APPROVAL IN PRINCIPLE

NAME OF PROJECT - BURNS ROAD, BIRCHENCLIFFE
NAME OF STRUCTURE - HIGHWAY RETAINING WALL.
STRUCTURE NUMBER - T.B.C.
GRID REFERENCE - SE 11947 18936

1. HIGHWAY DETAILS

1.1 Type of highway – Unclassified single carriageway all purpose road.

1.2 Permitted traffic speed – 20mph
Give speed over and or under bridge – depending on type
1.3 Existing Weight Restriction – N/A

2. SITE DETAILS

2.1 Obstacle crossed – N/A, boundary retaining wall.

3. PROPOSED STRUCTURE

3.1 Description of structure and working life: -

Mass concrete retaining wall, approximately 45 m in length (split 19.5m & 25.5m), with a maximum retained height of 3.50m. Wall to have a working life of 120 years.

A movement joint will be provided between adopted and non adopted structures.

3.2 Structural type: -

Retaining wall to be formed from mass concrete off a reinforced concrete foundation. Wall to be faced with stone facings tied back to the mass concrete. Movement joints to be provided in the concrete at maximum 6m centres and the masonry at 12m centres.

A cast iron safety railing is to be provided at the top of the wall.

A single sided safety barrier is to be provided in front of the wall adjacent to the carriageway, therefore no impact loads will be applied to the retaining wall.

3.3 Foundation type (Include reasons for choice): -

Spreader foundations – Dense sand sub-strata offers a safe bearing capacity of 125kN/m2.

Spreader foundation considered to be the most economical foundation solution, due to suitable bearing strata at nominal depth below existing ground levels.

3.4 Span arrangements: -

N/A

3.5 Articulation arrangements: -

Movement joints to the retaining wall to be provided at 6 metre maximum centres. Movement joints to the safety barrier to be provided at 15 metre maximum centres.

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3.6 Proposed classes/levels: -
3.6.1 Consequence class – CC2
3.6.2 Reliability class – RC2
3.6.3 Inspection class – IL2

3.7 Road restraint system type: -

760mm High single sided safety barrier adjacent to the carriageway.

3.8 Proposed arrangements for future inspection and maintenance
3.8.1 Traffic management: -

Traffic management will be required as a lane closure is likely to be required for maintenance work etc.

3.8.2 Access: -

Access will be available to both sides of the wall. Access to the rear of the wall will be available from the carriageway.

Pedestrian access to the front of wall will be via a ramp from the carriageway at the location of the culverted stream.

Surcharge loading limit to the back of the highway wall is not to exceed 10 kN/m^2

3.9 Sustainability issues considered. Materials and finishes.

Traditional construction materials are proposed; therefore, no significant sustainability issues are foreseen. Consideration will be given to minimising future maintenance requirements.

Concrete grade to be C35
Reinforcement grade - B500 TO BS4449:2005
Exposure classes: -
Chloride class - XD3
Carbonation class - XC4
Freeze thaw class - XF1
Surface finishes: -
Buried concrete - F1
Exposed concrete - F3

3.10 Risks and hazards considered for design, execution, maintenance, and demolition. Consultation with and/or agreement from Principal Designer/Principal Contractor: -

No residual risks involved in the construction & maintenance of the wall that a competent civil engineering contractor should not be aware of and capable of dealing with. The appointed contractor is to provide method statements & risk assessments for the principal designers/contractor's approval prior to works commencing on site.

There is an allowance for unplanned excavation to the front of the retaining wall equal to 10% of the overall height of the wall.

3.11 Estimated cost of proposed structure together with other structural forms considered (including where appropriate proprietary manufactured structure) and the reasons for their rejection

including comparative whole life costs with date of estimates.

Estimated cost - £175,000

3.12 Proposed arrangements for execution
3.12.1 Traffic management – N/A
3.12.2 Service diversions - N/A
3.12.3 Interface with existing structures

Not applicable as the proposed retaining wall is part of a new development and outside the zone of influence of any existing infrastructure.

4. DESIGN CRITERIA

4.1 Actions –

a) Permanent & variable actions: -

In accordance with BS EN 1991-1-1 and NS to BS EN 1991-1-1 & PD 6694-1:2001 cl 7.6.3 & BS EN 1991-2:2003 & its national annex.

b) Snow, wind, and thermal actions: -

No snow actions considered.

Wind actions – In accordance with BS EN 1991-1-4 & NA to BS EN 1991-1-4.

Thermal actions – In accordance with BS EN 1991-1-5 & NA to BS EN 1991-1-5.

c) Persistent actions relating to normal traffic under AW regulations and C&U regulations: -

In accordance with BS EN 1991-2 & NA to BS EN 1991-2.

d) Persistent actions relating to General Order Traffic under STGO regulations: -

In accordance with BS EN 1991-2 & NA to BS EN 1991-2.

e) Footway or footbridge persistent actions: -

In accordance with BS EN 1991-2 & NA to BS EN 1991-2.

f) Persistent actions relating to special order traffic, provision for exceptional abnormal indivisible loads including location of vehicle track on deck cross section: -

Not applicable.

g) Accidental actions: -

Accidental impact load on safety barrier in accordance with BS EN 1991-2 cl .7.3.3 & National annex containment level - N1.

h) Actions during execution: -

In accordance with BS EN 1991-1-6 & NA to BS EN 1991-1-6, subject to appointment of a specialist contractor and their specific method statements.

i) Special rules for combination of actions: -

None.

j) Any special action not covered above: -

None.

4.2 Heavy or high load route requirements and arrangements being made to preserve the route including any provision for future heavier loads or future widening:

Not applicable.

4.3 Minimum headroom provided (including allowance for vertical sag compensation and maximum deflection of structure): -

Not applicable.

4.4 Authorities consulted and any special requirements: -

Kirklees Council.

4.5 Standards and documents

a) List of relevant documents from the TAS. See attached schedule in Appendix A
b) Additional relevant standards and publications: -
CD 622 – Managing geotechnical risk.

4.6 Proposed departures from standards and documents given in 4.5 - None

4.7 Proposed methods of dealing with aspects not covered by standards and documents in 4.5 - None

4.8 List of record of options and choices (for category 2 or 3 checks) – Not applicable

5. STRUCTURAL ANALYSIS

5.1 Methods of analysis proposed for superstructure, sub-structure, and foundations: -

Wall to be designed as a cantilever gravity retaining structure with spreader foundation, sat on sub-strata with a safe bearing capacity of 125 kN/m2.

Spreader footing to be assessed using MasterSeries structural analysis software, to check the foundation for sliding, overturning, bearing pressures and reinforcement requirements.

Retaining wall to be designed in accordance with BS 8002:1994 Refer to attached calculations for the designs.

a) Method of analysis for ultimate limit states (excluding fatigue)

Retaining wall and foundation reinforcement design to be assessed using “at rest” soil pressures.

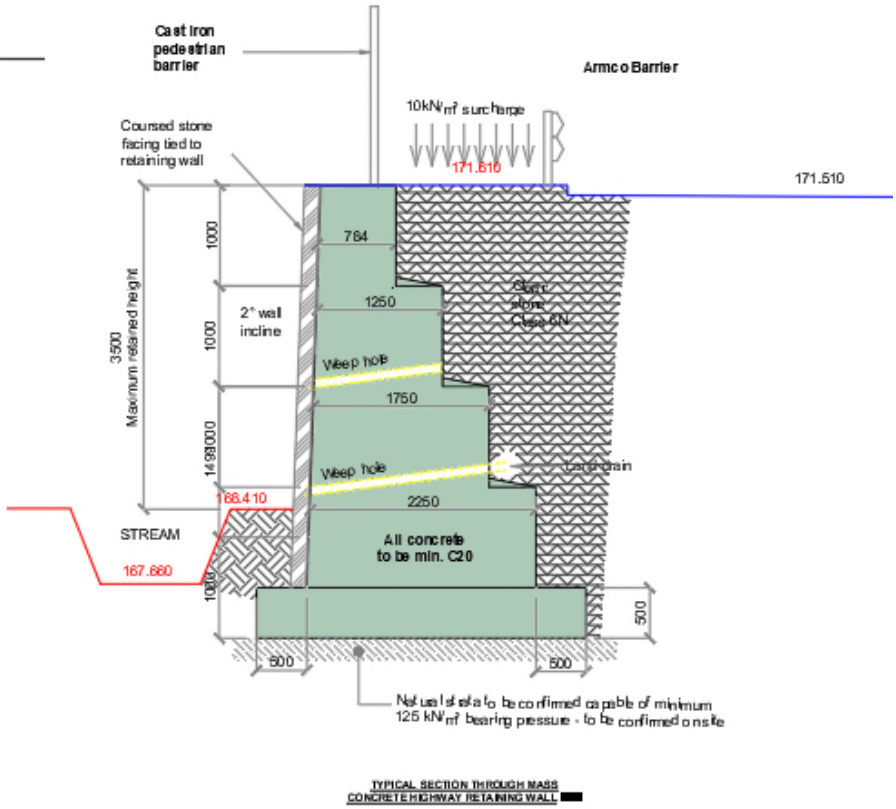
b) Method of analysis for fatigue

c)

d) Method of analysis for serviceability limit states

Retaining wall foundation to be assessed using “active” soil pressures.

5.2 Description and diagram of idealised structure to be used for analysis: -



TYPICAL SECTION THROUGH MASS CONCRETE HIGHWAY RETAINING WALL

5.3 Assumptions intended for calculation of structural elements stiffness – N/A

5.4 Proposed range of soil parameters to be used in the design of earth retaining elements

Earth pressure co-efficient based on an internal angle of friction = 35º (Ø)

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At rest pressures - Ko = 0.426

Active pressures - Ka=0.273 Kp = 3.40

6. GEOTECHNICAL CONDITIONS

6.1 Acceptance of recommendations of the Geotechnical Report (JNPGROUP: B22335-JNP-11-00-RP-G-1001) to be used in the design and reasons for any proposed changes: -

Recommendations of the site investigation report is accepted.

6.2 Geotechnical design report summary information: -

Topsoil/Made Ground was found to be 0.60m deep. Dense sands below down to 1.5m to 2.0m deep with safe allowable bearing capacity of 125 kN/m^2 with a total settlement of less than 25 mm.

The dense sands has SPT values ranging from N=22 to N=50

Refusal on sandstone bedrock has occurred approximately 2.0m bgl beneath the dense sands

No groundwater was encountered within the window samples carried out in the vicinity of the proposed retaining wall.

6.3 Differential settlement to be allowed for in the design of the structure: -

Bearing strata offers a safe bearing capacity of 125 kN/m2, differential settlement is expected to negligible. However, if rockhead is encountered, a movement joint is to be provided between foundations sat on differing sub-strata.

6.4 If the Geotechnical design report is not yet available, state when the results are expected and list the sources of information used to justify the preliminary choice of foundations: -

Not applicable

7. CHECKING

7.1 Proposed category of checking and design supervision level: -

Category 1

7.2 If category 3, name of proposed independent checker

Not applicable

7.3 Erection proposals or temporary works for which Types S and P proposals will be required, listing structural parts of the permanent structure affected with reasons.

Not applicable

8. DRAWINGS AND DOCUMENTS

8.1 List of drawings (incl. drawing numbers and revision and documents accompanying the Submission

Appendix A Schedule TAS

Appendix B General Arrangement Drawings

1) P&A drawing No 4872-22 / H-01 – Highway Retaining Wall

Appendix C Ground Investigation Reports

1) JNPGROUP Phase 2 Ground Investigation Report

B22335-JNP-11-00-RP-G-1001.

Appendix D Design Calculations

1) P&A Retaining wall foundation calculations sheets

4872-22 Sheets 1 to 4

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9. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed:

Name:	Peter Eccles
Engineering Qualifications:	BSc (Hons)
Name of organisation:	PARTINGTON AND ASSOCIATES Ltd
Date:	28/07/2022

Signed:

Name:	David Ormes - Director
Engineering Qualifications:	BEng (Hons) C. Eng MIStructE
Name of organisation:	PARTINGTON AND ASSOCIATES Ltd
Date:	28/07/2022

10. THE ABOVE IS REJECTED/AGREED SUBJECT TO THE AMENDMENTS AND CONDITIONS SHOWN BELOW

Signed:

Name:

Position held

Engineering Qualifications:

TAA:

Date