

A12 Chelmsford to A120 widening scheme TR010060

6.5 First Iteration Environmental Management Plan Appendix M: Soil Handling Management Plan

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6.5 First Iteration Environmental Management Plan Appendix M: Soil Handling Management Plan

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Appendix M Soil Handling Management Plan

M.1 Background to the plan

- M.1.1 The proposed scheme comprises improvements to the A12 between junction 19 (Boreham interchange) and junction 25 (Marks Tey interchange), a distance of approximately 24km, or 15 miles. The proposed scheme involves widening the A12 to three lanes throughout (where it is not already three lanes) with a bypass between junctions 22 and 23 and a second bypass between junctions 24 and 25. It also includes safety improvements, including closing off existing private and local direct accesses onto the main carriageway, and providing alternative provision for walkers, cyclists and horse riders (WCH) to existing routes along the A12, which would be removed. A detailed description of the proposed scheme can be found in Chapter 2 of the Environmental Statement [TR010060/APP/6.1].
- M.1.2 This Soil Handling Management Plan, in outline, sets out a strategy and action plan for the management of soils which are likely to be excavated and handled during the construction phase of the proposed scheme. This plan applies to topsoils and subsoils to be restored to agricultural land or reused in shallow landscaping (i.e. upper 1m of final landform) during the construction of the proposed scheme across areas of temporary and permanent land take.
- M.1.3 This purpose of this plan is to detail the principles of soil management that will be implemented by the Principal Contractor (PC) to protect soils and maintain their quality for future use before being returned to their original location where practicable or reused elsewhere on the proposed scheme.
- M.1.4 This management plan will be updated by the PC and included within the second iteration Environmental Management Plan (EMP), as appropriate and necessary, prior to commencement of works in accordance with the relevant Requirements in Schedule 2 of the draft Development Consent Order (DCO) [TR010060/APP/3.1] and the requirements of the first iteration EMP [TR010060/APP/6.5].
- M.1.5 The scope of this plan is limited to soils which will be restored to agricultural land or reused in shallow landscaping. Topsoil and subsoil which become surplus to agricultural restoration requirements should be prioritised for use in other landscaping or engineering applications which promote their retention onsite. The management of these soils for landscaping or engineering applications falls outside the scope of this plan and should be managed in accordance with the Materials Management Plan (MMP) (Appendix J) and the Site Waste Management Plan (Appendix L) of the first iteration EMP.

M.2 Responsibilities

- M.2.1 In relation to the control and management of soil, the PC will establish the appropriate roles and responsibilities for site staff in accordance with the roles and responsibilities set out in Chapter 2 of the EMP.
- M.2.2 The second iteration EMP will include details on appropriate supervision of soil handling operations by suitably qualified and experienced persons to ensure that soils are handled in accordance with good practice. The PC's Environmental Manager shall have overall responsibility for compliance with this plan, including monitoring, auditing and subcontractor communications required. Site managers and supervisors will have responsibilities delegated to them, including supervision of soil management compliance as required.

M.3 Legislation and best practice

- M.3.1 Soil management will be undertaken following the Department for Environment, Food & Rural Affairs' (Defra) published Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009a) where practicable, which details approaches and techniques for the following:
- The identification of soil resources at an early stage in the development process
 - Improved planning of soil use
 - Better level of soil management during project implementation, including sustainable use of surplus soil
 - The maintenance of soil quality and function both on and offsite
 - Avoidance of soil compaction and erosion (with a consequent reduction in flooding and water pollution)
 - Improved knowledge and understanding of soil at all levels in the construction industry, including soil amelioration techniques
 - Areas of soil to be protected from earthworks and construction activities
 - The areas and types of topsoil and subsoil to be stripped, haul routes and stockpile locations
 - The methods for stripping, stockpiling, respreading, and ameliorating landscape soils
- M.3.2 It is noted that this Defra guidance is in the process of being updated, such that the updated guidance would be followed where applicable and appropriate.
- M.3.3 Adverse effects on soils can be mitigated by adopting the measures included within this plan for soil handling, storage and management during construction,

and by avoiding the creation of bare areas of permanently exposed soil that would be vulnerable to erosion processes.

M.4 Construction impacts on soil resources

M.4.1 Construction related activities can result in some of the most significant adverse impacts on soil properties and soil quality. The Defra published Safeguarding our Soils: A Soil Strategy for England (2009b) which states that soil is often not considered until the landscaping phase of a project, by which time most of the damage has already been done.

M.4.2 Construction related activities can have adverse effects on soils in a number of ways by:

- Accidental spillages or the use of chemicals resulting in the contamination of soil resources.
- The mixing of topsoil and subsoil reducing the overall soil quality.
- Offsite disposal of soils due to the mixing of soil and construction waste or contaminated materials which require treating before reuse or ultimately even disposed of at landfill.
- Over-compaction of the soil through the use of heavy machinery or the storage of construction materials.
- The use of impermeable materials to cover soils, effectively sealing it, which can result in detrimental impacts on the soils' biological, chemical and physical properties. In addition, this can result in certain geotechnical parameters being altered such as drainage characteristics and structure.
- Deterioration of soil structure by incorrect storage, for example over-high stockpiles compressing soil structure.

M.5 Outline proposals for soil management

Preconstruction activities

M.5.1 Prior to any soil stripping, a soil resource survey would be undertaken, including appropriate soil sampling and laboratory analyses to inform landscaping and agricultural soil restoration. The design of this survey shall be informed by and supplement the Agricultural Land Classification (ALC) survey for the proposed scheme (included in Appendix 10.2 of the Environmental Statement [TR010060/APP/6.3]).

M.5.2 A soil resource plan would be completed in accordance with the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009a). This would include interpretation of the results of the soil resource survey and ALC survey with respect to landscaping and would help identify sustainable reuses for soil resources disturbed by the proposed scheme. Pre-

disturbance soil horizon thicknesses and soil types would be identified in the plan.

Preparation

- M.5.3 Soil stripping would be undertaken only after the soil resource plan has been completed.
- M.5.4 Biosecurity risks would be identified in advance of soil stripping via consultation, and good practice measures put in place as applicable, to reduce the potential for soil-borne disease (crop and animal disease) and pathogen transfer between different areas of agricultural land. This may include segregation of soils and cleaning/disinfection of machinery where appropriate.
- M.5.5 Intrusive archaeological investigations must be undertaken ahead of construction works to avoid soil stripping resulting in damage to buried archaeology, in accordance with the approach and techniques presented within the Archaeology Mitigation Strategy (Appendix 7.10 of the Environmental Statement [TR010060/APP/6.3]).
- M.5.6 The full depth of topsoil would be stripped from areas to be disturbed by construction, such as where haul roads, compounds and subsoil stockpiles are to be located, and from areas where topsoil would otherwise be sealed by permanent development (hardstanding and materials placement). This soil would be sustainably reused within the proposed scheme or elsewhere wherever practicable.
- M.5.7 Topsoil from below any root or crown spread of trees proposed to be retained would not be removed.
- M.5.8 Areas where soil stripping is required to be undertaken would be demarcated ahead of any major construction plant, vehicles or machinery entering the works area.
- M.5.9 All identified mitigation requirements for the location would be implemented prior to soil stripping, for example this could include checking whether an archaeological watching brief is required by a suitably qualified archaeologist to supervise any soil stripping operations.
- M.5.10 Temporary ditches would be excavated, where required, to act as drains to deal with surface water from adjacent fields, in accordance with the approaches and techniques presented in Appendix N: Water Management Plan within the first iteration EMP.
- M.5.11 It would be ensured that adequate stockpile storage designation areas are prepared prior to soil stripping. Where practical, stockpiles would be located in excess of 10m from any existing watercourse or drains, preferably on flat lying land. Where this is not feasible due to space constraints onsite, additional mitigation measures (such as bunds) would be implemented to provide an

adequate barrier between the potential source of contaminated runoff and the receptor. The stockpiling of materials would take predicted overland flood flow paths into account so as not to introduce an obstruction. Where practicable, stockpiles would be placed to screen the construction works from receptors sensitive to noise and visual impact, for example residential areas.

- M.5.12 Where reasonably practicable, soils would be stored in the nearest storage location to where it was excavated, allowances would be given if being moved for screening (as described above).
- M.5.13 Where soils are to be restored, topsoil and subsoils would be stored separately to each other and other materials. Topsoil and subsoil storage locations would be identified on preconstruction site layout drawings to be developed prior to construction.
- M.5.14 Where practicable, agricultural soils from different field boundaries would not be mixed, to mitigate potential biosecurity issues and the potential degradation of soil quality through mixing of soils from different sources.
- M.5.15 The potential maximum duration of topsoil and subsoil storage would be the duration of the construction programme, but most soils would be stored for a much shorter duration.

Soil stripping

- M.5.16 The following general principles would be followed during the stripping and handling of soil across the proposed scheme.
- M.5.17 The site would be carefully examined for non-vegetative potentially hazardous debris (for example, glass, bricks, concrete) and any invasive species¹ prior to soil stripping, with any such material encountered removed.
- M.5.18 Areas to be stripped of soil would first be cleared of all grass and herbaceous vegetation using mechanical means where practicable, or using herbicides where required and agreed with landowners. We will liaise closely with the landowner parties with interest in land and endeavour to work around the timing of crops / harvest ahead of construction works commencing if possible. Vegetation would be disposed of, recycled as green waste or harvested where possible (if agricultural crops present). Vegetation would not be incorporated into soil to be stored.
- M.5.19 Stripping of soil would be restricted to those areas that are to be disturbed by construction activities. Areas to be used for storing subsoils or other materials would first be stripped of topsoil.

¹ Appropriate guidance should be sought from an Ecologist if invasive species are identified. Measures relating to the management of invasive species are presented in the Invasive Species Management Plan included within Appendix H of the first iteration EMP.

- M.5.20 Stripping operations would be appropriately supervised and follow a detailed plan showing soil units to be stripped, haul routes and vehicle movements throughout the works. Information relating to the range of thickness, types and layers of soils across the route would be available from the soil resource plan so as to allow for soil units to be defined onsite.
- M.5.21 Topsoils and subsoils, as well as soils of distinctly different types or composition (as determined by the soil resource plan) would be stripped separately and segregated during storage.
- M.5.22 Topsoil and subsoil would only be handled or trafficked when the surface is free of standing water and not frozen. Soils would only be handled when they are in a reasonably dry and friable state, below the plastic limit.
- M.5.23 Earthmoving plant appropriate to the size of the site, the volume of soil to be stripped and the haulage distances would be used in accordance with appropriate work practices. Excavators and dozers would be used for the majority of soil stripping for the proposed scheme. The general methodology is set out below.

Stripping methodology for dozers

- M.5.24 Dozers are anticipated to be used for most soil stripping across the working corridor and for compounds. The following methodology would be used:
- The topsoil layer would be pushed up in the thickest layer possible (e.g. 150–200mm thick), whilst maintaining operational efficiency of the dozer, to form a low mound (1–2m high) along the edge of the exposed soil profile. The soil nearest the exposed face should be pushed up first, progressively working to the back of the strip. At least two passes are likely to be required to strip the full specified depth of topsoil. Subsoil would not be incorporated into the topsoil.
 - This procedure would be completed in segments (e.g. 20m widths) to ensure that the full depth of topsoil is stripped before moving on to the next segment.
 - Subsoil would generally be left *in situ*, but where subsoil stripping is required, it would be stripped in the same manner as set out above until the required base depth of stripping is reached. Subsoil should be stripped as soon as practicable after topsoil stripping to reduce the potential for subsoil degradation from erosion.

Stripping methodology for excavators

- M.5.25 Excavators are anticipated to be used for stripping soils in open cut trenches and may be used in other areas where stripping with excavators is more practicable than with dozers, for example in areas where archaeological mitigation is required. The following methodology would be used.

- Topsoil would first be stripped to the full specified depth, without incorporating subsoil, from the haul route edge of the first marked strip, and directly placed into stockpiles where practicable. Where stockpiles are remote to the area of stripping, soil would be loaded into dump trucks/tracked dumpers from the excavators.
- Where subsoils are to be stripped, they would be stripped as soon as practicable after topsoil stripping to reduce the potential for subsoil degradation from erosion. The subsoils would be separately stripped to the appropriate depths and directly placed into stockpiles where practicable, or otherwise loaded into dump trucks/tracked dumpers.
- The sequence of topsoil and subsoil stripping would be repeated across the strip area. Dump trucks/tracked dumpers would only traverse areas where topsoil has been stripped.

M.5.26 Detailed records would be kept of soil stripping operations undertaken; this would help ensure that soils are used for their intended purpose as per the soil resource plan, or reinstated to the correct agricultural field as applicable.

M.6 Soil storage

Stockpile construction

- M.6.1 The main aim when temporarily storing soil in stockpiles is to maintain soil quality and to reduce the potential for damage to the soil's physical condition and structure, and to facilitate the respreading and reinstatement of soil material. In addition, stockpiling soil should not cause soil erosion, pollution to watercourses or increase flooding risk to the surrounding area.
- M.6.2 Topsoil and subsoil should be segregated to ensure no mixture and subsequent degradation of soil quality where these soils would be restored to agricultural land or reused in shallow landscaping (i.e. upper 1m of final landform).
- M.6.3 Stockpile size is dependent on multiple factors including the nature and composition of the soil, the prevailing weather conditions at the time of the stripping, space limitations and any planning-related conditions or requirements attached to the consent for the proposed scheme.
- M.6.4 Soil would be transported directly to its stockpile location after stripping, and once the stockpile has been formed, the soil would remain in the stockpile until it is reused at its final destination. Interim stockpiles would not be used, unless unavoidable, to reduce double-handling of soils.
- M.6.5 In order to minimise the effect of storage:
- Stockpiles would be carefully formed with a slope no greater than a slope of 1:2, so as to reduce the potential for damage to the physical condition and future economic viability of soil resources.

- Stockpile heights would not exceed 4m for topsoil and 6m for subsoil but would be kept as low as practicable.
- Stockpiles would be shaped in a manner that facilitates the shedding of water and avoids the potential for ponding.
- The stockpiles would be monitored for signs of ponding, as indicated by standing water, and erosion. Where it occurs, temporary drainage measures, regrading and/or silt fencing would be put into effect.
- Be located to avoid interference with rainwater runoff from adjacent areas, and to prevent the pollution of water bodies.
- Where practical, be located in excess of 10m from any existing watercourse or drains. Where this is not possible due to space constraints onsite, additional mitigation measures (such as bunds) would be implemented to provide an adequate barrier between the potential source of contaminated runoff and the receptor.
- Be located beyond tree canopies and identified root protection zones around trees and vegetation to be retained.
- Be located in an area of the site where it can be left undisturbed and would not interfere with site operations.

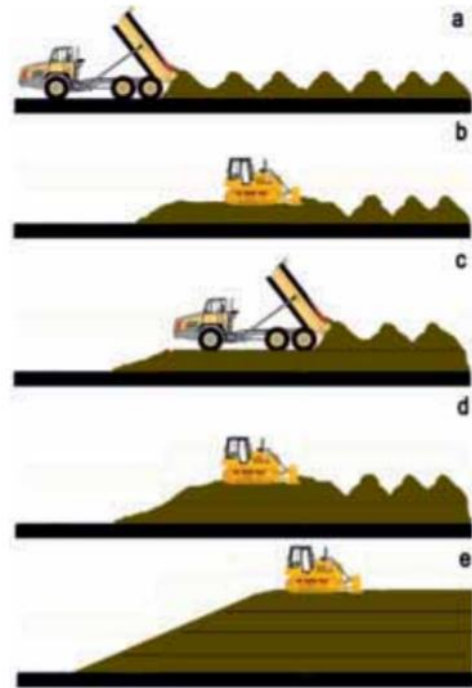
M.6.6 Depending on the prevailing conditions, all stockpiling operations would be undertaken in a manner consistent with either of the following methods, as detailed in the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009a) and shown in Plate M.1:

- Method 1: should be applied to soil that is in a dry and non-plastic state. The aim is to create a large core of dry soil, and to restrict the amount of water that can get into the stockpile during the storage period. Dry soil that is stored in this manner can remain so for a period of years and it is reusable within days of respreading.
- Method 2: should be applied if the construction programme or prevailing weather conditions result in soil having to be stockpiled when wet and/or plastic in consistency. This method minimises the amount of compaction, while at the same time maximising the surface area of the stockpile to enable the soil to dry out further. It also allows the soil to be heaped up into a 'Method 1' type stockpile, once it has dried out.

Plate M.1 Stockpiling methods (Defra, 2009a)

Method 1 – Dry non-plastic soils

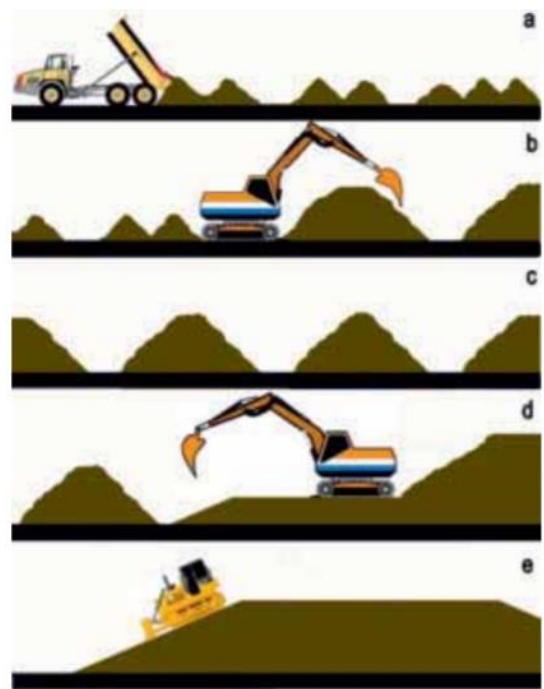
The soil is loose-tipped in heaps from a dump truck (a), starting at the furthest point in the storage area and working back toward the access point. When the entire storage area has been filled with heaps, a tracked machine (excavator or dozer) levels them (b) and firms the surface in order for a second layer of heaps to be tipped. This sequence is repeated (c & d) until the stockpile reaches its planned height. To help shed rainwater and prevent ponding and infiltration a tracked machine compacts and re-grades the sides and top of the stockpile (e) to form a smooth gradient.



Method 2 – Wet plastic soils

The soil is tipped in a line of heaps to form a 'windrow', starting at the furthest point in the storage area and working back toward the access point (a). Any additional windrows are spaced sufficiently apart to allow tracked plant to gain access between them so that the soil can be heaped up to a maximum height of 2m (b). To avoid compaction, no machinery, even tracked plant, traverses the windrow.

Once the soil has dried out and is non-plastic in consistency (this usually requires several weeks of dry and windy or warm weather), the windrows are combined to form larger stockpiles, using a tracked excavator (d). The surface of the stockpile is then regraded and compacted (e) by a tracked machine (dozer or excavator) to reduce rainwater infiltration.



Management of stockpiles

- M.6.7 Once the stockpile has been completed the area would be clearly defined to prevent any disturbance or contamination by other construction activities. Wheeled vehicles would be prohibited from tracking over stockpiles of soil that is to be reused.
- M.6.8 The locations, volumes and contents of all stockpiles would be clearly recorded.
- M.6.9 In order to mitigate the adverse effects of soil storage, the site would be managed in such a way that soil storage periods are minimised in duration.
- M.6.10 Should stockpile durations be greater than six months, the application of a mix of grass and clover seeds to the stockpile surface would be implemented to aid in reducing potential surface erosion and prevent potential nuisance weed infestation. Any weeds that have established on the stockpiles would be managed during summer months by the application of appropriate herbicide, by spraying techniques to kill off the weeds (taking precautions not to allow herbicide spray to drift onto adjacent crops), or by cutting techniques such as mowing and strimming to prevent any possible seed dispersion.
- M.6.11 Where the stockpiles are left unvegetated, they would be sprayed with water as necessary to prevent dust generation.

M.7 Soil restoration

Reuse and restoration of soils

- M.7.1 Where land is to be reinstated to its former use, such as for agricultural, soils would be reinstated to their pre-disturbance depths and quality as far as practicable, with reference to the soil resource plan. The PC shall not be obliged to reinstate the soil into any better condition than as evidenced by the soil resource plan and schedule of condition.
- M.7.2 Where land is to be restored to agriculture the PC would liaise with the landowner/occupier, through the Agricultural Liaison Officer (ALO), and set out the detail for restoration on each specific area of farmland. The land restoration would proceed with full consultation between the landowner/occupier and the PC including inspection of works where applicable and in accordance with requisite site health and safety procedures.
- M.7.3 Areas where soils are to be restored would be protected from the in-flow of water and ponding. In locations where ponding has occurred due to inclement weather, these areas would be drained in advance of restoration and allowed to dry out.
- M.7.4 All surfaces to receive topsoil or subsoil would be inspected and all obstacles, such as wire, rope, wood, metal, plastic and concrete debris, and any

temporary roads, surfacing or building materials, would be removed from site before the soils are reinstated.

- M.7.5 Appropriate cultivation and decompaction measures would be undertaken during reinstatement for topsoils, subsoils and their receiving substrates, for example loosening with ripping equipment.

Substrate

- M.7.6 The substrate would be properly de-compacted to break up any panning or sealing of the ground surface, in order to reduce flood risk and to promote deeper root growth.
- M.7.7 Should the substrate material require ripping, then the utilisation of ripper/subsoiling equipment (such as a single rigid tine device or large winged-tine rippers) would be implemented.
- M.7.8 Dedicated haul roads would be utilised to transport the subsoil.
- M.7.9 The spreading of subsoil would be undertaken from the furthest point from the area access point, to avoid over compaction of already placed subsoil. Spreading would be undertaken to an agreed thickness with subsequent layers applied, as required.
- M.7.10 Subsoil placement works would be suspended if sustained heavy rain occurs during the soil handling operations, and not restarted until the ground has had at least a full dry day or appropriate moisture content criteria can be met (to be set out in the second iteration EMP by suitably qualified and experienced persons).

Topsoil

- M.7.11 The PC would endeavour to reuse soils as soon as is reasonably practicable and return topsoil stripped during the construction of the proposed scheme as close to its source of origin as reasonably practical, and as appropriate to the design, during restoration.
- M.7.12 Damaged topsoil may be replaced where appropriate with topsoil of an equivalent quality with reference to the soil resource plan and schedule of condition (the PC shall use reasonable endeavours to procure soil free from contamination or disease).
- M.7.13 The application of topsoil to each designated area would be excavated from temporary storage stockpiles by 360-degree excavator and placed using articulated dumper trucks. Dedicated haul routes would be utilised on the subsoil to transport the soil to the first placement site. Thereafter, haul routes would continue to be adhered to.
- M.7.14 Topsoil would be placed in a windrow at appropriate centres from the edges of the site and spread evenly across the site. In spreading, the material operations

would commence at the furthest location from the access point and work backwards to avoid tracking over newly placed topsoil.

- M.7.15 The topsoil would be spread to an agreed depth as per the landscape specification for the proposed scheme.
- M.7.16 Topsoil placement works would be suspended if sustained heavy rainfall occurs during the soil handling operations, and not restarted until the ground has had at least a full dry day or agreed moisture content criteria can be met.

Aftercare

- M.7.17 Temporary agricultural land would be handed back to the landowner/occupier at the earliest opportunity once the restored land is in a suitable condition to be returned to its former agricultural use.
- M.7.18 Where land is to be used temporarily and returned to the landowner/occupier, the ALO would be responsible for discussing and agreeing reinstatement measures with the landowner/occupier.
- M.7.19 The ALO would undertake inspections of restored agricultural land with the landowner/occupier where issues arise requiring potential remedial measures.
- M.7.20 The ALO would coordinate the appropriate remedial actions and/or any previous agreements made at the time of acceptance of the initial restoration works and handover to the landowner/occupier.
- M.7.21 The schedule of aftercare maintenance for landscaping may include soil testing appropriate to the target specification following completion of the relevant construction work.

References

Department for Environment, Food & Rural Affairs (2009a). Construction Code of Practice for the Sustainable Use of Soils on Construction sites. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf. Accessed November 2021

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