildings and sanitary facilities; and
- VIII. South African Water Quality Guidelines: Aquatic Ecosystems, for discharge screening where applicable.

2.3 Compliance Standard Adopted for this Report

- Clean stormwater must be diverted around dirty areas wherever practicable.
- Dirty stormwater from pits, haul roads, stockpiles, loading areas, crushing areas and workshop/oil-risk areas must be contained, conveyed and treated or reused within the dirty water system.
- Clean water systems and dirty water systems must be designed, constructed, maintained and operated so that cross-spillage is not likely more than once in 50 years.
- Sediment traps, check dams, energy dissipaters and retention pond desilting must form part of routine maintenance, not once-off construction.
- No uncontrolled contaminated discharge from the quarry should occur. Any discharge must be preceded by water quality verification and confirmation of applicable authorisation requirements.
- Daily dust suppression records, water cart logs, road wetting logs and complaints/incident records must be retained for inspection.

3.0 SITE DESCRIPTION AND WATER MANAGEMENT CONTEXT

3.1 Location

Bethlehem Quarry is located approximately 3.6 km south of central Bethlehem in the Free State. The quarry is situated on the parent farm Zuid Wolhuters Kop No. 670, on farm portion 7/670 and Erf RE/4038, with a reported area of approximately 65.8862 ha. The locality maps below are included for orientation and must be checked against the latest approved mining right boundary and survey information before final issue.



Figure 3-1: Locality in National Context

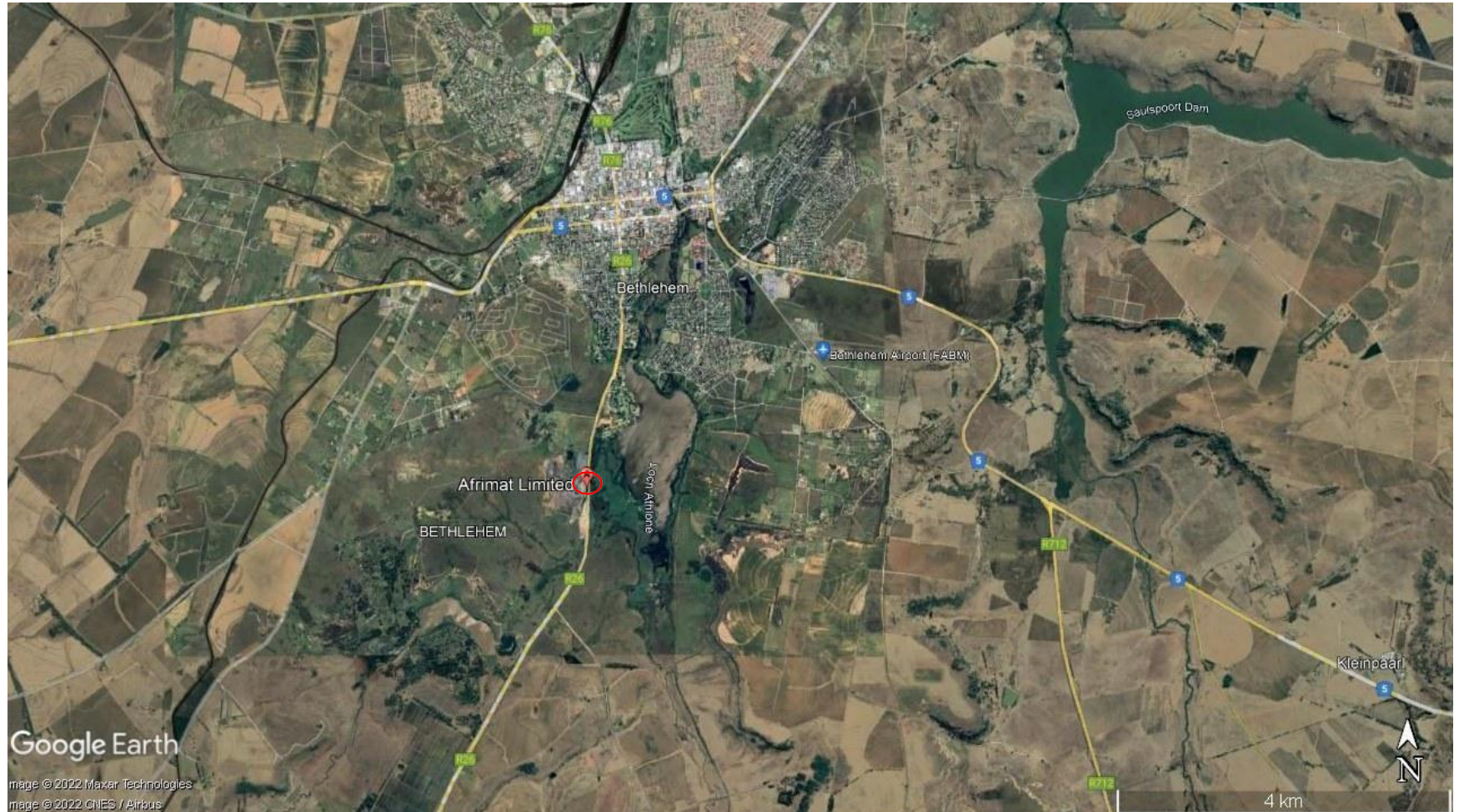


Figure 3-2: Locality in Bethlehem Context

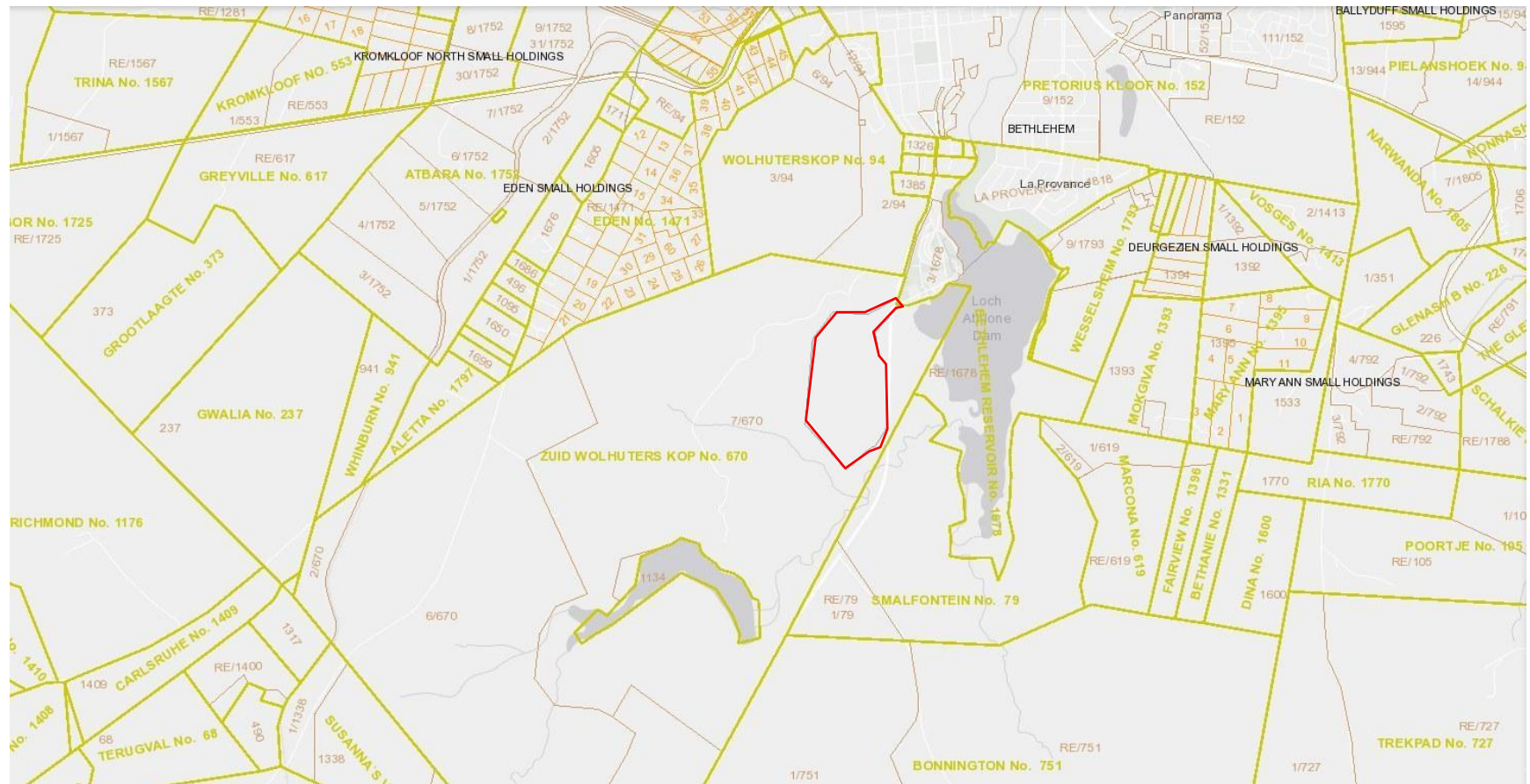


Figure 3-3: Cadastral Layout

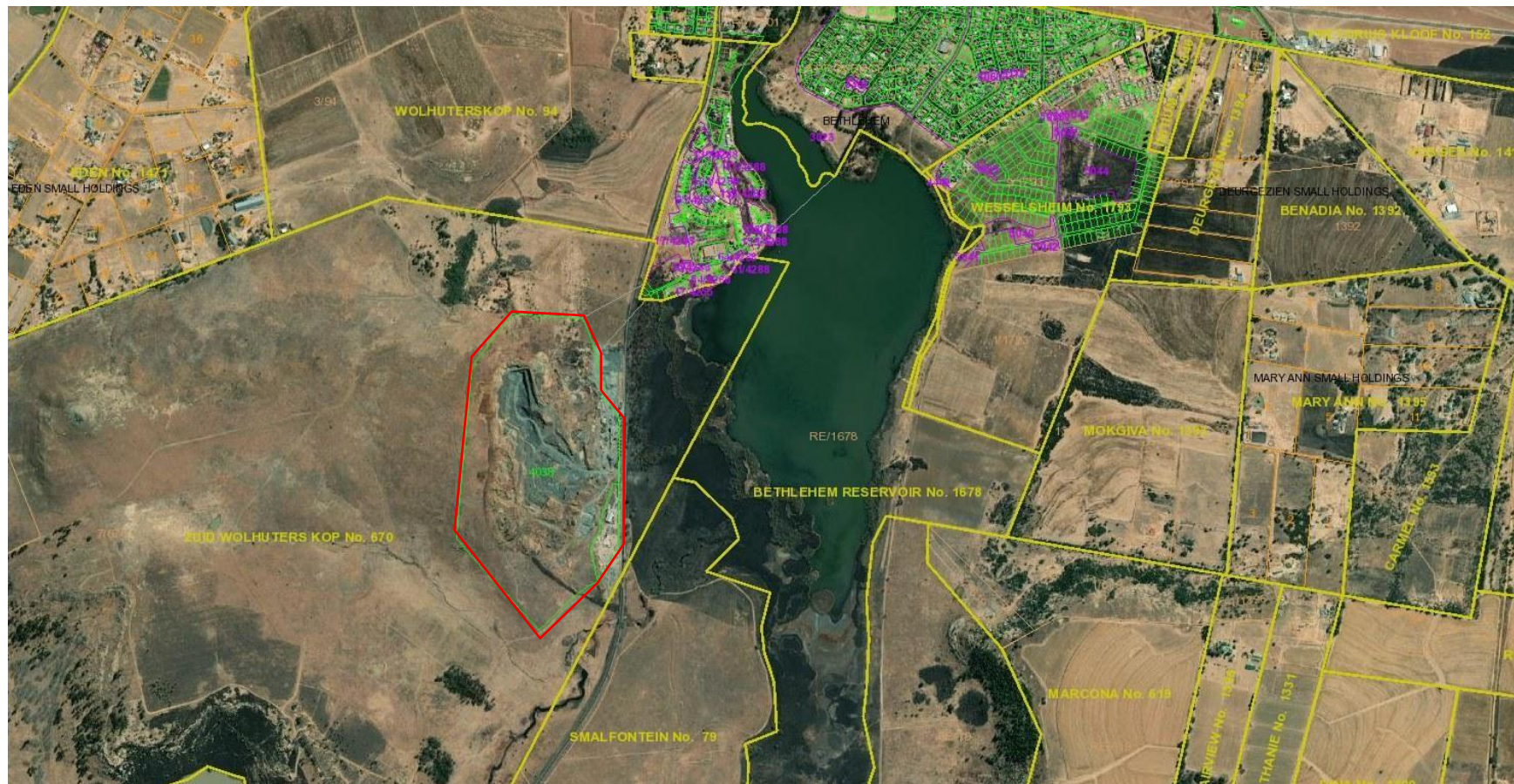


Figure 3-4: Cadastral on Satellite Imagery

3.2 Hydrology and Watercourses

The site falls within drainage region C in the Vaal Water Management Area. Available information places the site within quaternary catchment C83B, which is primarily drained by the Jordaan River and an unnamed drainage line flowing through Gerrands Dam towards Loch Athlone Dam.

Previous information indicated that the nearest river or drainage feature is approximately 320 m from the quarry. However, the 2026 inspection photographs show downstream drainage and runoff pathways that may receive stormwater from the operational area. The final report should therefore include a survey-based confirmation of watercourse positions, outfall locations, flow paths and the applicability of 1:50 and 1:100 year flood-line restrictions.

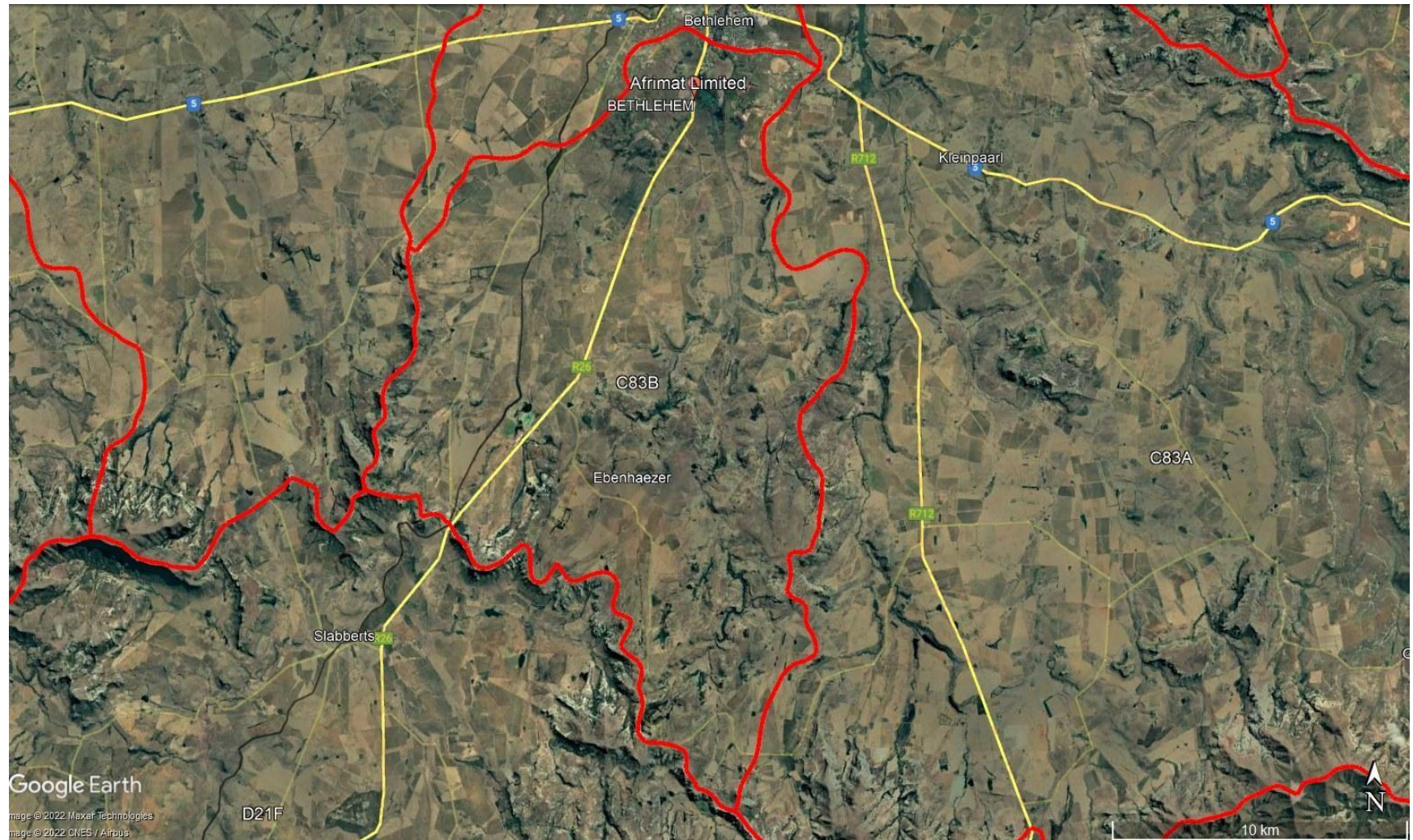


Figure 3-5: Study Area and Quaternary Catchment

3.3 Geology

Available information indicates that the site is predominantly underlain by Karoo Dolerite with quaternary material present in parts of the wider area. The hard rock quarry setting reduces infiltration in compacted and exposed operational areas and increases the importance of managed surface runoff, erosion control and sediment containment.



Figure 3-6: Site Geology

3.4 Mining Activities and Dirty Water Sources

The quarry is in the operational phase. Dirty water sources include the pit area, haul roads, exposed benches, stockpiles, loading and dispatch areas, crushing and screening areas, workshop or maintenance areas, wash-water areas, waste storage points, septic/sanitary infrastructure and areas where used oils, grease or hydrocarbon contamination may occur.

The primary stormwater risks are sediment transport, uncontrolled runoff from dirty areas, ponding on internal roads and work areas, carry-over of fine aggregate material, discharge of turbid water downstream, and the potential mobilisation of waste, oil or sewage contamination during rainfall events.



Figure 3-7: Current Site Satellite Image

3.5 Clean and Dirty Water Areas

For planning purposes, the site is divided into clean and dirty water management areas. C1 represents the main quarry and dirty operational catchment. C2 represents the cleaner catchment area that must be kept separate from dirty water. C3, C4 and C5 represent dirty catchments associated with roadways, stockpiles, storage and downstream runoff pathways. The delineation must be verified against the latest mine layout, current stockpile positions and survey levels.

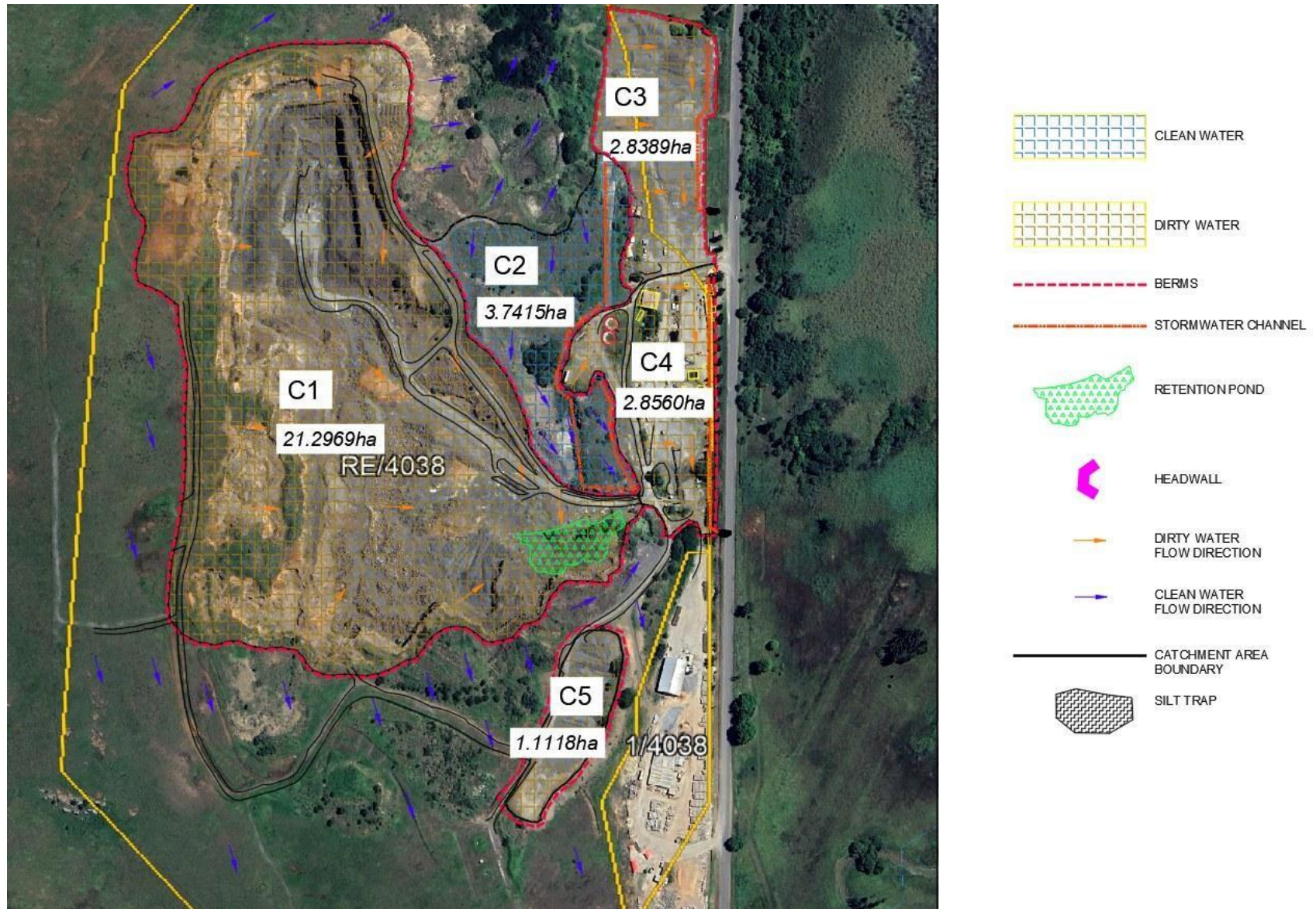


Figure 3-8: Separation of Clean and Dirty Water Areas

3.6 Current Site Conditions Requiring Corrective Action

- I. Roadside and aggregate storage areas require berms or raised edges to prevent dirty runoff from leaving the operational area;
- II. Retention capacity and sediment control are not yet adequate for all dirty water paths;
- III. Ponding occurs on work areas and roadways and must be directed to collection points rather than allowed to stagnate or bypass controls;
- IV. Dirty runoff was observed flowing towards or within downstream drainage areas and must be contained and treated before any discharge;
- V. Channels around work areas require formalisation, lining or armouring where velocities may erode the channel;
- VI. The existing retention pond requires desilting, extension or formal hydraulic sizing, with inlet protection, sediment forebay and controlled overflow/spillway;
- VII. Dust suppression must be regular, recorded and supported by water cart logs and visual checks; and
- VIII. Waste, oil and sewage controls must be improved where they may interact with stormwater.

4.0 DEPARTMENT NOTICE RESPONSE AND COMPLIANCE ASSESSMENT

4.1 Notice Response Matrix

Table 4-1: Department Notice Response Matrix

Department issue / request	Required corrective action	Status / close-out evidence
Stormwater runoff causing potential contamination.	Install permanent channels, berms, cut-off drains, sediment traps, retention pond upgrades and protected outlets. Prioritise C1, C3, C4, C5 and entrance areas.	Open. Close-out: as-built photos, survey/as-built plan, inspection sheets, desilting logs and water quality results where discharge occurs.
Request for channels, berms, cut-off drains and sediment traps.	Install temporary controls immediately while permanent works are constructed. Include accessible silt traps and check dams at low points and steep drains.	Open. Close-out: construction photos, dimensions, supervisor sign-off and maintenance schedule.
Dust suppression inadequate and daily dust records required.	Implement daily dust inspections, water cart logs, road wetting, speed controls, stockpile wetting where required and high-wind response actions.	Open. Close-out: daily signed dust logs, water cart logs, photographs, complaint register and corrective action records.
Waste storage requirements under NEMWA.	Use covered containers, bunded oil storage, spill kits, labelled hazardous waste containers, disposal certificates and housekeeping inspections.	Partially open. Close-out: waste register, disposal certificates, bund inspections, spill reports and photos.
EMPr/EIA outdated and not aligned to site.	Use this SWMP as a technical input into the EMPr/EIA update and include stormwater, dust, waste, rehabilitation and monitoring commitments.	Open action outside SWMP. Close-out: submitted EMPr/EIA and authority acknowledgement.

4.2 Current Compliance Status

Table 4-2: Current Compliance Status

Requirement	Current status	Comment / action required
GN 704 Regulation 4 - locality restrictions	Not finally confirmed	Available information indicates separation from the nearest mapped watercourse, but downstream drainage paths must be survey-confirmed and flood-line restrictions must be checked.
GN 704 Regulation 6 - clean and dirty water systems	Non-compliant / open	Clean and dirty water separation is not fully implemented or maintained. Permanent berms, cut-off drains, channels and retention systems are required.
GN 704 Regulation 7 - protection of water resources	Non-compliant / open	Dirty water must be retained, reused, treated or lawfully disposed of. Observed downstream runoff and ponding indicate unacceptable risk until controls are completed.
Dust control and daily records	Non-compliant / open	Daily logs and active dust suppression actions must be implemented immediately.
NEMWA waste storage and housekeeping	Partially compliant / open	Waste, oil and sewage controls require verification, bunding, storage records and disposal certificates.
EMPr/EIA alignment	Open action outside SWMP	An updated EMPr/EIA must be prepared and submitted in accordance with the Department instruction.

5.0 STORMWATER MANAGEMENT STRATEGY

5.1 Water Management Philosophy

The stormwater strategy is based on prevention at source, separation of clean and dirty water, containment of dirty water, sediment removal, reuse where practicable, and treatment or authorised disposal before discharge. The system must be simple enough to be maintained by site personnel and robust enough to remain functional during high-intensity storms.

5.2 Clean Water Management

- Divert clean upslope runoff around disturbed and dirty areas using cut-off berms and lined drains.
- Prevent clean water from entering the pit, stockpile areas, workshops, contaminated roads and sediment-laden areas.
- Maintain vegetated clean areas and stabilise topsoil stockpiles to prevent them becoming dirty water sources.
- Discharge clean water only to stable, erosion-protected routes downstream.

5.3 Dirty Water Management

- Classify runoff from the pit, haul roads, crushing/screening areas, stockpiles, loading areas, maintenance areas and waste/oil-risk areas as dirty water.
- Collect dirty water in channels and direct it to retention ponds, sediment traps or treatment points.
- Use sediment forebays, silt traps and check dams to reduce sediment load before water reaches the main retention pond.
- Use captured water for dust suppression where lawful, safe and operationally appropriate.
- Treat or test water before any off-site discharge and keep records of the results and decision process.

5.4 Erosion and Sediment Control

- Shape roads to drain towards controlled side drains rather than allowing diffuse runoff.
- Install berms on the roadside of storage areas and stockpiles to prevent dirty water from entering public road reserves or downstream drains.
- Install check dams or stone pitching in steep drains to calm flow and prevent erosion.
- Vegetate or armour exposed slopes and topsoil stockpiles.
- Desilt silt traps and retention ponds when sediment occupies 30% of the design volume or after major storm events, whichever occurs first.

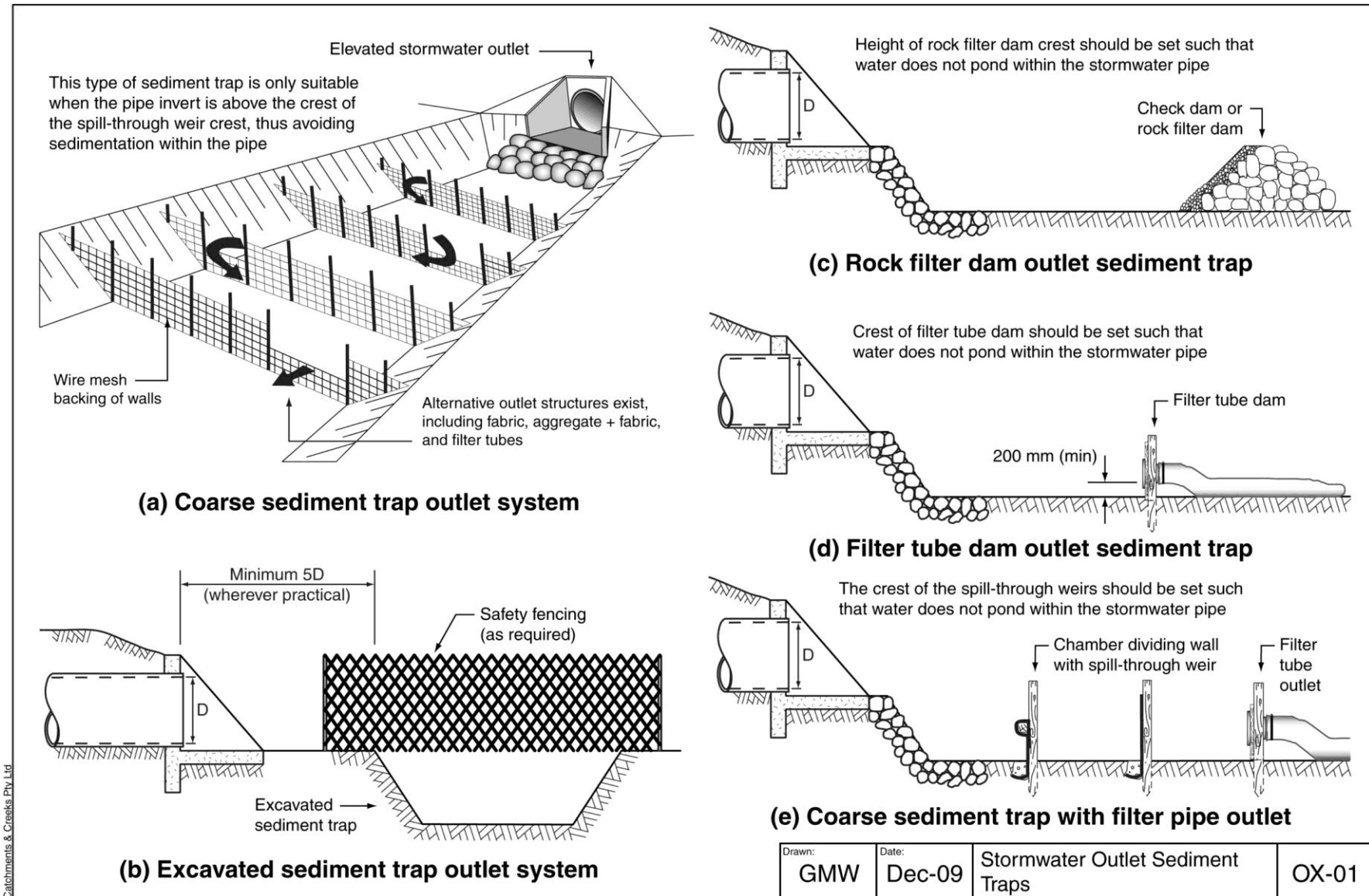


Figure 5-1: Conceptual Sediment Trap Arrangement

MATERIALS SEDIMENT FENCE FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. THE FABRICS SHOULD CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%). WALL REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm. SUPPORT POSTS/STAKES: 1500mm² (MIN) HARDWOOD, 2500mm² (MIN) SOFTWOOD OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC. AGGREGATE: 15 TO 25mm CLEAN GRAVEL OR AGGREGATE. FILTER TUBE: MANUFACTURED FROM A NON-WOVEN GEOTEXTILE WITH OR WITHOUT UV-STABILISED REINFORCEMENT. WIDE STRIP TENSILE STRENGTH (AS3706.2) MINIMUM 20kN/m IN BOTH DIRECTIONS. PORE SIZE (EOS, O95, AS 3706.7) LESS THAN 90mm. MASS PER UNIT AREA (AS3706.1) MINIMUM 300GSM. INSTALLATION (USING SEDIMENT FENCE FABRIC) 1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE. 2. CLEAR THE LOCATION OF THE SEDIMENT TRAP. REMOVE TREES, STUMPS, ROOTS AND OTHER SURFACE AND SUB-SURFACE MATTER THAT WOULD INTERFERE WITH INSTALLING AND MAINTAINING THE TRAP. 3. TAKE NECESSARY STEPS TO ENSURE INFLOW CORRECTLY ENTERS THE SEDIMENT TRAP AND DOES NOT BYPASS THE TRAP.	4. EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE OUTLINE OF THE SETTLING CHAMBERS. 5. SECURE THE SUPPORT POSTS INTO THE GROUND SPACED NO GREATER THAN 1.5m. 6. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE INSIDE FACE OF THE SUPPORT POSTS WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. 7. ENSURE THE MESH AND FABRIC ARE ATTACHED TO THE INSIDE FACE OF THE SUPPORT POSTS EVEN WHEN DIRECTING THE FABRIC AROUND A CORNER. 8. WHEREVER POSSIBLE, CONSTRUCT THE SETTLING CHAMBER WALLS FROM A CONTINUOUS ROLL OF FABRIC. WHERE NECESSARY, JOIN THE FABRIC EITHER BY: (i) ATTACHING EACH END TO TWO OVERLAPPING POSTS/STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH THE TWO STAKES TIED TOGETHER WITH WIRE; OR (ii) OVERLAPPING THE FABRIC TO THE NEXT ADJACENT SUPPORT POST/STAKE. 9. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS/STAKES USING 25mm STAPLES OR TIE WIRE AT MAXIMUM 150mm SPACING WITH THE FABRIC EXTENDED AT LEAST 200mm INTO THE TRENCH. 10. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH, IF ANY, ALONG THE FULL LENGTH OF THE FABRIC AT A MAXIMUM SPACING NOT EXCEEDING 0.5m. 11. ENSURE THE CHAMBER WALLS ARE AT LEAST 450mm HIGH, BUT NOT MORE THAN 700mm HIGH. 12. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE CHAMBER WALLS.	INSTALLATION OF SPILL-THROUGH WEIRS 1. LOCATE THE SPILL-THROUGH WEIRS AT ALTERNATE ENDS OF THE SETTLING CHAMBERS. 2. ENSURE THE SPILL-THROUGH WEIR CREST IS AT LEAST 300mm ABOVE THE GROUND. 3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST/ STAKE AND FOLD THE FABRIC OVER THE CROSS MEMBER IN THE DIRECTION OF OVERFLOW. SECURELY TIE THE FABRIC TO THE SUPPORT POSTS AND CROSS MEMBER. 4. INSTALL A SUITABLE SPLASH PAD OR OTHER EROSION CONTROL MEASURES AT THE OUTLET OF THE FINAL SPILL-THROUGH WEIR TO CONTROL SOIL EROSION. MAINTENANCE 1. INSPECT THE SEDIMENT TRAP AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY. 2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC. 3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED. 4. IF THE FABRIC IS SAGGING AT ANY POINT, THEN INSTALL ADDITIONAL SUPPORT POSTS/ STAKES. 5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 200mm. 6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.	REMOVAL 1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT TRAP ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE SEDIMENT TRAP MUST BE REMOVED AND THE AREA REHABILITATED. 2. REMOVE ALL MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD. 3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.								
		<table> <tr> <td>Drawn:</td><td>Date:</td><td></td><td></td></tr> <tr> <td>GMW</td><td>Apr-10</td><td>Coarse Sediment Trap</td><td>CST-02</td></tr> </table>	Drawn:	Date:			GMW	Apr-10	Coarse Sediment Trap	CST-02	
Drawn:	Date:										
GMW	Apr-10	Coarse Sediment Trap	CST-02								

Catchments & Creeks Pty Ltd

Figure 5-2: Conceptual Sediment Trap Notes

MATERIALS

GEOTEXTILE FABRIC: NON-WOVEN FILTER CLOTH (MINIMUM 'BIDIM' A34 OR THE EQUIVALENT), WIDE STRIP TENSILE STRENGTH (AS3706.2) MINIMUM 15kN/m IN BOTH DIRECTIONS, PORE SIZE (EOS, O95, AS 3706.7) LESS THAN 110mm, MASS PER UNIT AREA (AS3706.1) MINIMUM 200GSM.

SUPPORT POSTS/STAKES: 1500mm² (MIN) HARDWOOD, 2500mm² (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

BACKING MESH: PLASTIC OR STEEL MESH WITH A MAXIMUM MESH OPENING OF 200mm.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. UNLESS OTHERWISE DIRECTED BY THE RESPONSIBLE ON-SITE OFFICER, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED ALIGNMENT OF THE FILTER FENCE, PLACING THE EXCAVATED MATERIAL UP-SLOPE OF THE FENCE.

3. IF THE FILTER FENCE IS TO BE STAKED WITHOUT A MESH BACKING, THEN SECURE THE SUPPORT POSTS INTO THE GROUND AT A SPACING NO GREATER THAN 1.5m.

4. IF THE FILTER FENCE IS TO BE STAKED WITH A MESH BACKING, SECURE THE SUPPORT POSTS INTO THE GROUND AT A SPACING NO GREATER THAN 2.0m, THEN SECURELY ATTACH THE BACKING MESH TO THE UP-SLOPE SIDE OF THE SUPPORT POSTS FROM A CONTINUOUS LENGTH OF MESH. EXTEND THE MESH INTO THE EXCAVATED TRENCH.

5. IF THE FILTER FENCE IS TO BE SUPPORTED BY STRAW BALES, THEN AFTER SUITABLE ANCHORING THE BOTTOM 300mm OF FABRIC, PLACE A CONTINUOUS ROW OF STRAW BALES IMMEDIATELY DOWN-SLOPE OF THE FABRIC AND WRAP THE FABRIC OVER THE TOP OF THE STRAW BALES. SECURELY ANCHOR THE FILTER FENCE WITH A SINGLE STAKE DRIVEN THROUGH THE FABRIC AND CENTRE OF EACH BALE.

6. USING A CONTINUOUS LENGTH OF NON-WOVEN GEOTEXTILE, SECURELY ATTACH THE FABRIC TO THE UP-SLOPE SIDE OF THE SUPPORT POSTS OR BACKING MESH, WITH THE FABRIC EXTENDED AT LEAST 200mm INTO THE TRENCH.

7. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC TO PREVENT DISPLACEMENT OF THE FABRIC AND TO PREVENT THE FREE MOVEMENT OF WATER UNDER THE FABRIC.

8. IN ALL CASES, INSTALL THE FILTER FENCE IN A MANNER THAT WILL MINIMISE THE RISK OF SEDIMENT-LADEN WATER FLOWING AROUND THE FENCE.

MAINTENANCE

1. INSPECT THE FILTER FENCE REGULARLY AND AT LEAST DAILY DURING DE-WATERING OPERATIONS. MAKE REPAIRS AS NEEDED TO THE FABRIC AND SUPPORT FRAME.

2. INSPECT THE FABRIC FOR OBVIOUS LEAKS RESULTING FROM HOLES, TEARS OR JOINT FAILURE IN THE FABRIC.

3. CHECK THAT WATER HAS NOT OVERTOPPED THE FENCE AT LOW POINTS.

4. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC PLACED INSIDE THE OLD FABRIC, EXTENDING AT LEAST FROM SUPPORT POST TO SUPPORT POST.

5. CHECK FOR MATERIALS LEANING UP AGAINST THE FILTER FENCE. MAKE REPAIRS AS NEEDED TO THE FABRIC AND SUPPORT FRAME.

REMOVAL

1. REMOVE ALL ACCUMULATED SEDIMENT AND DISPOSE OF IT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

2. REMOVE ALL MATERIALS AND REPAIR DAMAGE TO THE GROUND SURFACE AS NECESSARY.

3. APPROPRIATELY REHABILITATE (E.G. REVEGETATE) THE GROUND AS NECESSARY TO MINIMISE THE RISK OF AN ONGOING EROSION HAZARD.

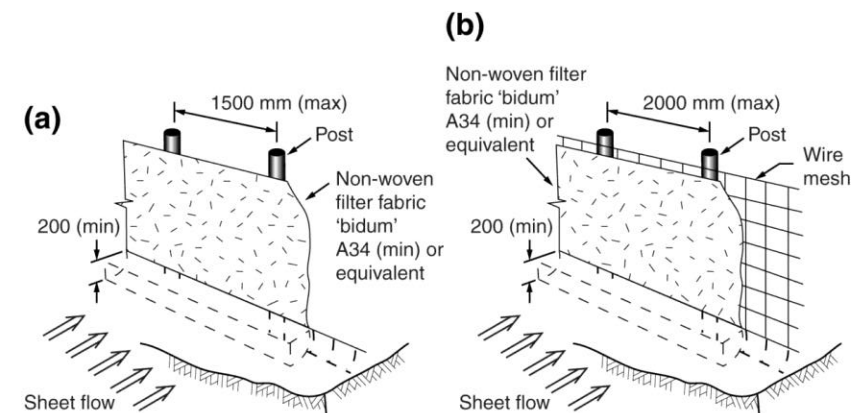


Figure 1 - Various installation methods

Drawn:	Date:		
GMW	Apr-10	Filter Fence	FF-01

Figure 5-3: Conceptual Filtering Array

5.5 Dust Suppression Interface

Stormwater management and dust control are linked because captured dirty water may be reused for dust suppression if water quality and authorisation requirements allow. The dust suppression system must not cause secondary pollution by over-watering roads, creating sediment-laden runoff or allowing slurry to leave site.

- Water carts must follow a daily schedule adjusted for weather, traffic and visible dust conditions.
- Speed limits must be maintained and enforced on internal roads.
- Material handling and stockpile areas must be dampened when wind or operations cause visible dust beyond the source area.
- Dust records must identify date, time, area treated, method, volume used where practical, operator and supervisor sign-off.
- Complaints, exceedances or visible dust plumes must trigger corrective action and be recorded.

5.6 Waste, Oil and Sewage Interface

Waste storage, used oil handling and sewage systems can become stormwater pollution sources during rainfall. These areas must therefore be excluded from clean water paths and must be protected by bunding, roof cover where practical, sealed or impermeable floors where required, spill kits and a clear incident response procedure.

6.0 CONCEPTUAL DESIGN AND INFRASTRUCTURE REQUIREMENTS

6.1 Design Criteria

- Clean water systems and dirty water systems must be designed and maintained so that cross-spillage is not likely more than once in 50 years.
- Dirty water must be directed to retention, sediment removal, reuse or treatment systems, and must not discharge uncontrolled off site.
- Channels must include erosion protection appropriate to slope and velocity, including stone pitching, riprap, concrete lining, gabion mattresses or vegetated lining where suitable.
- Silt traps must be accessible for front-end-loader or manual cleaning.

- Retention ponds must include inlet protection, sediment forebay, desilting access, freeboard, safe embankments and an emergency spillway routed to a protected location.
- Final hydraulic sizing must be confirmed against a current survey and current mine layout before construction of permanent works.

6.2 Preliminary Catchment and Peak Flow Summary

The preliminary peak flows below are calculated using the Rational Method, $Q = C I A / 3.6$, where A is in km². The catchment areas and rainfall intensities are based on the available delineation and must be verified using current survey information. The table corrects the calculation method by applying the runoff coefficient once.

Table 6-1: Catchment and Preliminary Peak Flow Summary

Catchment	Area (ha)	Runoff C	I (mm/h)	Q50 peak (m3/s)
C1	21.30	0.69	238.9	9.75
C2	3.74	0.45	247.6	1.16
C3	2.84	0.63	254.4	1.26
C4	2.86	0.63	202.8	1.01
C5	1.11	0.51	262.0	0.41

The preliminary calculation indicates that the C3 and C4 drain capacities used previously should be checked and probably increased or regraded before final construction, because the corrected peak flows are greater than the capacities previously tabled for those drains. The C1 retention pond must be sized through storage routing rather than simple drain capacity because it receives the main dirty quarry catchment.

6.3 Required Infrastructure by Area

Table 6-2: Required Stormwater Infrastructure by Area

Area	Risk	Required stormwater infrastructure / control	Priority
C1 - main quarry, pit and internal haul roads	Dirty water runoff, sediment transport, ponding and dust generation.	Construct/extend retention pond; direct pit and road runoff to pond; install sediment forebay; armour inlets; provide desilting access and emergency spillway.	High
C2 - cleaner central/topsoil area	Clean water may become contaminated if it contacts dirty surfaces or stockpiles.	Maintain as clean area; grass/stabilise stockpiles; install cut-off berms and clean diversion drains away from dirty areas.	Medium
C3 - eastern/roadside dirty area	Dirty runoff may flow towards road reserve/downstream drainage.	Install roadside berms, V-drains, silt trap and protected outlet to dirty water system; verify drain capacity.	High
C4 - aggregate storage/stockpile area	Runoff from aggregate surfaces and stockpiles; potential sediment-laden runoff.	Install perimeter berms and collection channel; direct to silt trap/retention; stabilise unused areas; verify drain capacity.	High
C5 - southern/downstream dirty area	Runoff and ponding near downstream drainage path.	Install berms and dirty water channel; remove sediment; protect outfall; monitor water quality before discharge.	High
Entrance / access road	Stormwater enters and exits through traffic route; sediment tracking.	Install road humps or cross-fall controls to mimic berms; add V-drains and sediment controls; maintain road surface.	High
Workshop, oil and waste areas	Hydrocarbon or waste contamination mobilised by rainfall.	Provide bunding, covered/labelled storage, spill kits, waste registers and no clean water flow through these areas.	High
Septic/sanitary area	Potential sewage contamination if system is incomplete or overloaded.	Complete and commission septic system; prevent stormwater ingress; maintain authorisations and inspection records.	Medium

Table 5:

6.4 Retention Pond and Sediment Trap Requirements

- Survey pond dimensions, current sediment depth and available freeboard.

- Desilt the existing pond and construct a sediment forebay at the inlet so coarse sediment can be removed frequently.
- Extend or enlarge the pond where storage routing shows insufficient capacity for the 1:50 year dirty water event.
- Provide stable side slopes, safe access, signage and protection against vehicle entry.
- Install a controlled spillway with erosion protection for emergency overflow only.
- Install a sampling point before any treated water is discharged or reused beyond dust suppression.

6.5 Channel and Berm Requirements

- Berms must be compacted and keyed into existing ground so water does not bypass or cut through them.
- Dirty water channels must be graded to drain to silt traps and retention ponds without stagnant sections.
- Steep channels must be stone pitched, riprapped, concreted or fitted with check dams to reduce velocity.
- Clean cut-off drains must be kept clean and free of sediment, aggregate and waste.
- All outlets must include erosion protection and must not discharge directly into vegetated drainage areas without energy dissipation and water quality control.

7.0 DUST, WASTE AND SUPPORTING ENVIRONMENTAL CONTROLS

7.1 Dust Suppression Plan

- Implement a daily dust suppression plan covering internal haul roads, crushing/screening areas, loading areas, stockpiles and entrance/exit routes.
- Maintain a water cart log showing date, time, area treated, operator, approximate water volume and supervisor check.
- Inspect for visible dust during each shift and after changes in wind conditions.
- Maintain road surfaces to avoid corrugation and loose fines that generate dust.
- Apply speed controls and signage, and record any disciplinary or corrective action where excessive speed contributes to dust.
- Escalate to management when water supply, pump failure or operational constraints prevent effective dust suppression.

7.2 Waste and Hydrocarbon Controls

- Store general waste in covered containers and remove waste regularly to an authorised facility.
- Store used oil, grease and hydraulic fluid in labelled containers within a bunded area protected from stormwater ingress.
- Keep spill kits at refuelling, workshop and oil storage areas and train relevant personnel in spill response.
- Remove contaminated soil immediately after spills and dispose of it at an authorised facility with disposal records retained.
- Keep housekeeping inspection records and disposal certificates on site.
- Prevent stormwater from flowing through waste, oil, scrap or maintenance areas.

7.3 Sanitary and Septic System Controls

- Confirm the new septic tank and associated infrastructure are completed, commissioned and authorised where required.
- Prevent stormwater ingress into septic infrastructure and prevent sewage overflow to stormwater drains.
- Maintain inspection and pump-out records.
- Ensure wash-water and industrial effluent do not enter domestic sewage systems unless specifically designed and authorised.

8.0 IMPLEMENTATION AND CLOSE-OUT ACTION PLAN

The action plan below is structured to respond directly to the Department notice and to provide auditable close-out evidence. Target dates should be confirmed by Afrimat management and aligned with any deadline in the Department notice or subsequent correspondence.

Table 8-1: Implementation and Close-out Action Plan

No.	Action	Target / responsible	Evidence
1	Temporary stormwater controls	0-7 days / Mine Manager	Photos and daily inspection sheet
2	Start daily dust inspections and water-cart records	Immediate and ongoing / Environmental Officer	Signed daily dust log and water-cart log
3	Improve waste, oil and spill controls	0-14 days / Workshop Supervisor	Waste register, spill-kit checklist and photos
4	Survey, desilt and assess retention pond capacity	0-30 days / Engineer and Site Supervisor	Survey, desilting records and photos
5	Construct priority berms and V-drains at entrance, C3 and C4	0-30 days / Contractor	As-built photos and dimensions
6	Construct silt traps and check dams at dirty water low points	0-45 days / Contractor	Photos, dimensions and maintenance plan
7	Verify hydraulic sizing using current survey	0-45 days / Engineer	Revised calculation sheet and layout drawing
8	Sample dirty water pond/outfall before discharge	0-60 days / Environmental Officer	Laboratory results and sampling register
9	Upgrade retention pond, forebay, inlet protection and emergency spillway	30-90 days / Contractor and Engineer	As-built records, photos and sign-off
10	Incorporate SWMP commitments into EMPr/EIA update	Within Department deadline / Environmental Practitioner	Submitted EMPr/EIA and authority acknowledgement
11	Routine drain, berm, silt trap and pond maintenance	Weekly and after rain / Site Supervisor	Inspection and maintenance register

Table 6:

8.1 Close-out Package for the Department

- Cover letter referencing the Department notice and summarising corrective actions implemented;
- This SWMP and implementation action plan;
- Before-and-after photographs of all berms, drains, silt traps, retention pond works, waste controls and dust control measures;
- As-built drawing or marked-up plan showing stormwater infrastructure;
- Daily dust monitoring records and water cart logs;
- Stormwater inspection and maintenance records;
- Water quality results where water is discharged or where downstream impact is alleged;
- Waste disposal certificates, used-oil records and spill response records; and
- Updated empr/EIA submission evidence or implementation plan.

9.0 MONITORING AND MAINTENANCE PLAN

Table 9-1: Monitoring and Maintenance Schedule

Frequency	Activity	Minimum check	Record
Daily	Dust inspection and suppression log	Visible dust, road condition, water cart activity, complaints and corrective actions.	Daily dust log signed by supervisor.
Daily	Housekeeping and waste check	Waste containers, oil areas, spill kits, septic area and no waste in drains.	Housekeeping checklist and photos if defects are found.
Weekly	Stormwater infrastructure inspection	Berms, drains, silt traps, retention pond level, sediment, erosion and bypasses.	Weekly stormwater checklist.
After rainfall >10 mm or visible runoff	Post-storm inspection	Overtopping, erosion, sediment deposits, blocked drains, downstream discharge.	Post-rain inspection record and corrective action register.
Monthly	Retention pond and silt trap sediment review	Sediment build-up, forebay performance, desilting requirement.	Sediment/desilting log.
Quarterly or as required	Water quality monitoring	Dirty water pond, outfall or downstream point where discharge risk exists.	Laboratory certificate and sampling register.

Frequency	Activity	Minimum check	Record
Six-monthly	SWMP audit	Review implementation progress, outstanding actions and regulator commitments.	Internal audit report and updated action plan.

10.0 CONCLUSIONS

The Bethlehem Quarry is not presently in a position to rely on paper compliance only. The Department notice requires visible, implemented and recorded corrective action. The site photographs from 3 June 2026 show that the main compliance risk remains uncontrolled dirty stormwater movement, inadequate sediment retention, ponding, contaminated downstream runoff risk and insufficient documented dust suppression.

Compliance can be restored through immediate temporary controls, construction of permanent berms, channels, cut-off drains, sediment traps, retention pond improvements, dust suppression records, waste/oil controls and an updated EMPr/EIA process. The highest priority is to stop uncontrolled dirty water from leaving dirty areas, to collect and treat dirty water, and to produce daily and weekly records that demonstrate active management.

This report should be used as the technical stormwater and compliance action plan for implementation and as a supporting input to the EMPr/EIA update. A final issue should incorporate updated survey information, hydraulic design drawings, retention pond storage calculations, water quality results and close-out evidence from completed works.

11.0 REFERENCES

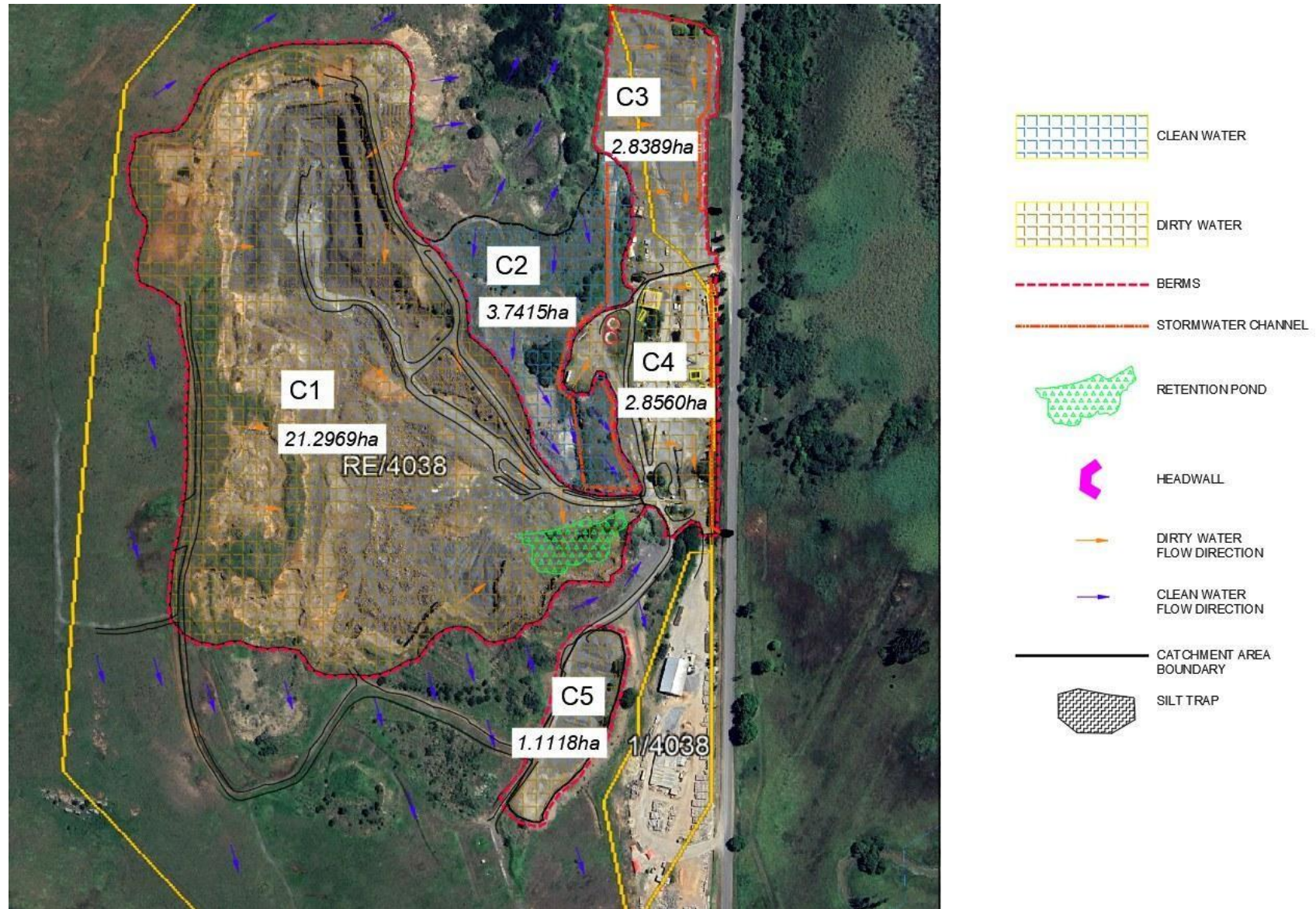
- [1] Armitage, N., Vice, M., Fisher-Jeffes, L., Winter, K., Spiegel, A., and Dunstan, J. (2013). South African Guidelines for Sustainable Drainage Systems.
- [2] Department of Mineral and Petroleum Resources. Notice of Intention to Issue a Compliance Notice in terms of Section 31L of the National Environmental Management Act, 1998, in relation to Afrimat Aggregate (KZN) (Pty) Ltd, FS 59/10060 MR.
- [3] Department of Water Affairs and Forestry. (1999). Regulations on use of water for mining and related activities aimed at the protection of water resources, Government Notice 704, Government Gazette 20119.
- [4] Department of Water Affairs and Forestry. (2006). Best Practice Guideline A1: Small-Scale Mining.
- [5] Department of Water Affairs and Forestry. (2006). Best Practice Guideline G1: Storm Water Management.
- [6] Department of Water Affairs and Forestry. (2008). Best Practice Guideline A5: Water Management for Surface Mines.

- [7] Department of Water Affairs and Forestry. (2006). Best Practice Guideline H3: Water Reuse and Reclamation.
- [8] MSBR Consulting (Pty) Ltd. (2022). Bethlehem Quarry Stormwater Management Plan. Prepared for Afrimat CM KZN Central (Pty) Ltd. Historical reference consulted only.
- [9] Republic of South Africa. National Environmental Management Act, 1998 (Act 107 of 1998), as amended.
- [10] Republic of South Africa. National Environmental Management: Waste Act, 2008 (Act 59 of 2008), as amended.
- [11] Republic of South Africa. National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004): National Dust Control Regulations, 2013.
- [12] Republic of South Africa. National norms and standards for the storage of waste.
- [13] South African National Roads Agency SOC Ltd. (2013). Drainage Manual, 6th Edition.

12.0 APPENDIX

APPENDIX A: DRAWING AND CATCHMENT PLAN

The drawing below is the current available clean and dirty water separation plan used for this draft. It must be replaced or supplemented with a current survey-based as-built plan before final issue. This as built should be done once the relevant strategies for addressing the contraventions have been applied.



Appendix A Figure A1: Current available clean/dirty water separation plan

APPENDIX B: PRELIMINARY DESIGN CALCULATION NOTES

The preliminary Rational Method calculation used in Section 6 is repeated below for auditability. These results must be checked against a current survey, updated rainfall intensity methodology and final catchment boundaries before construction of permanent works.

Catchment	Area (ha)	C	I (mm/hr)	Q50 (m3/s)
C1	21.30	0.69	238.9	9.75
C2	3.74	0.45	247.6	1.16
C3	2.84	0.63	254.4	1.26
C4	2.86	0.63	202.8	1.01
C5	1.11	0.51	262.0	0.41

Design verification items for final issue:

- Confirm topographical levels, pond invert levels, spillway levels and drain gradients;
- Confirm catchment boundaries against current stockpile and operational layout;
- Confirm rainfall intensity selection and time of concentration methodology;
- Perform retention pond storage routing for c1 and combined dirty water catchments;
- Check all proposed drain capacities with freeboard and erosion protection; and
- Confirm discharge water quality criteria and authorisation requirements.

APPENDIX C: PHOTO ACTION REGISTER

The following selected photographs from the 3 June 2026 site inspection have been included to link observations to corrective actions. The full geotagged photographic record should be retained in the project file.

Table 12-1: Photo Action Register

Photo area	Observation	Corrective action
C4 / roadside storage	Aggregate storage and roadside edge requiring berms to control dirty runoff.	Construct compacted roadside berm and V-drain to silt trap.
Roadside boundary	Roadside area requiring berms and protection against runoff leaving site.	Install berm, clean side drain and stabilised outlet.
Retention / flood zone	Minimal retention and uncontrolled flow paths observed.	Desilt and extend retention controls; provide forebay.
Work area	Ponding at worksite and roadways.	Grade surfaces to channel dirty water to collection point.
Haul road / operational area	Runoff to site and road ponding.	Shape road, construct side drains and maintain wearing course.
Main quarry / retention pond	Contaminated runoff directed to pond; pond requires extension.	Complete pond survey, desilting, extension and protected spillway.
Downstream drainage	Contaminated runoff observed downstream.	Prevent uncontrolled discharge; sample water and provide treatment/containment.
Plant/work area	Channels for drainage required around work areas.	Construct channels and sediment traps with erosion protection.
Septic and oil areas	New septic tank and oil collection controls require close-out.	Complete commissioning, bunding, spill kits and inspection records.



Photo C1: Roadside of storage area requiring berms.

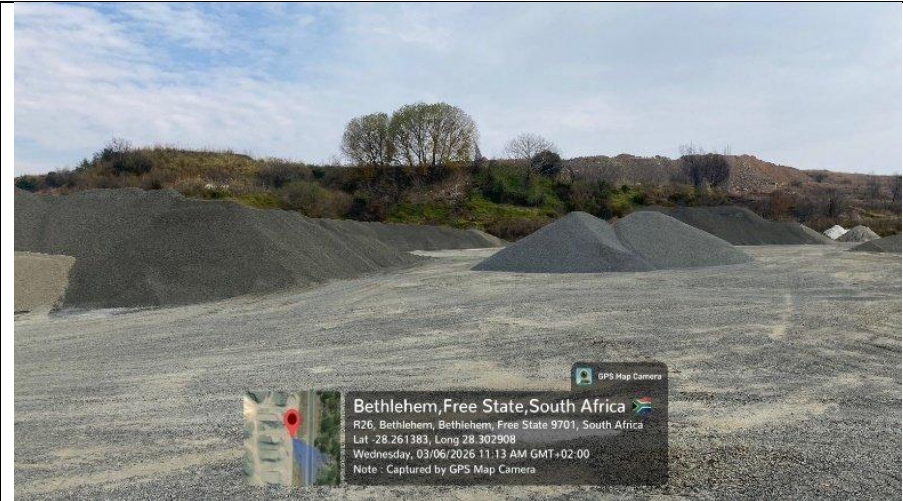


Photo C2: Aggregate storage area at C4 requiring runoff control.

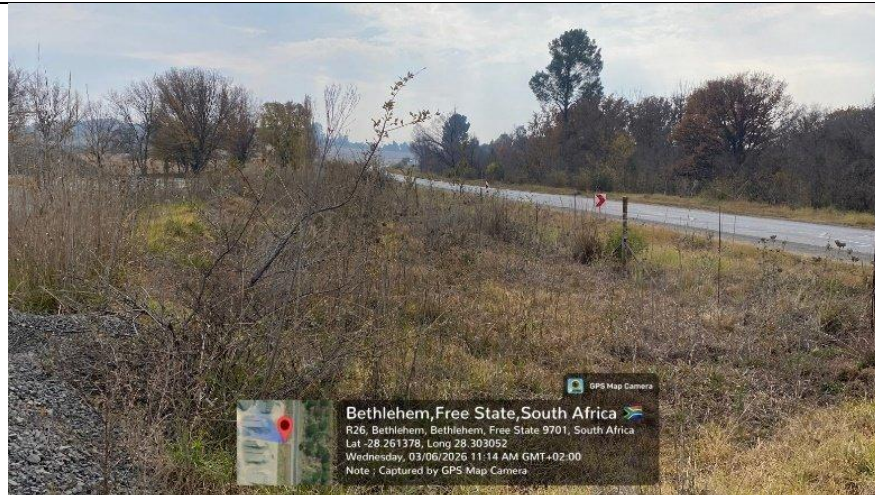


Photo C3: Roadside area requiring berms.

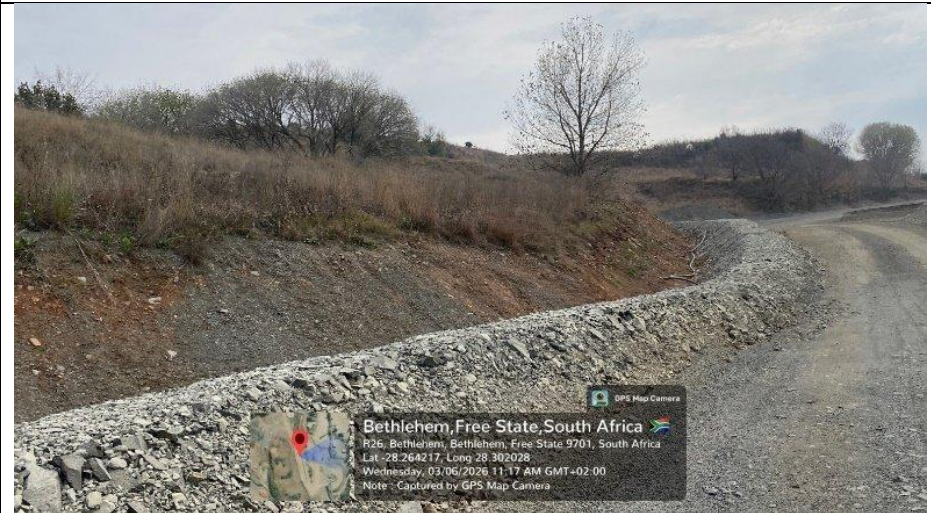


Photo C4: Minimal retention systems in place.



Photo C5: Existing ponding/retention condition requiring formalisation.

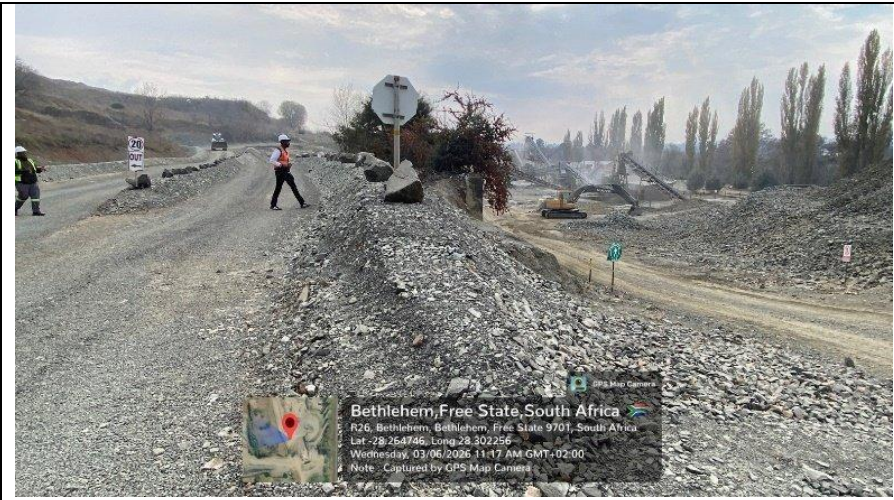


Photo C6: Berms to be enforced to minimise runoff.



Photo C7: Ponding at worksite to be channelled to collection point.



Photo C8: Ponding on roadways requiring regrading and drainage.



Photo C9: Dirty runoff pathway to retention pond.

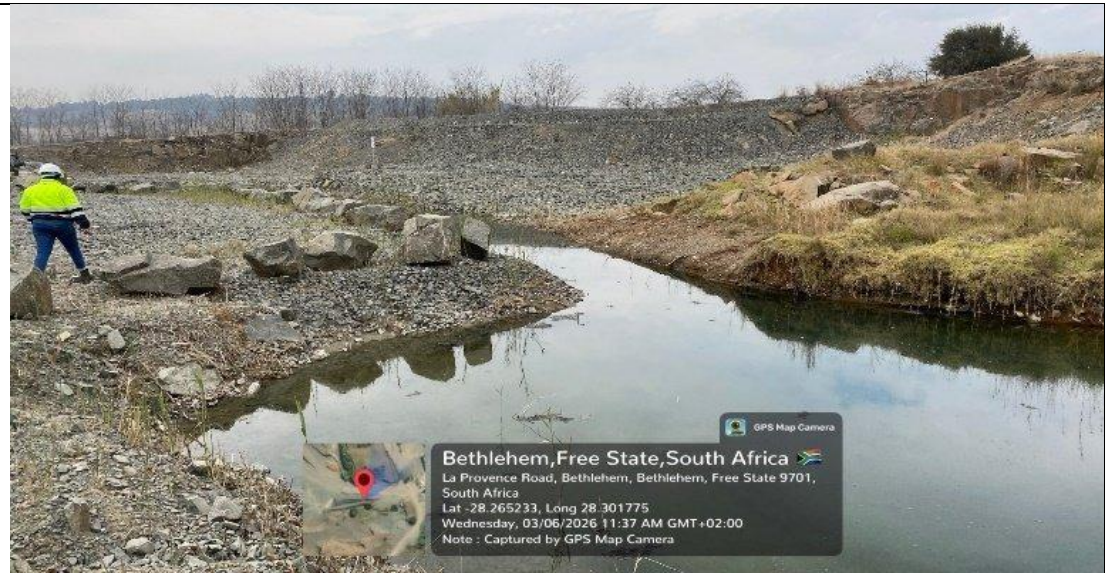


Photo C10: Retention pond requiring extension/desilting.



Photo C11: Contaminated runoff



Photo C12: Downstream runoff pathway requiring control.

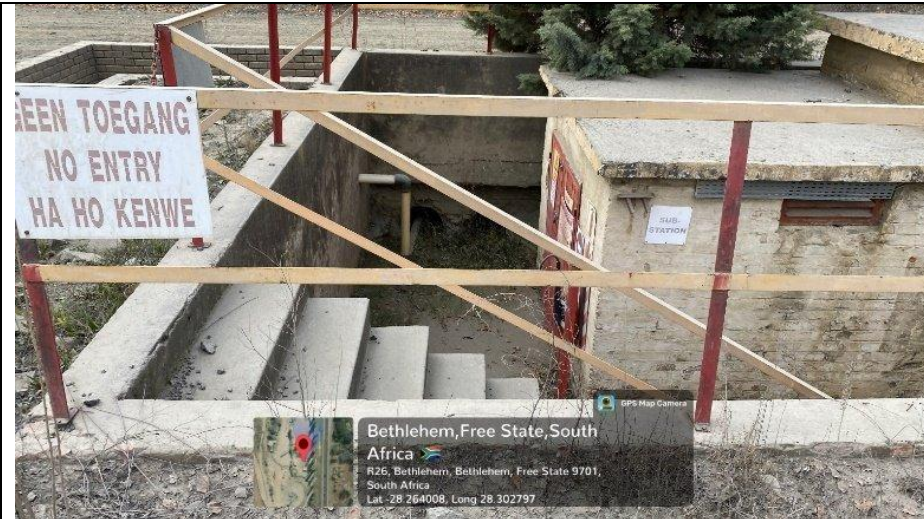


Photo C13: Downstream culvert / access area requiring protection.



Photo C14: Contaminated runoff downstream.



Photo C15: Work area requiring drainage channels.

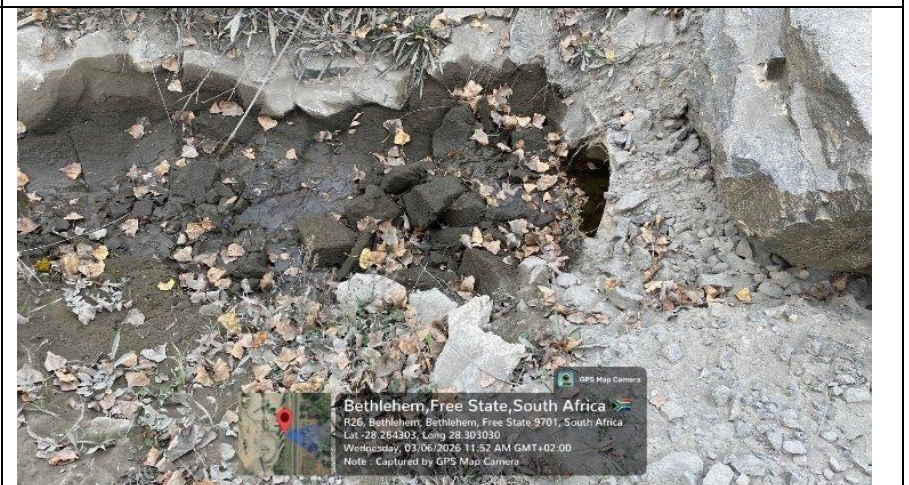


Photo C16: Erosion/undermining requiring repair.



Photo C17: New septic tank under construction.

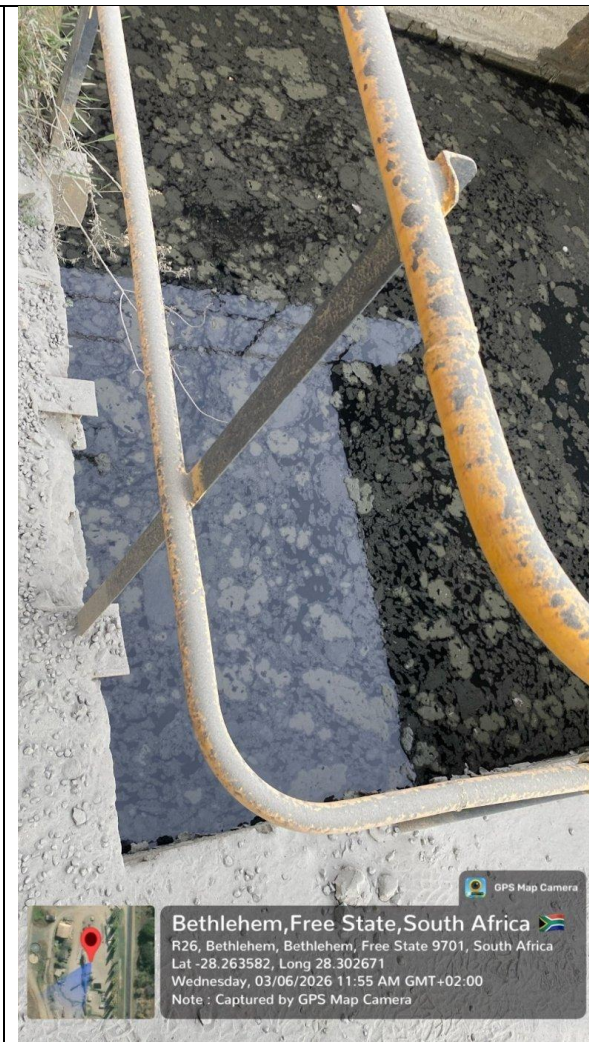


Photo C18: Oil collection area requiring bunding and records.

APPENDIX D: MONITORING TEMPLATES

The following templates should be printed or converted into site inspection sheets and retained on site. Completed records form part of the compliance close-out file.

D1 Daily Dust and Road Condition Log

Date / time	Area	Dust condition	Action / water cart	Operator / supervisor

D2 Stormwater Inspection and Maintenance Log

Date / trigger	Area	Issue found	Action / responsible	Close-out / photo ref

D3 Water Quality Sampling Register

Date / sample point	Reason	Parameters / lab ref	Result / action