

**A66 Northern Trans-Pennine Project
TR010062**

**2.7 Environmental Management Plan
Annex C4 Piling Method Statement**

APFP Regulations 5(2)(a)

Planning Act 2008

**Infrastructure Planning (Applications: Prescribed Forms and
Procedure) Regulations 2009**

Volume 2

June 2022

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed
Forms and Procedure)
Regulations 2009**

A66 Northern Trans-Pennine Project
Development Consent Order 202x

**2.7 ENVIRONMENTAL MANAGEMENT PLAN
ANNEX C4 PILING METHOD STATEMENT**

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| Regulation Number: | Regulation 5(2)(a) |
| Planning Inspectorate Scheme Reference | TR010062 |
| Application Document Reference | 2.7 |
| Author: | A66 Northern Trans-Pennine Project Team, National Highways |

| Version | Date | Status of Version |
|----------------|--------------|--------------------------|
| Rev 1 | 13 June 2022 | DCO Application |

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C4 Piling Method Statement

C4.1 Introduction

Purpose

C4.1.1 This document forms Annex C4 of the Environmental Management Plan (EMP) (Application Document Reference 2.7). Annex C4 is an extended essay plan for a Piling Method Statement for the A66 Northern Trans-Pennine project (the Project). It will be completed on an iterative basis by the Principal Contractor (PC) as the Project progresses through the detailed design and construction planning stage, resulting in a final method statement for consultation and approval prior to construction commencing.

C4.1.2 This Method Statement is intended to set out the detail of the methods to be employed during any piling works for the Project and describe how the key environmental controls will be implemented.

C4.1.3 The Method Statement includes:

- Location of proposed piling works
- Sensitivity of the local environment
- Brief description of works to be undertaken
- Equipment to be used
- Step by step description of the method to be implemented
- Key environmental control measures to be applied
- Monitoring to be undertaken.

Overview of the project

C4.1.4 The Project involves upgrading the existing single lane sections of the A66 to dual two-lane all-purpose roads with a speed limit of 70 miles per hour (mph), with the exception of a section of the A66 from the M6 junction 40 through Kemplay Bank which will have a speed limit of 50mph. The Project also includes amendments to existing junctions and accesses within these sections.

C4.1.5 The A66 lies within three local planning authority administrative areas: Eden District, Durham County and Richmondshire District as illustrated in ES Figure 1.1: A66 Location and Overview Plan, in ES Chapter 1: Introduction (Application Document 3.2).

C4.1.6 The Project will be delivered as a number of schemes:

- M6 Junction 40 to Kemplay Bank
- Penrith to Temple Sowerby
- Temple Sowerby to Appleby
- Appleby to Brough
- Bowes Bypass
- Cross Lanes to Rokeby
- Stephen Bank to Carkin Moor
- A1(M) Junction 53 Scotch Corner.

C4.1.7 The A66 is located in a very sensitive environment, passing through the North Pennines Area of Outstanding Natural Beauty (AONB) and close to the North Pennine Moors Special Area of Conservation (SAC) and Special Protection Area (SPA) between Brough and Bowes. The Lake District National Park is approximately 2km south-west of Penrith and the Yorkshire Dales National Park is located approximately 3.5km south of the A66. The catchment of the River Eden SAC crosses several of the schemes to the western end of the route.

C4.2 Location of works

C4.2.1 The detailed design and construction planning are not yet completed, but at this stage it is expected that piling will be required at a number of locations for the construction of key structures.

C4.2.2 This section will be completed by the PC to include both the types of structures that will require piling and the exact locations of those structures where piling is required and their purpose.

Structures that may require piling

C4.2.3 At the current stage of design, it is expected that the structures that may require some form of piling will include (but not be limited to):

- Overbridges
- Underpasses
- Retaining walls
- Embankments.

Piling Locations

C4.2.4 This section will include a detailed list of specific piling locations. These locations will also be marked on a plan, to be included with this document.

C4.2.5 The locations where piling is required for each scheme are:

- [insert lists of exact locations of piling and for what purpose.]

C4.3 Baseline Conditions

Key sensitivities

C4.3.1 When exact piling locations are confirmed, this section will be updated to include details of specific receptors close to confirmed piling locations.

C4.3.2 This will include:

- Residential properties
- Sensitive fish spawning ground
- Ecological habitats
- Groundwater
- Surface water
- Habitats and key sensitivities of the River Eden SAC (see Annex C1 Working in and Near an SAC Method Statement)
- Scheduled Monuments
- Listed Buildings

- Buried remains.

Key risks

C4.3.3 The sensitive receptors and assets potentially face the following key risks from piling activities:

- Disturbance of ecological receptors
- Contamination of groundwater or surface water
- Damage to property
- Vibration damage/disturbance
- Damage from excavation
- Tracking of vehicles over buried archaeology
- Compaction of archaeological deposits by construction traffic and structures
- Partial or total removal of heritage resources, including archaeological remains, within the project footprint.

C4.3.4 This section of the method statement will be updated to include location and receptor specific risks once the exact piling locations are confirmed.

C4.4 Construction Methodology

Overview

C4.4.1 This section provides indicative information on the potential construction approach to typical elements of the Project involving piling. These methods may be used on each of the schemes, with possible exceptions on A1(M) Junction 53 Scotch Corner which has a smaller scope of works.

C4.4.2 Once detailed design and construction planning is complete, this section will be updated to include detail of exact piling method to be implemented at each location where it is required.

Overbridge Construction

C4.4.3 Several new overbridges are to be constructed across the Project to carry roads over the A66, as well as locations where the A66 itself is carried on a bridge or crossing over a watercourse or existing local access road. Across the Project there a variety of overbridges of varying span lengths dependent on the angle the access road crosses over the A66 or the new A66 crosses an existing feature. As part of the typical construction, they will incorporate a deck supported by abutments with or without the addition of further central piers, which are all supported by foundations.

C4.4.4 The overbridges are of varying sizes, spans and lengths. In some instances, there may be a requirement to construct large overbridges over flood plains and rivers, with open multi span solutions being required to cover longer distances and facilitate free movement of flood water. This is required on the Temple Sowerby to Appleby and Appleby to Brough schemes. More commonly found on the schemes, will be single or two span overbridges with spans of up to 35m each. Such bridges will commonly cross over local roads, the new A66 or smaller water courses.

- C4.4.5 To construct a typical overbridge, it is common to prepare a work area in each verge and potentially one in the central reserve, depending on the structures span and support arrangements. On some schemes, where multiple spans are required, groundworks will be required at all pier locations. Depending on traffic management restrictions (if applicable), this may need to be undertaken across several phases.
- C4.4.6 Subject to the site's ground investigation records and the size of the overbridge required, foundations may be a pile raft solution, individual piles or a mass fill concrete base. This will be finalised as part of the detailed design.
- C4.4.7 To construct the pile foundation solution, a conventional piling rig is likely to be used to undertake the drilling and concreting of the piles below ground. Piles are normally circular columns in the ground, ranging from depths of 5m to over 15m made from concrete and steel reinforcement. Depending on the design these piles could be connected together at the surface with a large reinforced concrete structure known as a pile cap.
- C4.4.8 To form the abutment and pier walls, it is likely that they will be cast in situ on site using concrete and steel reinforcement. To construct the walls, large wooden or metal shutters will be constructed to contain the concrete and steel reinforcement. Readymix Concrete will then be poured into the enclosed shutter using a crane with a concrete skip or with the use of a concrete pump.
- C4.4.9 Upon completion by the PC, this section will include a detailed description of the piling methods to be implemented at each location.

Underpass Construction

- C4.4.10 Several new underpasses are to be constructed across the Project to carry roads or passageways under the A66. In addition, there are also several underpasses that are required to be extended enabling existing assets to remain to prevent additional disruption and construction activities.
- C4.4.11 Underpasses are constructed in a similar process to an overbridge, with the structure being situated below ground level. The underpass features foundations, retaining walls and a deck-type roof structure. It could also be constructed from cast in situ or pre-cast box culverts dependent on design, ground conditions and suitability.
- C4.4.12 To construct an underpass, excavation works will take place to reduce level dig the land. Depending on the foundations, the area could then have a piling platform installed to facilitate a piling rig to install reinforced concrete piles or have a large deep excavation formed to enable a mass fill concrete foundation to be constructed.
- C4.4.13 The construction of the walls and deck are likely to be similar to the methodology detailed for the overbridge abutment walls (Section 3.2).
- C4.4.14 Upon completion by the PC, this section will include a detailed description of the piling methods to be implemented at each location.

Retaining Wall and Embankment Construction

- C4.4.15 Across the Project there are requirements for retaining walls or steep retained embankments where there is insufficient land available to conventionally grade the land at a shallow slope angle between two level differences.
- C4.4.16 Retaining walls or steep retained embankments can be constructed from a variety of different methods and materials, with their suitability dependent on ground conditions, topography, access, retained height requirements, retained length requirements and design life. The main (but not exhaustive) types of retained solution are listed below:
- C4.4.17 Continuous bored pile walls – Continuous bored piles are a type of embedded retaining wall solution that are used to retain large level difference. The bored piles are commonly installed from ground level using a piling rig. Depending on the type of piling rig selected, concrete will be poured into the augured hole and followed by a steel reinforcement cage. Once the concrete has cured, earth can be excavated on one side of the pile to enable material to be retained. Where further support is required, a concrete slab may be cast against the piles to provide additional support.
- C4.4.18 Steel sheet pile-driven walls – Sheet-piled walls are constructed by driving high strength corrugated sections of interlocking metal into the ground. The steel sections are normally driven individually using either high frequency vibration and/or impacting the head of the pile with a large weight. Once one pile is installed to the correct level, the next pile is pitched into position and the process continues. The wall acts in cantilever and facilitates material to be excavated out from one side to enable a retained wall solution. This type of installation method is normally faster to install but commonly not used where very deep retaining wall solutions are required.
- C4.4.19 Reinforced concrete cantilevered walls – These are concrete formed walls that integrate into an embankment, with fill material subsequently backfilled around the wall as it is constructed. The walls commonly feature a horizontal base and vertical wall section that are connected to utilise the fill material weight on the rear side of the wall to aid with stability. Walls can be pre-cast or cast in-situ. The size and width of the wall will be determined by the topography, ground conditions and retained height requirements.
- C4.4.20 Mechanically stabilised or earth-retained walls – Stabilised or reinforced earth walls are similar to reinforced concrete walls by utilising the fill material to help support the wall. Reinforced earth walls are formed by placing and compacting layers of granular material between plastic geotextile fibres, with a concrete block face.
- C4.4.21 For stabilised solutions, the ground may have reinforcing rods placed into the ground from the exposed face to help utilise the self-weight properties of the soil buried at depth to enable a steeper embankment to be constructed. Soil nailing is a good example of this where high strength rods are inserted into the embankment, grouted up and secured at the end. Such a solution may be used on a number of schemes to mitigate

large earthwork cuts and also large construction works, with possible examples on the M6 Junction 40 to Kemplay Bank scheme.

- C4.4.22 Upon completion by the PC, this section will include a detailed description of the piling methods to be implemented at each location.

C4.5 Control Measures

Working Hours

- C4.5.1 Most construction works will be undertaken during standard day working hours of 7am until 6pm. Piling should be avoided at night, however, if it is essential to undertake works at night or weekends and cannot be avoided the Principal Contractor will liaise with the Local Authority to agree what notices will be provided to residents and whether additional measures (e.g. providing temporary accommodation away from the area for residents) are required during the works.
- C4.5.2 This section of the method statement will identify any specific locations and times where piling is required out of hours and the measures that will be implemented to minimise disturbance and notify the Local Authority and local residents.
- C4.5.3 Whilst programme optimisation will remain a key driver on the Project to reduce to duration of construction works, National Highways is committed to undertaking the works safety and with the least disturbance to local residents as possible. Whilst we will look to optimise the number of hours that can be worked on the Project, we must remain vigilant of the increased dangers the workforce are exposed to when working excess hours. In addition, we are also aware of the impacts caused to stakeholders of working continuously, 7 days a week. Where key elements require increased work patterns, appropriate provisions will be implemented above and beyond the standard 5 day working week.

Timing of works

- C4.5.4 Piling close to watercourses (and in particular close to those watercourses that are linked to the River Eden SAC) has the potential to cause vibration and disturbance effects to fish and other sensitive species. This section will set out how specific measures will be implemented at each location relevant to the SAC in order to ensure impacts are minimised as far as practicable.
- C4.5.5 This will include detailed construction timings, in line with the programme constraints outlined in the Statement to Inform Appropriate Assessment (Application Document 3.6).
- C4.5.6 Ground vibration as a result of construction activities, such as piling sound, can cause fatal injuries in fish and fish eggs/embryos. No compaction (or other activities resulting in Peak Particle Velocity of greater than 13mm/s) will be permitted within 5m of watercourses supporting gravel spawning species (salmon, trout, lamprey sp., bullhead) without prior consultation with the Environment Agency and Natural England, during the fish spawning and incubation period - 1st October to 31st May.

Noise control

- C4.5.7 This section will set out how specific noise control measures (as specified in Section 3 of the EMP, Register of Environmental Actions and Commitments) will be implemented at each location where piling is required, to be determined depending on the type of piling to be implemented and the location and type of receptor nearby.

Pollution prevention

- C4.5.8 This section will set out how specific pollution prevention measures will be implemented at each location in order to ensure no pollution of surface or groundwater occurs and impacts are minimised as far as practicable.
- C4.5.9 This is likely to include adhering to pollution prevention guidelines and best practice, for example measures outlined in *Pollution prevention for businesses (Department for Environment, Food and Rural Affairs, 2016)*¹

Material storage and plant transfer

- C4.5.10 This section will set out how specific material storage and plant transfer measures will be implemented at each piling location in order to ensure impacts on surrounding receptors are minimised as far as practicable.
- C4.5.11 Strict biosecurity measures will be required to be put in place. Measures will be required to specify no transfer of plant from eastern to western schemes without appropriate safeguards to avoid the introduction and/or spread of invasive non-native species to the SAC.
- C4.5.12 Details regarding material storage and management of piling equipment in flood prone areas will be developed by the PC and provided in this section.

Permits and licensing

- C4.5.13 The PC will liaise with Local Authorities when details of location, type of piling and duration are known, in order to agree what consents are required. This section will then outline any required license.

Section 61 agreement

- C4.5.14 Depending on predicted noise levels at a given construction location the PC may need to obtain a Section 61 agreement with the relevant local authorities.

European Protected Species licences

- C4.5.15 All works must be undertaken in accordance with any conditions stipulated under European protected species licences (EPSL). This section will record whether any such conditions exist that are relevant to piling, and if so how they are complied with.

¹ Department for Environment, Food and Rural Affairs (2016) Pollution prevention for businesses

Pre-construction surveys

- C4.5.16 Pre-construction surveys will be undertaken in accordance with relevant industry guidance. Pre-construction survey results will be used to inform species-specific mitigation measures that may be relevant to piling works. This section will be developed by the PC if relevant.

Piling Risk Assessment

- C4.5.17 This section will present the full piling risk assessment for any locations where piling has the potential to affect watercourses or groundwater.