North Yorkshire County Council

Business and Environmental Services

Executive Members

25 March 2022

Highways Design Guide, Commuted Sums and Highway Drainage Supplementary Guidance Notes

Report of the Assistant Director – Highways and Transportation

1.0 Purpose of Report

1.1 To seek the approval of the Corporate Director, BES in consultation with the BES Executive Member for Access for the publication and commencement of use of the revised highway drainage and Commuted Sums Design Guidance, from the 01 April 2022.

2.0 Background to the report

2.1 North Yorkshire County Council (NYCC), in its capacity as Local Highway Authority (LHA), is statutory consultee to the planning process on highways matters.

2.2 Following planning approval, NYCC works with developers (charging a superintendence fee for the service, as a percentage of the total calculated bond value for highway works), to ensure that roads are designed and constructed to a standard which enables it to confidently adopt the new road and accept it as highway maintainable at the public expense.

2.3 It is critical to this process that the advice given by the local highway authority when undertaking its duties as statutory consultee to the planning process is impartial, being technical in nature and involving a consideration of the evidence provided by developers to the local planning authority, in line with national and local guidance, to enable the LHA's substantive response.

2.4 Robust, up to date technical design guidance is therefore critical to support officers in arriving at a recommendation to the Local Planning Authority.

2.5 In March 2020, the Corporate Director, BES in consultation with the BES Executive Member for access approved the commencement of work to revise the existing guidance and specification documents which support NYCC Officers in both undertaking its role as statutory consultee to the planning process and in the subsequent adoption process.

2.6 The last time the NYCC Highways Design Guidance Documents were comprehensively updated was in 1994. Ensuring all aspects of the guidance are robust and in line with present national standards and policy is therefore a significant workstream for the Development Management Team.

2.7 The Manual for Streets 2, the national standard document for residential development has been under review for the duration since it was agreed to progress the revision of the NYCC design guidance in March 2020. It is presently expected in the Spring of this year.

2.8 The outcome of the review may have significant implications for some aspects of local NYCC guidance with an extra focus on, for example, the prioritisation of sustainable travel and reduced focus on private car use.

2.9 Whilst it is imperative that local guidance reflects national standards, the necessity to update the NYCC guidance at the earliest opportunity is nevertheless clear; its age and the relevance of its application are frequent concerns raised by the developer community.

2.10 The stipulation of officers based on present guidance are subject to recurrent challenge by those acting for developers. This issue is increasing over time, given the present guidance reduces the opportunity for other desirable planning requirements. These include, for example, the use of trees within the highway curtilage and use of sustainable drainage options for highway water.

2.11 Consequently, work to progress all chapters has continued over the last two years. Some design chapters will however not feel an immediate impact from the revision of the Manual for Streets 2, with policy influences being drawn from a wider area of guidance documents. These chapters include the Highway Drainage and Commuted Sums Guidance.

2.12 These chapters are therefore brought to the BES Executive meeting in advance of the revision of the Manual for Streets, so that their use can begin and opportunities are not missed.

3.0 Highway Drainage Chapter

3.1 The highway drainage chapter has been revised to better reflect today's standards and the range of drainage options available and their appropriate use for draining the highway. For example the chapter gives design guidance for the use of sustainable drainage techniques, such as incorporation of soakaways, which at present are viewed on a case-by-case basis, often with support from term consultants to provide technical input.

3.2 This technical support has become less required since closer working between the LHA and LLFA on planning recommendations commenced, however the guidance document offers developers the appropriate information to develop acceptable design and offers officers a design framework to apply to the auditing of submissions when reviewing and reflects the planning requirements of both LHA and LLFA functions.

3.3 The chapter is included as Appendix A of this report. It is intended that for any "extra-over" design features, the commuted sums chapter would be referenced to ensure there is no additional cost from these atypical design features to the LHA.

3.4 The design guidance will continue to be refreshed, typically in line with amendments to the North Yorkshire Sustainable Drainage Guidance, which in turn would relate to amendments to national best practice documents.

4.0 Commuted Sums for Maintaining Infrastructure Assets in Association with Section 278 and Section 38 Highway Agreements Chapter

4.1 The commuted sums chapter seeks to bolster and develop the application of values to "extra-over" design features. This includes for example, the basis of calculation of soakaways for highway drainage purposes, a value to cover the maintenance of the life cycle of trees and vegetation planted within higher specification paving and other materials.

4.2 It is reflective of existing commuted sum guidance relating to traffic signals. The draft chapter is included as Appendix B

4.3 The robust application of commuted sums will permit a wider design palette to be utilised in development in North Yorkshire, whilst protecting the public purse from any associated maintenance costs that are higher than typical specification.

5.0 Consultation process

5.1 Both chapters have been circulated in draft to relevant internal and external representatives for comment to ensure its use is applicable and does not have implications outwith the NYCC highways development management team.

5.2 NYCC consultees have included representatives from Highway Operations, Traffic Engineering, Bridges and Structures, Economic Growth, Public Health and Climate Change.

5.3 Comments have been received from Highway Operations, Bridges and Structures, Traffic Engineering, Public Health and Climate Change. Suggestions have been incorporated where possible, with explanation offered where comments offered are not able to be incorporated into the guidance.

5.4 Externally, all Local Planning Authorities within the NYCC boundary have been invited to comment. In addition City of York Council has been approached, to permit consistency of approach within the county area.

5.5 National Highways has also been invited to comment and the guidance has been offered to developer representatives.

5.6 It was not surprising that limited external feedback was received from external parties, given the technical nature of both chapters, which does not necessarily impact on wider planning processes. External feedback was however received from Craven District Council, which reported no concerns with the approach and Ryedale District Council (RDC).

5.7 RDC was concerned about the impacts of the commuted sums approach on site viability across the authority, given there is no viability assessment which explores the implications of this from some different housing scheme typologies across the North Yorkshire area.

5.8 This was something that NYCC officers had already recognised and explored. Response given to RDC explained that this sum is for “extra-over” design features only and does not impact on the use of typical highway construction materials or features. In addition, commuted sums are already collected by NYCC, so it does not seek to alter the status quo and instead the new document aims to make the calculation of sums more accessible to developers and robust in its application.

5.9 Commuted sums are a typical tool used by local authorities to cover the risk to the public purse from expensive design features incorporated into any areas of the site they wish to be adopted. Of course, if a developer does not wish for infrastructure or the access network within a site to be adopted that remains at their discretion. Notwithstanding this, developers should be aware that a commuted sum would be applicable which would be agreed to during the drafting of an agreement under s38 or 278 of the Highway Act (1980).

5.10 RDC also raised concerns over the 30 years commuted sum period, given that smaller builders are less likely to be in operation within that time period. Sums would however be collected upfront, held by NYCC for maintenance use as and when required over the lifespan of the infrastructure. Ultimately, the cost and the quantity of materials used as extra-over features is fixed and therefore its application protects the public purse from the higher maintenance costs of the feature.

5.11 This rationale has been explained to the commenting officer at RDC and it has withdrawn the concerns.

5.12 It is considered, that given the age of previous guidance it is vital to introduce the document at the first opportunity, particularly given that it reflects a process which is already occurring, but at present one which is dealt with on a case-by-case basis with developers. Notwithstanding that, the document would not be introduced without a commitment to reviewing it following a year of operation to ensure its use has not resulted in unforeseen issues and also it may be considered pertinent to undertake a review at an appropriate point following LGR.

5.13 It will in any case, be necessary to review the commuted sums charges annually in line with commercial fluctuations. This will be linked to the annual review of the fees and charges schedule.

6.0 Financial implications

6.1 The revision of the guidance seeks to reduce the financial risks to the authority from the adoption process and ensure there is no additional strain placed on the public purse, from either poor design or extra-over design features. The commuted sum chapter in particular will permit a value to be available for the maintenance of extra-over design features, during the design lifespan.

7.0 Legal implications

7.1 North Yorkshire County Council Local Highway Authority and as such, in a two tier authority area is a statutory consultee to the planning process, as set out in Article 22 of the Development Management Procedure Order. Consultees are under a duty to provide a “substantive response” (as defined in the Article).

7.2 Local planning authorities must provide such consultees with information that will enable them to provide a substantive response.

7.3 The substantive response should include reasons for the consultee’s views so that where these views have informed a subsequent decision made by a local planning authority the decision is transparent.

7.4 New and existing roads can be adopted by highway authorities so that they become maintainable at public expense, pursuant to Section 38 of the Highways Act (1980).

7.5 This report concerns the introduction of revised NYCC guidance to enable the substantive response to the planning process and to enable subsequent adoption of the roads, delivered to an acceptable standard, in accordance with the legislation above.

7.6 The statutory authority for commuted sum payments derives from Sections 38 and 278 of The Highways Act 1980, with both section of the Act containing enabling powers for authorities to secure contributions (commuted sums) from third parties for the future maintenance of highway assets.

7.7 Section 38 applies to new roads constructed on private land which the developer, upon completion, wishes to be adopted by the highway authority as highway maintainable at the public expense, and;

7.8 Section 278 Agreements provide developers with a mechanism to either fund works, or undertake works themselves, to the existing public highway. The works are often termed 'off site works' as they are usually separate from the developer's site and the works are necessary to provide improved access to, or mitigate the effects of, the new development.

7.9 A court of appeal decision known as "the Redrow case", confirms that it is appropriate for authorities to use these powers to seek commuted sums for all elements of future highway maintenance after adoption.

8.0 Equalities implications

8.1 There are no equalities implications arising from this report. The initial equality impact assessment screening form is included as Appendix C accordingly.

9.0 Climate Change Implications

9.1 A climate change assessment form is included as Appendix D. There are no adverse climate change implications arising from the report, in fact both chapters, in places encourage more sustainable construction techniques and more opportunity for sustainable drainage options for the highway and incorporation of trees into the highway curtilage without additional cost to the authority.

10.0 Recommendations

10.1 It is recommended that;

i) the Corporate Director, BES, in consultation with the BES Executive member for Access approve the publication and use of the revised drainage and commuted sums chapters from 1st April 2022.

ii) a further report is provided on the commuted sums chapter following a year of operation to ensure its use has not resulted in unforeseen issues.

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Background Documents:
Design Manual for Roads and Bridges (DMRB)
Manual for Streets 2

Highway Drainage Chapter
(incorporating Sustainable Drainage Systems)

16.1_ General

16.1.1 Highway Authorities have the powers to construct, adopt, and maintain highway drainage infrastructure. This guidance aims to provide a foundation for consistency of highway drainage design to current standards which developers must follow to ensure that systems are satisfactorily designed and constructed.

16.1.2 The new guidance moves away from design specifications to a modern philosophy of source control and performance specification. For instance, high return period design storms must now be simulated, and flood flow paths examined as part of the design of highway drainage, as it no longer matters to the public whether a pipe surcharges or a manhole floods, but rather that flooding causes nuisance, inconvenience, damage or health and safety risks.

16.1.3 North Yorkshire County Council (NYCC) as the Local Highway Authority (LHA) is responsible for the adoption of surface water drainage systems serving highway areas as part of its statutory legal duty to effectively drain the public highway.

16.1.4 In order to ensure that the LHA is able to fulfil this duty, the highway drainage system will only accept surface water received from adopted areas of highway following agreement with the LHA. Additionally, the Water Authority must have indicated that it is prepared to accept and adopt any connection to a sewer system to which they have a controlling interest. Therefore it is important that any highway put up for adoption includes an appropriately designed highway drainage system.

16.1.5 This Chapter should be read in conjunction with 'North Yorkshire County Council's SuDS Design Guidance 2018' produced in the Council's capacity as the Lead Local Flood Authority (LLFA).

16.1.6 The use of a positive drainage system should be provided for all roads to be offered for adoption as part of S38 agreements, and where possible discharging to a sustainable drainage systems (SuDS) where infiltration to the ground, large waterbody and/or controlled discharge into a system or watercourse can take place. A watercourse being a ditch or stream (not a field gutter), should be maintained / inspected on a regular basis. It shall be free flowing and capable of taking all the site water.

16.1.7 The Building Regulations Part H and CG 501 (DMBR – Design of Highway Drainage Systems) recommend the following order of priority for dealing with surface water runoff:

a) Discharge into the ground (infiltration)
b) Discharge to a surface water body
c) Discharge to a surface water sewer (with the agreement of the Water Authority)[1]
d) Discharge to a combined sewer (with the agreement of the Water Authority)[1]

[1]Note – The LHA will only accept surface water from the development highway into a LHA maintained highway drain. Surface water from open land and watercourses are not accepted.

16.1.8 When designing infiltration systems, one of the greatest uncertainties is future performance. Over time, infiltration rates can reduce, particularly if little or no effective pre-treatment is included in the design or the system is poorly maintained. To account for this, a factor of safety is introduced into the design procedure. Factors of safety are based upon engineering judgement and depend upon the consequences of failure. The SuDS Manual C753 suggests suitable Factor of Safety values, but NYCC reserves the right to apply stricter

regulation to ensure that development has a positive, rather than just neutral impact on flood risk.

16.1.9 A commuted sum will be required to cover maintenance/replacement of all ground infiltration systems. Specific guidance on the use of soakaways is offered in section 16.20.

16.2_ Water Authority Consent

16.2.1 Where the discharge of surface water through SuDS features may not be possible, particularly in more urban areas, then normal practice would be to provide highway gullies that discharge directly into a public surface water sewer, with any new connection being subject to a Section 106 agreement under the Water Industry Act (1991) with the Water Authority. As a last resort, the Water Authority may, subject to agreement, allow surface water discharge into a combined sewer. The use of pumps to drain the public highway will only be considered at the discretion of the Water Authority.

16.2.2 The Water Authority must provide Section 104 agreement certification before the Council agrees to adopt the highway layout under the provisions of a Section 38 agreement. Where complications are envisaged on a development it is recommended that the Developer seeks Section 104 approval at an early stage.

16.3_ Connecting to an Existing System or Watercourse

16.3.1 Where a new highway drainage system is reliant upon the existing highway network for an effective surface water outfall, there will be a requirement to prove its capacity in order to receive the additional flows and that the outfall is in a satisfactory condition before any connection approval takes place.

16.3.2 Any works that require the use of an existing drainage systems will be subject to carrying out CCTV surveys accompanied by a technical report with any associated improvement works undertaken at the Developers expense.

16.3.3 The right to discharge surface water from a highway drain into any ditch or watercourse must be agreed in writing by the issue of a permit or consent form from the Environment Agency (for a main river), or, an Internal Drainage Board (IDB) for non-main river within an internal drainage district. Where a watercourse is not within the applicant's land ownership, in addition to the relevant permits, an agreement is generally required in the form of a deed of covenant giving permission from the Riparian Landowner to discharge water must also be provided. NYCC will accept no liability for any failure to seek such agreements, which rest outside of the planning process.

16.3.4 Where there is a requirement that a drain is located outside of the limits of the highway, for example the outfall to a watercourse, then a 'Deed of Grant of Easement' will be required, the responsibility for which rests with the Developer to obtain.

16.3.5 Where a highway system discharges to a watercourse the connection should be made in line with the direction of flow and at an angle no less than 65 degrees to the bankside. A detailed headwall design should be submitted to include appropriate erosion/scour protection for the bankside. The design should incorporate flap valve(s)/no return valve(s) as standard. Confirmation must also be received from the LLFA on whether consent under Section 23 of the Land Drainage Act 1991 (as amended) (Land Drainage Consent) is required for the outfall headwall structure.

16.3.6 Only in exceptional circumstances will elements of a highway drainage system be permitted within an area of public open space requiring the written approval of the Planning Authority. Where such circumstances do arise, the landowner (the Developer) will be required to provide a Grant of Easement giving the Highway and Lead Local Flood Authority right of access at all times for repair and maintenance purposes.

16.4_ Discharging Surface Water to SuDS

16.4.1 Where a drainage system serving the public highway discharges to a SuDS feature then this must be put up for adoption and be located within the highway boundary or forming an integral part of the road being offered for adoption. The adoption of SuDS components that are "off line" or remote from the highway are unable to be adopted and thus this should be fully considered early in the design process. Designs should be in accordance with the CIRIA SuDS Manual and the Councils SuDS Design Guidance.

16.4.2 There may be circumstances where a SuDS system is constructed within the highway boundary and the system takes proportionally more 'non-highway runoff' in which case the system would not be adopted under a S38 agreement and future maintenance for the lifetime of the development would need to rest with a management company.

16.4.3 Due to the bespoke nature of SuDS systems, the adoption of each feature will be dependent on the agreement and provision of an appropriate commuted sum to secure the ongoing maintenance of the feature. It is recommended that the Engineer is contacted at an early stage to seek agreement in principal for adoption. The use of Commuted Sums is covered in Chapter 28.

16.5_ Design Criteria

16.5.1 The rate of discharge from a new highway scheme must not exceed the greenfield rate for all events up to a 1 in 100 year design storm, plus an appropriate allowance for urban creep (where applicable) and future climate change allowance in accordance with current 30% (20% Commercial) guidance from the Environment Agency.

16.5.2 Highway drainage system designs should include a hydraulic model of the proposed highway network with the modelling parameters being in accordance with NYCC's design guidance.

16.5.3 Hydraulic modelling calculations (MicroDrainage or similar) shall include a design criteria summary, contributing area summary, full network details table, pipeline schedule, control/storage structure details and a results summary.

16.5.4 The drainage network must be designed and demonstrate, that unless an area is designed to hold and/or convey water:

- Surface water flows are contained within the proposed drainage pipes without surcharge for up to a 1 in 2 year flood event;
- Flooding does not occur on any part of the site for a 1 in 30 year rainfall event, with all development surface water flows remaining within the proposed drainage system;

- Flooding does not occur during a 1 in 100 year rainfall event (+CC) in any part of a building (including basement) or in any utility plant susceptible to water (e.g. pumping station or electric substation) within the development.

16.5.5 The following principles should be considered when defining the catchment areas for the road drainage system:

- Areas to be drained are identified, including whether they are permeable (grassed areas) or impermeable (surfaced).
- All high and low points on the longitudinal gradients of the road are identified.
- Crossfall or Camber on the road at all locations, and in particular identify locations where the direction of crossfall or the camber changes. The Design should avoid the creation of flat areas.
- As part of any longitudinal design care should be taken in respect of hog curves created at the top of the vertical curve which can flatten to well below the desirable minimum gradient.
- Confirm the direction that surface water will flow from all other areas.
- Confirm outfall locations.
- Identify any obstacles which will split catchments.

16.5.6 Pollution prevention methods should be incorporated in designs to prevent polluted run-off. The incorporation of SuDS may prevent the need for oil separators. Refer to Pollution Prevention Guidelines (PPG's). The requirements for oil separators should be confirmed with the Environment Agency.

16.5.7 The Hydraulic model must be referenced to a schematic site layout plan with all pipes, manholes, drainage and ancillary features clearly numbered.

16.6_ Designing for Exceedance

16.6.1 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.

16.2.2 Typically, areas designated to hold or convey water will be an appropriately designed public open space within the development. Where the designated area is off site on land or into watercourses owned by a third party then evidence of approval will be required as part of any submission.

16.6.3 Safe and appropriate flow routes as a result of blockage and exceedance of the drainage system must be evaluated, and the potential effects of flooding assessed. An exceedance plan drawing is required to show exceedance areas and overland flow routes during an extreme flood event, exceeding the capacity of the proposed drainage system.

16.6.4 Site design must be such that when SuDS features are exceeded due to failure caused by blockages or when the system is overwhelmed by excessive flood flows, the exceedance flows do not cause flooding of properties or infrastructure on or off site. This is achieved by designing suitable flood pathways.

16.6.5 The use of the highway for exceedance flows may not be suitable in all locations, particularly in steeper catchments. Designers should consider the impacts of the velocity of exceedance flows on traffic, pedestrians and adjacent structures.

16.7_ Designing for Urban Creep

16.7.1 Urban creep is defined as future development expansion creating impermeable areas within a development site through activities such as building extensions, paving gardens and creating driveways which often rest outside of the development control processes. As such, an allowance of 10% is required for this increase in the impermeable area of a development.

Design Requirements

16.8_ Highway Gully Specification

16.8.1 Gully gratings and frames shall be class D400 and installed to BS EN124 with a minimum width of 450mm in accordance with the requirements of BS 7903. The use of slot drains on the adoptable highway will not be permitted. All road gully gratings are to be hinged and a minimum of 100mm deep on estate roads and 150mm deep in all locations of block paving. Cycle / Pedestrian friendly grates shall be provided on all Shared Space road layouts.

16.8.2 Emergency accesses, footpaths and cycletracks that are remote and not adjoining the carriageway should be positively drained. Surface water runoff from adoptable footpaths and cycleways that discharges across other footways or carriageways or discharges into adjoining private property and private areas, including gardens, is not acceptable. Particular care should be taken when a footway or cycleway is constructed in cutting, as surface water will be channelled to its lowest point leading to ponding.

16.8.3 For footways and cycleways gully gratings and frames shall be to class C250 with a minimum opening of 350mm x 310mm x 75mm with a captive hinge and cycle/pedestrian friendly grate.

16.8.4 Gully pots should be specified as plastic or pre-cast concrete units with a minimum diameter of 450mm and a minimum depth of 900mm. Brick built gully pots will not normally be accepted unless it can be demonstrated that these are required due to engineering difficulties.

16.8.5 The minimum allowable pipe diameter for gully connections to either the public sewer or a main highway carrier drain is 150mm.

16.8.6 Gullies are to be connected into a catchpit or manhole where reasonably practicable.

16.8.7 Gully spacing should be calculated in accordance with DMRB. The drained area for road gullies should not exceed an area of 150m^2. With the maximum gully spacing not exceeding 35m.

16.8.8 Gullies shall be positioned away from areas of regular vehicle overrun, including the wheel tracked areas of junction bell mouths, driveways, formal and informal pedestrian crossing points and potential informal pedestrian desire lines.

16.8.9 Where it is not possible to meet the above requirements the Council will in exceptional cases accept the use of kerb type drainage systems (beany blocks) in short stretches where it can be demonstrated that kerb drainage can be effectively maintained. The use of kerb drainage should be agreed with the Engineer at an early stage in the design process and will be subject to securing a Commuted Sum.

16.8.10 Standing and running surface water at junctions, transitions, pedestrian crossing points, bus stops and cycle lane entries should be minimised by installing a gully on the upstream side.

16.8.11 The use of Linear Drainage Channels / Slot drains / Aco drains should be carefully considered due to maintenance liability and often still require a positive outlet and therefore their use shall be agreed early in the design stage with the Engineer if required to overcome a particular problem that cannot be addressed by conventional drainage solutions.

16.8.12 New carriageways to be put up for adoption should be designed to avoid the creation of flat areas. Where the development will utilise an existing highway where flat areas are already present, the introduction of false flats should be considered, i.e. reshaping the road surface profile into peaks and troughs between gullies to achieve minimum gradients.

16.8.13 Channels should be used on carriageways where gradients are shallower than 1 in 80 in order to prevent future ponding. Alternatively, the use of combined kerb/drainage systems may be considered in certain circumstances, but with the prior approval of the Engineer due to maintenance liability and will be subject to a commuted sum calculation.

16.8.14 Where possible footways should be designed to fall towards the carriageway. Where backfall is unavoidable and if there is significant longitudinal fall then a 'dish' should be formed in the surfacing and directed such that the water flows off into the channel. At times where this is not possible, a gully will be required within the footway. The use of dished channels should be avoided where possible as they can present a tripping hazard and thus the use of fluted channels is generally more acceptable.

16.8.15 A pair of gullies are required at all low points along a road channel, or at locations where a single blocked gully has the potential to create ponding and subsequent exceedance. Each gully should have an independent connection to the carrier drain unless agreed with suitable reasoning offered at the design stage with the Engineer. The independent connections to the carrier drain must be at least 1m apart to ensure the carrier drain is not weakened.

16.8.16 To assist with the checking of the road layout / drainage designs as part of any Technical Approval for S38/278 works, the application submission should include a road layout/drainage plan overlaid with 100mm contour heights/flow arrows.

16.9_ Pipework

16.9.1 Desirable minimum cover to any highway pipework should be 1200mm where trenches are backfilled with suitable granular material. The absolute minimum cover with the exception of the connection to the road gully should be 600mm, where this occurs all drains must be laid on a bed of, and surrounded by, 150mm of ST2 mix concrete protection with flex cell expansion joints on all bends and every 3m of length.

16.9.2 All pipework should be designed to be self-cleansing with a minimum velocity of 1.0m/sec or an absolute minimum of 0.75m/sec. Any main carrier drain running in the highway should have a minimum diameter of 225mm.

16.9.3 Pipework up to and including under 900mm diameter must comply with Series 500 of the MCHW, and for the avoidance of doubt plastic pipes up to 300mm are acceptable to use, as long as they are twin wall approved for highway use. Plastic pipes greater than 300mm dia are subject to agreement with the Engineer, being CE marked and will be subject to suitable specification for bedding and encasement.

16.9.4 Where;

1. Pipework exceeds 900mm diameter or clear span or

2. Combinations of pipe where combined span is in excess of 0.9m, and the distance between two pipes is less than that of the larger of the two spans.

Then these will be treated as structures requiring a Technical Approval submission and will not be permitted under the highway by NYCC.

16.4.5 The current NYCC Technical Approval Procedures document can be made available upon request.

16.4.6 For further requirements refer to the Structures Chapter of this Design Guide.

16.10_ Culverts

16.10.1 NYCC is, in general opposed to the culverting of watercourses and has recently published a 'Culverting Works and Drainage Maintenance Protocol 2019'.

16.10.2 Culverts must be designed so they do not cause a restriction to flow and this must be demonstrated through the submission of supporting evidence. Culverts must not increase the risk of flooding or prevent maintenance of the adjacent open watercourse. Consideration must also be given to overland flow paths in the event of a culvert becoming obstructed or overloaded. It should also be demonstrated that flows will not affect property or cause unreasonable nuisance or harm.

16.10.3 The responsibility for future maintenance and clearance of a culvert must be agreed and details of those responsible submitted with the consent application. The responsibility for the maintenance of a culvert lies with the riparian landowner or the owner of the culvert unless otherwise arranged.

16.10.4 All culverts that are to be adopted by NYCC shall be supervised on-site during the construction phase activities. No works shall start until the Technical Approval and any Section 38/278 agreements have been entered into with consent under the Land Drainage Act 1991 (watercourses) or an Environmental Permit (EA Main River) having been issued by the appropriate bodies.

16.10.5 A technical approval submission will be required for all structures defined as being greater than 900mm diameter or clear span.

16.11_ Catchpits

16.11.1 Catch pits with a minimum clear opening of 675mm x 675mm should be constructed with a minimum sump of 300mm and should be located at every change of direction, at any change of diameter, and where any system joins the main line (Single gully connections may be permitted without the construction of a catch pit with agreement of the Engineer). Changes of direction of more than 90 degrees in catch pits will not be permitted.

16.11.2 Refer to the NYCC Technical Approval Procedures for all manholes with a diameter greater than 1250mm

16.12_ Manhole Chambers

16.12.1 Manhole chambers will be required at a maximum spacing of 90m for systems that run for a long distance without any incoming connections to allow access for jetting. All manhole covers on the adoptable network are to be 150mm deep EN124 D400 ductile iron bedded using a proprietary mortar/polymer resin based product or 100mm deep EN124 C250 in the case of footpaths or verges.

16.12.2 All covers in footpaths and shared surface areas that are to be trafficked for maintenance purposes e.g. access required by tanker, jetter, gully emptier, street lighting hoist shall be fitted with BS EN124 D400 cover and frames.

16.12.3 Manholes must not straddle centrelines/ lane lines, and be kept clear of vehicle wheel tracks with pipework being a minimum of 1.0m from a kerb line, and any manhole being a minimum of 500mm from a kerb line in order to minimise disruption during future maintenance work. Sub-surface drainage will be required where the water table is within 600mm of the formation

16.12.4 Refer to the NYCC Technical Approval Procedures for all manholes with a diameter greater than 1250mm

16.13 Flow Control Chambers & Oversized Attenuation Pipes

16.13.1 Flow control chambers and oversized attenuation pipes constructed to control surface water discharge rates to the existing drainage network should be situated outside of the adopted carriageway extents to avoid disruption to the highway during any future maintenance.

16.13.2 It is acknowledged that in some small/medium size developments it may not be viable to provide surface water attenuation tanks and pipes outside the confines of the highway. Appendix CH 16-1 provides an example of a permitted surface water attenuation pipe arrangement within the adoptable highways for smaller development sites where other SuDS options cannot be accommodated. A departure from NYCC standards must be negotiated with both the highways engineer and structures engineer.

16.13.3 Large chambers (>3.0m diameter) will not be permitted within the carriageway without consideration of all maintenance activities and safeguarding the movement of members of the public during any works, including the replacement of a chamber cover slab. Where chamber cover slabs are bespoke, a structural design will need to be submitted for approval.

16.13.4 Where pipes/culverts larger than 900mm clear span or diameter are agreed within the highway, they will be classed as structures for the purpose of systematic structural inspection and will require a technical approval submission.

16.13.5 NYCC will accept the use of vortex control devices as a method of flow control on a highway system, and will also permit the use of orifice plates with a minimum internal diameter of 75mm for vortex control values and 100mm for orifice plates. Throttle pipes shall be 150mm and should be less than 15m in length. Should this requirement detailed above not be approved then the Applicant is exposed to the risk of the site not being adopted.

16.14_ Cellular Storage Systems

16.14.1 The use of below ground cellular storage systems for surface water attenuation is becoming more common and are permissible where it can be demonstrated that all other options have been considered and dismissed for technical reasons.

16.14.2 The approval of a cellular storage system will be subject to the submission and approval of a detailed design.

16.14.3 The construction of a cellular storage system constructed directly under a carriageway will not be permitted.

16.14.4 As such, any system put forward for adoption must be located in an adjacent area of adopted public highway, preferably in verge area and must be suitable for vehicular trafficking and certified accordingly

16.14.5 The design of the specified system must allow jetting along the entire length of the feature. A plan identifying access arrangements for maintenance should be submitted. It must be demonstrated that the chosen system permits the inspection of the entire tank with conventional CCTV apparatus.

16.14.6 Crates with solid internal walls will not be accepted. Any storage tank must be appropriately vented and include a sump catch pit at the main inlet and adjacent to, or constructed as part of, the outfall/flow control structure to allow the jetting of the entire feature and the removal of sediment. On large systems it is likely that the use of two catchpits could be needed, with flow split between the two catchpits.

16.15_ Subsoil Drainage

16.15.1 An adequate system of subgrade drainage to maximise longevity of the pavement construction and its associated earthworks shall be constructed to the Engineers satisfaction where:

- the winter height of the water table is within 600mm of formation level; or
- the sub-soil is saturated; or
- there is a likelihood of water running from or out of adjacent ground; or
- springs, land drains, leats or other watercourses are encountered; or
- the subgrade is likely to be altered due to groundwater.

16.15.2 The designer should also refer to TRL report PPR341 Drainage of Earthworks Slopes. Future maintenance of drainage systems must be a principal factor in the design and for this reason, fin drains should not be used.

16.16_ CDM Regulations

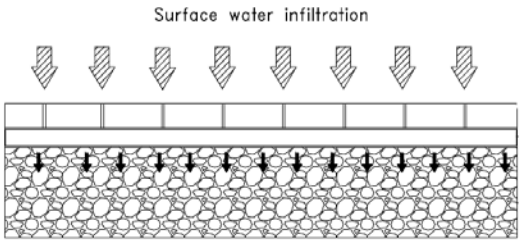
16.16.1 Under the CDM Regulations, the designer must take full account of the general principles of prevention, with the aim, as far as reasonably practicable, of eliminating foreseeable risks. In this respect, Surface Water attenuation tanks are deemed to be a 'confined space' structure when undertaking systemic future inspections and maintenance, due primarily to the potential build-up of toxic and contaminated material, harmful gases and

water risks. It is expected that the CDM Health and Safety File will include all details to enable future inspection and maintenance.

16.16.2 All relevant information forming the Health and Safety File shall be submitted to the LHA in CD format prior to S278/38 Final Certificates being issued. The Local Highways Area Office will be required to store this information or future reference.

16.17_ Permeable Paving

16.17.1 The use of permeable paving has the potential to both store and treat highway water without the land take of conventional sustainable drainage features. Engagement with the highway authority into the use of permeable paving is encouraged at an early stage in the design process.



16.17.2 At present, NYCC are not willing to adopt permeable paving on the adopted highway. The construction of permeable paving within private highways, shared parking areas and private drives is permitted subject to the submission of a detailed design, maintenance plan and future ownership details at the planning stage. A reduction for the use of permeable paving shall not be made in the site drainage design for private driveways as homeowners may replace their drives with cheaper impermeable material in the future.

16.17.3 Any permeable paving systems should be designed in line with the most up to date version of permeable paving design guidance. The use of loose gravel or similar unbound material will not be permitted by NYCC as a permeable paving solution, as typically, weed growth takes place; the material gets tracked onto the adjacent highway which can lead to road safety concerns and potential damage to highway surfaces. Additionally, unbound materials can create problems for users of wheelchairs, mobility scooters and pushchairs.

16.17.4 The approval of permeable paving designs being reliant upon infiltration will be subject to infiltration testing undertaken by a UKAS accredited laboratory. This testing will determine if full, partial or no filtration is achievable, which in turn determines if a piped outfall and an impermeable geo-textile layer is required.

16.17.5 Permeable paving to be offered for adoption will require a positive drainage outfall and a commuted sum for the future maintenance. In the circumstance there is no other suitable solution available the use of permeable paving out falling via infiltration will need to be discussed at the early stages of site design with the Engineer

16.18_ Private Area Drainage

16.18.1 The drainage of private areas must be considered as part of the technical approval submission. No private drainage element will normally be permitted within the area offered for adoption. Surface water run-off from private driveways, courtyards and footways should be positively drained and thus intercepted by linear channels and private drains and discharged into the private domestic surface water network associated with the proposed dwellin1 in 80g/private structure.

16.18.2 Conversely, the drainage design should ensure that no surface water runoff from the proposed adoptable highway area enters areas in private ownership. Private culverts/structures will not be permitted within areas offered for adoption. This issue should be addressed as early as possible during the design stage.

16.18.3 Private connections not forming part of the adoptable sewer system within the highway limits, are the responsibility of the Developer and his successors, but shall be constructed in accordance with NYCC's specification. Any private apparatus located within the adopted public highway will be subject to the provisions of a Section 50 licence.

16.19_ Use of Management Companies

16.19.1 It must be demonstrated to the Local Planning Authorities satisfaction that maintenance of private surface water drainage assets will be assured for the lifetime of the development.

16.19.2 To assist with the maintenance of private areas and private drainage assets that come under the control of a Management Company, it is expected that the Local Planning Authority and the nominated Management Company will be provided with a 'SuDS Scheme Operation and Maintenance Manual' document forming part of the CDM Health and Safety File enclosing all pertinent information.

16.19.3 The SuDS Scheme Operation and Maintenance Manual is to be provided as part of any submission at Full Planning and Approval of Reserve Matters planning stages, as well as for any Draft Section 38 Highway and SuDS Adoption Agreement. As a minimum, this file should contain:

- The Management Companies name, address, email address and contact number. (Where this is not known during the planning stage then full details must be submitted as part is part of the Health and Safety File at S278/38 Final Certificate Stage);
- A description of the site and construction details;
- A brief summary of the design intent, how the SuDS components work, their purpose and potential performance risks;
- An explanation of the objectives of maintenance that is proposed and potential implications of not meeting those objectives split into planted and hard elements;
- Visual indicators that will trigger maintenance plus depth of silt and of oil separators etc. that will trigger requirement for removal;
- A plan of the site that identifies surface water run-off sub-catchments, SuDS components, critical water levels, control structures, flow routes (including exceedance routing) and outfalls;
- A plan clearly showing the extent of the un-adopted area along with easements and rights of way for access to enable maintenance. If other parties are responsible for different parts of a scheme, this should be clearly shown on the plan;
- The access that is required to each management component for maintenance purposes and a plan for the safe and sustainable removal and disposal of waste periodically arising from the drainage system;
- A maintenance schedule (see example in Appendix CH 16-3) itemising the tasks to be undertaken and the frequency at which the tasks should be performed so that the long term performance of the asset is secured. This schedule can then be priced, checked on site and form the basis of an inspection log. It is expected that the schedule would

be a living document and will be subject to change where inspections advice that changes are necessary to the maintenance requirements;

- A maintenance specification detailing the materials to be used and the standard of workmanship required. The specification should describe how the work should be carried out, health and safety requirements and should contain clauses giving general instructions to the nominated Contractor;
- Details of how future residents will be made aware of their responsibilities and obligations where these rest outside of the Management Companies remit.
- An action plan for dealing with accidental spillages of pollutants;
- Details of who to contact in the event of pollution or the system is not working;
- Advice on what to do if alterations are to be made to a development, or if service companies need to undertake excavations or similar works that could affect the SuDS.

Highway Soakaways

16.20_ General

16.20.1 When designing infiltration systems, one of the greatest uncertainties is future performance. Over time, infiltration rates can reduce, particularly if little or no effective pre-treatment is included in the design or the system is poorly maintained. To account for this, a factor of safety is introduced into the design procedure. Factors of safety are based upon engineering judgement and depend upon the consequences of failure. The SuDS Manual C753 suggests suitable Factor of Safety values, but NYCC reserves the right to apply stricter regulation to ensure that development has a positive, rather than just neutral impact on flood risk.

16.20.2 NYCC is generally opposed to the use of highway soakaways due to siltation and future maintenance liabilities and therefore where they are proposed, all other infiltration surface water discharge options should have been considered and discounted.

16.20.3 Where standard soakaway designs and deep borehole soakaways are the proposed method of highway drainage, and are being offered for adoption as part of the S38 Agreement, it is essential that the design is approved at an early stage by NYCC.

16.20.4 Evidence that sufficient rates of infiltration are present to effectively drain the highway are required.

16.20.5 For the avoidance of doubt, NYCC will not accept soakaways being installed within areas forming the carriageway / footway that will be offered for adoption.

16.21_ Infiltration Test Specification

16.21.1 In order to ensure that infiltration rates are representative of the site ground conditions, infiltration tests should be undertaken on site as close as possible and within 20m for uniform subsoil conditions and in the location of the soakaway for non-uniform subsoil conditions and within the same depth range as the proposed soakaway.

16.21.2 The infiltration tests are to be carried out by a UKAS accredited laboratory in accordance with BRE365 'Soakaway Design' taking into consideration anticipated groundwater levels, ensuring a working filtration zone is achievable. All designs should take into consideration the requirements of HA118/06.

16.21.3 Trial pit logs are to be provided with each test pit, logged in accordance with as EN 1997-2:2007. A minimum of three fillings should be conducted in each test pit. Any submissions with less than 3 tests will be automatically refused.

16.21.4 If it is not possible to carry out a full depth soakage test then the soil infiltration rate calculations should be based on the time of the fall of water from 75% to 25% of the actual maximum water depth achieved in the test.

16.21.5 The Engineer or his Representative shall be advised when infiltration testing is being undertaken allowing the opportunity of superintendence.

16.22_ Soakaway Design Criteria

16.22.1 Soakaways should be designed using the slowest infiltration rate from one of the three tests in each pit. A minimum of a 1 in 100+CC year return period should be used for design purposes. Soakaways must be designed in accordance with the BRE365 method (2016 or any subsequent update) or the Bettess method (1996). The applicant must apply a suitable safety factor, as referenced in CIRCA C753 Table 25.2 if using the Bettess (1996) method.

16.22.2 It is appreciated that conventional highway drainage systems can only convey a limited volume of water during short duration high intensity events i.e. up to 30 minutes. For this reason, the temporary flooding of the highway during storms above the 1 in 30 year event would be accepted in short duration events, as long as it can be demonstrated that this exceedance volume will be completely contained within the adopted highway or other designated exceedance storage areas, taking into account a total footpath height of 75mm above carriageway level. The flooding of 3rd party land or property curtilages would not be permitted.

16.22.3 Adoptable soakaways should be constructed using either preformed plastic crates or perforated rings being a minimum of 1500mm diameter and installed in accordance with the manufactures instructions. All soakaways put up for adoption must be suitable for use in trafficked areas and certified accordingly.

16.22.4 All soakaways and filter drains are to be encased in a suitable geotextile, in the case of a soakaway laid between the chamber and the filter material to prevent fines being washed away. All soakaways should be designed with a suitable access point at each point of connection to allow future cleansing of the system in the event that it becomes silted.

16.22.5 If plastic crates are utilised, the design of the specified unit type must allow jetting along the entire length of the feature. Crates with solid internal walls will not be accepted and the feature must be appropriately vented. On larger soakaways additional inspection chambers should be provided to allow future cleansing of the system.

16.22.6 If more than one soakaway is planned, they are to be linked by a 225mm diameter pipe, and where possible, the soakaway should incorporate an overflow link (minimum 225mm diameter) to an existing highway drain/outfall system.

16.23_ Highway Soakaway Location

16.23.1 The position of the soakaways should be considered early in the design process. They **must not be located beneath the adopted highway** or areas subject to regular HGV traffic. They should be situated not less than 3m from the edge of the carriageway (or any other area subject to highway vehicular loading) in private car parking or areas of public open space with the agreement of the LPA and the completion of a legal Deed of Easement with the landowner (the Developer).

16.23.2 Designs where highway soakaways are proposed in inaccessible areas for example, between plots will not be accepted. They must not be located directly beneath the adopted highway and the bottom of the soakaway should not extend below a line drawn at 45 degrees from the edge of the carriageway or any structure or boundary.

16.23.3 Soakaways should be situated not less than 5m from any building, wall, or retaining structure and a 3m easement from any property curtilage or the edge of the carriageway should also be provided. Fences shall also be kept a reasonable distance from the soakaway.

16.23.4 No permanent structures, play equipment, steps or significant landscaping should be placed on or adjacent to the soakaway or within the easements.

16.23.5 When determining the location of the soakaway, due consideration should be given to future maintenance. Provision must be made for pedestrian and vehicular access from the adopted highway to the whole of the soakaway and associated drainage runs without significant changes in ground level.

16.23.6 Gradients within the easements should not normally be steeper than 1:20 across grassed or landscaped areas without suitable reinforcement. Easements are required for any drainage outside of the adoptable highway and these should be a minimum of 3m around a soakaway and 3m either side of the centre of any pipe. Additional areas for access may be required.

16.23.7 Soakaways and any other form of surface water ground infiltration will not be permitted under any circumstances in the Ripon area of Harrogate Borough, as Ripon sits on a layer of gypsum at a relatively shallow depth. Gypsum is a water soluble rock where dissolution can result in the creation of underground cavities which can lead to sink holes developing. A map showing the central bend of Ripon depicted by the enclosing lines of C-C is included in Appendix CH 16 - 2.

16.24_ Soakaway Design

16.24.1 When submitting a soakaway design for approval (this will normally be approved by the LLFA) the following information must be provided to ensure that the design can be promptly checked and subsequently approved:

- Impermeable drainage area assumed in the calculations.
- Infiltration rate assumed for design purposes based on BRE365 testing
- Confirmation that a 100 year +30% CC return storm period has been used in the calculations.
- BRE365 should be used as the design method or Bettess (1996) method
- Confirmation of the Factor of Safety assumed in the design
- Soakaway dimensions proposed and construction detail
- Proposed invert level and effective drainage depth
- Porosity of proposed drainage medium.
- Location plan(s), indicating the position of the infiltration test(s) with respect to the location of the proposed soakaway(s)
- Location plan(s) showing proposed easement details
- The design submission must provide evidence that contaminated land does not exist, or that the construction of the drainage system will not harm the environment. Where appropriate, the design submission must provide

evidence that the effects of past mining/quarrying activity has been considered and addressed
- Ground water levels

Further Information on Sustainable Drainage Systems (SuDS)

16.25_ General

16.25.1 As advocated above, NYCC promotes the use of Sustainable Drainage Systems for the treatment, attenuation and disposal of surface water runoff from new and retrofitted developments, including the runoff from highways.

16.25.2 SuDS provide a sustainable approach to drainage, mitigating the impacts of developments on flood risk and climate change whilst promoting flood resilience plus they can provide amenity and environmental benefits.

16.25.3 SuDS look to manage surface water runoff from rainfall near to where it falls, in other words 'at source' and water not collected for use must be discharged to one or more of the following in the order of priority shown in accordance with the Building Regulations Part H:

a) Discharge into the ground (infiltration) – Note - in the Ripon Area – See Section 16.23.7
b) Discharge to a surface water body
c) Discharge to a surface water sewer (with the agreement of the Water Authority)
d) Discharge to a combined sewer (with the agreement of the Water Authority)

16.25.4 There are various SuDS components that are particularly suitable for dealing with surface water runoff, these include permeable surfaces, detention basins, ponds, swales, rainwater gardens, wetland systems and attenuation storage.

16.26_ Location of SuDS Features

16.26.1 When determining the location of the SUDs features, due consideration should be given to future maintenance. Provision must be made for pedestrian and vehicular access from the adopted highway to the whole of the SUDs feature and associated drainage runs without significant changes in ground level.

16.26.2 SuDS features should be situated away from any building, wall or retaining structure in accordance with best practice, with a 5m easement being provided around the SuDS feature with a 2.5m easement either side (5m) of any connecting pipework.

16.27_ Water Quality

16.27.1 The adopted highway network has the potential to generate a significant volume of surface water during storm conditions. Due to vehicle traffic this water can often carry pollutants and have a high sediment loading. It is therefore important that highway surface water is properly attenuated and treated before it reaches a receiving watercourse or other water body. Any new highway drainage system put up for adoption must therefore pass through a minimum of 2 levels of surface water treatment prior to discharging to any outfall.

16.27.2 These levels of treatment can either be provided as part of the design of the highway drainage system or as part of the wider "site wide" drainage design. Features such as highway

gullies and catch pits are familiar to Highway Engineers and can provide some pre-treatment and form an effective method for sediment removal, however these do not have the capability to provide any treatment of dissolved pollutants meaning they will not be considered as a level or surface water treatment.

16.27.3 The design of SuDS can incorporate various mechanisms that retain pollutants or prevent the pollution of controlled waters through one or more of the following techniques:

- Sedimentation – *whereby suspended solids are settled out of solution by reducing the velocity of flow through the SUDS component. The design should take into account the risk of re-suspension of solids during extreme rainfall events.*
- Filtration – *where pollutants conveyed with sediment are trapped either within the soil or gravel media matrix, or on geotextile layers that form part of the SuDS construction*.
- Biodegradation – *provides a biological process that allows the creation of microbial communities to be established within the soil or gravel media to degrade organic pollutants including hydrocarbons.*
- Adsorption – *occurs when pollutants attach themselves or bind to soil, gravel media particles or to other media*.
- Uptake by vegetation – *provides a mechanism for removal of nutrients such as phosphorous and nitrogen.*

16.27.4 Attenuation and treatment of highway water can be achieved through the use of filter strips, infiltration trenches/soakaways, swales, rainwater gardens and other sustainable drainage features located in wide adoptable highway verges.

16.27.5 Where larger highway SuDS features are required these should preferably be located in adoptable areas or in exceptional cases located with public open space land with the written approval of the Planning Authority and a legal Grant of Easement by the Landowner (the Developer). The required number of treatment stages can be accommodated in site wide SuDS features if the highway is being designed as part of a wider residential or commercial development.

16.28_ Side Slope Gradients

16.28.1 The gradient of side slopes for swales and other attenuation features should not exceed 1 in 5 (20%) when constructed adjacent to high speed roads, with maximum depths of water not exceeding 200mm. Side slopes should not exceed 1 in 3 (33%) in residential areas, however more shallow gradients are preferred in all locations to permit easier maintenance.

16.29_ Surface Water Management During Construction

16.29.1 Damage caused during construction operations has the potential to prevent SuDS functioning as required. As such, appropriate planning must be applied to surface water management during the construction phase.

16.29.2 A statutory duty requires that surface water quality and quantity is managed throughout construction to prevent the adverse impact of surface water off-site.

16.29.3 The following details should be provided as part of a Construction Management Plan:

16.29.4 Method Statements and plans/drawings detailing surface water management proposals including:

- Temporary drainage systems, including for any dewatering;
- Measures for managing pollution / water quality and protecting controlled waters and watercourses, including emergency control measures;
- Measures for managing any on or off site flood risk associated with construction;
- Required consents, e.g. Land Drainage Act, Environmental Permit (if required);
- Construction management, maintenance and remediation schedule.

16.30_ Commuted Sums

16.30.1 Commuted Sums will be applied to Non-Standard drainage assets and SuDS features that are within the adoptable extent of the public highway to cover future maintenance associated with routine inspection, general maintenance and repair, the risk of the system failing, risk of subsidence induced by the system and reduced performance as a result of siltation. Commuted Sum values for S38/278 works will be derived in accordance with NYCC policy and practice utilising the guidance document 'Commuted sums for maintaining infrastructure assets' produced by the County Surveyors Society (known now as ADEPT). For further guidance on Commuted Sums see NYCC Design Guide Chapter 28.

16.30.2 Commuted sums will be applied to the following Non-standard drainage assets and SuDS features:

- Underground storage incl. oversized pipes, cellular storage and/or in-situ storage tanks, petrol interceptors)
- Above ground storage incl. (swales, ditches, rainwater gardens, dry and wet ponds)
- Precast Concrete Ring Soakaways / Trench Soakaways
- Weirs, Flow Control Devices, Hydro-brakes / Flow Control (vortex) Chambers
- Filter Strips / Filter Drains
- Slot Drains / Aco Drains
- Combined Kerb Drainage Systems (beanie blocks)
- Concrete Bagwork Headwalls (Precast units will not be subject to a Commuted Sum)
- Permeable Paving (if subject to adoption agreement)

16.31_ Construction Records

16.31.1 All works associated with S278/38 legal agreements require 'as-built' drawings to be supplied to NYCC as part of the Health and Safety File in digital format (preferably on CD) to enable all new highway assets to be logged and added to maintenance records.

16.32_ Inspections

16.32.1 CCTV surveys and reports are to be provided by the developer for all adoptable highway drainage including all gully connections, catchpits, inspection chambers, soakaways and headwalls.

16.32.2 If as a result of the CCTV and as-built surveys it is found that the constructed drainage differs significantly to the original designs provided, then a full set of revised calculations reflecting all the changes are to be resubmitted to demonstrate that the drainage system remains satisfactory.

16.32.3 Inspection Reports are to include:

- As built plans identifying the runs surveyed with catchpit, gully and pipe line references.
- Sizes of all pipes surveyed
- Cover levels and invert levels of all pipes entering catchpits, together with the size of all the catchpits
- A video in .AVI format of all drainage runs with reports identifying all defects and their locations with relevant '.JPG picture stills' taken from videos being provided where required.
- PDF copies of the report, all plans, notes and defect sheets.

16.33_ Further Design Guidance

16.33.1 Unless otherwise indicated, highway drainage shall be designed in accordance with the Design Manual for Roads and Bridges, and the latest design manuals and guidance notes published by The Construction Industry Research and Information Association (CIRIA).

16.33.2 Construction details should conform to Highway Construction Details in the MCHW, unless an equivalent detail exists in North Yorkshire County Council's Standard Details. Reinstatement should be in accordance with NYCC's Standard Details and the NRSWA Specification for the Reinstatement of Openings in Highways (DfT/HAUC ACoP).

16.33.3 Designers are also referred to the National Planning Policy Framework which sets out Government policy on development and flood risk.

16.33.4 Different sites will present different opportunities for sustainable highway drainage systems therefore early engagement with NYCC's Development Management Engineer and the LLFA is advised.

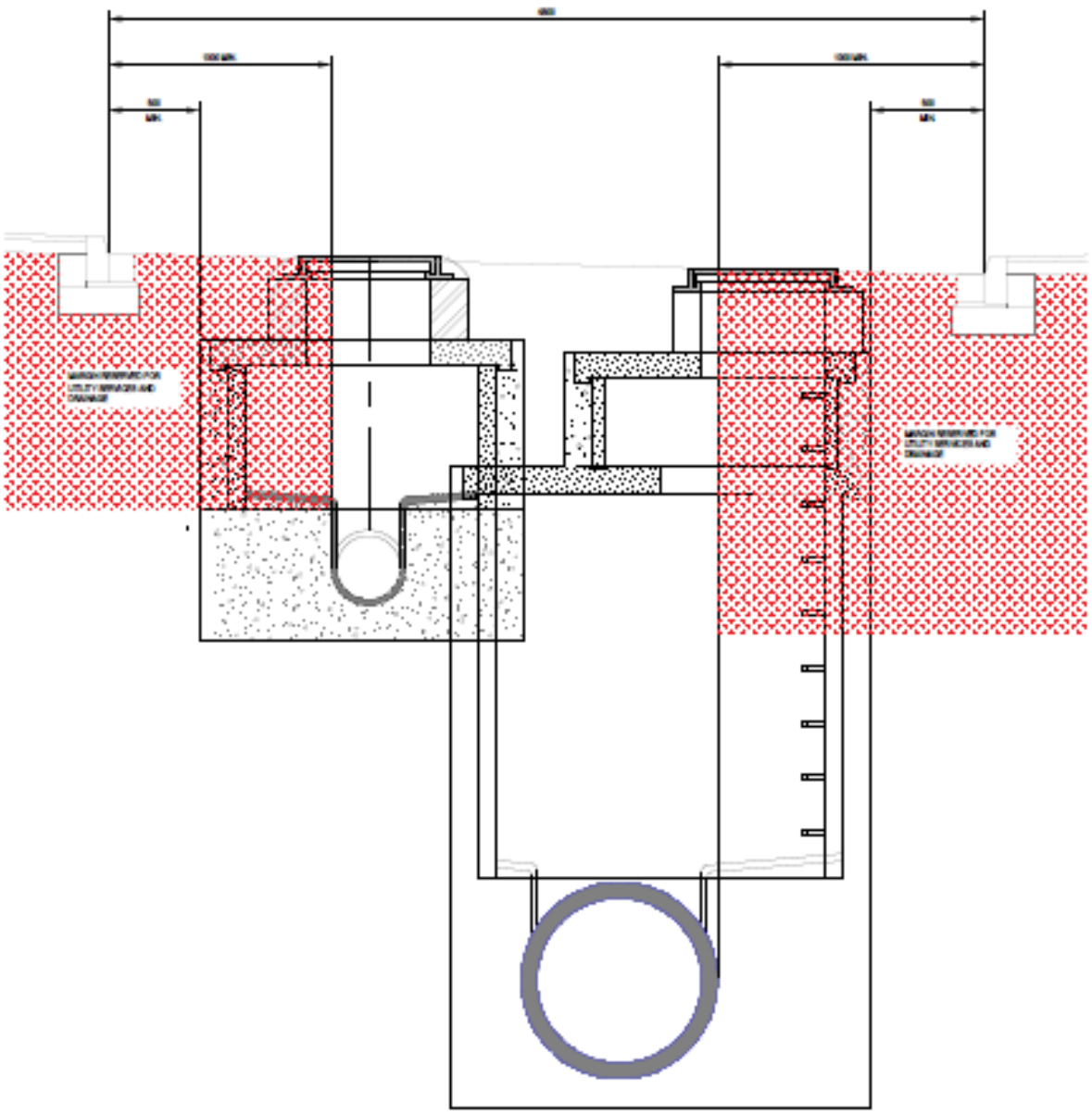
16.33.5 There is a range of guidance available on the design and construction of sustainable highway drainage systems which should be adhered to as part of any drainage system serving the adoptable highway.

- The SuDS Manual C753
- Specification for housing and Industrial Estate Roads and Private Street Works – 3rd Edition
- North Yorkshire County Council SuDS Design Guidance 2018
- Rainfall Runoff Management for Developments
- Susdrain the community for sustainable drainage
- UK SuDS Tools Web site – HR Wallingford
- BS8582:2013 Code of Practice for Surface Water Management for Development Sites
- Building Regulations 2010 Section H3 Rainwater Drainage 2015 Edition
- DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems
- Local Authority SuDS Officer Organisation (LASOO) Non-Statutory Technical Standards for Sustainable Drainage Practice Guidance
- Culvert Design Manual, Ciria168
- NYCC Culverting Works and Drainage Maintenance Protocol 2019

Recommended Highway Drainage Design Parameters

Design Consideration	Comments / Value
Minimum Slope / Gradient	1 in 300
Roughness Value (K) – manning "n" should only be used for open channels	0.6mm
Minimum System Velocity	1.0m/sec or an absolute minimum of 0.75m/sec
Maximum System Velocity	5m/sec (if >5m/sec suitable pipe & bedding combinations should be based on manufacturer Spec)
Climate Change	30% (20% Commercial)
Additional Flow – Urban Creep (where applicable)	10%
Minimum pipe run distance from kerb line	1.0m
Minimum Rainfall	Usually capped at 50mm/hour for AutoDesign
Volumetric Run-off Coefficient (Summer/Winter)	1.0 (unless peak flow rates are derived from impermeable area only)
Percentage Impermeable Area (PIMP)	100% for compliance with SfA 100% permeable areas 50% grassed areas & verges
Private impermeable areas	Areas greater than $6m^2$ to be positively drained into the private surface water system
Acceptable Infiltration Rates	Greater than $x10^{-6}$ m/sec
Margin for Flood Risk Warning	300mm
Area Reduction Factor	1
Time of Entry	3 – 8 minutes
Return Period	1, 30, 100 years as a minimum
Maximum Drained Area per Gully	$150m^2$
Maximum Spacing between Gullies	35m
Minimum pipe run distance from kerb line	1.0m
Maximum length of Gully Lead	20m (15m desirable)
Minimum pipe run distance from kerb line	1.0m
Minimum Manhole distance from kerb line	500mm
Maximum Manhole Spacing	Max 90m and at all changes in direction
Gully Grating and Frame and gully pot details	D400 Gully Grating and Frame 900 x 450mm gully pot
Manhole Covers in Carriageway	150mm deep EN124 D400 ductile iron bedded on a proprietary mortar/polymer resin based product.
Manhole Covers in Footway/verge	100mm deepEN124 C250 ductile iron
Minimum Pipe Depth	1.2m for all highway pipework (Absolute minimum 0.6m with concrete surround)
Minimum Pipe diameters	150mm gully connections 225mm carrier drains
SuDS Scheme Operation and Maintenance Manual	To be provided with Full Planning or at Approval of Reserve Matters planning Stage
Soakaway/Swales and other Infiltration Features – Minimum Distance from any building, wall, structure	Not less than 5m
Soakaway/Swales and other Infiltration Features – Minimum Distance from carriageways	Not less than 3m
Soakaway – Easement Distances	6m diameter easement around any soakaway 3m either side of the centre of any pipe (6m overall)
Soakaway – Gradients within Easement	Not Steeper than 1 in 20

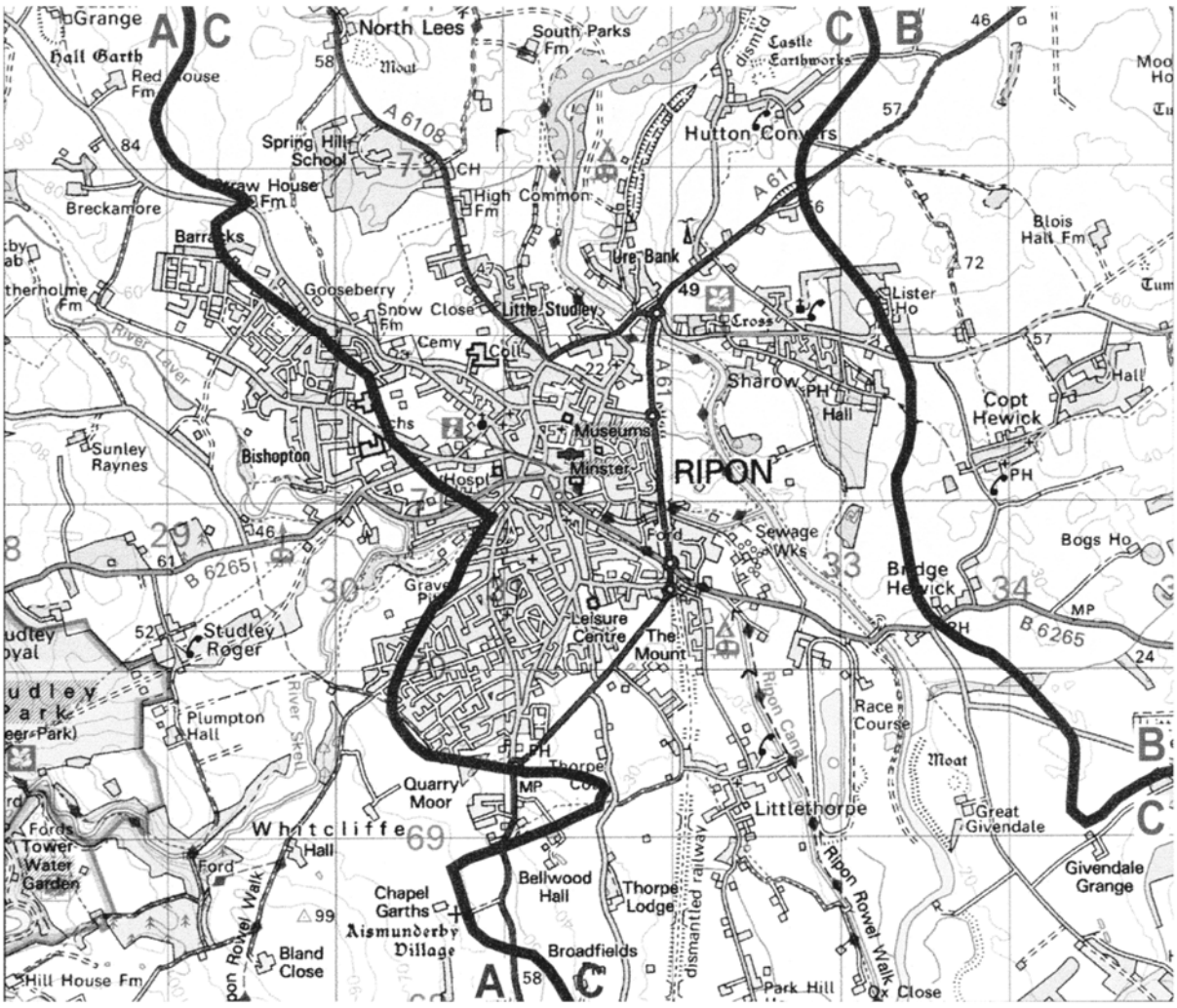
Appendix CH 16 - 1 – Permitted surface water attenuation pipe arrangement in adoptable highways for smaller development sites where other SuDS options cannot be accommodated.



Typical Cross Section showing single 900mm diameter attenuation pipe and foul system within a 4.8m wide carriageway width
(NYCC Highways Standard Detail Drawing available upon request)

Appendix CH 16 - 2

DEVELOPMENT GUIDANCE MAP: POTENTIAL SUBSIDENCE ARISING FROM GYPSUM DISSOLUTION IN RIPON



Key:
DEVELOPMENT CONTROL AREAS

- **A** No known gypsum present
- **B** Some gypsum present at depth
- **C** Gypsum present and susceptible to dissolution

Geological details represented on this map are based upon an interpretation of data partly obtained from exising publications of the British Geological Survey and partly from other sources as described in the Symonds Travers Morgan technical report to the DofE: 'Assessment of Subsidence Activity Arising from Gypsum Dissolution (with particular reference to Ripon)'

The map is intended to be used only as a general guide and should not be relied upon to provide detailed information at specific sites.

Appendix CH 16 – 3

Lagoons / Ponds / Swales are to be designed to minimise the requirements for ongoing maintenance and to ensure that the pond does not cause nuisance to nearby properties.

It is expected that off line ponds will be grassed utilising a slow growing grass mixture that will tolerate the prevailing conditions and will be cut at a frequency of 6 cuts per year.

Planting of trees and shrubs will be such that falling leaves branches and root systems will not have an adverse impact on the pond.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Litter and debris removal	Monthly
	Grass cutting – access route	Monthly during growing season, or as required
	Grass cutting – in and around basin	Half yearly Spring (before bird nesting season) and Autumn
	Manage other vegetation and removal of nuisance plants	Monthly during growing season (then as required)
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlet and outlet	Annually (or as required)
	Flow control device cleaning	
Occasional Maintenance	Re-seed areas of poor vegetation growth	Annually (or as required)
	Prune and trim trees and remove cuttings	3 years (or as required)
Remedial Actions	Repair of erosion or other damage by re-seeding or re-turfing	As Required
	Repair / Rehabilitation of outlet	As Required
	Re-level uneven surfaces and reinstate design levels	As Required
Monitoring	Inspect outlet for blockages and arrange clearance if required	Monthly / after large storm event
	Inspect bank sides, structures, pipework etc for evidence of physical damage	Monthly / after large storm event
	Inspect facility surface for silt accumulation and establish appropriate silt removal frequencies	Half Yearly
	Check flow control device and arrange clearance/maintenance if required	Monthly / after large storm event

Suggested Maintenance requirements based on Table 16.1 CIRIA C697 ' The SuDS Manual'

Commuted Sums for Maintaining Infrastructure Assets in Association with Section 278 and Section 38 Highway Agreements

1.0 Introduction

1.1 The aim of this chapter is to offer a transparent and consistent approach to commuted sums levied where new highway infrastructure is being adopted by North Yorkshire County Council (NYCC) as Local Highway Authority (LHA). This should reduce uncertainty and risk for developers so that they can consider commuted sum requirements at an early stage in the development process. This chapter is a working document that will be subject to periodic review.

1.2 Historically there has been considerable variation in approach by local highway authorities to the collection and use of commuted sums, and recognising this, the Association of Directors of Environment, Economy, Planning & Transport's (ADEPT) published guidance documentation which has been widely adopted by local highway authorities and has been broadly accepted as the national standard procedures and principles for the assessment and collection of commuted sums.

1.3 North Yorkshire County Council's approach to commuted sums will be closely aligned to ADEPT's 'accepted national standard,' but further recognises the benefits to all parties of introducing local guidance which forms the catalyst for this document.

1.4 The legal definition for the term 'Commuted Sum' in relation to the adoption of new infrastructure is:

"A payment of a capital sum by an individual, authority or company to the highway authority, local authority or other body, as a contribution towards the future maintenance of the asset to be adopted or transferred."

1.5 This guidance sets out a best practice approach for the application of commuted sums including understanding 'whole life costs' to ensure undue burdens are not placed on maintenance budgets and the public purse. However, it stresses that commuted sums should be applied in a reasonable manner that does not stifle innovation and is fair to all parties.

1.6 In the main, a commuted sum is expected to relate to a payment by a developer to the highway authority as a contribution towards the future capital maintenance of 'non-standard' and 'extra-over' features of that development.

1.7 The payment of a commuted sum discharges the responsibility of a developer of any obligations to the future maintenance of that asset following the issue of the final completion certificate (adoption). The obligation and associated risks upon adoption then lie with the highway authority to maintain the asset.

2.0 Background

2.1 The County Council, as the Local Highway Authority, has a statutory responsibility for the maintenance and management of adopted highways in North Yorkshire. This duty extends beyond the surface and includes the structure and fabric of the highway. Highway assets would typically consist of carriageways, footways, drainage systems, traffic signals, bridges, culverts, ditches, walls, fences, gates, landscaping and lighting systems and all objects legitimately located in or on the highway with the permission of the Highway Authority, and by accepting these assets, a further financial burden is placed upon the authority for their management and upkeep.

2.2 The rationale for seeking commuted sums is to ensure that highway authorities have sufficient financial resources to fund the future maintenance, associated works and, where appropriate, replacement of these additional assets, for which any funding received from Government through the Revenue Support Grant is insufficient.

2.3 Regardless of the potential offer of a commuted sum payment, the highway authority will retain discretion as to what it is prepared to adopt, particularly where a proposal may not be acceptable in principle, for example on the grounds of highway safety, or where it would be inappropriate for it to do so (e.g. street art, play areas) or where materials are considered to be of an unacceptable or inappropriate specification.

3.0 Legal Status

3.1 For highway infrastructure, the statutory authority for commuted sum payments comes from Sections 38 and 278 of The Highways Act 1980, with both section of the Act containing enabling powers for authorities to secure contributions (commuted sums) from third parties for the future maintenance of highway assets.

3.2 Section 38 applies to new roads constructed on private land which the developer, upon completion, wishes to be adopted by the highway authority as highway maintainable at the public expense, and;

3.3 Section 278 Agreements provide developers with a mechanism to either fund works, or undertake works themselves, to the existing public highway. The works are often termed 'off site works' as they are usually separate from the developer's site and the works are necessary to provide improved access to, or mitigate the effects of, the new development.

3.4 A court of appeal decision known as "the Redrow case", confirms that it is appropriate for authorities to use these powers to seek commuted sums for all elements of future highway maintenance after adoption.

4.0 Scope for Applying Commuted Sums

4.1 This guidance is equally applicable to both Section 278 and Section 38 agreements, albeit, as detailed above, they are different situations, and as far as possible, all assets will be treated on the same basis for commuted sum calculation purposes, with North Yorkshire County Council as the Local Highway Authority entering into multiple S278/38 Agreements each year with developers.

4.2 The LHA has taken the approach that commuted sums will generally be sought for all 'non-standard' assets, 'extra over areas' and 'extra over (bespoke) cost items' that place additional burdens on maintenance budgets where there are no other sources of funding available to cover on-going maintenance. For example, the Revenue Support Grant system which local highway authorities rely upon for their highway maintenance budgets recognises increased highway length within the overall grant allocation and that, as such, commuted sums for 'standard' network adoptions are not appropriate.

4.3 All new works that do not entail the creation of a new length of road and/or footway or cycleway, carried out as part of a Section 278 Agreement, are appropriate for the application of commuted sums.

5.0 Identifying Infrastructure Assets subject to Commuted Sum payments

5.1 The purpose of this guidance is to set out which assets are defined as 'standard' and, as such, would not attract commuted sums and which assets would be classed as 'non-standard' and would attract commuted sum payment for future maintenance.

6.0 'Standard' Construction Assets (not liable for commuted sum payments)

6.1 The following table defines a list of 'standard' construction assets. These assets will not attract a commuted sum payment where they are in compliance with the LHA's standard highway construction details, and form part of a standard new length of road which the authorities Revenue Support Grant would typically cover.

Category	**Asset**
Carriageway Surfacing	• Hot Rolled Asphalt (non-pigmented binder and non-colour aggregates) • Close graded macadam • Asphalt Concrete • Thin Coat Surfacing • Concrete Block Paving – standard colours of Red, Charcoal, Brindle and 200mmx100mx80mm
Carriageway Ancillaries	• Pre cast concrete Kerbs • Granite Kerbs • Granite setts for demarcation of highway boundary • PCC Channels • Road Markings • Road studs
Footways, Cycleway & Paved Areas (including PROW)	• Hot Rolled Asphalt (non-pigmented binder and non-colour aggregates) • Close graded macadam • Asphalt Concrete • Concrete Block Paving– standard colours of Red, Charcoal, Brindle and 200mmx100mx80mm • Modular Paving • Tactile Paving
Footway Ancillaries	• Vehicle Crossovers • Tactile Paving • PCC Edgings • Timber Edgings • Markings • Bollards – NYCC Standard Specification
Fences & Barriers	• Steel Safety barriers • Standard Galvanised Pedestrian Guardrail
Street Lighting	• Standard Street Lighting as per NYCC's Street Lighting Specification.
Traffic / Pedestrian Management	• Non/Illuminated Traffic Signs • Non/Illuminated Pedestrian Signs • Non/Illuminated Bollards • Non/Illuminated Beacons • Passively safe sign posts (for road safety)
Drainage	• Gullies • Catchpits

	• Pipework less than 500mm dia
Verges / Landscaping	• Grass Verge – Required for highway purposes

7.0 Non-Standard Construction Assets (liable for commuted sum payments)

7.1 Commuted sums for future maintenance would generally be sought when satisfying the five broad situations as summarised below. This is not an exhaustive detailed list, but is intended to illustrate the basic principles.

7.1.1 Alterations to the existing highway to form an access to a development that would not have been required should the development not take place. Usually these comprise the construction of roundabouts, traffic signal controlled junctions and standard priority junctions often requiring additional street lighting, signage, road markings, highway drainage, safety fencing, landscaping, additional carriageway and footway construction over and above areas of existing highway, often in the form of dedicated turn lanes and increased lane widths.

7.1.2 'Additional' areas of carriageway, footway, landscaping etc. over and above the minimum requirements required, in the opinion of the highway authority, for the safe functioning and operation of the highway:

- *Examples can include additional areas of carriageway, such as a square surrounding a turning head or additional grassed areas not required for highway purposes to the rear of a visibility splay, the installation of Traffic Calming measures, carriageway widening to accommodate on-street parking facilities, new trees/shrubs.*

7.1.3 'Extra over' cost items such as:

- *Any street furniture not required for road safety purposes (as would normally be the situation on residential streets.)*
- *Proprietary or coloured surfacing materials not required for highway safety purposes but specified for aesthetic reasons only such as coloured high friction surfacing*
- *Any culvert, bridge, retaining wall or other structure*
- *Special features such as noise fencing, vehicle restraint barriers, pedestrian guard railing, fences, gates, traffic signals, traffic calming, safety fencing, bus shelters, intelligent warning signs or traffic systems etc.*
- *Landscaping features such as planting, trees, root protection systems, hedging, etc.*

7.1.4 Permitted alternative materials or equipment to those specified in the definition of standard construction such as:

- *The installation of specialist or 'non-standard' equipment (e.g. street lighting equipment) that is not of the authority's standard type, and/or such items as decorative luminaires, or columns with embellishments applied etc.*
- *The additional columns (and equipment) from the provision of street lighting to a standard above that which is normally provided by the authority (and indicated in its lighting policy).*

- *The use of any materials (e.g. surfacing materials), which whilst being approved will result in maintenance or replacement costs over and above the authority's 'standard' highway construction.*

- *Any other 'non-standard' construction types or materials.*

7.1.5 Sustainable Drainage Systems (SuDS) or non-standard highway drainage features such as:

- *Flow control devices and attenuation storage*
- *Sustainable drainage systems (SuDS) including maintenance of any landscaping*
- *Oil or petrol interceptors including the disposal of contaminated waste*
- *Pumping stations and their energy charges*
- *Watercourses and swales*
- *Combined kerb drainage units*
- *The utilisation of existing highway infrastructure by the proposed development, an example being the discharge of highway surface water runoff into an existing highway drain or culvert*

7.2 When proposing SUDS the developer must hold early discussions with all relevant parties (and certainly before any planning application) to agree ownership and responsibility for the infrastructure proposed.

7.3 With the national trend towards innovation, and higher quality design the highway authority are flexible in their approach to asset specification and may reduce, or waive, any commuted sums requirements if it can be proven, or experience has shown, that the specified asset will not present an undue maintenance burden when compared to the 'standard' highway assets defined in section 6.0 above.

7.4 The designer is encouraged to consider minimising the future maintenance liability of the asset as part of the design process. This could include enhanced construction (i.e. to reduce any maintenance requirements) or for the provision of higher quality materials, which could then offset all or part of the need for any commuted sum requirement.

7.5 The table below features a list of 'non-standard' assets that would attract a commuted sum payment for their future maintenance. The list is not exhaustive, but is based on the type of assets that most frequently come forward for adoption in association with S278/38 Agreements.

Category	Asset
Carriageway Surfacing	• High Friction Surfacing • Pigmented / Decorative Surfacing • Granite sett / Block paving to overrun Areas • Non-standard blockwork
Footways, Cycleway & Paved Areas (including PROW)	• Pigmented / Decorative Surfacing • Non-standard blockwork
Fences & Barriers	• Acoustic Fences • Non-standard pedestrian guardrails
Street Lighting	• Street Lighting not compliant with as NYCC's Street Lighting Specification.
Drainage	• Underground storage incl. oversized pipes, cellular storage and/or in-situ storage tanks, petrol interceptors) • Above ground storage incl. (swales, ditches, rainwater gardens, dry and wet ponds) • Precast Concrete Ring Soakaways / Trench Soakaways • Weirs, Flow Control Devices, Hydro-brakes / Flow Control (vortex) Chambers • Filter Strips / Filter Drains • Slot Drains / Aco Drains • Combined Kerb Drainage Systems (beanie blocks) • Concrete Bagwork Headwalls (Precast units will not be subject to a Commuted Sum) • Permeable Paving (if subject to adoption agreement) • Petrol Interceptors • Oversized Pipes >500mm
Traffic Signals	• Signal Controlled Junctions • Signal Controlled Crossings
Traffic / Pedestrian Management	• Gateway Signs • Speed Cushions • Chicanes • Wig Wag Signs • Vehicle Activated Signs
Highway Structures	• Bridge, buried structure, subway, underpass, culvert and any other structure supporting the highway with a clear span or internal span or internal diameter of 0.9m or greater. • Retaining wall (including pipe headwalls) with a retained height of greater than 1.0m.
Verges / Landscaping / Street Furniture	• Trees • Root Protection Systems • Soft Landscaping • Hedges

	• Seats/Benches • Planters • Grassed verges - not required for highway purposes
Other	• Real Time Bus Information • Bus Shelters • Automated Rising Bollard Systems • EV Charging Systems • Wildlife Accessories – i.e. Wildlife Kerbs, Newt Ladders, Tunnels.

7.6 It is acknowledged that many of the current problems experienced by developers in respect of commuted sums, and other procedures, are as a result of inadequate knowledge of the highway authority's requirements, leading to the potential burden of costs at a very late stage in the design process.

7.7 North Yorkshire County Council actively encourage developers to establish an early dialogue with the Council's Development Management Engineer or Area Highways Office Engineer who is/will be dealing with the Planning Application at the earliest possible stage in the process and should preferably be before a planning application is submitted.

7.8 Whilst the application of commuted sums will relate to the final scheme design and that design may not be decided on until after land has been purchased, early dialogue can remove many uncertainties. Continuous dialogue throughout the design process ensures that, as the scheme evolves, the financial implications are clearly understood.

8.0 Payment Triggers

8.1 Where commuted sums are required, they will be calculated provisionally at the detailed design stage of Section 278/38 Agreements being calculated. The sums will be identified and included in the draft legal agreements that are circulated following technical approval.

8.2 The legal Agreement will include conditions requiring the payment of commuted sums and specify when such payments will need to be made. However, as it is unlikely that the full cost implications of the site will be known by the authority at the time that the legal Agreement is entered into, the amounts specified may be 'provisional'.

8.3 The Agreement will therefore contain provision for recalculating the 'provisional' commuted sums based on the final infrastructure design, actual quantities, revised time periods to maintenance operations if appropriate, and a price fluctuation factor to adjust current costs and maintenance operations specified in the Agreement.

8.4 The time period between the Agreement and completion of the development can be quite long. As such, recalculation of the sum calculated at the time of the Agreement will be necessary to arrive at the commuted sum payable prior to the issue of the Final Certificate of Adoption.

8.5 For Section 278 Agreements (works within existing highway) the Commuted Sum is required prior to works commencing. For Section 38 Agreements (works on private land) the Commuted Sum is required prior to adoption.

8.6 To secure the provision of commuted sums in default, they should be included in the Bond required under the Agreement, unless payment is made prior to engrossment. This should be based on the 'provisional' commuted sums calculated when the Agreement is completed, and the security will be released following satisfactory completion of the maintenance period and payment of the actual commuted sum due.

8.7 Appendix 'A' of this guidance document contains S38/278 Commuted Sum example agreement clauses.

9.0 Methodology for Calculation of Commuted Sums

9.1 The commuted sum paid needs to be discounted to allow for the fact that it will be earning interest that will make up part of the maintenance payment when it is required. It is, therefore, necessary to determine the Net Present Value (NPV) of a future expense. The following formula is used to calculate the maintenance obligation:

Net Present Value (NPV) = Mp/(1+D/100)T

Commuted Sum = summation of all Net Present Values for appropriate future costs.

Maintenance Cost (Mp) = Estimated future maintenance cost T years from now

The maintenance regime applied to the asset are generally based on a 'whole life costing' approach with the frequency of inspection, treatment, and/or the intervals of replacement, based on planned frequencies or historic information. It may also be appropriate to add an agreed percentage to the works costs to cover the highway authority design and supervision costs.

Therefore, the associated activities/functions that may be included in the calculation of commuted sums are as follows:

- Inspections and surveys
- Routine and cyclic maintenance
- Winter maintenance
- Energy charges
- Design and supervision fees
- Asset replacement

The maintenance unit costs are based on term maintenance contract rates and staff hourly rates as the time of calculation.

Periodic Discount Rate (D) (effective annual interest rate) (2.2%)

The County Council uses the discount rate (effective annual interest rate) of 2.2%, which is recommended in the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) guidance document.

This is worked out as follows:

D = ((1.045 / 1.0225) – 1) x 100 = 2.2%

Where: 1.045 is the interest rate (4.5% based on long-term neutral base rate (LTNBR)) and 1.0225 is the inflation rate (2.25% based on RPI-X rate (published monthly by the office of National Statistics) that is RPI excluding mortgage payments).

The formula ensures that both the interest earned on the commuted sum, and the effect of inflation in increasing the cash sums eventually required, are taken into account.

Time Period (T) = Time period before expenditure will be incurred or cyclical period (years)

The period of 60 years is conventionally used as the life of housing and highway assets. A figure of 60 years represents a reasonable compromise between covering future costs and the uncertainties over how far into the future the assets will be required.

Therefore, 60 years has been adopted as the time period for all assets apart from traffic signals and highway structures. The latter will be calculated using 120 years as recommended by the Bridge Management Code produced by the ADEPT. A Whole Life Costing period of 30 years will be applied to traffic signal infrastructure, as it is difficult to predict the use of technology over a longer period and the potential for signals to be superseded by the likes of autonomous vehicles.

10.0 Example Calculation:

10.1 For a sum deposited in respect to a future maintenance activity, interest will be accrued up until the activity must be carried out, although over the same period inflation will tend to reduce the value of the deposit. This effect is taken into account by the use of the Periodic Discounted Rate, which represents the effective interest rate.

10.2 The calculation is based on the conversion of future expenditure, (the cost of which is known at today's prices), being converted into a Net Present Value (NPV). This is the sum, which if deposited today and invested at the Periodic Discounted Rate, would provide the sum required for the activity to be undertaken when it becomes due in 'T' years.

Worked Example - considering the costs for a typical 'Asset':

The commuted sum must include for the inspection, cleaning and replacement of that 'Asset' every 10 years.

The cost of undertaking the inspection, cleaning and replacement of the 'Asset' requires labour, materials and plant, the cost of which has been determined to be £850 at current rates. The activity will be required in 10, 20 and 30 years' time.

Using the formula:

NPV factor = Σ 1 / (1 + D / 100) ^{T} where D is the Periodic Discounted Rate calculated at 2.2% as outlined above.

NPV factor $= 1 / (1 + D / 100)^{10} + 1 / (1 + D / 100)^{20} + 1 / (1 + D / 100)^{30}$

$= 1 / (1 + 2.2/100)^{10} + 1 / (1 + 2.2/100)^{20} + 1 / (1 + 2.2/100)^{30}$

= 0.80444 + 0.64712 + 0.52056

= 1.97211

Commuted sum for Asset = Current Cost x NPV factor
= £850.00 x 1.97211
= £1,676.30

Commuted sums are rounded to the nearest pound and therefore the commuted sum required would be £1,676. For ease of manual calculation, NPV factors for various periods are listed in Appendix B

A typical commuted sum expenditure example based on the above 'Asset' example scenario is shown in Appendix C

The list in Appendix D reflects highway assets which attract commuted sums and may be reviewed from time to time including the amount which is based on the LTNRB and RPI-X interest rates published by the Office of National Statistics.

The commuted sums based upon term maintenance contract tender rates are reviewed on a regular basis and updated accordingly.

APPENDIX - A

Typical References to Commuted Sums in agreements under Section 38 and 278 Highways Act 1980

Section 278 Clauses

Definitions

Commuted Sum(s)"	means the sum to be paid by the Developer to the County Council for the future maintenance of an asset which will be adopted by the Council

Financial Provisions

Pay to the County Council the [Asset Description] Commuted Sum prior to the date on which the [Asset Description] forming part of the Highway Works are commissioned by the County Council and become operative or within 7 days of the issue of the Certificate of Completion, if earlier.

Pay to the County Council within 7 days of receipt of a demand in writing from the County Council its reasonable and proper costs for maintenance of the [Asset Description] forming part of the Highway Works for the period commencing on the date on which the [Asset Description] are commissioned by the County Council to the date immediately prior to the date on which the Final Certificate for the Highway Works is issued

Pay the Commuted Sum(s) to the County Council prior to [insert timing provision] and not to permit cause or allow [insert timing provision] unless and until the Commuted Sum has been paid to the County Council

Section 38 Clauses

Definitions

"Commuted Sum(s)"	means the sum of POUNDS (£) being the amount which the Developer has agreed to contribute towards the costs likely to be incurred by the Council following adoption of the road or roads for the maintenance of the (item in question)

Developer's Liability

"THE Developer shall pay the Commuted Sum to the Council on the date hereof" (hereof being the date the s.38 is signed although sometimes payment has been required on issue of Final Certificate)

Alternatively, we will add a Clause and Schedule, example as follows:

(Clause No.) Commuted Sum:

On the date hereof the developer shall pay to the Council the sum specified in the second column of Part 3 of the Schedule in respect of the future maintenance of the corresponding item described in the first column of Part 3 of the Schedule

Part 3

Item	Commuted Sum
Commuted Sum Description of the highway elements attracting the commuted sum	£(Value)

APPENDIX – B

NET PRESENT VALUE FACTORS

FORMULA = NPV Factor = Sum 1/ $(1+D\%)^T$	LTNBR = 4.5% RPI-X = 2.25% There Periodic Discount Rate (D) = 2.20% And (1+D%) = 1.0220	Table 1 shall be applied to Traffic Signal Assets Table 2 shall be applied to all other Highway Assets Table 3 shall be applied to Highway Structures

Table 1 – NPV Factors for 30 Years (Applied to Traffic Signal / Technology Assets) & with agreement (Smaller Sites) — **NPV Factors for £1.00 expenditure at various intervals within a 30 Year period**

Interval	Every Year	Every 2 Years	Every 3 Years	Every 4 Years	Every 5 Years	Every 6 Years	Every 10 Years	Every 15 Years	Every 20 Years	Every 25 Years	Every 30 Years	Twice per Year	4 Times per Year	6 Times per Year	12 Times per Year
NPV Factor $1 / (1+D\%)^T$	21.79260	10.77774	7.10671	4.24683	4.17092	3.43740	1.97211	1.24206	0.64712	0.58040	0.52056	43.58520	87.17040	130.75560	261.51120

Table 2 – NPV Factors for 60 Years – (Applies to most Infrastructure Assets) — **NPV Factors for £1.00 expenditure at various intervals within a 60 Year period**

Interval	Every Year	Every 2 Years	Every 3 Years	Every 4 Years	Every 5 Years	Every 6 Years	Every 10 Years	Every 15 Years	Every 20 Years	Every 30 Years	Every 60 Years	Twice per Year	4 Times per Year	6 Times per Year	12 Times per Year
NPV Factor $1 / (1+D\%)^T$	33.3455	16.57194	10.80608	8.11761	6.52581	5.22677	2.99871	1.88862	1.33686	0.791545	0.27098	66.6910	133.382	200.073	400.146

Table 3 – NPV Factors for 120 Years (Applies to Bridges and Structures) — **NPV Factors for £1.00 expenditure at various intervals within a 120 Year period**

Interval	Every Year	Every 2 Years	Every 3 Years	Every 4 Years	Every 5 Years	Every 6 Years	Every 10 Years	Every 15 Years	Every 20 Years	Every 25 Years	Every 30 Years	Every 60 Years	Every 120 Years	2 Times per Year	4 Times per Year
NPV Factor $1 / (1+D\%)^T$	41.60823	20.82921	13.73452	10.18801	8.06077	6.64317	3.81133	2.40043	1.69913	1.22626	1.00605	0.34442	0.07343	166.43291	332.86582

APPENDIX – C

Example of Commuted Sum Expenditure

As shown in the example 'Asset' calculation given in Section 10.0:

Expenditure of £850 every 10 years

RPI-X = 2.25% (Inflation Rate)

LTNBR = 4.50% (Interest Rate)

NPV Factor = 1.97211

Commuted Sum for 30 years = £850.00 x 1.97211 = £1,676.30 or £1,676 to the nearest pound

Effect of Inflation on Maintenance Cost (RPI-X)

Years	Cost	RPIX (%)	Increase In Maint Cost	Cost of Maintenance
1	850.00	2.25	19.13	
2	869.13	2.25	19.56	
3	888.68	2.25	20.00	
4	908.68	2.25	20.45	
5	929.12	2.25	20.91	
6	950.03	2.25	21.38	
7	971.40	2.25	21.86	
8	993.26	2.25	22.35	
9	1015.61	2.25	22.85	
10	1038.46	2.25	23.37	1061.82
11	1061.82	2.25	23.89	
12	1085.71	2.25	24.43	
13	1110.14	2.25	24.98	
14	1135.12	2.25	25.54	
15	1160.66	2.25	26.11	
16	1186.78	2.25	26.70	
17	1213.48	2.25	27.30	
18	1240.78	2.25	27.92	
19	1268.70	2.25	28.55	
20	1297.24	2.25	29.19	1326.43
21	1326.43	2.25	29.84	
22	1356.28	2.25	30.52	
23	1386.79	2.25	31.20	
24	1418.00	2.25	31.90	
25	1449.90	2.25	32.62	
26	1482.52	2.25	33.36	
27	1515.88	2.25	34.11	
28	1549.99	2.25	34.87	
29	1584.86	2.25	35.66	
30	1620.52	2.25	36.46	1656.98

Interest earned on Deposited Sum (LTNBR)

Years	Deposited Sum	LTNB (%)	Interest	Deposited Sum plus interest	Expenditure	Deposited Sum + Interest Expenditure
1	1676.00	4.50	75.42	1751.42		1751.42
2	1751.42	4.50	78.81	1830.23		1830.23
3	1830.23	4.50	82.36	1912.59		1912.59
4	1912.59	4.50	86.07	1998.66		1998.66
5	1998.66	4.50	89.94	2088.60		2088.60
6	2088.60	4.50	93.99	2182.59		2182.59
7	2182.59	4.50	98.22	2280.80		2280.80
8	2280.80	4.50	102.64	2383.44		2383.44
9	2383.44	4.50	107.25	2490.70		2490.70
10	2490.70	4.50	112.08	2602.78	1061.82	1540.95
11	1540.95	4.50	69.34	1610.30		1610.30
12	1610.30	4.50	72.46	1682.76		1682.76
13	1682.76	4.50	75.72	1758.48		1758.48
14	1758.48	4.50	79.13	1837.62		1837.62
15	1837.62	4.50	82.69	1920.31		1929.31
16	1920.31	4.50	86.41	2006.72		2006.72
17	2006.72	4.50	90.30	2097.03		2097.03
18	2097.03	4.50	94.37	2191.03		2191.39
19	2191.39	4.50	98.61	2290.00		2290.00
20	2290.00	4.50	103.05	2393.05	1326.43	1066.62
21	1066.62	4.50	48.00	1114.62		1114.62
22	1114.62	4.50	50.16	1164.78		1164.78
23	1164.78	4.50	52.41	1217.19		1217.19
24	1217.19	4.50	54.77	1271.19		1271.97
25	1271.97	4.50	57.24	1329.20		1329.20
26	1329.20	4.50	59.81	1389.20		1389.02
27	1389.02	4.50	62.51	1451.52		1451.52
28	1451.52	4.50	65.32	1516.84		1516.84
29	1516.84	4.50	68.26	1585.10		1585.10
30	1585.10	4.50	71.33	1656.43	1656.90	-0.55

The above table shows that the commuted sum invested and earning interest at the LTNBR rate will be sufficient to cover maintenance costs, which will increase annually at the RPI-X rate, over a period of 30 years.

APPENDIX – D

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Traffic Signals

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 30 Years	Total Commuted Sum – 30 Years	Comments
1	**Traffic Signal Junction – (Typical of a 4-Arm Crossroads)**	Pole and Sockets	8	No.	1 every 15 years	1.24206	£600.00	£5,961.89	**£212,914.62**	To be recalculated on a site specific basis to take into consideration the number of posts and traffic signal heads etc.
		Power Supply Pillar	1	Item	1 every 30 years	0.52056	£300.00	£156.17		
		Controller / Monitoring	1	Item	1 every 15 years	1.24206	£7,000.00	£8,694.42		
		Signal Heads /Detection	8	No.	1 every 15 years	1.24206	£1,200.00	£11,923.78		
		Low voltage MVD	4	No.	1 every 15 years	1.24206	£250.00	£1,242.06		
		Stop line detector	4	No.	1 every 15 years	1.24206	£700.00	£3,477.77		
		Cabling	700	Metres	1 every 15 years	1.24206	£6.00	£5,216.65		
		Specialist Signals Operative Labour with van & equipment	250	Hours	1 every 15 years	1.24206	£95.00	£29,498.93		
		2x Civils operatives with van & equipment	140	Hours	1 every 30 years	0.52056	£100.00	£7,287.84		
		Chambers	12	No.	1 every 30 years	0.52056	£750.00	£4,685.04		
		Supply and Install pole retention socket	8	No.	1 every 30 years	0.52056	£750.00	£3,123.36		
		Ducting in footway & Reinstatement	150	Metres	1 every 30 years	0.52056	£200.00	£15,616.80		
		Ducting in carriageway & Reinstatement	50	Metres	1 every 30 years	0.52056	£700.00	£18,219.60		
		Tactile Paving & Edging	400	No.	1 every 30 years	0.52056	£100.00	£20,822.40		
		Road crossing studs	100	No.	1 every 30 years	0.52056	£20.00	£1,041.12		
		Maintenance & Testing	1	Item	1 every 1 year	21.7926	£1,200.00	£26,151.12		
		NYCC Traffic Signals Engineer refurbishment design and supervision	150	Hours	1 every 15 years	1.24206	£64.00	£11,923.78		
		Communications	1	Item	1 every 1 year	21.7926	£80.00	£1,743.41		
		Electricity cost	1	Item	1 every 1 year	21.7926	£1,300.00	£28,330.38		
		Decommission	1	Item	1 every 15 years	1.24206	£6,000.00	£7,452.36		

		Refresh road markings	1	Item	1 every 5 years	4.17092	£800.00	£3,336.74		

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Traffic Signals

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 30 Years	Total Commuted Sum – 30 Years	Comments
2	**Puffin Crossing**	Pole & Sockets	4	No.	1 every 15 years	1.24206	£600.00	£2,980.94	**£108,497.84**	To be recalculated on a site specific basis to take into consideration the number of posts and traffic signal heads etc.
		Power Supply Pillar	1	No.	1 every 30 years	0.52056	£300.00	£156.17		
		Controller / Monitoring	1	No.	1 every 15 years	1.24206	£5,000.00	£6,210.30		
		Signal Heads / Detection Equipment	6	No.	1 every 15 years	1.24206	£1,200.00	£8,942.83		
		Tactile indicator / Demand Units / Audible Units / Detectors	2	No.	1 every 15 years	1.24206	£1,000.00	£2,484.12		
		Low voltage MVD	2	No.	1 every 15 years	1.24206	£250.00	£621.03		
		Cabling	200	Metres	1 every 15 years	1.24206	£6.00	£1,490.47		
		Specialist Signals Operative Labour + Van and Equipment	40	Hours	1 every 15 years	1.24206	£95.00	£4,719.83		
		2 Civils operatives with van & equipment	60	Hours	1 every 30 years	0.52056	£100.00	£3,123.36		
		Chamber	3	No.	1 every 30 years	0.52056	£750.00	£1,171.26		
		Supply and Install pole retention socket	4	No.	1 every 30 years	0.52056	£750.00	£1,561.68		
		Ducting in footway & Reinstatement	50	Metres	1 every 30 years	0.52056	£200.00	£5,205.60		
		Ducting in carriageway & Reinstatement	10	Metres	1 every 30 years	0.52056	£700.00	£3,643.92		
		Tactile Paving & Edging	100	No.	1 every 30 years	0.52056	£100.00	£5,205.60		
		Road crossing studs	25	No.	1 every 30 years	0.52056	£20.00	£260.28		
		Maintenance & Testing	1	Item	1 every 1 year	21.7926	£1,200.00	£26,151.12		

		NYCC Traffic Signals Engineer refurbishment design and supervision	75	Hours	1 every 15 years	1.24206	£64.00	£5,961.89		
		Communications	1	Item	1 every 1 year	21.7926	£80.00	£1,743.41		
		Electricity cost	1	Item	1 every 1 year	21.7926	£880.00	£19,177.49		
		Decommission	1	Item	1 every 15 years	1.24206	£3,500	£4,347.21		
		Refresh road markings	1	Item	1 every 5 years	4.17092	£800.00	£3,336.74		

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Traffic Signals

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 30 Years	Total Commuted Sum – 30 Years	Comments
3	**Toucan Crossing**	Pole & Sockets	4	No.	1 every 15 years	1.24206	£600.00	£2,980.94	**£108,497.84**	To be recalculated on a site specific basis to take into consideration the number of posts and traffic signal heads etc.
		Power Supply Pillar	1	No.	1 every 30 years	0.52056	£300.00	£156.17		
		Controller & Monitoring	1	No.	1 every 15 years	1.24206	£5,000.00	£6,210.30		
		Signals Head / Detection Equipment	6	No.	1 every 15 years	1.24206	1,200.00	£8,942.83		
		Tactile indicator / Demand Units / Audible Units / Detectors	2	No.	1 every 15 years	1.24206	£1,000.00	£2,484.12		
		Low voltage MVD	2	No.	1 every 15 years	1.24206	£250.00	£621.03		
		Cabling	200	Metres	1 every 15 years	1.24206	£6.00	£1,490.47		
		Specialist Signals Operative Labour + Van and Equipment	40	Hours	1 every 15 years	1.24206	£95.00	£4,719.83		
		2 Civils operatives with van & equipment	60	Hours	1 every 30 years	0.52056	£100.00	£3,123.36		
		Chamber	3	No.	1 every 30 years	0.52056	£750.00	£1,171.26		
		Supply and Install pole retention socket	4	No.	1 every 30 years	0.52056	£750.00	£1,561.68		
		Ducting in footway & Reinstatement	50	Metres	1 every 30 years	0.52056	£200.00	£5,205.60		
		Ducting in carriageway & Reinstatement	10	Metres	1 every 30 years	0.52056	£700.00	£3,643.92		
		Tactiles and Edging	100	No.	1 every 30 years	0.52056	£100.00	£5,205.60		

		Road crossing studs	25	No.	1 every 30 years	0.52056	£20.00	£260.28		
		Maintenance & Testing	1	Item	1 every 1 year	21.79260	£1,200.00	£26,151.12		
		NYCC Traffic Signals Engineer refurbishment design and supervision	75	Hours	1 every 15 years	1.24206	£64.00	£5,961.89		
		Communications	1	Item	1 every 1 year	21.79260	£80.00	£1,743.41		
		Electricity cost	1	Item	1 every 1 year	21.79260	£880.00	£19,177.49		
		Decommission	1	Item	1 every 15 years	1.24206	£3,500.00	£4,347.21		
		Refresh road markings	1	Item	1 every 5 years	4.17092	£800.00	£3,336.74		

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Traffic Signals

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 60 Years	Total Commuted Sum – 60 Years	Comments
4	**Pedestrian Crossing (Zebra)**	LED Flasher Unit	2	No	1 every 10 years	2.99871	£50.00	£299.87	**£4,452.24**	
		Globe	2	No	1 every 10 years	2.99871	£100.00	£599.74		
		Posts	2	No	1 every 20 years	1.33686	£350.00	£935.80		
		Refresh Road Markings / Studs		Item	1 every 10 years	2.99871	£500.00	£1,499.35		
		Inspection / Testing		Item	1 every 6 years	5.22677	£150.00	£784.02		
		Electricity Usage		Item	1 every 1 year	33.3455	£10.00	£333.46		

Structures

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 120 Years	Total Commuted Sum – 120 Years	Comments
5	**Road Bridge (Site by Site basis)**	Inspection		Item	1 every 2 years	20.82921	£250.00	£5,207.30	**£76,019.75**	Costs to be determined on an individual scheme basis. Figures
		Bearnings		Item	1 every 60 years	0.34442	£25,000	£8,610.50		
		Expansion Joints		Item	1 every 20 years	1.69913	£15,000	£25,486.95		
		Replacement		Item	1 every 120 years	0.07343	£500,000	£36,715.00		
6	**Footbridges**	Inspection		Item	1 every 2 years	20.82921	£250.00	£5,207.30		

		Replacement		Item	1 every 120 years	0.07343	£100,000	£7,343.00	**£12,550.30**	given are guidance only
7	**Retaining Structure / Wall**	Inspection		Item	1 every 2 years	20.82921	£250.00	£5,207.30	**£8,144.50**	
		Replacement		Item	1 every 120 years	0.07343	£40,000	£2,937.20		

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Drainage

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 60 Years	Total Commuted Sum – 60 Years	Comments
8	**Culverted Watercourse**	Inspection / Desilting / Cleaning per metre	1	lin. m.	1 every 5 years	6.52581	£10.00	£65.26	**£65.26** per metre	
9	**Combined Kerb / Drainage Units (Beaney Blocks) Slot-Drains / ACO Drains**	Inspection / Desilting / Cleansing per meter	1	lin. m.	1 every 5 years	6.52581	£10.00	£65.26	**£65.26** per meter	
10	**Drainage Gully**	Inspection / Cleansing	1	No	1 every 1 year	33.3455	£6.00	£200.07	**£200.07** per gully	
11	**Drainage Ditch**	Inspection / Desilting / Cleaning per meter	1	lin.m.	1 every 5 years	6.52581	£35.00	£228.40	**£236.69** base cost of 1sq.m & 1 lin.m	
		Grass Cutting per Sq.m	1	Sq.m.	1 every 2 years	16.57194	£0.50	£8.29		
12	**Soakaways**	Inspection / Desilting / Cleansing per Sq.m	1	Sq.m.	1 every 5 years	6.52581	£3.00	£19.57	**£19.57** per Sq.metre	Based upon gross impermeable area draining to the soakaway.
13	**Oil Separator**	Inspection		Item	1 every 1 year	33.3455	£900.00	£30,010.95	**£30,010.95** + tank cubic meterage	
		Desilting / Cleansing		Cub. m.	1 every 5 years	6.52581	£6.00	£39.15		
14	**Attenuation Tanks**	Inspection		Item	1 every 5 years	6.52581	£900.00	£5,873.23	**£19,681.95** base	

		Desilting / Cleansing		Sq.m	1 every 5 years	6.52581	£3.00	£19.57	cost per tank – figure will increase per square meter of impermeable area draining to the tank	
		Structural Inspection		Item	1 every 10 years	2.99871	£1,500	£4,498.07		
		Flow Control Inspection		Item	1 every 2 years	16.57194	£150.00	£2,485.79		
		Flow Control Maintenance		Item	1 every 5 years	6.52581	£500.00	£3,262.91		
		Flow Control Replacement		Item	1 every 30 years	0.791545	£4,500	£3,561.95		
15	**Attenuation Ponds**	Inspection		Item	2 every 1 years	66.6910	£150.00	£10,003.65	**£70,302.67** base cost only per Pond – figure will increase per Sq.m	Based on CIRIA Report C597 Guidance, with items omitted if not applicable. Large areas of grasscutting may require commuted sum to be worked out over a 120 year period.
		Clear Inlet / Outlet		Item	2 every 1 years	66.6910	£150.00	£10,003.65		
		Litterpicking per Sq.m	1	Sq.m	6 every 1 year	200.073	£0.01	£2.00		
		Grass Cutting / Strimming per Sq.m	1	Sq.m	6 every 1 year	200.073	£0.05	£10.00		
		Replace / Maintain Fence per metre	1	Lin m.	1 every 15 years	1.88862	£80.00	£151.09		
		Reinstate Erosion		Item	1 every 5 years	6.52581	£500.00	£3,262.91		
		Desilting / cleansing		Item	1 every 5 years	6.52581	£1,500.00	£9,788.72		
		Clear Dead Vegetation / Weedkilling		Item	1 every 1 year	33.3455	£300.00	£10,003.65		
		Prune vegetation / trees / shrubs		Item	1 every 3 years	10.80608	£500.00	£5,403.04		
		Inspect / Maintain Safety Equipment / Signage (where required)		Item	2 every 1 year	66.6910	£50.00	£3,334.55		
		Structural Inspection / Report Compilation		Item	1 every 15 years	1.88862	£800.00	£1,510.90		
		Flow Control Inspection		Item	2 every 1 year	66.6910	£150.00	£10,003.65		
		Flow Control Maintenance		Item	1 every 5 years	6.52581	£500.00	£3,262.91		
		Flow Control Replacement		Item	1 every 30 years	0.791545	£4,500	£3,561.95		
16	**Flow Control Devices**	Inspection		Item	2 every 1 year	66.6910	£150.00	£10,003.65	**£16,828.50**	
		Cleaning / Adjustment / Repairs		Item	1 every 5 years	6.52581	£500.00	£3,262.90		
		Replacement /		Item	1 every 30 years	0.791545	£4,500.00	£3,561.95		

		Refurbishment								
17	**Permeable Paving**	Replacement / Maintain per Sq.m		Sq.m	1 every 15 years	1.88862	£75	£141.65	**£141.65** per Sq.m	

Traffic Calming Measures

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 60 Years	Total Commuted Sum – 60 Years	Comments
18	**Chicane**			Item	1 every 20 years	1.33686	£10,600	£14,170.72	**£14,170.72**	Based upon indicative costs per feature
19	**Speed Table**			Item	1 every 20 years	1.33686	£13,900	£18,582.35	**£18,582.35**	
20	**Speed Cushion**			Item	1 every 15 years	1.88862	£1,000	£1,888.62	**£1,888.62**	
21	**Speed Hump**			Item	1 every 15 years	1.88862	£2,000	£3,777.24	**£3,777.24**	
22	**Raising Bollard System**			Item					**£120,000.00**	
23	**Vehicle Activated Sign**			Item	1 every 5 years	4.14092	£5,000	£20,704.60 (based on 30 years Whole Life Cost)	**£20,704.60** (based on 30 years Whole Life Cost)	TBC based on NYCC VAS Protocol

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Street Lighting and Signage & Bollards

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 60 Years	Total Commuted Sum – 60 Years	Comments
24	**Street Lighting Columns**	Electricity Usage		Item	1 every 1 year	33.3455	£30.00	£1,000.37	£1,733.13	Based upon LED units
		Lantern Replacement		Item	1 every 30 years	0.791545	£160.00	£126.65		
		Inspection / Testing		Item	1 every 5 years	6.52581	£10.00	£65.26		
		Structural Testing		Item	1 every 20 years	1.33686	£60.00	£80.21		
		Column Replacement		Item	1 every 40 years	0.41876	£1100.00	£460.64		
25	**Ornamental Lighting Columns**	Electricity Usage		Item	1 every 1 year	33.3455	£30.00	£1,000.37	£2,374.54	Based upon LED units
		Lantern Replacement		Item	1 every 30 years	0.791545	£600.00	£474.93		
		Inspection / Testing		Item	1 every 5 years	6.52581	£10.00	£65.26		
		Structural Testing		Item	1 every 20 years	1.33686	£60.00	£80.21		
		Column Replacement		Item	1 every 40 years	0.41876	£1,800.00	£753.77		
26	**Illuminated Traffic**	Electricity		Item	1 every 1 year	33.3455	£5.00	£166.73		Based upon

	Sign	Inspection Testing		Item	1 every 6 years	5.22677	£10.00	£52.27	£1,422.17	LED units
		Post & Plate Replacement		Item	1 every 20 years	1.33686	£900.00	£1,203.17		
27	**Illuminated Traffic Bollard**	Electricity Usage		Item	1 every 1 year	33.3455	£5.00	£166.73	£1,331.26	Based upon LED units
		Inspection Testing		Item	1 every 6 years	5.22677	£6.00	£31.36		
		Replacement Bollard		Item	1 every 15 years	1.88862	£600.00	£1,133.17		
28	**Non-illuminated Retro-reflective Traffic Bollard**	Replacement Bollard		Item	1 every 20 years	1.33686	£400.00	£534.74	£534.74	
29	**Bollard (standard)**	Bollard	1	No.	1 every 20 years	1.33686	£200.00	£267.37	£267.37	Based on standard highway bollard
30	**Non-illuminated Single Post Traffic Sign**	Inspection / Cleaning		Item	1 every 6 years	5.22677	£75.00	£392.01	£726.23	
		Post and Plate Replacement		Item	1 every 20 years	1.33686	£250.00	£334.22		
31	**Non-illuminated Advance Direction Sign**	Inspection / Cleaning		Item	1 every 6 years	5.22677	£120.00	£627.21	£1,696.70	Actual Cost to be based upon Sign Design Schedule
		Post Replacement	1	No.	1 every 20 years	1.33686	£500.00	£668.43		
		Sign plate Replacement	1	Sq. m	1 every 20 years	1.33686	£300.00	£401.06		

LIST of COMMON HIGHWAYS ASSETS with indicative COMMUTED SUM AMOUNTS (2020)

Miscellaneous

Item No.	Asset Type	Element Description	Quantity	Unit	Frequency of Intervention	NPV Factor	Unit Cost @ 2020 Rates	Commuted Sum Element @ 60 Years	Total Commuted Sum – 60 Years	Comments
32	**Cantilever Bus Shelter**	Shelter		Item	1 every 20 years	1.33686	£5,000	£6,684.30	**£10,352.31**	
		Maintenance		Item	1 every 1 year	33.3455	£100.00	£3,334.55		
		Change Time Table		Item	1 every 1 year	33.3455	£10.00	£333.46		
33	**Enclosed Bus Shelter**	Shelter		Item	1 every 20 years	1.33686	£7,000	£9,358.02	**£13,026.03**	
		Maintenance		Item	1 every 1 year	33.3455	£100.00	£3,334.55		
		Change Time Table		Item	1 every 1 year	33.3455	£10.00	£333.46		
34	**Bus Stop Flag Pole**	Pole, Flag & Timetable Case		Item	1 every 15 years	1.88862	£200.00	£337.72	**£671.18**	
		Change Timetable		Item	1 every 1 year	33.3455	£10.00	£333.46		

35	**Real-time Bus Info systems**	Real-time Shelter mounted		Item					**£9,000**	Indicative Figure given
		Real-time Post Mounted		Item					**£12,500**	
36	**Safety Barrier (Galvanised)**	Safety Barrier Replacement	1	Lin. m	1 every 20 years	1.33686	£150.00	£200.53	**£200.53** per metre	Based upon Open Box Beam RRS
37	**Safety Barrier End Post**	Replacement	1	No.	1 every 20 years	1.33686	£3,500	£4,679.01	**£4,679.01**	
38	**Pedestrian Guardrail (St/ard Galvanised)**	Replacement	1	Lin. m.	1 every 15 years	1.88862	£100.00	£188.86	**£188.86** per metre	Based on standard galvanised off the shelf pedestrian guardrail
39	**Carriageway as part of a Highway Agreement as 'Additional width'**	Plane and resurface	1	Sq. m.	1 every 20 years	1.33686	£20.00	£26.74		For example localised widening for traffic signals, roundabouts and ghost island right turn pockets
		High Friction Surfacing	1	Sq. m	1 every 20 years	1.33686	£70.00	£93.58		
		Pigmented Binders / Decorative Surfacing	1	Sq. m.	1 every 20 years	1.33686	£40.00	£53.47		
		Surface Dressing	1	Sq. m.	1 every 7 years	1.085870	£10.00	10.86		
40	**Road Markings as part of Highway Agreement as 'Extra-over' eg new lanes created**	Refresh Markings	1	Lin. m	1 every 10 years	2.99871	£3.00	£9.00		For example localised widening for traffic signals, roundabouts, ghost islands
		Refresh Markings (letters / numbers / arrows)	1	No	1 every 10 years	2.99871	£20.00	£59.97		
41	**Grassed / Hard Landscaped Areas as part of Highway Agreement as 'Extra Over' eg behind Visibility Splays**	Grass Cutting / Strim	1	Sq. m	6 every 1 year	200.073	£0.05	£10.00		
		Plane and resurface	1	Sq. m.	1 every 20 years	1.33686	£12.00	£16.04		
42	**Soft Landscaping (Shrubs)**	Maintenance /re-planting		Sq. m.	1 every 3 years	0.936855	£25.00	£23.42	**£23.42** per Sq.m	
43	**Seats and Benches**	Replacement		Item	1 every 15 years	1.88862	£400.00	£755.45	**£755.45**	

APPENDIX C

Initial equality impact assessment screening form
(As of October 2015 this form replaces 'Record of decision not to carry out an EIA')

This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.

Directorate	Business and Environmental Services
Service area	Highways and Transportation
Proposal being screened	To seek approval for the publication and application of revised highway drainage and commuted sums guidance chapters, from the 1st April, 2022.
Officer(s) carrying out screening	Emily Mellalieu
What are you proposing to do?	Introduce revised design guidance for highway drainage and application of commuted sums.
Why are you proposing this? What are the desired outcomes?	To ensure guidance and specification is fit for purpose and reflects current national guidance and practice associated with the delivery of new roads and developer funded work.
Does the proposal involve a significant commitment or removal of resources? Please give details.	There is no significant commitment or removal of resource associated with the decision.

Impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYCC's additional agreed characteristic
As part of this assessment, please consider the following questions:

- To what extent is this service used by particular groups of people with protected characteristics?
- Does the proposal relate to functions that previous consultation has identified as important?
- Do different groups have different needs or experiences in the area the proposal relates to?

If for any characteristic it is considered that there is likely to be a significant adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your Equality rep for advice if you are in any doubt.

Protected characteristic	**Yes**	**No**	**Don't know/No info available**
Age		No	
Disability		No	
Sex (Gender)		No	
Race		No	
Sexual orientation		No	
Gender reassignment		No	
Religion or belief		No	
Pregnancy or maternity		No	
Marriage or civil partnership		No	
NYCC additional characteristic			
People in rural areas		No	
People on a low income		No	
Carer (unpaid family or friend)		No	
Does the proposal relate to an area where there are known inequalities/probable impacts (e.g. disabled people's access to public transport)? Please give details.	No.		

Will the proposal have a significant effect on how other organisations operate? (e.g. partners, funding criteria, etc.). Do any of these organisations support people with protected characteristics? Please explain why you have reached this conclusion.	No			
Decision (Please tick one option)	EIA not relevant or proportionate:	X	Continue to full EIA:	
Reason for decision	The proposal involves the revision of technical guidance so does not adversely affect any one interest group differently to another. There may however be positive benefits for place making given it is an opportunity to consider how we can improve this and also consider how we promote the delivery of more sustainable transport opportunities.			
Signed (Assistant Director or equivalent)	Barrie Mason			
Date	14/03/2022			

APPENDIX D

Climate change impact assessment

The purpose of this assessment is to help us understand the likely impacts of our decisions on the environment of North Yorkshire and on our aspiration to achieve net carbon neutrality by 2030, or as close to that date as possible. The intention is to mitigate negative effects and identify projects which will have positive effects.

This document should be completed in consultation with the supporting guidance. The final document will be published as part of the decision making process and should be written in Plain English.

If you have any additional queries which are not covered by the guidance please email climatechange@northyorks.gov.uk

Please note: You may not need to undertake this assessment if your proposal will be subject to any of the following:
Planning Permission
Environmental Impact Assessment
Strategic Environmental Assessment

However, you will still need to summarise your findings in in the summary section of the form below.

Please contact climatechange@northyorks.gov.uk for advice.

Title of proposal	**Revision of NYCC highway drainage and commuted sums design guidance**
Brief description of proposal	**As above**
Directorate	**BES**
Service area	**Network Strategy**
Lead officer	**Emily Mellalieu**
Names and roles of other people involved in carrying out the impact assessment	**E Mellalieu, Deborah Hugill**
Date impact assessment started	**March 2022**

Options appraisal Were any other options considered in trying to achieve the aim of this project? If so, please give brief details and explain why alternative options were not progressed.
What impact will this proposal have on council budgets? Will it be cost neutral, have increased cost or reduce costs? Please explain briefly why this will be the result, detailing estimated savings or costs where this is possible. The proposal will be cost neutral. The introduction of the guidance will ensure the construction of drainage associated with new development is appropriate for maintenance and also where required a relevant commuted sum is collected to ensure there is no burden on the public purse.

How will this proposal impact on the environment? **N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.**		**Positive impact** (Place a X in the box below where relevant)	**No impact** (Place a X in the box below where relevant)	**Negative impact** (Place a X in the box below where relevant)	**Explain why will it have this effect and over what timescale?** **Where possible/relevant please include:** • **Changes over and above business as usual** • **Evidence or measurement of effect** • **Figures for CO_2e** • **Links to relevant documents**	**Explain how you plan to mitigate any negative impacts.**	**Explain how you plan to improve any positive outcomes as far as possible.**
Minimise **greenhouse gas emissions** e.g. reducing emissions from travel, increasing energy efficiencies etc.	Emissions from travel		**X**		**The report seeks the approval of revised design guidance relating to highway drainage and the application of commuted sums. Neither chapter would have any impact on emissions, given that it does not commit the authority to delivery of work, rather it seeks to guide the standard of delivery.**	**n/a**	**n/a**
	Emissions from construction		**X**		**As above**		
	Emissions from running of buildings		**X**		**As above**		
	Other		**X**		**As above**		

How will this proposal impact on the environment? **N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.**	**Positive impact** (Place a X in the box below where relevant)	**No impact** (Place a X in the box below where relevant)	**Negative impact** (Place a X in the box below where relevant)	**Explain why will it have this effect and over what timescale?** **Where possible/relevant please include:** • **Changes over and above business as usual** • **Evidence or measurement of effect** • **Figures for CO_2e** • **Links to relevant documents**	**Explain how you plan to mitigate any negative impacts.**	**Explain how you plan to improve any positive outcomes as far as possible.**
Minimise **waste:** Reduce, reuse, recycle and compost e.g. reducing use of single use plastic		X		As above		
Reduce **water** consumption		X		As above		
Minimise **pollution** (including air, land, water, light and noise)	X X			The guidance will have the potential to minimise pollution through the incorporation of SuDS where appropriate The		
Ensure **resilience** to the effects of climate change e.g. reducing flood risk, mitigating effects of drier, hotter summers	X			The use of SuDS incorporated into highways drainage would have a positive impact on reducing the impact of flooding, by reducing the volume of water originating from the highway in public sewers.		
Enhance **conservation** and wildlife	X X			The use of SuDS would potential offer biodiversity gain. The		

APPENDIX D

How will this proposal impact on the environment? **N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.**	**Positive impact** (Place a X in the box below where relevant)	**No impact** (Place a X in the box below where relevant)	**Negative impact** (Place a X in the box below where relevant)	**Explain why will it have this effect and over what timescale?** **Where possible/relevant please include:** • **Changes over and above business as usual** • **Evidence or measurement of effect** • **Figures for CO_2e** • **Links to relevant documents**	**Explain how you plan to mitigate any negative impacts.**	**Explain how you plan to improve any positive outcomes as far as possible.**
Safeguard the distinctive characteristics, features and special qualities of **North Yorkshire's landscape**	X			The commuted sum application will encourage a wider use of construction materials and therefore will permit more bespoke development.		The authority will be open to characteristics in development which encourage reflection of distinctive characteristics through the application of commuted sum
Other (please state below)		X				

Are there any recognised good practice environmental standards in relation to this proposal? If so, please detail how this proposal meets those standards.
n/a

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Summary Summarise the findings of your impact assessment, including impacts, the recommendation in relation to addressing impacts, including any legal advice, and next steps. This summary should be used as part of the report to the decision maker.

There are no adverse climate change implications arising from the report, in fact both chapters, in places encourage more sustainable construction techniques and more opportunity for sustainable drainage options for the highway and incorporation of trees into the highway curtilage without additional cost to the authority.

Sign off section

This climate change impact assessment was completed by:

Name	**Emily Mellalieu**
Job title	**Development Management Team Leader**
Service area	**H&T -Network Strategy**
Directorate	**BES**
Signature	**E Mellalieu**
Completion date	**07/03/2022**

Authorised by relevant Assistant Director (signature): Barrie Mason

Date: 14/03/22