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		• Exposed soils should be protected from winds until sealed or re-vegetated; • Minimise dust generating activities by continually reviewing working methods, particularly near residential receptors/sensitive ecosystems during prolonged dry, dusty weather unless damping/other suppressants are used. Damping down will be regularly carried out in dry weather to ensure dust suppression; • Ensure an adequate water supply to site and use water as dust suppressant where applicable. It's not envisaged that grey water will be readily available, however this will be investigated further when on site and if appropriate will be abstracted in accordance with appropriate licencing regulations; • Ensure equipment suitable for clearing spills etc. is available at all times; • Use covered skips where practicable. • Ensure any site machinery is well maintained and in full working order; and • Sand and aggregates shall be stored away from sensitive receptors and screened/shielded. • **Earthworks:** • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable; • Stockpile surface areas should be minimised (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;	

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		• Where practicable, sheeting should be positioned around material stockpiles, and vehicle loading/unloading areas shall be positioned away from site boundaries and residential properties.
		• During dry or windy weather, material stockpiles and exposed surfaces should be dampened down using a water spray to minimise the potential for wind pick-up.
		• **<u>Construction Specific Measures:</u>**
		  • Avoid scabbling (roughening of concrete surfaces) if possible; and
		• **<u>Track Out Specific Measures:</u>**
		  • Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being in frequent use;
		  • Avoid dry sweeping of large areas; and
		  • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
		  • Traffic management measures will be required during the construction phase and shall be detailed in the PMP.	

Noise and Vibration	• Noise impacts on residential dwellings from on-site construction activities; and • Vibration impacts on residential dwellings	• The use of BPM, as defined under Section 72 of the CoPA (Ref 7.1) specifically to mitigate against noise and vibration: • The appropriate selection of plant, construction methods and programming: Only plant conforming with or better than relevant national or international standards, directives or recommendations on noise or vibration emissions will	• Periodic monitoring by a suitably competent person throughout the construction phase to ensure that Best Practicable Means (BPM) identified are adhered to at all times. This will include the

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	from on-site construction activities.	be used. Construction plant will be maintained in good condition with regards to minimising noise output and works exposed to harmful noise and vibration; • Construction plant will be operated and maintained appropriately, having regard to the manufacturer's written recommendations or using other appropriate operation and maintenance programmes which reduce noise and vibration emissions. All vehicles and plant will be switched off when not in use; • Design and use of site hoardings and screens, where necessary, to provide acoustic screening at the earliest practicable opportunity. Where practicable, gates will not be located opposite buildings containing noise-sensitive receptors (NSRs). The localised use of temporary site hoardings or noise barriers has not been included in the assessment of construction noise undertaken by WSP in order to represent a worst-case scenario. BS 5228 advises that noise barriers can provide a reduction in noise levels of 5dB when the top of the plant is just visible over the noise barrier, and 10dB when the plant is completely screened from a receptor. The effectiveness of a noise barrier depends upon its length, effective height, position relative to the noise source and to the receptors, and the material from which it is constructed. • Install the Schemes permanent noise barrier as soon as practicable; • Choice of routes and programming for the transport of construction materials, spoil and personnel to reduce the risk of increased noise and vibration impacts due to the construction of new roundabouts. Further details are included within the CTMP; • Vehicle and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers, be maintained in good working order and operated	use of noise monitoring equipment on site, continued review of working methods and plant section. Baseline noise readings shall be taken prior to any works commencing, and these will be used in conjunction with Specification Appendix 1/9 to monitor noise.

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		in such a manner as to minimise noise emissions. Plant items that comply with the relevant EU/UK noise limits applicable to that equipment will be used; • The positioning of construction plant and activities to minimise noise at sensitive locations; • Equipment that breaks concrete by munching or similar, rather than by percussion, will be used as far as is practicable – however its currently envisaged that no work of this type is required; and • The use of mufflers on pneumatic tools; • Selection of low vibratory equipment and methodologies; • Any complaints that occur during the works period will be appropriately addressed and recorded in the Site Monitoring Sheet, including details of the actions taken; and • Where community complaints are recorded with respect to site noise, the relevant noise source will be identified and any additional feasible and reasonable measures available will be implemented to either reduce noise emissions or reduce the impact on receptors; • Use of electrical items of plant instead of diesel plant where practicable and the work type allows it/are available; • Deliveries should be programmed to arrive during daytime hours only; • Care should be taken when unloading vehicles to minimise noise;	

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		• Delivery vehicles should be routed so as to minimise disturbance to local residents; • Delivery vehicles should be prohibited from waiting within or in the vicinity of the site with their engines running; • Lorries shall enter and exit work sites in a forward direction, except where space restriction does not permit this. This will assist in the minimisation of noise from reversing alarms. In that event, movement shall be properly controlled by a responsible person(s) observing the rear of the vehicle. Entry and exit conditions shall be approved with the Highways Authorities prior to their implementation. • All site staff, including sub-contractors, will be made aware of the potential for noise and vibration issues to arise and the use of BPM and the CEMP through site inductions and Toolbox Talks; • Work with the PLO to establish relations with people living, working and studying in the vicinity of the site. Such relations will be developed through keeping people fully informed of progress and by treating complaints fairly and quickly. Warning will be given prior to particularly noisy operations / night work being carried out, and contact details will be provided for site personnel having responsibility for addressing noise complaints.	
Water Resources and Flood Risk	• Short-term increase in flood risk due to construction activities. • Potential effects on the water quality of surface water and groundwater resources due to	• The use of BPM, operational management and design of the Scheme, including the provision of temporary attenuation features and runoff control. • Secondary mitigation measures during the construction phase will include the following: • Excavation elements to be constructed during the summer months where possible;	• Groundwater level monitoring during the construction phase if groundwater is encountered. • Installation of systems such as silt traps and swales designed to trap silty water

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	construction activities or accidental leaks and spillages. • Potential increase in physical contamination (i.e. sedimentation) of surface water bodies due to ground disturbance. • Fluvial flooding is possible near the access road and pond 3 near Barnham Rife Ditch. • Sensitive water receptors that could be impacted by pollution are surface water bodies (Barnham Lane Ditch, Lidsey Rife and School Ditch) and groundwater bodies (Superficial Deposits). The pollution of both surface and groundwater bodies may be exacerbated by accidental spillages. • During periods of heavy rainfall, vehicle movements associated with construction activities resulting in damage to soil structure may generate increased	• Groundwater levels to be monitored throughout construction by the site team using existing monitoring points; • Damp proof membranes will be incorporated during construction where necessary to prevent the ingress of shallow groundwater into cuttings and excavations; • Storage of material and construction activities should avoid areas of flood risk; • Temporary bunding and settlement ponds; • Preparation of incident response plans to set out the measures that must be taken in the event of a pollution incident; • On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak; • Wherever possible, plant and machinery would be kept away from the drainage system and watercourses; • Use of drip trays under mobile plant; • Construction materials brought to site shall be free of any contaminated material; • Care shall be taken to ensure that wet cement does not come into contact with surface water or near the streams and drainage ditches. Cement should be poured in dry and consideration should be given to use fast drying cement; • If ground contamination is encountered during construction works, work shall stop immediately and measures would be taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed for off-site treatment – the Contractor's design consultant will be called to site in such instances to review. Planning condition 10 requires that if during the works contamination not previously identified is found, no further works (unless otherwise agreed in writing with the County Planning Authority) are to be carried out until a remediation strategy detailing how \ will be dealt with is submitted to and approved by the County Planning Authority, in conjunction with the Environment Agency • Working areas shall be clearly defined to ensure the disturbance of soils is minimised, where possible; • Haul routes and accesses shall be clearly defined to minimise risk of accidents; • Site vehicles will require their wheels washed prior to leaving Site; • Controlled and covered waste storage areas;	including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions.

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	sedimentation within surface run-off.	• Implementation of a Dust Management Plan (i.e. damping down) with subsequent consideration given to the management of surface water run-off; • Installation of systems such as silt traps and swales designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions; • Provision of environmental awareness training for Site workers; • The final permanent surface water drainage design shall be constructed on a phase by phase/catchment by catchment basis as part of the design solution to attenuate flow and control runoff from new impermeable surfaces; • The implementation of a temporary drainage strategy to prevent uncontrolled runoff; and • The operational drainage system will need to be protected from sediment or debris, and jetted on completion of the works to remove any accumulation of sediment or debris. • Measures to specifically minimise the short-term increase in flood risk due to construction activities include the following: • Implement a construction-phase drainage strategy to intercept, capture and attenuate surface water runoff and adopt a phased approach to the construction of the operational drainage system to ensure impermeable areas are appropriately drained and attenuated prior to discharge. The construction-phase drainage strategy could include the provision of a bund along the lowest perimeters of the site to prevent uncontrolled runoff towards existing properties. Operational-phase drainage systems must be protected from ingress of sediment and debris and cleaned on completion of construction works. • Storage of material and construction plant should be set back from the Barnham Rife Ditch and away from areas that may be at risk of flooding or existing overland flow routes as described in the Flood Risk Assessment. • To minimise groundwater seepage into the areas of excavation/cutting, deep excavations should be constructed during the summer months as far as practicable and groundwater levels shall ideally be monitored during construction. • Measures to specifically minimise the potential effects on the water quality of water resources due to accidental leaks and spillages include the following:	

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		• Surface water run-off from within the Site shall be managed to prevent uncontrolled migration of pollutants to waterbodies. This could include temporary bunding and settlement ponds; • Preparation of incident response plans, prior to construction, which should be present on-site throughout construction to inform contractors of required actions in the event of a pollution incident; • Spillages and leaks would be immediately contained in line with the incident response plan; • On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak; • Wherever possible, plant and machinery will be kept away from the drainage system and watercourses; • Use of drip trays under mobile plant; • Oil, fuels and other harmful substances should be stored on an impermeable surface with appropriate drainage or containment; • Construction materials brought to the Site should be free of any contaminated material, so as to avoid any possible contamination of watercourses; • Care shall be taken to ensure that wet cement does not come into contact with surface water or near the watercourses and drainage ditches. Cement shall be poured in dry conditions where possible and consideration shall be given to use fast drying cement; • If ground contamination is encountered during construction works, work are to stop immediately and measures taken to prevent disturbance and mobilisation of contaminants, until the contamination has been treated in-situ or removed for off-site treatment.	

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
		• Measures to specifically minimise the potential increase in physical contamination (i.e. sedimentation) of surface waterbodies due to ground disturbance include the following: • Locating stockpiles and materials storage a minimum of 10m from any watercourses or drainage lines; • Working areas shall be clearly defined to ensure the disturbance of soils is minimised, where possible. • The cleaning of HGV vehicle wheels that have been to site, prior to leaving site. Dust Management Plan to be prepared with subsequent consideration given to the management of surface water run-off; • Installation of systems such as perimeter bunds, silt traps and swales around material storage heaps designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions; • The implementation of a temporary drainage strategy to prevent uncontrolled runoff; • Locating stockpiles and materials storage a minimum of 10m from any watercourses or drainage lines; • If perched groundwater is encountered within the made ground or superficial deposits at the site, during the establishment of the foundations, dewatering may be required. The most appropriate method of dewatering would be chosen at this stage, which may include the enclosure of the excavation by sheet piling. Piezometers could be used outside of the sheet-pile to monitor groundwater levels. Damp proof membranes will be incorporated during construction to prevent the ingress of shallow groundwater;	

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		• If dewatering is required, water shall be passed through an appropriate sediment control system prior to discharge.	

Landscape	• Construction related features, including an increase in construction traffic on the roads, views of construction activities from nearby residences, a reduction in tranquillity from the noise and an increase in activity.
	• The introduction of construction related features and activities, particularly around the new roundabout at the junction of A29 Fontwell Avenue.
	• Visual impacts during the construction phase are likely to include the following:
	  • Construction traffic – large vehicles moving along roads and throughout the site;
	  • Removal of vegetation;
	  • Visual intrusion of construction
		• Protect existing vegetation during construction so to ensure continued growth and maximise vegetation retention;
		• Planting to be installed and maintained as soon as possible within the construction programme, so that –
		  • New woodland planting shall provide green visual containment in addition to creating habitat for wildlife;
		  • New specimen tree planting shall enhance visual appeal and integrate the Scheme into the surrounding landscape;
		  • New hedgerow planting shall enhance visual amenity of the Scheme, respond positively to the local character and screen the nearby residents from the proposed noise barrier;
		  • Areas of wildflower grassland and bulb planting shall enhance the biodiversity along with visual appeal; and
		  • Established areas of existing vegetation to be retained and enhanced where possible.
		• The following construction phase mitigation measures have been identified for the Scheme and are those which are standard best practice:
		  • Temporary construction lighting to be minimal in extent and use. The lighting is to be highly directional and seek to minimise light spill and glare into the surrounding landscape. Construction operations to be limited to daylight working hours where possible;
		  • Noise and dust to be kept to a minimum;
			• Monitoring of planted vegetation to ensure it takes successfully.
			• Regular site inspections to be carried out which will report on the effectiveness of the environmental actions / controls / mitigation measures stated.

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	compounds and temporary lighting; • Presence of bare earth before seeding has established; • Noise from machinery, workmen etc, affecting tranquillity which impacts on the user experience of the view; • View of partially constructed infrastructure elements; • Earth-moving – stripping of topsoil, installation of temporary topsoil stores and permanent embankments to proposed road alignment; and • Installation of road drainage. • During construction, views of construction activities including HGVs would be very noticeable. • During construction, residents of Murrell	• Construction working area to be as contained and constrained as possible to minimise land take, vegetation loss and reinstatement requirements. • Construction lighting shall be designed such that, where practicable, all luminaires are installed internal to the site (such as on the inside of hoarding) and are directed towards the working area. • Lighting shall be operational only during construction works, except where lighting is required for out-of-hours security or safety reasons. • Lighting shall adhere to industry best practice, including guidance from industry bodies (such as the Construction Industry Research and Information Association, CIRIA). CIRIA guidance, for example, notes that lighting on construction sites is typically required for security and safety, while at the same time being required to minimise impact on the surrounding environment in accordance with current best practice. • Lighting to be mindful of temporary impact on sensitive flora and fauna and limit the intensity and duration of lighting to the minimum required. • The Landscape Subcontractor shall hold a BASIS amenity horticultural products certificate in order to be able to provide appropriate advice on the selection and application of herbicides (if required), and shall be competent in identifying plant species, including those proposed as part of seed and planting mixes and all undesirable species; • Any diseases or pests present shall be reported to the Council in the first instance and a programme of removal and replacement shall be provided.	

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	Gardens will have very noticeable views of construction activities from a close range. • Barnham Road will be affected by construction activities as they will dominate the view and traffic management requirements will alter the experience of the road for users. • Disturbance due to construction lighting.		
Archaeology and Heritage	• During the construction phase, there could be impacts on prehistoric and roman remains from site preparation, road construction, excavation for attenuation ponds, services/drainage and possible planting.	• Further archaeological investigation are required prior to construction, in order to clarify the nature, survival and significance of any archaeological assets that may be affected. • Archaeological investigation may include either trial trenching in accordance with the Schemes approved WSI or preliminary site strip in the form of Strip, Map and Sample during the construction phase. WSCC are currently reviewing their preferred approach to take and will advise on this shortly. Regardless of the option, a Post-Excavation Assessment Report will be required, to be carried out by others. • An appropriate mitigation strategy will be required for any significant archaeological assets. Mitigation normally comprises preservation by record: advancing understanding of asset significance through targeted archaeological excavation in advance of development. This might be combined with a watching brief during ground works for remains of lesser significance. In the unlikely event that nationally important remains are present, preservation in situ may be required (i.e. through redesign/ avoidance). Any archaeological work would need	• Monitoring in the form of an archaeological watching brief, may be required during ground works. Currently being reviewed by WSCC Archaeology team.

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		to be undertaken in consultation with the WSCC's archaeological advisor, in accordance with an approved archaeological Written Scheme Investigation. • The recording of a 19th century wall on Fontwell Avenue is required prior to demolition works. • Stop work procedures will be implemented in the event of asset discovery.	
Transport and Access	• Construction traffic adversely impacted local traffic volumes and flows; • During construction, Public Rights of Ways (PRoWs) and footpaths which intersect the Site and those in the surrounding area will either be temporarily closed or have restricted access to users.	• A detailed Construction Traffic Management Plan (CTMP) has been prepared to manage the impacts of construction traffic. This includes anticipated construction traffic volumes, delivery/construction routes and proposed lane and/or road closures, sustainable travel options and logistics. This will minimise the effects of the construction works on road users. This also includes a Construction Worker Travel Plan to minimise the effects of the construction works on road users. • The site manager along with the buying department shall coordinate deliveries to avoid causing congestion to the local residents/businesses and the surrounding road network. Delivery drivers will be requested to call ahead to ensure access is available and vehicle marshals will manage on site movements to ensure a smooth operation. • A plan showing the "Construction Traffic Route" on site will be displayed in the site offices, on hoardings and at entrances to the site. The plan shall identify the construction traffic route and anticipated swept path movements for differing types of vehicle likely to visit site. Any additional restrictions imposed on the movement of vehicles (together with the CMP) on site will be displayed in the construction traffic route plan. • Arrangements for managing traffic movements/pedestrian access on site shall comprise as a minimum the following: • Establish a HGV booking system and discuss/agree with our suppliers so to control traffic flows - this will help manage vehicle movements to site so that these can be spaced / averaged out so to reduce peak numbers as much as possible. This may require stockpiling of materials;	• None required.

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		• Establish controlled crossing points at interfaces with existing Barnham Road & Fontwell Avenue access points; • Establish designated parking off-loading areas; • Establish controlled haul road into main work area inclusive of designated crossing bays; • All excavators on site and HGV's entering working areas will have a banksman supervising movements so to keep aware of any pedestrian movements in proximity, and take necessary action if required; • A 10mph speed limit shall be implemented throughout site; and • Pedestrian routes for operatives around site shall be segregated from plant where possible. • All construction site vehicle parking (including contractor and employee parking) shall take place within the designated space within each site compound. Adequate contractor and site operative parking areas and space for delivery vehicles to park and turn shall be considered when planning the compounds and this shall be provided together with on-site loading / unloading areas. • It has been agreed with the WSCC Public Rights of Way Officer that, as there is no readily available safe alternative route, the temporary re-routing/diversion of the PRoW will not be required during the construction activities. Heras fencing will be used along the boundary of the diverted PRoW during construction to ensure users do not stray onto the construction site, and all temporary closure durations will be minimised as much as possible. Once the construction works are completed and the PRoW re-opened, there will be no need to reinstate the existing as it will be permanently diverted to its new alignment as part of the permanent works.	
Geology and Soils	• Lateral migration of aqueous and dissolved contaminants via groundwater flow or preferential pathways could impact surface	• Ground investigations followed by an on-going DQRA have provided acceptance limits for soils in the bases and sides of the planned excavation dig. These have been formally accepted by the Environment Agency. By a combination of delivering the lines and levels of the Scheme earthworks and applying these criteria in a validation exercise will protect controlled waters. Checks will be required that a suitable thickness of uncontaminated soils /or new cap is present at the surface in	• Watching brief during earthworks; • A monitoring log to ensure measures to mitigate effects

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	waters including Lidsey Rife.
	• Vertical migration of aqueous and dissolved contaminants through made ground strata or via preferential pathways could impact groundwater.
	• Made Ground/ engineering fill associated with Landfill; Tanks – Fleurie Nursery; and Fordingbridge Industrial Site are all considered to have potential to cause contamination.
	• Ingestion, inhalation and dermal contact with contaminated soil and ground gases; inhalation of windblown dust; and soil vapour inhalation are some of the potential pathways to impact human health.
		specified areas shown on the earthwork drawings on completion of the Scheme. Contamination testing will be undertaken to ensure suitable mitigation is in place and if present, contaminated material will be removed and disposed at authorised sites, through the implementation of a remediation strategy.
		• To minimise the risk of adverse impacts during construction, industry best practice measures in addition to those noted already, will be employed, such as the following:
		  • Spill kits to contain appropriate material for relevant leaks or spills;
		  • Ensure good driver behaviour and maintenance of vehicles;
		  • Use of appropriate PPE and suitable hygiene;
		  • A watching brief will be maintained during earthworks activity to ensure that unexpected contaminated materials, if encountered, are managed in an appropriate manner and in accordance with statutory requirements; and
		  • Compliance with the Construction Design and Management Regulations 2015.
		• If contaminated soil/ groundwater is found or suspected, further specialist advice must be sought.
			relating to geology and soils are in place and are effective.

Ecology and Nature Conservation (should be read	Offsite Habitats of Principal Importance: • Offsite Habitats of Principal Importance (HPI) could be affected	• Fencing shall be installed around all construction works to protect the surrounding retained habitats. • Best Practical Measures will be employed, including the following:	• Monitoring of planted vegetation during maintenance period to ensure it takes successfully.

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alongside the Ecological Management Plan in Appendix C)	indirectly by dust, airborne pollution and degradation through temporary storage of construction materials during the construction phase. Pollution may occur at chronic levels from day-to-day construction activities, or at acute levels from a pollution event such as a fire or chemical spill. A pollution event could therefore cause loss of habitat.	• Measures shall be taken to prevent dust and other emissions from construction affecting the retained habitats and land beyond the Scheme; • Chemicals and fuels shall be stored in secure containers located away from watercourses or water bodies. Spill kits must be available; • Creation of and implementation of a construction-phase drainage strategy to intercept, capture and attenuate surface water runoff; • Excavations shall be covered or securely fenced (with no potential access points beneath fencing) when the construction site is closed (e.g. overnight) to prevent entrapment of animals, specifically badgers; • Retained trees and hedgerow shall be protected in accordance with British Standard BS5837:2012 Trees in Relation to Construction, including the erection of robust protective fencing encompassing root protection areas; • Noise and vibration must be controlled and kept to the minimum necessary, especially with regard to working in close proximity to known active badger setts; • Lighting used for construction shall be kept to a minimum and switched-off when not in use; • Lighting shall be positioned so as not to spill onto adjacent land or retained vegetation within the Scheme; and • Night works shall be avoided where possible to reduce lighting of sensitive habitats and disturbance to species.	• Daily checks of ground protection measures by a suitably competent appointed person.
	Onsite Habitats of Principal Importance (Hedgerows): • Three Onsite HPI Hedgerows are to be removed during the construction phase. Retained hedgerow could be affected by dust, airborne pollution and degradation through temporary storage of construction materials during the construction	• All retained hedgerows will be protected in accordance with British Standard BS5837:2012 Trees in Relation to Construction, including the erection of robust protective fencing encompassing root protection areas. It is however recognised that BS5837 is read quite prescriptively and is often excessive in this context. The fencing specifically described in the BS is what is often expected, but the BS does allow for less substantial fencing where appropriate. It is therefore suggested that a meeting is held on site early in the construction programme with the WSCC Project Arboriculturalist so that a tree & hedge protection plan can be agreed and implemented. • The BPM's mentioned above will be employed throughout the construction phase.	• Monitoring of planted vegetation during maintenance period to ensure it takes successfully. • Daily checks of ground protection measures by a suitably competent appointed person.

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	phase and pollution may occur at chronic or acute levels.	• Measures to avoid temporary storage of construction materials adjacent to retained hedgerows will be put in place throughout construction. • Where it is not feasible to retain all or part of hedgerows, they will be replaced with higher quality species-rich hedgerow. • All newly created habitats to be managed in line with the LMMP (appendix E) which will effective in mitigating air quality impacts as a result of increased vehicle omissions on Hedgerow HPI.	
	Onsite Habitats of Principal Importance (Traditional Orchard): • During the construction phase, there will be a loss of traditional orchard HPI. Parcels of retained orchard habitat within the Scheme and immediately outside of the Scheme could be affected indirectly by dust, airborne pollution and degradation through temporary storage of construction materials during the construction phase and pollution may occur at chronic or acute levels.	• All retained trees within the orchard will be protected in accordance with British Standard BS5837:2012 Trees in Relation to Construction, including the erection of robust protective fencing encompassing root protection areas. • The BPM's mentioned above will be employed throughout the construction phase. • Measures to avoid temporary storage of construction materials adjacent to retained trees shall be put in place throughout construction. • All newly created habitats to be managed in line with the LMMP which will effective in mitigating air quality impacts as a result of increased vehicle omissions on orchard HPI.	• Monitoring of planted vegetation during maintenance period to ensure it takes successfully. • A programme of monitoring will need to be undertaken by the project arboriculturalist. This may include phone/email contact, site visits and direct monitoring of sensitive works. • Daily checks of tree protection fences by a suitably competent appointed person. • Daily checks of ground protection measures by a suitably competent appointed person.
	Bats (Roosting): • Habitat removal required to facilitate construction will result in the loss of	• All retained trees will be protected in accordance with British Standard BS5837:2012 Trees in Relation to Construction, including the erection of robust protective fencing encompassing root protection areas.	• The monitoring of potential alternative roosting opportunities by Ecologist during the works.

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	six trees assessed to have moderate or high potential to support roosting bats, including:
	• T34-35, T37-38 and T40 with moderate potential; and
	• T39 with high potential.
	• If bats are present at the time of works, there is a risk of direct loss of individuals through injury/mortality.
	• Construction works will be in close proximity to Building B5 which supports a transitional roost for soprano pipistrelle and Serotine and noisy construction activities may deter bats from using the building as a roost.
	• During the construction phase, habitat degradation over a wider area both in terms of disturbance to retained trees and habitat fragmentation may adversely impact roosting bats.
		• The BPM's mentioned above will be employed to minimise the effects of noise pollution, dust and air pollution and visual intrusion during construction.
		• Measures to avoid temporary storage of construction materials adjacent to retained trees will be put in place throughout construction.
		• Prior to tree removal there will be at least a 12-month time lapse between the most recent surveys (2019) and construction commencing, therefore an updated ground level inspection will be completed (by the Employer) to confirm the level of suitability for bat roosts to be present. This is to ensure that mitigation is appropriate and based on information current at the time of works. The following approach will then be taken:
		  • Trees assessed as having low potential to support bat roosts will be soft-felled by suitably qualified arborists, following an at-height inspection of any potential roost features to confirm the absence of roosting bats (and evidence of roosting bats). Contractors with basic bat awareness shall be employed and guidance within British Standard BS8596:2015 Surveying for Bats in Trees and Woodland should be adhered to. Where it is not possible to thoroughly asses PRFs, sectional soft felling methods should be used to remove those features. As the trees are not likely to offer hibernation potential to bats, felling works should be undertaken in the winter (November – March, depending on weather conditions) where possible, when bats can reasonably be assumed to be absent.
		  • Trees assessed as having moderate or high potential to support bat roosts will be subject to a climbing inspection to enable a thorough assessment of potential and to search for evidence indicating the presence of roosting bats.
		  • In the event that the presence of a bat roost is highlighted at this stage, the requirement for works affecting the roost would be reconsidered to identify whether adverse effects can be avoided. Where possible, in this scenario, proposals would be updated to enable retention and protection of the bat roost. In the event that retention is not possible, a licence would be sought by the Employer from Natural England to permit works to proceed, the licence application would be subject to a detailed method statement.
			• Daily checks of tree protection fences by a suitably competent appointed person.

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	• It's currently envisaged that there will be limited after dark lighting during the construction phase, however there will be noise and vibration that may affect roosting bat opportunities in retained trees and buildings with potential to support roosting bats.	• A precautionary method of works (PMoW) document has been prepared by WSP and agreed with the WSCC County Ecologist – this is to be followed in full for all works in proximity to Building B5. This is contained within Appendix N. This includes measures (but not limited to):
		  • Timing of works to times outside sensitive periods of bats;
		  • Avoidance of construction lighting;
		  • Toolbox talks to onsite contractors;
		  • Details for use of machinery close to the bat roost;
		  • Unexpected Discovery Procedure; and
		  • Ongoing Monitoring.
		• In the unlikely event that any bats are encountered or Potential Roosting Features (PRF's) of moderate/ high suitability for supporting roosting bats are identified during the construction phase, felling works shall cease and further professional ecological advice shall be sought.
		• New roosting opportunities in the form of bat boxes will be installed on retained mature trees in suitable locations, either within the Site itself, or within nearby land under the ownership of WSCC, prior to any trees being felled. The number of bat boxes installed will at least replicate the number of PRFs lost from the six moderate/high suitability trees (12 PRFs in total), with another five additional PRFs provided as an enhancement measure. These boxes will be sited in appropriate locations, at least 4m high and close to foraging and commuting habitat (e.g. hedgerow) under the guidance of an ecologist.
		• Lighting during the construction phase will be kept to a minimum to avoid light spillage on retained habitat that bats will use for foraging and commuting purposes.
		• Where lights are used, effective luminaires or other directional light accessories (shields, hoods or cowls) will be employed to ensure that light spillage, particularly onto adjacent retained habitats, particularly retained trees with bat roosting potential.
		• On at least one occasion in the first five years post-completion, an inspection of the bat boxes will be undertaken by a Natural England (NE) licensed ecologist to record evidence of use by bats and advise on any necessary repairs to be carried out. If a box has not been used for several years in succession, the installation of new	

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
		alternative boxes (non-integral) shall be considered following the advice of a suitably qualified ecologist.	
	Bats (Foraging and Commuting): • The construction phase will result in the severance of several commuting routes, including the severance of hedgerows and tree lines. This will result habitat degradation through the loss of areas of foraging and commuting habitat for bats. A reduction in the available foraging resource could ultimately contribute to reduced populations of bats in the local area and negatively affect the conservation status of bats. • Temporary lighting associated with the construction phase which spills onto retained ecological features (e.g. retained hedgerows) or noisy construction activities (e.g. piling, drilling)	• Lighting during the construction phase will be kept to a minimum to avoid light spillage on retained habitat that bats will use for foraging and commuting purposes. • Where lights are used, effective luminaires or other directional light accessories (shields, hoods or cowls) will be employed to ensure that light spillage, particularly onto adjacent retained habitats and retained trees with bat roosting potential is directed away from retained habitat that bats will use for foraging and commuting purposes. • Measures will be taken to conserve and protect retained trees and hedgerow habitat which provides a foraging/commuting resource for bats. This will include the installation of protective fencing in line with BS5837:2012. • In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.	• Daily checks of tree protection fences by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	during any night-time works may also deter bats from using established commuting routes or foraging resources within the Scheme.		

	Badgers:
	• The Scheme will result in the loss of one main sett, one subsidiary sett and a number of outlier setts.
	• The site preparation, earthworks and construction phase of the Scheme has the potential to bring about negative effects on badgers though sett loss, habitat loss / fragmentation and potential injury / harm to individuals both within their setts and commuting and foraging across the Site.
		• As the use of the Site by badgers changes over time, with some setts becoming inactive and new setts being created, a walkover survey will be undertaken by the Employer prior to commencement of works, and the licence application being submitted.
		• Following confirmation that badgers are using the artificial sett constructed, it will be necessary to close the setts under a licence from Natural England. A suitable mitigation strategy will be put in place by the Employer to obtain the licence and is likely to include the installation of one-way badger gates, kept in place for a minimum of 21 days, monitoring of the sett for signs of badgers entering of leaving the sett and destruction of the sett once badgers are excluded to reduce the risk of badgers re-occupying the sett. The area will also be secured against re-entry by badgers by using heavy-gauge chain link fencing.
		• Badgers use the wider area for foraging and commuting purposes and therefore measures shall be put in place during the construction phase to minimise effects upon badger movement and foraging activity. These measures include the following:
		  • Fencing dangerous areas of the construction site (e.g. deep excavations) or providing a means of egress from shallow excavations;
		  • Storage of plant and materials on areas of potential foraging habitat (e.g. retained grassland) will be avoided;
		  • Noise reduction measures during construction (please refer to the Noise and Vibration section of this table for more information);
		  • There will be no night works unless specifically needed, to avoid disturbance by artificial lighting; and
			• Monitoring/surveys will be undertaken to confirm badgers have relocated to the artificial sett prior to construction.
			• Checks for new burrows for badgers or other burrowing animals within or adjacent to the Scheme extent shall be undertaken by the Employer.
			• Daily checks of ground protection measures by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring

		• Where the use of lighting is unavoidable, hoods, cowls or shields will be used to avoid light spill onto setts or badger paths.
		• For setts that are located outside the Scheme extent, to ensure they are not affected by the works, a 30m buffer around each sett (including the artificial badger sett) in which no construction activities can take place will be clearly marked.
		• If any potential badger setts are identified these shall be checked by an ecologist prior to any clearance works to confirm their status.
		• In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.
		• Permanent badger fencing will be installed either side of the new road, with an underpass located to the west of the Scheme, to allow badgers to forage on either side of the road and therefore reducing the risk of vehicle collision.
		• A precautionary method of works (PMoW) document has been prepared by WSP and agreed with the WSCC County Ecologist – this is to be followed in full for all works associated with the Scheme and contains details of timing of works and measures required to reduce badger disturbance effects. This is contained within Appendix O. This includes measures (but not limited to):
		  • Toolbox talks to all site workers;
		  • Vegetation clearance and habitat manipulations;
		  • Timings of Work; and
		  • Unexpected Discovery Procedures.	

	Wintering Birds: • The construction phase of the Scheme will result in the loss of suitable wintering bird habitat suitable for supporting a wintering bird community	• The BPM's mentioned above will be employed to minimise the effects of noise pollution, dust and air pollution and visual intrusion during construction. • The current landscaping proposals include for a range of different habitats that will provide a foraging resource for wintering birds. This includes the creation of wet swales, woodland, orchard and scrub habitat.	• Daily checks of tree protection fences by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	of up to local level value, and therefore result in a reduction in the habitat available. • Temporary lighting associated with the construction phase which spills onto retained ecological features (e.g. retained hedgerows) or noisy construction activities may also have a negative effect on wintering birds.	• In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.	

	Breeding Birds:
	• The construction phase of the Scheme will result in the loss of suitable habitat for breeding birds, including hedgerow, broadleaved and plantation woodland and scrub. This will result in habitat loss and degradation. A reduction in the available suitable nesting habitat could ultimately contribute to reduced populations of breeding birds in the local area and negatively affect the conservation
		• A precautionary method of works (PMoW) document has been prepared by WSP and agreed with the WSCC County Ecologist – this is to be followed in full for all works associated with the Scheme and contains details of timing of works and measures required to reduce disturbance effects. This is contained within Appendix O. This includes measures (but not limited to):
		  • Toolbox talks to all site workers;
		  • Building Inspection for Barn Owl;
		  • Vegetation clearance and habitat manipulations;
		  • Timings of Work; and
		  • Unexpected Discovery Procedures.
		• Suitable bird nesting habitat clearance shall be undertaken outside of the bird nesting season (indicatively March to September) where possible. Where clearance of habitat is not possible outside of the breeding bird season, all areas to be affected will be checked for evidence of nesting birds by a suitably qualified ecologist provided by the Employer in accordance with a precautionary working method
			• Daily checks of tree protection fences by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	status of an assemblage of species considered to be of up to District level value. • If construction activity occurs during the primary bird nesting season (March to August inclusive) it is highly likely that active birds' nests would be damaged or destroyed and probable young would be injured or killed during the removal of vegetation. Noisy construction works has the potential to cause a disturbance effect on breeding birds, which could result in nest abandonment. • There will also be a loss of habitat suitable for foraging barn owl during the construction phase.	statement. The check will be undertaken a maximum of 24 hours prior to the vegetation removal taking place. • If any active bird nests are discovered these will be cordoned off with a buffer of at least 5m (this may increase depending on the species, proposed works and location) where no potentially disturbing works will take place. The buffer will remain in place until the young have fledged and the nest vacated. Upon fledging, a second nesting bird check would then be undertaken to ensure the vegetation does not contain any further active nests prior to felling or removal works taking place. • Measures will be taken to conserve and protect retained trees, shrub and hedgerow habitat which provide a nesting resource for birds. This will include the installation of protective fencing in line with BS5837:2012. • The BPM's mentioned above will be employed to minimise the effects of noise pollution, dust and air pollution and visual intrusion during construction. • To mitigate for the loss of nesting opportunities across the Scheme, at least six bird boxes will be installed in suitable locations within retained habitat. • In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.	
	Reptiles: • The construction phase will result in the removal of suitable habitat and therefore it is possible that there will be direct loss of animals from the	• The removal of any rubble, brash or log piles as part of the Scheme shall be carried out in accordance with the PMoW contained within Appendix O. This is to ensure compliance with legislation and planning policy regarding small mammals (including hedgehog and Polecat), common reptile species and amphibian species listed as NERC priority species.	• Daily checks of ground protection measures by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	population as a result of mortality and/or injury during construction works to facilitate construction. • Habitat removal required during the construction phase will reduce the area of habitat available to support the reptile population present and fragment retained areas of suitable habitat; inhibiting population movement.	• All areas of suitable habitat will be treated as potentially supporting reptiles. Where/when possible, in these areas clearance of vegetation will be undertaken outside of the sensitive hibernation season (indicatively November-February inclusive, but weather dependent). • Where tall herbaceous vegetation is cleared during the active season for reptiles, then it will be undertaken in two stages over at least two consecutive days and include an initial cut down to 150mm, with the second cut reducing vegetation as close as possible down to ground level in order to progressively render habitat unsuitable for reptiles. • Any refugia will be dismantled by hand with all works undertaken under the supervision of a suitably qualified ecologist (provided by the Employer) to minimise the risk of killing or injury to reptiles. Works will be temporarily halted if individual animals are encountered to allow the animal to disperse from the work site. • Logs from felled trees are to be retained for hibernacula within the landscaped areas within the wildflower meadow. • In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme	
	Invertebrates: • The construction phase could result in a direct loss of invertebrates, including stag beetle as a result of mortality and/or injury during enabling works to facilitate construction. • Habitat removal required during the construction phase will reduce the area of habitat available	• The removal of any rubble, brash or log piles as part of the Scheme shall be carried out in accordance with the PMoW contained within Appendix O. This is to ensure compliance with legislation and planning policy regarding small mammals (including hedgehog and Polecat), common reptile species and amphibian species listed as NERC priority species. • Mitigation will entail the careful clearance of suitable habitat. Where any deadwood habitat is removed, this will be retained and incorporated within the areas of proposed landscaping. • Careful habitat removal will also include a check of the soil around the deadwood / hedgerows to check for stag beetle larvae.	• Daily checks of ground protection measures by a suitably competent appointed person.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	to support invertebrate species, including stag beetle.	• In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.	
	Other Species of Principal Importance (SPI): • The construction phase could result in a direct loss of SPI, as a result of mortality and/or injury during enabling works to facilitate construction. • Habitat removal required during the construction phase will reduce the area of habitat available to support invertebrate species.	• The removal of any rubble, brash or log piles as part of the Scheme shall be carried out in accordance with the PMoW contained within Appendix O. This is to ensure compliance with legislation and planning policy regarding small mammals (including hedgehog and Polecat), common reptile species and amphibian species listed as NERC priority species. • Mitigation will entail the careful clearance of suitable habitat. This will include the sensitive clearance of habitat, which will be carried out in a phase approach (as above for reptiles) and avoid the hibernation period. Where this is not possible, careful removal of log / brash piles that may support hedgehogs will be undertaken. • Pre-work checks for roosting features and updated ground level inspection in trees for barn owls shall be conducted by the Employer. • In line with the landscape strategy, retained, enhanced and newly created habitat will be maintained in line with the LMMP to ensure biodiversity continues to benefit during the lifetime of the Scheme.	• Checks for new burrows for badgers or other burrowing animals within or adjacent to the Scheme extent by a suitably competent appointed person. • Daily checks of tree protection fences by a suitably competent appointed person. • Daily checks of ground protection measures by a suitably competent appointed person.

Arboriculture	• Potential for soil compaction and root damage resulting in loss of vitality and decline in health.
	• During the construction phase, 22 individual trees and the whole or partial removal of tree groups and four hedges will take place. Arboricultural features selected for removal are
		• Refer to the Tree Protection Plan (within Appendix D) and Site Clearance Drawings which shows the location and extent of the following tree protection information:
		  • Tree retention and removals (Root Protection Areas (RPA) shown for all retained trees); and
		  • Tree Protection Fencing.
		• Tree protection fencing to be agreed with the Project Arboriculturalist and erected prior to works starting. Fencing to remain in situ until all construction activities are complete;
		• There is potential for construction access to occur within the Root Protection Areas (RPAs) of retained trees. Tree protection fencing will to be installed as specified in the Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) to prevent access to the RPAs (see Appendix D).
			• Daily checks of the tree protection fencing to check it is still in place, functioning. Any damage to be rectified immediately.
			• Frequency of monitoring including site visits and direct monitoring of sensitive works will be determined by the intensity and proximity of works to trees and will be flexible enough to accommodate changes in the

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	identified on the Tree Protection Plan (TPP). • In addition to the individual trees lost, the total removals equate to approximately 192 linear metres of tree groups, 165 linear metres of hedge and 0.7 hectares of tree cover (groups). • Moderate-quality tree group G85 is covered by TPO/BN/1/20. This means that a number of protected trees will need to be removed in order to facilitate construction. The trees to be removed are those located at the northernmost end of the group and represent only a small percentage of all protected trees. • Features G98 (TPO tree T9), G98 (TPO tree T22), T25, T39 and all other retained trees whose RPA extends across the Planning Application Site Boundary may be impacted the following:	• A Pre-commencement meeting shall be held between the site Project Manager, local authority tree officer and the project arboriculturalist. The purpose of this meeting will be to ensure that all aspects of the tree protection measures are clear and understood and that any future sequencing and supervisory arrangements are agreed (to include task/location specific Arboricultural Method Statement Review); • The Hornbeam hedge shall be protected during construction; • A semi-natural buffer of 15 x stem diameter have been applied in respect of potential veteran trees T2, T20, T23 and T42. These semi-natural buffers can be wholly retained during construction and can be robustly protected through the appropriate use of tree protection fencing.	scheduling of tasks as they occur on site.

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	• Soil compaction and root damage; • Loss of vitality and decline in health; and • Reduction in quality of tree / potential death of tree. • Subject to the installation of protective fencing, encroachment into the Root Protection Areas (RPA) of trees T9, T22, T25 and T39 will occur.		
Biosecurity	• It's not currently considered that the site has any Invasive Non-native Species (INNS). However it's important to consider potential pathways of introductions onto site from elsewhere. • Ash Die Back being found on site (surveys anticipated in May 2021). Ash has been picked up within tree	Standard measures to minimise risk of import/spreading of invasive species/fungi/microbes etc. as follows - Good site hygiene shall be maintained dealing with any non-native species by implementing the following - • Where contaminated soil, materials or water are located, signage should be erected to indicate them; • Material / water left after vehicles have been washed shall be contained, collected and disposed of appropriately; • Temporary barriers are to be used to create a working corridor for plant and personnel, which will minimise: o damage of habitats (including pollution);	• Daily checks of tree protection fencing and corridor fencing to check it is still in place, functioning. Any damage to be rectified immediately. • Frequency of monitoring including site visits and direct monitoring of sensitive works will be determined by the intensity and proximity of works to trees and will be flexible enough to accommodate changes in the

Environmental Topic	Potential Impacts	Environmental Action / Commitment / Mitigation	Construction Monitoring
	groups along the proposed alignment.	○ prevent transfer of INNS via biosecurity site management; and ○ direct mortality and disturbance to animals located within and adjacent to the Scheme. If any INNS are identified during the works, the ECoW shall assist the site team in preparing an Invasive Species/Biosecurity Management Plan, and supervise the treatment and/or removal of any INNS. There is no cure for ash dieback, but good biosecurity practice should be followed so to help reduce the risk of introducing and spreading tree pests and diseases. These measures include – • The cleaning and disinfection of clothing, PPE, tools, equipment and vehicles working on or around affected trees; • Arboricultural operations such as pruning, felling and planting should be planned, managed and supervised to minimise the movement of arisings and soil. All arisings must be appropriately disposed of. Not all infected ash trees will need to be removed and pruning shouldn't be ruled out as a management option, particularly where trees show a tolerance to the disease. Further discussions shall be necessary with the Project Arboriculturalist.	scheduling of tasks as they occur on site.

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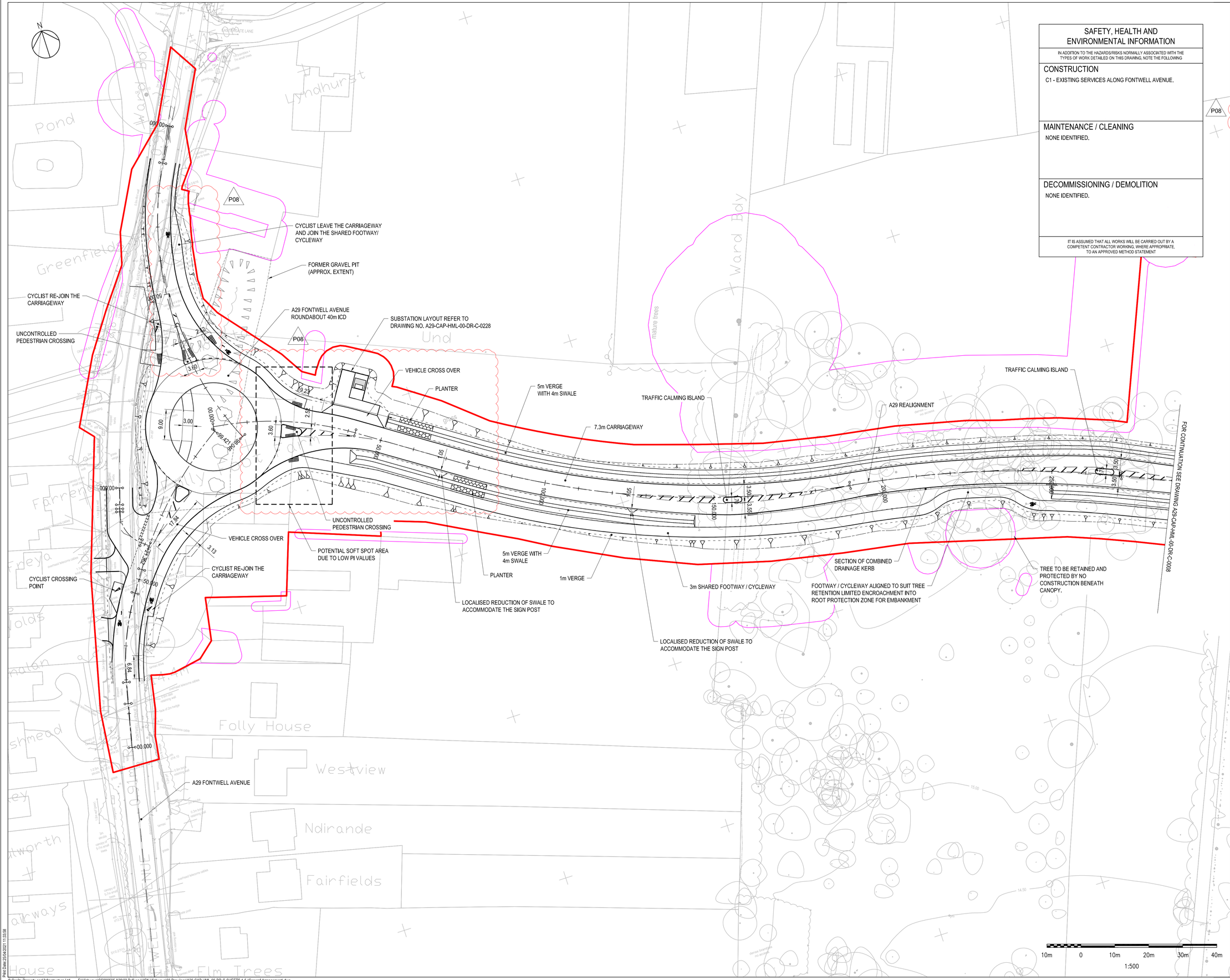
Appendix A

General Arrangement & Remediation Actions Drawings



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION

C1 - EXISTING SERVICES ALONG FONTWELL AVENUE.

MAINTENANCE / CLEANING

NONE IDENTIFIED.

DECOMMISSIONING / DEMOLITION

NONE IDENTIFIED.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

NOTES:

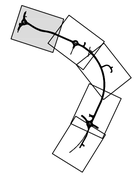
1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ROAD ALIGNMENT IS BASED ON CAPITA DESIGN MODEL NO. A29-CAP-HGN-00-M3-C-0018-P02.
3. WIDTH OF TACTILE PAVING CROSSING ARE 2.80m.
4. A29 LINK ROAD IS BASED ON CAPITA DESIGN MODEL NOS. A29-CAP-HGN-00-M3-C-0050-P02
5. FOR DRAINAGE DETAILS REFER TO DRAINAGE SERIES DRAWINGS.
6. FOR PAVEMENT DETAILS REFER TO PAVEMENT SERIES DRAWINGS AND TABLE 4 - FOUNDATIONS FOR DESIGN CBR (%) AND CHAINAGE EXTENTS.
7. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SERIES 600 EARTHWORKS SPECIFICATION APPENDICES.
8. THE FORMATION SHALL BE INSPECTED PRIOR TO CONSTRUCTION WITH INSITU CBR TESTING UNDERTAKEN AT FORMATION LEVEL AT NO GREATER THAN 30m CENTRES STAGGERED ACROSS THE WIDTH OF THE PAVEMENT, UNLESS OTHERWISE INSTRUCTED BY OVERSEEING ORGANISATION.
9. WHERE AREAS OF SOFT SOIL/WEAKER GROUND ARE ENCOUNTERED (Cu < 50kPA), THIS IS TO BE EXCAVATED TO AT LEAST 0.5m BELOW, AND REPLACED WITH ACCEPTABLE FILL SIMILAR IN CHARACTERISTICS TO THE SURROUNDING INTACT MATERIAL.
10. THICKNESS OF TOPSOIL STRIP IS 200mm, UNLESS OTHERWISE INSTRUCTED BY OVERSEEING ORGANISATION.
11. THICKNESS OF TOP SOIL PLACEMENT SHALL BE 150MM UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
12. EARTHWORK SIDE SLOPES ARE 1 IN 3.
13. WIDTH OF TACTILE PAVING CROSSING IS 2.80m

KEY:

RED LINE BOUNDARY

ROOT PROTECTION AREA - INDICATIVE LOCATION ONLY

Location Key Plan (Not to Scale)



Rev	Drwn	Chkd	Appd	Description	Date
P08	AS	KS	AB	NOTES AMENDED AND SSE SUBSTATION LAYOUT RELOCATED, RLB UPDATED. POTENTIAL SOFT SPOT AREA ADDED. ADDRESS DFS NO. 3 COMMENTS	26.04.21
P07	KS	FD	UL	NOTES 8 & 9 AMENDED	13.01.21
P06	JPC	DAH	KS	NORTHERN ARM POSITION WHERE CYCLIST REJOIN CARRIAGEWAY AMENDED	08.01.21
P05	JPC	DAH	KS	ALIGNMENT DESIGN UPDATED & NOTES ADDED	03.12.20
P04	PD	DAH	KS	LAYOUT AMENDED AT SPLITTER ISLANDS	06.07.20
P03	PD	DAH	KS	ROAD MARKINGS ADDED & TAPERS AMENDED AT TRAFFIC CALMING ISLANDS	19:06:20
P02	JPC	DAH	KS	ROUNDABOUT MOVED, ALIGNMENT AMENDED AND ACCESS ROAD ADDED	22.04.20
P01	JPC	DAH	KS	FIRST ISSUE	31.03.20

Purpose of Issue

For Review and Comment — S3

Classification

Commercial in Confidence

Client

west sussex county council

Jackson

Project

A29 Realignment Scheme

Drawing

General Arrangement
Sheet 1 of 5

Scale @ A1	Drawn	Checked	Approved
1:500	JPC	DAH	KS

Project No. CS099505

Date 31.03.20

Drawing Identifier
Project - Originator - Zone - Level - File Type - Role - Number
A29-CAP-HML-00-DR-C-0007

BS1192 Compliant revision P08

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Plot Date: 25/04/2021 11:33:58

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE BELOW

CONSTRUCTION

NONE IDENTIFIED.

MAINTENANCE / CLEANING

NONE IDENTIFIED.

DECOMMISSIONING / DEMOLITION

NONE IDENTIFIED.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

P08

NOTES:

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2. ROAD ALIGNMENT IS BASED ON CAPITA DESIGN MODEL NO. A29-CAP-HGN-00-M3-C-0018-P02.
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13. WIDTH OF TACTILE PAVING CROSSING IS 2.80m

KEY:

RED LINE BOUNDARY

ROOT PROTECTION AREA - INDICATIVE LOCATION ONLY

REFER TO DRAWING NO. A29-CAP-HGN-00-DR-C-0216 FOR POND 2 ACCESS TRACK

DEVELOPER ROUNDABOUT 40m ICD

5m VERGE WITH 4m SWALE

A29 REALIGNMENT

ATTENUATION POND ACCESS

CONNECTION TO EXISTING PUBLIC RIGHT OF WAY LEADING NORTH TOWARDS EASTERGATE LANE

5m VERGE WITH 4m SWALE

FOR CONTINUATION SEE DRAWING A29-CAP-HML-00-DR-C-0009

WILDLIFE CROSSING TUNNEL

LOCALISED REDUCTION OF SWALE TO ACCOMMODATE THE SIGN POST

7.3m CARRIAGEWAY

LOCALISED REDUCTION OF SWALE TO ACCOMMODATE THE SIGN POST

WILDLIFE CROSSING TUNNEL

5m LANDSCAPED AREA TAPERS TO 1m GRASSED VERGE ON APPROACH TO ROUNDABOUT

5m VERGE WITH 4m SWALE

3m SHARED FOOTWAY / CYCLEWAY

1m GRASSED VERGE

UNCONTROLLED PEDESTRIAN CROSSING

CONNECTION TO EXISTING PUBLIC RIGHT OF WAY LEADING SOUTH TOWARDS BARNHAM ROAD

1m VERGE

3m SHARED FOOTWAY / CYCLEWAY

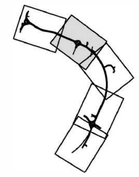
5m VERGE WITH 4m SWALE

FOR CONTINUATION SEE DRAWING A29-CAP-HML-00-DR-C-0007

10m 0 10m 20m 30m 40m

1:500

Location Key Plan (Not to Scale)



Rev	Drwn	Chkd	Appd	Description	Date
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P01	JPC	DAH	KS	FIRST ISSUE	31.03.20

Purpose of Issue

For Review and Comment S3

Classification

Commercial in Confidence

Client

west sussex county council

Jackson

Project

A29 Realignment Scheme

Drawing

General Arrangement
Sheet 2 of 5

Scale @ A1	Drawn	Checked	Approved
1:500	JPC	DAH	KS

Project No. CS099505

Date 31.03.20

Drawing Identifier
Project - Originator - Zone - Level - File Type - Role - Number
A29-CAP-HML-00-DR-C-0008

BS1192 Compliant revision P08

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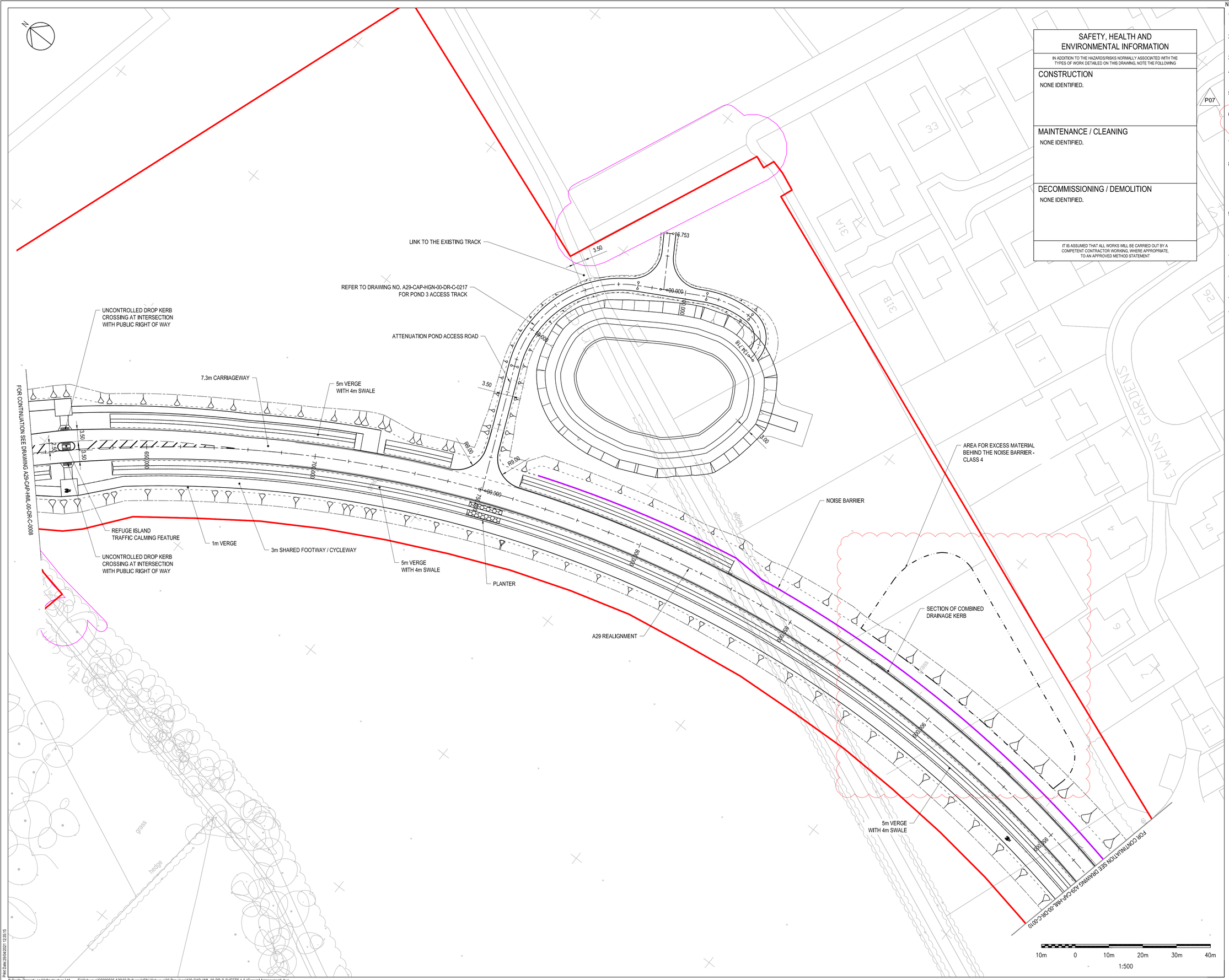

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION

NONE IDENTIFIED.

MAINTENANCE / CLEANING

NONE IDENTIFIED.

DECOMMISSIONING / DEMOLITION

NONE IDENTIFIED.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT

P07

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ROAD ALIGNMENT IS BASED ON CAPITA DESIGN MODEL NO. A29-CAP-HGN-00-M3-C-0018-P02.
3. WIDTH OF TACTILE PAVING CROSSING ARE 2.80m.
4. A29 LINK ROAD IS BASED ON CAPITA DESIGN MODEL NOS. A29-CAP-HGN-00-M3-C-0050-P02
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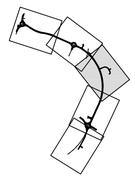
KEY:

- RED LINE BOUNDARY
- ROOT PROTECTION AREA - INDICATIVE LOCATION ONLY

Location Key Plan (Not to Scale)



Rev	Drwn	Chkd	Appd	Description	Date
P07	AS	KS	AB	NOTES AMENDED. RLB UPDATED. AREAS TO PLACE EXCESS MATERIAL ADDED.	26.04.21
P06	KS	FD	UL	NOTES 8 & 9 AMENDED	13.01.21
P05	JPC	DAH	KS	ALIGNMENT DESIGN UPDATED & NOTES ADDED	03.12.20
P04	PD	DAH	KS	LAYOUT AMENDED AT SPLITTER ISLANDS	06.07.20
P03	PD	DAH	KS	ROAD MARKINGS ADDED & TAPERS AMENDED AT TRAFFIC CALMING ISLANDS	19/06/20
P02	JPC	DAH	KS	POND ACCESS ROAD ADDED	22.04.20
P01	JPC	DAH	KS	FIRST ISSUE	31.03.20

Purpose of Issue

For Review and Comment — S3

Classification

Commercial in Confidence

Client

west sussex county council

Jackson

Project

A29 Realignment Scheme

Drawing

General Arrangement
Sheet 3 of 5

Scale @ A1	Drawn	Checked	Approved
1:500	JPC	DAH	KS

Project No. CS099505

Date 31.03.20

Drawing Identifier (Project - Originator - Zone - Level - File Type - Role - Number): A29-CAP-HML-00-DR-C-0009

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C1 - EXISTING SERVICES ALONG B2233 BARNHAM ROAD.

MAINTENANCE / CLEANING

NONE IDENTIFIED.

DECOMMISSIONING / DEMOLITION

NONE IDENTIFIED.

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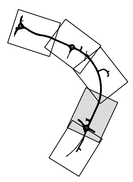

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P07	AS	KS	AB	NOTES AMENDED AND NOISE BARRIER ALIGNMENT ADJUSTED, RLB UPDATED, AREAS TO PLACE EXCESS MATERIAL ADDED.	26.04.21
P06	KS	FD	UL	NOTES AMENDED 8 & 9	13.01.21
P05	JPC	DAH	KS	ALIGNMENT DESIGN UPDATED & NOTES ADDED	03.12.20
P04	PD	DAH	KS	LAYOUT AMENDED AT SPLITTER ISLANDS	06.07.20
P03	PD	DAH	KS	ROAD MARKINGS ADDED	19.06.20
P02	JPC	DAH	KS	ROUNDABOUT SPLAY AMENDED, ROAD MARKINGS MOVED AND ACCESS ROAD REMOVED	22.04.20
P01	JPC	DAH	KS	FIRST ISSUE	31.03.20

Purpose of Issue: For Review and Comment — S3

Classification: Commercial in Confidence

Client: west sussex county council / Jackson

Project: A29 Realignment Scheme

Drawing: General Arrangement Sheet 4 of 5

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Project No.: CS099505 — Date: 31.03.20

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P07

AREA FOR EXCESS MATERIAL BEHIND THE NOISE BARRIER - CLASS 4 AND TOPSOIL

SECTION OF COMBINED DRAINAGE KERB

7.3m CARRIAGEWAY

A29 REALIGNMENT

NOISE BARRIER

FOR CONTINUATION SEE DRAWING A29-CAP-HML-00-DR-C-0009

FOR CONTINUATION SEE DRAWING A29-CAP-HML-00-DR-C-0011

CYCLIST RE-JOIN THE CARRIAGEWAY

3m SHARED FOOTWAY / CYCLEWAY

UNCONTROLLED PEDESTRIAN CROSSING

CYCLIST LEAVE THE CARRIAGEWAY AND JOIN THE SHARED FOOTWAY/ CYCLEWAY

VEHICLE CROSS OVER

VEHICLE CROSS OVER

3m SHARED FOOTWAY/ CYCLEWAY

LIMIT OF PHASE ONE WORKS

UNCONTROLLED PEDESTRIAN WITH CYCLING CROSSING

3m SHARED FOOTWAY/ CYCLEWAY

B2233 BARNHAM ROAD ROUNDABOUT 44m ICD

UNCONTROLLED PEDESTRIAN CROSSING

CYCLIST RE-JOIN THE CARRIAGEWAY

FALSE ROAD HUMP

VERGE TAPERS AWAY TO REDUCE LAND TAKE IN CONSTRAINED AREA

SECTION OF COMBINED DRAINAGE KERB

EXISTING BUND TO BE REMOVED TO FACILITATE CONSTRUCTION OF ROAD

CYCLIST LEAVE THE CARRIAGEWAY AND JOIN THE SHARED FOOTWAY/ CYCLEWAY

HALO SITE ACCESS

3m SHARED FOOTWAY / CYCLEWAY

1m VERGE

CYCLIST LEAVE THE CARRIAGEWAY AND JOIN THE SHARED FOOTWAY/ CYCLEWAY

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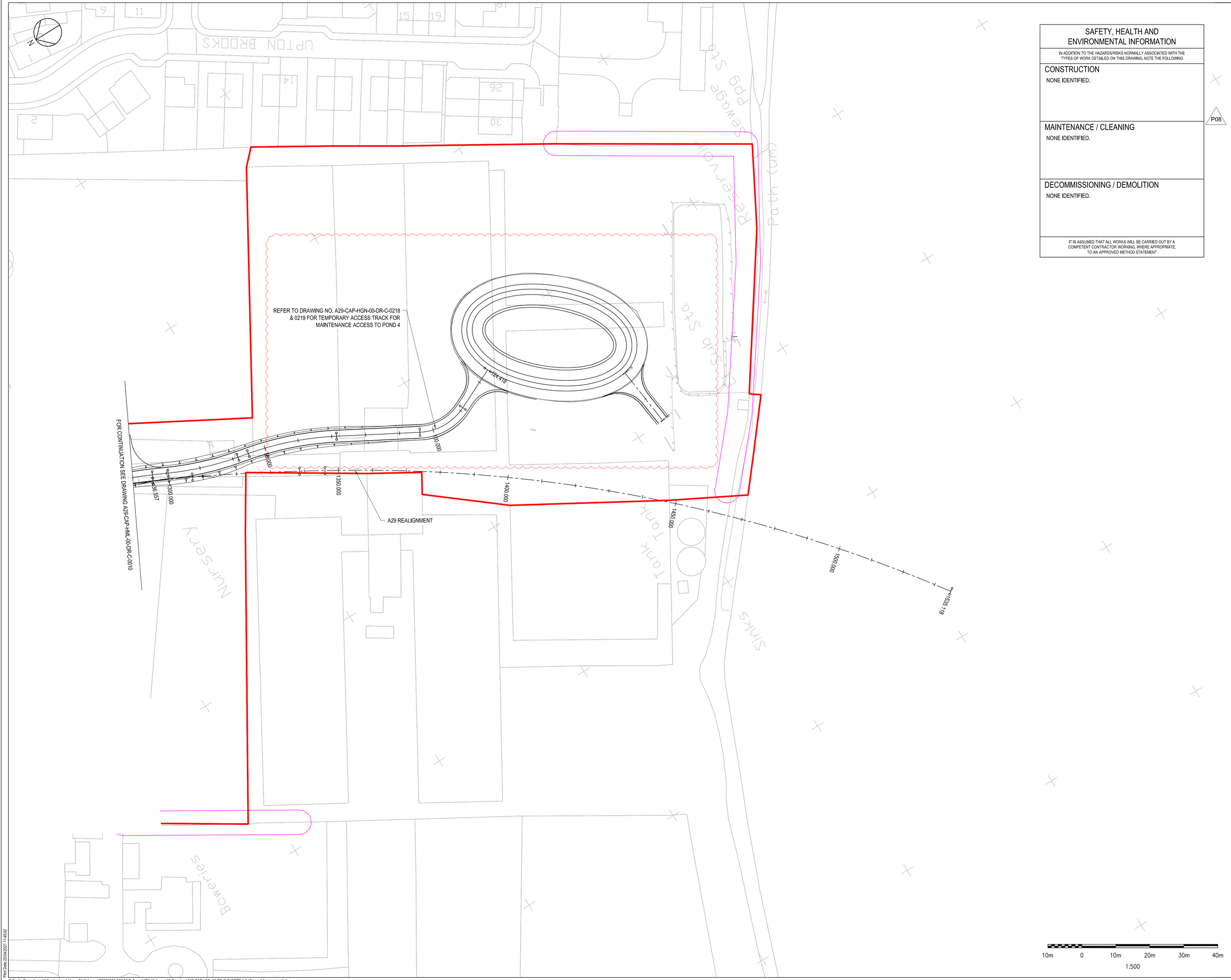
1:500



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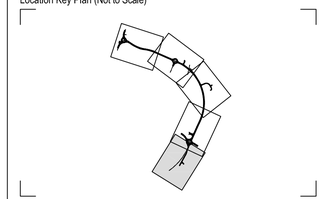
RED LINE BOUNDARY

ROOT PROTECTION AREA - INDICATIVE LOCATION ONLY

Location Key Plan (Not to Scale)



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A29 Realignment Scheme

Drawing

General Arrangement
Sheet 5 of 5

Scale @ A1	Drawn	Checked	Approved
1:500	JPC	DAH	KS

Project No.	Date
CS099505	31.03.20

Drawing Identifier (Project - Originator - Zone - Level - File Type - Role - Number) BS1192 Compliant revision

A29-CAP-HML-00-DR-C-0011 P07

10m 0 10m 20m 30m 40m

1:500

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CAPITA

Jackson

Appendix B

Environmental Design Mitigation Report

West Sussex County Council

A29 PHASE 1

Design Mitigation Plan

V04
NOVEMBER 2020

CONFIDENTIAL

West Sussex County Council

A29 PHASE 1

Design Mitigation Plan

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 70060779

OUR REF. NO. V04

DATE: NOVEMBER 2020

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QUALITY CONTROL

Issue/revision	Prelim draft	First issue	Second issue	Third issue	Fourth Issue
Remarks	Early Draft – in progress	V01	V02	V03 – following update to design and completion of draft ES	V04 – following RLB change, lighting change and design changes
Date	17/02/2020	10/03/2020	18/06/2020	28/08/2020	12/11/2020
Prepared by	Jo North	Jo North	Matt Miles	Jo North	Jo North
Signature					North, Jo (UKJFN001) Digitally signed by North, Jo (UKJFN001) DN: cn=North, Jo (UKJFN001), ou=Basingstoke (Mountbatten House), email=Joanne.North@wsp.com Reason: Updated Date: 2020.11.12 17:25:08
Checked by			Jo North	Matt Shepherd	Verity Dickie
Signature					
Authorised by			Jo North	Alan Cowan	Jo North
Signature					North, Jo (UKJFN001) Digitally signed by North, Jo (UKJFN001) DN: cn=North, Jo (UKJFN001), ou=Basingstoke (Mountbatten House), email=Joanne.North@wsp.com Reason: Authorised Date: 2020.11.12 17:25:52
Project number		70060779	70060779	70060779	70060779
Report number		V01	V02	V03	V04
File reference	77060779_WSP_ENV_PL_Des Mit Plan_V04				

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APPENDICES

Appendix A – Design Mitigation Mapping

Appendix B – Arboricultural Report

1 INTRODUCTION

1.1 PURPOSE

The purpose of this plan is to ensure that the project environmental effects are understood, and to provide a means for the design measures necessary to prevent, minimise or mitigate adverse effects to be communicated to the design team.

Its specific objectives are to:

- Summarise the key environments that would be affected or impacted by the proposed improvement works; and
- Outline design measures to prevent or mitigate potential environmental impacts.

V04 is considered to be the final version, prepared to capture the preliminary design as submitted in the Environmental Statement (ES) and A29 Phase 1 Planning Application (planning application reference number WSCC/052/20).

1.2 SCOPE

V01-V03 captured environmental and design considerations during design development. Capturing design recommendations as information became available from modelling, from field investigations and assessment as the project progressed. The associated Design Mitigation Plan (DMP) mapping in Appendix A puts this information in graphical form to assist the detailed design consultant (Jacksons and Capita) with development of the preliminary design for the planning application and for the detailed design. It collates information from specialist reports and assessments detailed in the following chapters:

- Ecology
- Arboriculture
- Landscape
- Noise and vibration
- Archaeology
- Air quality

As the design evolved and mitigation measures developed these were removed from this DMP and captured in the Landscape Strategy (Appendix 3.3 to the ES). Recommendations for construction mitigation and management have been mentioned where relevant, but generally excluded from this DMP. These are documented in the Outline Construction Environmental Management Plan (CEMP) (Appendix 3.5 to the ES).

2 ECOLOGY

Species surveys were carried out in 2019. The key results and recommendations are detailed in Table 1. Further measures and recommendations for mitigation and management will be developed during the environmental assessment process.

The Project aim was to achieve a 10% biodiversity net gain (BNG). The habitats created within the Landscape Strategy (Appendix 3.3 to the ES) were quantified and compared to those currently present. The details of the BNG process are provided in Table 2. A further 50m of species rich hedgerow habitat needs to be included in the detailed landscape design plans to achieve the goal of 10% BNG.

Table 1 – Species and design mitigation recommendations

Species	Description / date	Results	Recommendations
Badger	Badger survey Report First Draft December 2019	Walkover identified badger setts on the alignment and throughout the study area. Badger bait marking survey undertaken in 2019.Three setts were baited with peanuts 2 suspected main setts and a one subsidiary sett. This identified one badger clan over the survey area using a variety of habitats for foraging, including orchards, broadleaved woodland, dense scrub and semi-improved grasslands. During the time of the survey the badger clan had 3 very active setts (sett 1-2) likely comprising a main, annex and subsidiary sett.	All badger setts within 30m of the alignment footprint will need to be permanently or temporarily closed under a licence from Natural England. A suitable mitigation strategy will need to be in place to obtain the licence and is likely to include the installation of one-way badger gates, kept in place for a minimum of 21 days, monitoring of the sett for signs of badgers entering or leaving the sett and destruction of the sett once badgers are excluded to reduce the risk of badgers re-occupying the sett. The area will also need to be secured against re-entry by badgers by using heavy-gauge chain link fencing. As one of the setts to be lost is a main sett, the installation of an artificial sett was required. Specifications for the artificial sett have been developed in consultation with Natural England. Recommendations for design and construction are found on Sharepoint (V03). The artificial sett is to be in place at least 6 months before closure of the badger setts to allow sufficient time for the badgers to locate the artificial sett. Construction of the badger sett occurred in October 2020 under ecological watching brief. It is recommended that badger surveys are undertaken from February to April 2021 to determine whether badgers have found or are using the artificial sett, and if not to encourage them with the use of bait. The next steps are required to obtain a licence to destroy the existing badger setts. ▪ Badger survey. ▪ Preparation of mitigation strategy. ▪ Confirmation badgers are using the artificial setts through monitoring (2021). ▪ Obtain licence to close sett (May 2021) ▪ Active setts to be closed under licence (July-November only). Permanent badger fencing along the road (200m each way from the location of the artificial sett) to prevent badger mortality and funnel into any badger crossings (see below). The fencing design will be refined during the application for the sett closure licence, however, will be dug deep to prevent badgers tunnelling underneath and designed to encourage badgers to use the underpass. The permanent badger fencing will

Species	Description / date	Results	Recommendations
			need to be installed prior to the road becoming operational, but it should be noted that badgers should be excluded from the construction zone throughout the duration of the works to avoid risk of injury or mortality. The recommended area for installation of the crossing to link the north and south areas is shown in Appendix A.. Creation of foraging habitat to replace that lost – recommendations have been incorporated into the Landscape Strategy.
Bat	Bat survey report First Draft December 2019	Bat surveys of site and 20m buffer including bat activity surveys using automated static detectors and a Preliminary Bat Roost Assessment (PBRA) survey of buildings and trees. Followed by: ▪ At height surveys of trees ▪ Dusk emergence/dawn re-entry surveys of buildings A bat roost was identified in Tr3 during the PBRA. However, damage to the tree prior to the bat surveys exposed the roost so was no longer considered to be active. The surveys identified bat roosts/activity in the following locations: ▪ Tr20 (tree) ▪ B5 (building) (including soprano pipistrelle *Pipistrellus pygmaeus* and serotine *Eptesicus serotinus* The survey area has been found to providing commuting and foraging opportunities for an assemblage of at least 8 bat species during the automated bat detector surveys, with activity dominated by common pipistrelle. Lower level activity was recorded for rare species including: ▪ Greater horseshoe bat *Rhinolophus ferrumequinum* ▪ Barbastelle *Barbastella barbastellus* ▪ Nathusius pipistrelle *Pipistrellue nathusii* ▪ Leisler's bat *Nyctalus leisleri* The survey area is considered to be of conservation value at the District level overall for its assemblage of foraging and commuting bats. Location 2 is important for barbastelle, location 3 had highest level of bat activity.	Bat roost - Building B5 ▪ The recommendation is to retain and avoid indirect impacts during construction/operation. However, if this is not possible, due to proximity of construction a **licence to disturb will be necessary** as it is understood that Barratts would not be willing to remove the building under licence to streamline the process. Barratts would still need to prepare a licence to destroy when demolishing this building. ▪ A licence to disturb will require preparation in December/January 20/21, this will require site visits to inspect the roost as part of the application process. However, the licence cannot be submitted until planning permission is obtained. Replacement bat roosts The Ecological Management Plan (Appendix F of the CEMP) includes further recommendations for the location and siting of the bat boxes on retained mature trees in suitable locations, either within the Application Site itself, or within nearby land under the ownership of WSCC. Recommendations include: ▪ 2F Schweglar Bat Box – for general purpose ▪ 2FN Schweglar Bat Box – suited to noctule roosting requirements ▪ 1FF Schweglar Bat Box – for general purpose and maternity colonies; and ▪ 1FW Bat Hibernation Box – for hibernation. The locations have been included in Appendix A of this DMP. Bat boxes should be installed at approximately 4m above the ground and placed in a range of locations at slightly different heights and facing in slightly different directions to give a choice of roost site options. The direction of the boxes should be selected to avoid facing them into the prevailing weather and will preferably be positioned facing in a southerly direction (ie. SW through to S- SE) where they will receive a good degree of sunlight. Bat boxes should be installed in positions where they are out of reach of people and high enough to deter cats and other predators. Recommended locations of bat box installation include retained orchard and woodland habitat within habitat immediately south of the west of the Application Site as well as along the retained dark corridor of the PRoW (Footpath 318).

Species	Description / date	Results	Recommendations
			Trees ▪ An update to the Preliminary Bat Roost Assessment will be required prior to commencement of works to establish if the suitability of trees have changed since the baseline surveys. This can be conducted at any time of year, but if follow up surveys are required then should be conducted in the active bat season (May to September). ▪ An updated ground level inspection will be required before works commence and appropriate construction mitigation for those considered low, moderate or high bat roost potential have been included in the Outline CEMP (Appendix 3.5 to the ES). ▪ Retention of trees with bat roosting potential where possible. ▪ Soft felling of all trees under ecological supervision. Lighting ▪ Lighting constraints for bats have been discussed and agreed with SSE. Lit pedestrian crossing to the east of the bat corridor has been moved 21m further east to minimise light spill (<0.4lux required) upon light sensitive bats. ▪ Minimise lighting – use the minimum number of lights necessary to illuminate the road, this may equate to reducing light intensity and/or using the minimum number of light sources or minimum column height. ▪ Use hoods, louvres or other luminair design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging or commuting bats. ▪ Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm.neutral colour temperature <2,700 kelvin lighting ▪ Use light sources that emit minimal UV light to avoid attracting night flying invertebrate species which in turn may attract bats to the light. ▪ Avoid light spill on suspected or confirmed roosts in addition to new bat boxes. ▪ Creation of a buffer zone of very low illuminance (if any) adjacent to established or proposed key habitats such as adjacent to treelines. ▪ A site specific dimming regime in the months where bats are active is recommended. With lighting located within the PRoW (Footpath 318) buffer zone either switched off (lighting columns 17, 18, 21, 22 and 23) or dimmed to 30% lumen output (lighting columns 19 and 20) to ensure the ecological limitations are achieved in line with the recommendations in ILP PLG08. Returning this lighting to WSCC's standard dimming regime in the winter months where bats are less active would need to be undertaken in agreement with WSP's ecologists and consider the functionality of the council's lighting control system. This will allow for lighting to be turned on in winter when bats

Species	Description / date	Results	Recommendations
			are not active (November to February inclusive) due to hibernation. Design/ Landscaping ▪ Provision of alternative foraging habitat set away from the road and accessible along retained flight lines. Woodland and wildflower meadows have been incorporated into the Landscape Strategy. ▪ Planting within foraging habitat to include species which are known to attract night flying insects including those described in Bat Conservation Trust Guidance (BCT, 2012). Flowering plants, trees (including fruit trees) and shrub varieties have been incorporated into the Landscape Strategy where possible. ▪ Retention of trees. ▪ Provision and monitoring of alternative roosting opportunities. ▪ Suggested locations for the bird and bat boxes are included in the Ecological Management Plan (within the Outline CEMP – Appendix 3.5 to the ES). Also included in Appendix A of this DMP.
Breeding bird	First issue Breeding birds survey December 2019	Survey conducted March-May 2019. 44 species recorded over the survey area. 38 of which are considered to breed there. Of these 15 legally protected/species of conservation concern there were: ▪ 3 Wildlife and Countryside Act Schedule 1 species (Cetti's warbler *Cettia cetti*, peregrine falcon *Falco peregrinus* and barn owl *Tyto alba*. ▪ 8 Species of Principle Importance listed under the Natural Environment and Rural Communities (NERC) Act 2006: - Bullfinch *Phyrulla phyrulla* - House sparrow *Passer domesticus* - Dunnock *Prunella modularis* - Linnet *Linnaria cannabina* - Song thrush *Turdus philomelos* - Starling *Sturnus vulgaris* - Black headed gull *Larus ridibundus* - Herring gull *Larus argentatus* ▪ 6 Birds of conservation concern (BoCC) red listed species and 7 BoCC amber list species. Red list species include: - House sparrow - Linnet - Mistle thrush *Turdus viscivorus* - Song thrush - Starling - Herring gull ▪ Amber list includes: - Dunnock - Bullfinch - Kestrel *Falco tinnunculus* - Meadow pipit *Anthus pratensis* - Stock dove *Columba oenas* - Black headed gull - Mallard *Anas platyrhynchos*	Barn owls are known to be present in the area, having been observed during site visits. Barn owls roost in barns and trees. As no buildings are to be demolished, with the exception of the residential property and adjacent weatherboard structure at the western end (Roy's property), there is no requirement for further design mitigation. However, the requirement for an updated ground level inspection of trees has been included in the Outline CEMP (Appendix 3.5 to the ES). Loss of foraging habitat has been considered during preparation of the Landscape Strategy. Orchard habitat, specimen trees and hedgerows have been incorporated into the Landscape Strategy. It is possible that roosts exist within land to the south and Barratts should survey and develop mitigation as necessary. To mitigate for the loss of nesting opportunities at least six bird boxes should be installed in suitable locations within retained habitats. Bird box designs should reflect the nesting requirements for species known to use the area that are local conservation priorities such as house sparrow *Passer domesticus* and starling *Sturnus vulgaris* as well as common and widespread woodland species. Box dimensions and placement should be tailored to the target species. Indicative designs include: ▪ 1B Schwegler nest box – cavity nest box ▪ 2H Schwegler robin box – open fronted box ▪ CedarPlus Triple Sparrow House – for sparrow species ▪ 3S Schwegler Starling Nest Box – for use by starling and other cavity nesters. Suggested locations for the bird boxes are included in the CEMP and within Appendix A of

Species	Description / date	Results	Recommendations
		The breeding bird community is considered to be of District conservation importance.	this DMP. In general boxes should be installed on mature trees 2-4m high and placed to avoid strong sunlight and the wettest winds (usually north to east, depending on the shade level) and the entrance should face slightly downwards to protect from the rain. Boxes should have a clear flight path on the approach and be relatively undisturbed. Indicatively the boxes should be placed within retained woodland and orchard habitat to the south of the Site or within the retained PRoW (Footpath 318).
Dormouse	Dormouse survey report December 2019	Dormouse survey including next tube survey of suitable habitat was completed between May – September 2019. No dormice or evidence of dormice found.	Considered absent from site. No mitigation recommendations.
Great crested newt	Great Crested Newt Survey Report December 2019	Five water bodies within 500m of the survey area were subject to Habitat Suitability Index Survey. Four were found to be suitable for breeding GCN. A presence/likely absence survey in the form of eDNA was completed of these four. All tested negative indicating GCN is likely absent from the site.	Considered absent from site. No mitigation recommendations.
Reptiles	Reptile Survey Report December 2019	Survey undertaken April-July 2019. The results indicate low populations of common lizard and slow worm. The desk study uncovered grass snake records within 150m so it is considered they are likely present.	To mitigate for the loss of reptile habitat and refuges, suggested locations for six refugia/hibernacula for reptiles is included in the Ecological Management Plan appended to the Outline CEMP (Attached as Appendix 3.5 to the ES). At least six refugia/hibernacula should be installed at suitable locations within retained grasslands on the edge of scrub habitat. And include brush and log piles to create cover. The suggested locations are included in Appendix A of this DMP. Timing of mitigation to be discussed with Barratts to ensure they are complementary. As a standalone project, exclusion would be appropriate however housing development mitigation may result in isolated population requiring translocation. Mitigation measures for reptiles not required in 2020 based on the early to mid 2021 start date. .
Invertebrates	Invertebrate survey May-August 2019	Surveys recorded 6 species of conservation concern including: ▪ 3 nationally scarce species (an ant *Lasius brunneus,* longhorn beetle *Priorus coriarius* and flower beetle *Mordellistena humeralis*. ▪ 3 SPI including small heath butterfly *Coenonympha pamphilus*, ghost moth *Hepialus humuli* and cinnabar moth *Tyria jacobaea.* Additionally, stag beetle *Lucanus cervus*, a SPI which are of high conservation concern were recorded incidentally on site.	Dead wood should be retained within woodland habitats where possible to mitigate for the loss of suitable stag beetle habitat. Log piles created as reptile refugia will also serve as invertebrate habitat. These should be placed in grassland and scrub habitats, with sunny positions to benefit invertebrate species.

Table 2 – Biodiversity net gain assessment evolution

Description / date	Results	Recommendations
Initial Biodiversity Net Gain Assessment December 2019	Three scenarios were evaluated: A – no potential for on site habitat compensation all habitat compensation to be delivered off site B – 10% of area within red line boundary available for on-site habitat compensation. C - 20% of area within red line boundary available for on-site habitat compensation. Total footprint of the proposed scheme cover 15.22 ha of which 15.22ha of habitat is expected to be lost. No irreplaceable habitat (Ancient Semi Natural Woodland (ASNW) or Plantation on Ancient Woodland Soils (PAWS) have been identified in the site. Hand drawn vegetation clearance drawings were provided by Jacksons. CAD versions were prepared by WSP and areas of recommended retention were provided by WSP ecology and arboriculture teams and the clearance areas updated. These updates were discussed with Jacksons and used as the basis of the interim assessment.	This final BNG Report confirms the overall status as 'no net loss' due to the status of the hedgerow units. To achieve an overall project BNG of 10% it is recommended that an additional 50m of native species rich hedgerow is incorporated into the detailed landscape design. The planting schedule detailing the species to be incorporated into the landscape design is attached as Appendix 10.3 to the ES. In order to achieve the no net loss or the net gain (with additional 50m of hedgerow), it is essential that the landscaped areas are monitored and managed for a period of at least 5 years to ensure the establishment of the vegetation. A Landscape Management and Maintenance Plan, detailing these requirements is attached as Appendix 10.4 to the ES. The BNG tool includes a number of assumptions on the status of the habitats created. If this status is not achieved any BNG will be significantly reduced and could result in a loss.
Interim BNG assessment June 2020	The draft Landscape Strategy was used for the Interim assessment. The results indicate the draft landscape plan and RLB would deliver the following: ▪ Area based +36% (gain) ▪ Linear – 30% (loss)	
Final BNG assessment August 2020	Edits were made to the Landscape Strategy following comments from WSCC Environment and Maintenance teams and Jacksons. The aim being to minimise landscape and maintenance costs and increase the linear habitat net gain. The final assessment was undertaken which showed the scheme would deliver the following (based on Landscape Strategy V04): ▪ Area based +33% (gain) ▪ Linear + 11% (gain) Subsequently the instruction was given to reduce the BNG and replace wildflower meadows with amenity grassland. The BNG implications of these changes is to be calculated and will form an addendum to the BNG Final Report.	
Final BNG assessment October 2020	In September/October 2020 changes were made to the design in the vicinity of Fontwell Avenue and access to the Halo site. Changes were made to the areas to be landscaped. Further discussions with Barratts resulted in edits to the red line boundary and an increase in the proportion of temporary land take, to be returned to its current condition following construction, as such removed from the Landscape Strategy and BNG calculations. The August BNG assessment was revised and this Final version was submitted as Appendix 9.10 to the ES. The landscape plan (V07) as submitted with the planning application would deliver the following: ▪ +44% area based habitat units ▪ +3% hedgerow units This results in a status of 'No Net Loss'.	

3 ARBORICULTURE

A walkover survey of trees was undertaken on 9th May 2019. Since that time Arun District Council (ADC) has added a number of Tree Preservation Orders (TPOs) to specimens within the study area.

The desk study identified a single TPO (TPO BN/1/20) which includes 19 Pedunculate oak (*Quercus robur*) trees, and a group (G85) of Hornbeam (*Carpinus betulus*) and records of two potential veteran trees (both Pedunculate oak) located on the eastern side of public footpath 318 towards its northern end.

An Arboricultural Report including Tree Protection Plan is attached as Appendix 3.4 to the ES.

A total of 77 arboricultural features were surveyed. The details of which are provided within the Arboricultural Survey Schedule and Tree Protection Plan in Appendix E and G of the Arboricultural Report. Those of note (Category A) are included in Table 3.

Eight high quality features were recorded as noted in Table 3. In addition, a total of nine moderate quality arboricultural features were recorded including seven individual trees and two groups. These are specimens which lack the special value associated with high-quality features, but which nonetheless still provide a quantifiable degree of amenity value.

The desk study identified the presence of substantive areas of 'traditional orchard' within the northern section of the Site. Whilst 'traditional orchard' is primarily a habitat classification it does indicate the possible presence of rare or veteran fruit trees. During the walkover survey nine apple trees were recorded within areas of 'traditional orchard' and, in the absence of any information relating to their provenance, were listed as either low and very-low quality features. It is recommended that specialist advice be sought regarding the varieties of apples present and their local and national rarity. If found to be important then consideration should be given to their propagation if they are to be removed.

Table 3 provides recommendations for measures to minimise the impact to high quality trees.

The vegetation clearance boundary created for the BNG assessment, as described in Table 2, was reviewed and inputs provided in relation to root protection zones. These have been included in the Landscape Strategy (Attached as Appendix 3.3 to the ES).

There are two un-surveyed arboricultural features present within, or adjacent to, the red line boundary. Access to the land within which these features are located was not available at the time of the walkover survey and as such they could not be surveyed. These are located at the southernmost end of the site and around the edge of a piece of land used for glasshouse production.

Table 3 – Category A trees

Reference	Quality	Description	Recommendations
T2 (TPO/BN/1/20)	High	Oak (A1) Notable specimen (potential veteran - 97691)	Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837

Reference	Quality	Description	Recommendations
T3 (TPO/BN/1/20)	High	Oak (A2) high quality	North of proposed works - No impact
T10 (TPO/BN/1/20)	High	Oak (A2) high quality	Located within the front garden of residence. Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837
T20 (TPO/BN/1/20)	High	Oak (A1) Notable specimen (potential veteran - 97690)	Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837
T23 (TPO/BN/1/20)	High	Oak (A1) Veteran features (potential veteran)	No impact Root protection area to be protected during construction in accordance with BS 5837
T25 (TPO/BN/1/20)	High	Oak (A1) Notable specimen. High quality.	Located north of the site boundary. Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837
T42 (TPO/BN/1/20)	High	Oak (A1) Veteran features (potential veteran)	Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837
T45	High	Evergreen Oak (A2) High quality	Evergreen oak T45 is also located within the front garden of a residential property to the north of the B2233 Barnham Road. Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation ▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837
T39*	Moderate	Oak (B2)	Alignment has been shifted north to enable retention Design should avoid potentially damaging activities within root protection area. These should include: ▪ Construction of any structure ▪ Level changes ▪ Excavation

Reference	Quality	Description	Recommendations
			▪ Temporary works Root protection area to be protected during construction in accordance with BS 5837

* although not currently A category opportunity to retain has been incorporated during route realignment.

Details of the trees to be removed for construction of the scheme are shown in the Tree Protection Plan attached to the Arboricultural Report (Appendix 3.4 to the ES). Arboricultural removals have been identified on the basis that they are either located directly within the area of construction or that their RPAs cannot be protected such that they can be sustainably retained.

Moderate-quality tree group G85 is covered by TPO/BN/1/20. This means that a number of protected trees will need to be removed in order to facilitate construction. The trees to be removed are those located at the northernmost end of the group and represent only a small percentage of all protected trees.

Mitigation for loss of trees, tree groups and hedges has been considered during preparation of the Landscape Plan.

TREE PRESERVATION ORDERS

A Tree Preservation Order makes it a statutory offence to cut down, uproot, lop, top, wilfully damage or wilfully destroy a protected tree without formal consent. Provisional TPOs may be made whenever a planning authority deems it appropriate with only those persons interested in the land served with a copy of the Order.

Because of this, any reference to the presence of a TPO is only valid on the date at which the desk study search was undertaken. In instances where works unspecified in this report are to be undertaken, which may impact trees, a further search for the presence of TPOs should be carried out prior to commencement.

TPOs within TPO BN/1/20 in the northern area of the Scheme are shown in detail in the Tree Protection Plan attached to the Arboricultural Report.

With the exception of G85, construction of the Scheme will not require the removal of any moderate or high-quality features covered by a TPO or any tree identified as having veteran potential.

The locations are shown in Appendix A.

VETERAN TREES

A veteran tree is one that possesses the physical characteristics of an ancient tree[1] but which is not aged in comparison with other trees of the same species. Thus, a veteran tree may not necessarily be particularly old but, due to the rigours of life, may exhibit signs of ancientness.

[1] The physical characteristics of an ancient tree include, but are not limited to;

- hollowing of the trunk