amey

Figure 18 is an extract of the Masterplan submitted for the Land at Sturry application (CA/20/02862) illustrating the nature and scale of the development.

The SLR enters the proposed development at a high, potentially second storey, level having crossed over the railway and continues on embankment for a short length rising in profile but progressively reducing in height as it merges into the slope of the Stour valley, where a new roundabout is proposed (west roundabout).

From here, the road character changes running centrally through the

residential elements of the Land at Sturry development but retaining an open aspect characterised by tree lined verges with buildings set well back from the road with no direct frontage access.

Access to dwellings is gained from the road via a series of 'T' junctions and the two new roundabouts.

In terms of the road design, it aims to follow as far as practicable the existing valley terrain and is therefore notably undulating in profile with a combination of low embankments or shallow cuttings of less than 1.5m in height/depth. Ultimately, these will be hidden as the land form is reshaped to the required profiles for the new development.



Figure 18: Extract of Masterplan submitted for Land at Sturry application

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## **Key Design Parameters & Provisions**

The following sections consider the full route of the SLR as the aspects discussed are common and largely interdependent between the road sections inside and outside the Application Site.

### Carriageway width

Carriageway provision and safety standards have been determined using the Design Manual for Roads and Bridges (DMRB) as modified by the Kent Design Guide (KDG).

A minimum carriageway width of 6.75m is proposed which the KDG describes as typical for roads of this character and use.

With the likelihood of the SLR being used as a bus route, lesser widths would be too narrow for the safe passage of buses. A wider carriageway width say to 7.3m, would potentially offer improved flow conditions however with traffic flows significantly constrained by the local roads and junctions, any increase in capacity is unlikely to be beneficial. Pedestrians will also benefit with crossing widths kept to a minimum.

The actual layout will however be much wider generally throughout to allow provision for central right turning lanes, a bus lane southbound over the railway and some lane widening to compensate for the relatively 'tight' curvature adopted. Total carriageway widths will vary from 6.75m to 10.8m but will be predominantly 10m or above.

The need for parking restrictions on the SLR will need to be carefully considered to ensure the safe and efficient passage of vehicles. Currently, parking restrictions are considered unnecessary on the assumption that no direct access to individual dwellings or any retail or commercial frontage development would be permitted as part of the application for the Land at Sturry development. This will need to be reviewed following determination of the Land at Sturry application.

## Junction types

All junctions along the new route are at-grade comprising a mixture of normal roundabouts and 'T' junctions, all conventional in design and compliant with the DMRB standards.

The new roundabouts serve as the key road junctions for traffic travelling to and from Canterbury and Herne Bay and include the addition of access spurs (stub ends) to provide access to the housing development north of the railway and to land allocated in the Local Plan for future employment use direct off the A28 in the south.

All 'T' junctions will take the form of a 'ghost island' arrangement (i.e. they include a central right turn lane), providing protection to right turning traffic whilst not impeding through traffic.

### **Bus stop measures**

Stagecoach, the main bus operator, has confirmed their expectation to run a frequent bus service along the SLR to serve the new development. The current 'Triangular' service will be diverted via the SLR and will provide a bus every 15 minutes (daytime) between the new housing and Canterbury City Centre in one direction, and Herne Bay in the other.

Existing bus services would still serve Sturry on existing routes to preserve the current link between there, Herne Bay, Thanet and into Canterbury, and to provide connections into the train service at Sturry.

Six new bus stops are proposed on the SLR and have been located to suit catchment areas and road safety considerations (i.e. visibility and junction locations) as shown in Figure 19 overleaf. The existing bus stop northbound on Sturry Hill opposite the Sturry railway station is to be relocated to the south side of the level crossing. This is due to the difficulties associated with safely accommodating the existing bus stop location within the new junction layout.



Stagecoach confirmed their general agreement to the locations proposed and the provision of bus laybys, as opposed to in-lane bus cages, wherever possible.

Where bus laybys are proposed, their design is in accordance with *Figure 20* in the TFL publication 'Accessible Bus Stop Design Guidance' at the request of Stagecoach.

Any special bus services to serve the new school have yet to be identified. There does however remain only limited scope to incorporate additional bus facilities on the SLR due to safety and operational concerns.

#### Figure 20: Typical bus stop layby layout



### Pedestrian and cycle provision

To encourage alternative transport modes such as walking and cycling, the proposals set out to provide an equitable balance between pedestrian and cyclist needs.

With a potential thriving new community, including a new primary school, where the desire for cycle trips by children or inexperienced cyclists may ultimately grow, coupled with high traffic flows predicted for the SLR, the provision of an off-road cycle facility is considered the most appropriate choice.

A shared-use unsegregated footway provision to run alongside the SLR over its full length is therefore proposed. This type of provision is considered to provide the highest level of service compared to a segregated provision because of the likely low number of cyclists.

Designed with an effective width of either 3m or 3.5m, 3m being the preferred minimum width<sup>3</sup>, it should provide a good quality, safe and comfortable provision for the number of cyclists and pedestrians anticipated. An unsegregated provision will also benefit from being uncomplicated with street furniture kept to a minimum through reduced cycle signage, particularly at junctions, which is desirable.

To off-set the concerns of some pedestrian groups, particularly the vulnerable such as the elderly and disabled, who can feel intimidated when walking in areas where cyclists are permitted, cycle provisions will be limited to one side of the carriageway.

Frequent pedestrian crossing points are provided along the SLR within the development site all with central pedestrian refuges for improved safety and ease of crossing including one signal controlled pedestrian crossing near to the site for the new school.

A further signal controlled crossing, to be shared with cyclists, is also provided across the SLR just to the north of the new roundabout at the A28.

The development Master Plan also includes for the provision of a new footway cycleway link through the development to the station avoiding the A291 Sturry Hill.

## Speed limit assessment

The scheme has been designed to operate with a speed limit of 30mph through areas of the new housing development and 40mph on the section over the railway down to the A28.

On the link to Shalloak Road, a derestricted limit is to be adopted once beyond the extent of the housing development.

These speed limits were determined with reference to Circular 01/2013 (Selecting Local Speed Limits) and are considered to reflect the individual characteristics of the road environment and the existing speed limits in the surrounding area.

### Street lighting design strategy

Guidance from the recommendations within BS5489-1:2013, Code of Practice for the Design of Road Lighting, has been used to determine an appropriate level of lighting to the SLR and extents to which it should be lit. Additionally, reference is also taken from the ILP Professional Lighting Guide 02, The Application of Conflict Areas on the Highway (ILP LG02).

<sup>&</sup>lt;sup>3</sup> Local Transport Note 1/12 – Shared Use Routes for Pedestrians and Cyclists

Based on this guidance it has been concluded that the full extent of the SLR, including the link to Shalloak Road, but excluding the section on the viaduct, should be lit. This takes account of the identified conflict zones, that must be lit for safety reasons, of the three roundabouts and the Shalloak Road junction together with the presence of numerous crossings and bus stops.

On the viaduct, it is considered that lighting is not required as it is a straight section of road with no junctions or crossing points and lighting could have potential safety and environmental issues with the railway and the wildlife corridor beneath. Consideration will be given to the provision of low level lighting of the footway cycleway across the viaduct.

The design of the new lighting installation will locate columns at the rear of footway/verges culminating in a combination of staggered and single sided arrangements and on the outside perimeter of the roundabouts as illustrated in Figures 21 & 22 that provide an indication of the type of lighting column positions and spacing that would be required to meet the chosen parameters.

To achieve the required lighting design class (M4) whilst considering environmental factors it is proposed to adopt post top mounted lighting



columns limited to a maximum height of 8 metres. This would allow for good visual appearance and spacing between columns that would minimise the number of columns and energy usage.



However, the use of 10 metre columns with bracket arms on the new A28 Sturry Road roundabout (above) is more appropriate as this would tie in with the existing lighting system on A28 Sturry Road. This section can be considered in isolation from the main scheme lighting, given the absence of road lighting on the viaduct.

Reduced column heights may need to be considered at the west end of the scheme, near Shalloak Road, where the recently installed overhead power lines cross the carriageway as part of the National Grid, Richborough Connection Project.

In respect of the design of the columns and lanterns, it is proposed that;

- No bracket arms installed, other than at the new A28 roundabout.
- Standard lighting columns to be used as passive safe lighting columns are considered inappropriate due to slow vehicular speeds and there being a risk of secondary impact with pedestrians/cyclists and trees.
- LED luminaires will be installed, in accordance with KCC policy
- Luminaires will be installed, if practical, at 0<sup>0</sup> tilt to the horizontal.
- Luminaires with a colour temperature of 4000k (Neutral white), currently specified by KCC, are proposed.
- Luminaires with a glare class of G4 or greater should be considered in areas of significant ecological and environmental interest. This class is higher than the standard specified luminaires.
- Baffles/light shields may be considered for luminaires within these areas.

It is proposed to electrically service the new lighting installation via District Network Operator low voltage single phase connections where practicable, keeping any private cable network installations to a minimum.

It is anticipated that the only private cable networks will be to traffic signs and bollards which require illumination that are located within the roundabouts and traffic islands.

Each luminaire will be controlled via an individual control unit mounted on the lantern canopy. There are various options available to accurately control the switching of lighting installations which can include the trimming of the hours the luminaire is in use along with the dimming of the units during hours where traffic flow is low. The actual system to be implemented will be developed during the detailed design phase in accordance with KCC street lighting policy.

# Flood Risk and Drainage Strategy

In support of this application a Flood Risk Assessment (FRA) and outline Drainage Strategy (DS) was produced which included hydraulic modelling to provide a detailed up-to-date assessment of the existing fluvial flood risk at the study area and for quantify the change in flood risk elsewhere because of the proposed SLR.

Full details are reported in the submission document CO0430039/009 'Flood Risk Assessment and Drainage Strategy'. The main findings are;

# <u>Fluvial flood risk</u>

- Maximum water levels at the study area and wider flood plain remain very similar to existing water levels during all fluvial events (maximum modelled variation +/-4mm)
- Compensatory flood storage is not required due to the negligible increase in water levels during flooding events

- Maximum flow velocities also remain very similar to existing except for small areas local to the proposed support piers where maximum velocities increase by 0.2m/s. Maximum existing flow velocities are around 0.8m/s
- New climate change allowances have been used in the hydraulic modelling based on the 'Flood risk assessments: climate change allowances' published February 2016. A 35% increase in flow has been adopted as agreed with the EA
- The SLR will be at a height considered to be at very low risk of fluvial flooding, as well as tidal, groundwater and sewer flooding
- The minimum proposed viaduct soffit level exceeds the EA requirement of 600mm freeboard above the 1 in 100 year storm event

### Drainage Strategy

- The proposed drainage strategy for the SLR will mimic the existing drainage regime and will discharge surface water via attenuation ponds before discharging indirectly into the River Great Stour
- A new drainage network will be provided to intercept surface water runoff. Surface water discharge will be controlled at staged Greenfield Run-off rates for each return period in accordance with the emerging CCC draft drainage strategy, except over the viaduct. Any excess runoff will be attenuated within the site with a balancing pond for up to 1 in 100 year design flood level plus 20% allowance for climate change
- Surface run-off from the viaduct will be collected in the attenuation pond to the south of the viaduct to contain polluted run-off prior to discharge to adjacent water courses.

- Gullies and catchpits are to be installed as part of the collection system to provide primary treatment of polluting matter entering the drainage network close to the source.
- Over the viaduct, a linear drainage system will be provided with sump outfalls to trap polluting matter. Solid barriers 0.5m high will be provided on the bridge parapets to reduce the overspill from road salts during periods of winter maintenance. Oil interceptors and penstock valves will provide further treatment downstream to prevent escaped polluting matter from the sump outfalls entering the River.
- Attenuation ponds will incorporate settlement lagoons to allow saline from winter maintenance to be collected and treated prior to outfall to adjacent water courses.
- The drainage catchment north of the railway will be collected and treated in attenuation ponds before being pumped back into the highway drainage system to bypass the sensitive ecologically sensitive habitat naturalised by Desmoulins snails.
- The drainage network will be designed to meet the following parameters:
  - I. No increase in discharge rates
  - II.
     1 in 30 year
     No Flooding

     III.
     1 in 100 year
     Demonstration of practical flood routes
  - IV. 1 in 100 year + CC Consideration given to the flow paths

### Land requirements

Private land is required. Acquisition of land interests by negotiation is ongoing and compulsory purchase powers will be used to ensure all land is secured and to give programme certainty.



Figure 23: Land plots affected

Although land acquisition is unavoidable, it has however been limited to land owned by the Kings School, with whom Heads of Terms are being established, to two privately owned plots to the south located within the lower lying land of the Great Stour flood plain and a strip of land from the Viridor Kent Waste Limited site as illustrated in Figure 23. No land is required from Network Rail. Land interest in the form of an easement on Southern Water Services land for permanent access rights will also be required.

Plot No.1 is currently used as grazing land and allocated for employment use under CCC's Local Plan. This plot will benefit from the scheme through provision of a new means of access direct from the new A28 roundabout that would enable development of the site to proceed. It is therefore anticipated that land acquisition here would be by negotiation.

Plot No.2 is residential with a large open space (front/rear gardens) surrounding a single two storey dwelling set back from the A28.

Initial exploratory discussions with the land owners of both Plots has established their key concerns and, as such, development and feedback on 'localised' design alternatives for the route alignment has taken place to help address these. These alternatives are discussed later.

Land required from the Viridor Kent Waste Limited site consists of mature vegetation within which is located a derelict cottage, which will require demolition. Acquisition of land interests by negotiation is ongoing as is the same with Southern Water Services Limited land for permanent access rights.

## Layout Design - Specific Areas

Throughout this section more details of the scheme are provided including the reasons why certain choices have been made. Any alternatives considered are also described and the reasons given behind the selection of the preferred option.

Each section is described in turn from the A28 in the south to the A291 in the east.

# A28 to north of railway (Section 1 – this application)



For the section of the scheme between the railway and the A28 the design is driven by engineering, cost and land ownership factors.

This includes satisfying the requirements of the Environment Agency, Network Rail, feedback from the public consultation event and reaching an equitable compromise between the different land uses of neighbouring land plots.

### A28 Sturry Road – New Junction

Where the SLR connects to the A28 in the south a new 4-arm roundabout is proposed that will be constructed on land currently undeveloped to the north of the A28. This ensures any impact to a former landfill site on the south side of the A28 is avoided.

The roundabout is 50m in diameter and is the maximum size possible within the land constraints set for the site (See Figure 24) and to satisfying geometric standards (i.e. minimum entry/exit radii, visibility and entry 'deflection'). It has a circulatory carriageway width of 8.2m with 2-lanes provided on the entry to the roundabout on each approach.



Figure 24: Proposed new roundabout off A28 Sturry Road

The design will permit construction of a new means of access directly off the new roundabout to the land allocated for employment use which is the preferred choice on safety grounds, rather than a new access off the SLR.

Additionally, allowance has been made in the design for construction of a southern spur as part of potential improvements to the Sturry Road Park & Ride that includes an option for an access road from the new roundabout.

An existing vehicular access point off the A28 to the property known as Perryfield Farm is located near to the eastern exit of the roundabout as shown in Figure 25. Any vehicle slowing down on the exit from a roundabout can present a safety risk and for that reason, following discussions with the landowner, it is proposed to provide a new access directly off the roundabout as shown Figure 25. This will also provide access for maintenance to the attenuation pond.



Figure 25: Proposed new access to Perryfield Farm

Junction performance using capacity assessment ARCADY 9 software and forecast modelled flows for year 2031 have confirmed good levels of reserve capacity at the roundabout during peak periods, typically between 30% and 50%, providing some in-built resilience to accommodate flow variations. For details of forecast traffic flows see the Transport Assessment Reports submitted with this application.

Pedestrian and cycle provisions include a shared staggered signal controlled crossing (TOUCAN) across the northern approach arm that links the shared unsegregated 3.5m footways either side that in turn join up with the existing cycle provisions on the A28.

Whilst pedestrian and cycle flows are likely to be relatively low, it is the high volume of traffic that has dictated the need to provide a signal controlled crossing. Guidance given in (Table H.10) of the Sustrans Design Manual (April 2014) and Table 2.4.2 in Interim Advice Note 195/16 'Cycle Traffic and the Strategic Road Network' indicate that the forecast flows anticipated for the SLR would be above the flow threshold where signal controlled crossings are justified for the given speed limit (40mph).

A subway is not a practical alternative to signal controlled crossing on engineering grounds given the difficulties associated with the impacted flood plain. In addition, uneasiness is often felt over personal safety when using subways.

To provide a full off-road cycleway provision at the roundabout, the design includes a new off-road cycle track skirting the southern side of the roundabout as shown in Figure 24. This is currently detailed as one-way for westbound cyclists. However, if suitable crossing facilities can be incorporated at the entries to the roundabout to link up with the

cycle track, it could be made two-way thereby enhancing the overall provision. This will be considered during the detailed design stage.

## Alternative Junction layout

As an alternative to the roundabout the merits of a signal controlled junction were examined and a layout developed as shown in Figure 26

A small reduction in land take and greater control on traffic flow conditions at the junction would be possible but overall the roundabout is preferred as it would;

- allow traffic to remain more free flowing with minimal delay,
- enable safer means of access to adjacent land,
- incur less maintenance,
- would be consistent with other junction types in the area and;
- would be more conducive to encouraging A28 traffic to use the SLR.



Figure 26: Signal controlled Junction option (NOT ADOPTED)

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#### Drainage provisions - SuDs Features

On the east side of the roundabout a drainage attenuation pond is proposed for storage and management of surface water prior to entering the existing watercourse known as Sturry Road Dyke along the A28, which is maintained by the Internal Drainage Board (IDB) and currently serves to accommodate existing surface run off from the A28. The Sturry Road Dyke will be cleaned out and regraded in agreement with the IDB.

The location of the pond makes use of land severed by the scheme from the main holding on the west side as illustrated in Figure 27. The pond will frequently retain water, making for a more aesthetic feature.

In addition to controlling and treating the discharge of surface water within the pond, the drainage strategy includes for the provision of further treatment measures including settlement basins, oil interceptors and trapped gullies. Appropriate planting will be incorporated into the ponds to help remove pollutants from the surface water runoff from the carriageway. Details of the drainage strategy are illustrated in Figure 27.















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