

Title: Review of footway crossfall

Location: A35 Chideock, Dorset

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Introduction

Highways England have received correspondence from Chideock Parish Council regarding a length of footway adjacent to the A35 in the village of Chideock, Dorset. (See appendix 1)

The Parish Council has made representations to Highways England concerning the difficulty that a resident with mobility impairment and other mobility residents and visitors have traversing a part of the footway in the village leading to potential danger. It has been stated that the footway is hampering the ability to travel freely within the village.

Background

Engineers within Highways England's SW regional Safety Engineering and Improvements teams undertook an initial qualitative review to understand the problem the customer is experiencing. Dependent upon the finding of this review, there may have been opportunities to make reasonable adjustments to improve the ability to travel through the village.

A general inspection of Highway assets was undertaken. It was noted that the footway throughout this area does not conform to current standards both in terms of width and alignment. However, this is not uncommon where traditional routes have developed over many years and would have conformed to applicable requirements at the time of construction. It should be noted that there is no footway on the opposite side of the A35 at this location. (Appendix 3)

The inspection identified a 25metre length of footway where crossfall significantly exceeds acceptable levels by current standards of the Design Manual for Roads and Bridges (DMRB). This length corresponds with the location as identified by the Parish Council.

Problem

The footway through the village does not meet current requirements generally. However, the assessment focusses on the 25metre section that, on visual inspection, is clearly significantly below the requirements of current standards.

The issue occurs where the full height kerbs are lowered to provide vehicular access to private driveways that lead to properties that are significantly above the level of the footway. To provide an adequate change in vertical height from carriageway to the driveways, the footway must rise significantly over a relatively short distance due to the narrow footway. This has resulted in excessive cross fall. (Appendix 3)

Assessment

Following the initial qualitative review, LiDAR data* has been used to inform a quantitative assessment of the section of footway through the village (Figure 1) with a view to improving crossfall.

The inclusive mobility guide (2005) states that “*Crossfall on footways and footpaths may be necessary to provide good drainage, but if too great, can make it difficult for wheelchair users. It should be noted that the report states: Recommendations contained in guidelines vary somewhat but, under normal circumstances, a figure of 2.5 per cent (1 in 40) should be regarded as the maximum acceptable. Where possible, it is preferable to have a crossfall between 1 and 2 per cent*”.

This recommended crossfall is also confirmed in the study by C.S Holloway, *The effects of crossfall gradient on wheelchair accessibility (2011)*, which states that “*current crossfall guidelines of 2.5% seem reasonable, and that inexperienced users may struggle when these guidelines are exceeded*”.

Five cross sections were assessed over the 25metre length utilising LiDAR from the AVIS system. (**Appendix 2**)

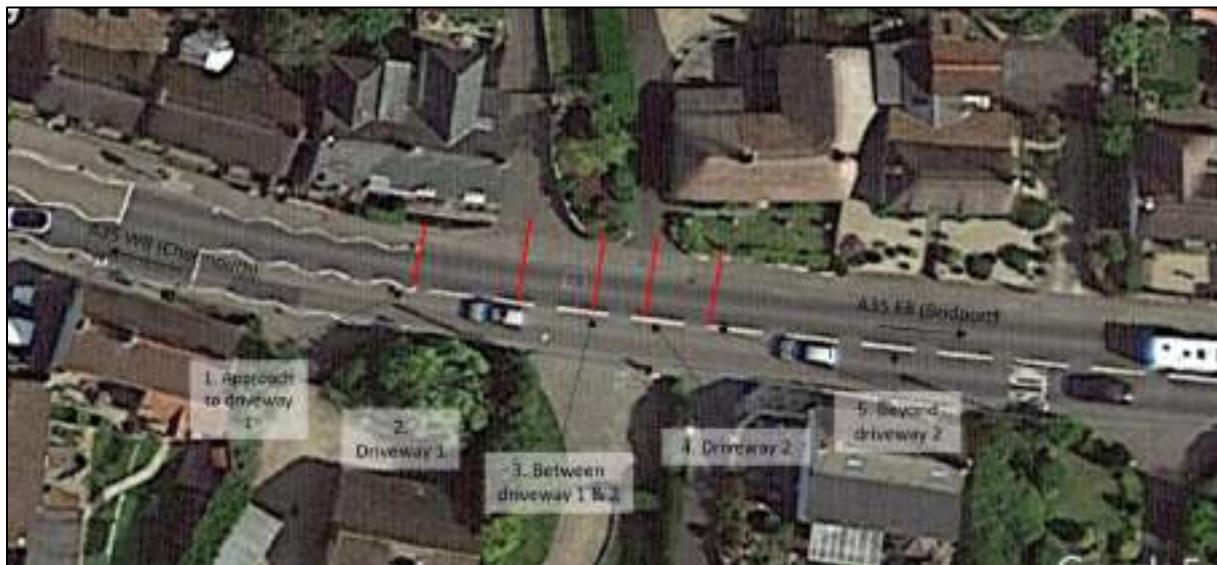


Figure 1, Chideock footway cross section locations

‘Driveway 1’ currently has the steepest crossfall at 1 in 5.6 (18%), followed by ‘Driveway 2’ at 1 in 6.4 (16%).

The shallowest crossfall was ‘Beyond driveway 2’ at 1 in 15.6 (6.4%).

Further assessing ‘Driveway 1’ as the ‘worst case scenario’, it is calculated that based on the current width of the pavement and design crossfalls, significant vertical adjustment will be needed to tie the footway into the driveway to achieve an acceptable crossfall. The table below shows the level of vertical adjustment required to meet the stated design crossfall. This would require either lowering the rear of the footway or raising the front of the footway.

(*LiDAR data is held within Highways England Asset Visualisation Information System database. This LiDAR point clouds are currently spatially accurate to 30mm, with measurements of objects accurate to 10mm).

Design Crossfall	Required vertical adjustment (mm)
1 in 10	147
1 in 15	203
1 in 40 (Maximum recommended)	272

The footway level is constrained at its front edge by the lowered kerbs provided to allow safe vehicular access to the private properties. Effectively the level at the front of the footway is fixed therefore an acceptable crossfall can only be achieved by lowering the rear of the footway where it meets the private driveways.

Changing the level of the footway without adjustment of the private driveways will result in a significant 'crease' at the interface.

As an indication of the footprint required to achieve these cross falls (without considering the private driveway levels and assuming ground levels were constant beyond the back of the footway), the following lengths of reprofiling would be required.

Design Crossfall	Tie in length (m)
1 in 10	1.884
1 in 15	2.825
1 in 40 (Maximum recommended)	7.534

The above figures are theoretical and do not consider the change in levels as on site.

In reality, the ground continues to rise behind the rear of the footway to form private driveways. The resulting effect is that the tie in would need to be significantly extended into the private land to avoid creating a 'crease' where the back of the footway meets the driveways. This is further complicated by the presence of private dwellings bounding the driveways. **Figures 2 and 3** show the indicative reprofiling required for 1:15 & 1:40 cross falls.

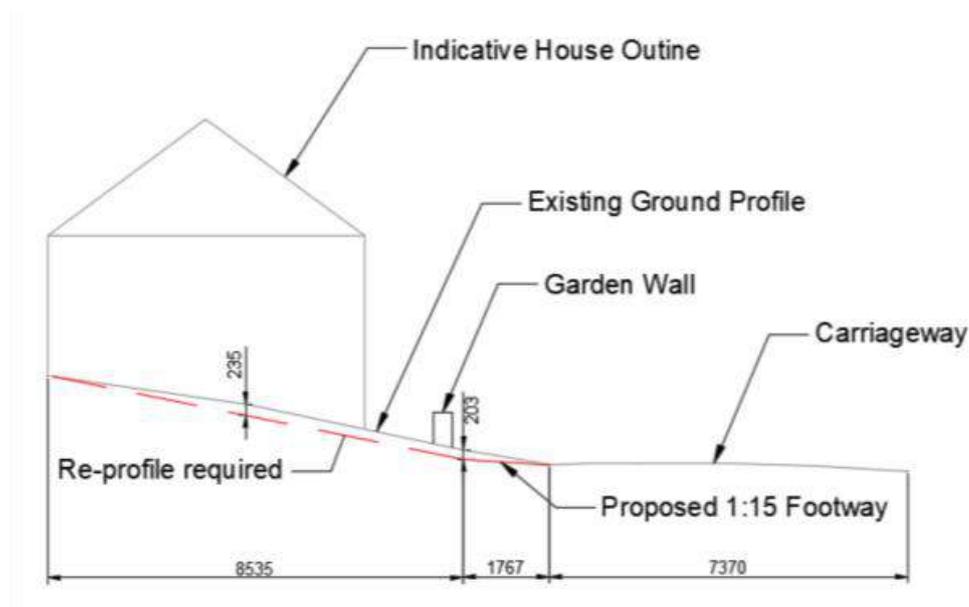


Figure 2, 1:15 footway crossfall and associated re-profiling

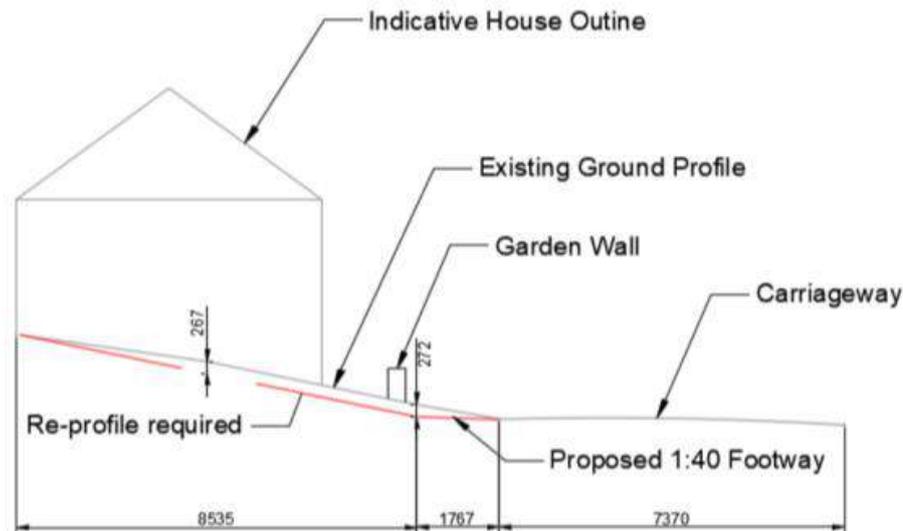


Figure 3, 1:40 footway crossfall and associated re-profiling

As shown this would require significant modification to 3rd party land levels including utility services and building damp proofing.

Due to the significant impact upon 3rd party assets needed to achieve a suitable crossfall, the Engineers have considered alternative options that may provide an improvement.

An assessment has been made as to whether the footway could be widened. This would have an effect of increasing the width over which the vertical alignment could be achieved therefore reducing the crossfall.

The rear of the footway is constrained by 3rd party assets therefore to widen the footway this would require encroachment into the carriageway. Accordingly, a further assessment has been made of the impact on the carriageway width.

The A35 through this section is 2 lane single carriageway and requires a minimum total width (excluding hard strips) of 7.3m (**DMRB CD 109**). The Annual Average Daily Traffic (AADT) figures provide that this section carries 16,371 vehicles per day. *

LiDAR measurements indicate that the carriageway is approximately 7.35 metres wide at this location, indicating there is a negligible ability (0.05 metres) to extend the footway into the carriageway. This falls significantly short of the width needed to make a noticeable reduction in the footway crossfall.

To avoid further narrowing the carriageway to a sub-standard level widening the footway could be achieved by re-aligning the carriageway in its entirety effectively slewing the road away from the footway on the northern side.

(* Source: WSP Report - A35 Annual Average Daily Traffic (AADT) for the 12-month period of 01/04/2017 to 31/03/2018 to the east of Chideock (at London Inn)).

Visual inspection shows that there is no footway or hard strip on the southern side of the A35 negating the ability to slew the carriageway within the curtilage of the highway (**Appendix 3**) and there are private properties abutting the carriageway along the length of the southern side.

It should be noted that slewing the carriageway would need to be undertaken over a distance significantly in excess of the length of footway that forms the focus of this report to ensure conformity with the DMRB.

Any subsequent widening would require significant acquisition of 3rd party land and property. It should be noted the location that forms the focus of this report sits within the Chideock Conservation Area under Dorset County Council, and a significant number of properties along the length of Main Street have Grade II listed status. In addition, given the presence of multiple inspection covers located within the carriageway and the presence of medium voltage overhead cabling and telecoms equipment, any major carriageway re-alignment will generate substantial utility disruption.

A further assessment has been conducted to examine the options to shut the private driveways and provide an alternative access. This would provide an opportunity to lower the rear of the footway.

There is a narrow lane to the west of the property served by Driveway 1 known as Apple Trees Lane. This lane is only wide enough to support the passage of one vehicle with no provision for passing. Any intensification of this route would be likely to raise planning objection without substantial widening that would affect traditional thatched properties with historical value/Grade II listed status in the Chideock Conservation Area. Subsequent linking carriageways into the properties served by Driveways 1 and 2 would require the destruction of significant 3rd party assets and the potential to affect assets with historical value as noted.

Conclusion

The footway is significantly below the standard requirement for crossfall. Accordingly, the crossfall will have a detrimental impact upon a wheelchair user which will hamper the ability to travel through the village at the 25metre section identified.

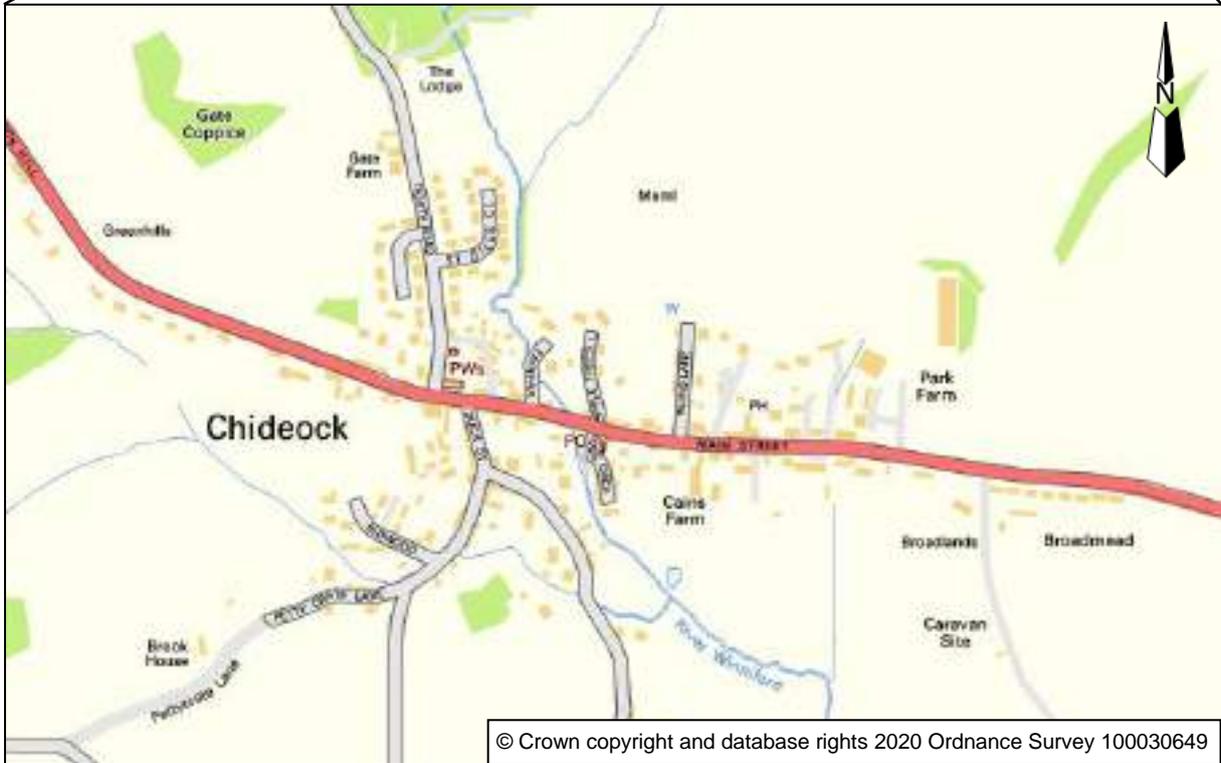
The options for improvement are shown in the table below:

Option	Advantages	Disadvantages
Reduce crossfall by reprofiling footway only	Requires no 3 rd party asset. No interference with utilities. Low cost.	Prevents access to 2 private driveways leading to private properties.
Reduce crossfall by reprofiling footway and limited 3 rd party driveway reprofiling	Limited impact on 3 rd party asset. Medium cost.	Will create issues for those accessing the properties affected. This could result in collisions on the A35 due to heavy braking into the driveways, and difficulties for vehicles leaving the private driveways due to grounding. Unsafe for pedestrians accessing property. Potentially requires a CPO and/or legal agreement with the landowners. Planning permission potentially required including listed building consents and conservation area consents.
Reduce crossfall by reprofiling footway and full 3 rd party driveway reprofiling	Provision of crossfall to an acceptable standard.	Significant impact on 3 rd party asset. Affects property foundation and damp courses. High cost Potentially requires a CPO and/or legal agreement with the landowners. Planning permission potentially required including listed building consents and conservation area

		consents. Possible blight implications.
Narrow carriageway	Requires no 3 rd party asset. Provision of crossfall to acceptable standard. Medium cost	A35 will become sub-standard with a risk of head on collisions. Impact on safety of vehicles using carriageway and slower journey times. Possible air quality impact due to idling engines due to removal of centre white line.
Move carriageway over	Provision of crossfall to acceptable standard.	Significant disruption to A35. Requires significant 3 rd party assets. Significant impact on a number of 3 rd party assets. Movement of utilities. High cost. Potentially requires a CPO and/or legal agreement with the landowners. Planning permission potentially required including listed building consents and conservation area consents. Possible blight implications.
Shut driveways and provide access to rear of properties from local authority network	Provision of crossfall to full standard	Significant impact on 3 rd party asset. Potentially requires a CPO and/or legal agreement with the landowners. Planning permission potentially required including listed building consents and conservation area consents. Possible blight implications.

APPENDIX 1

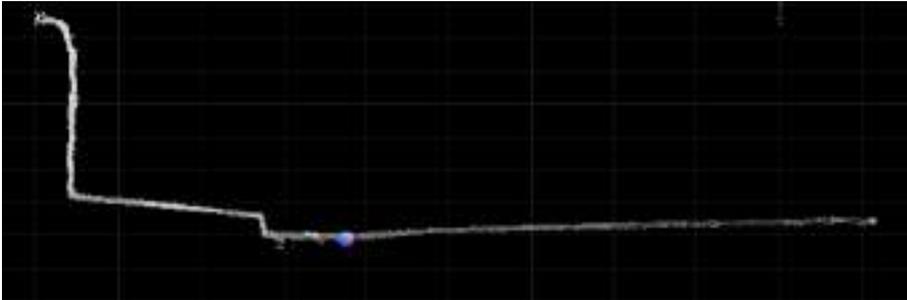
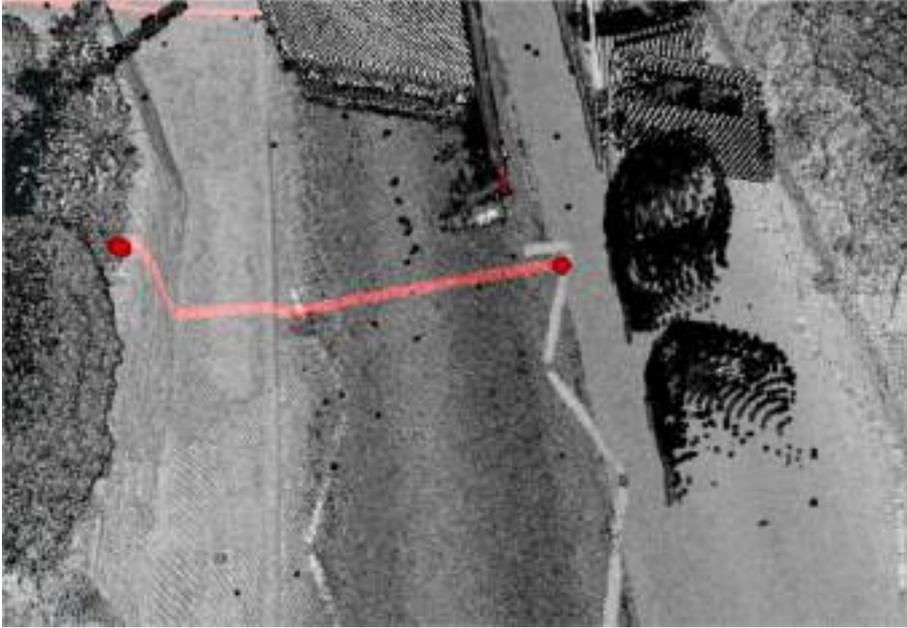
Location Plan



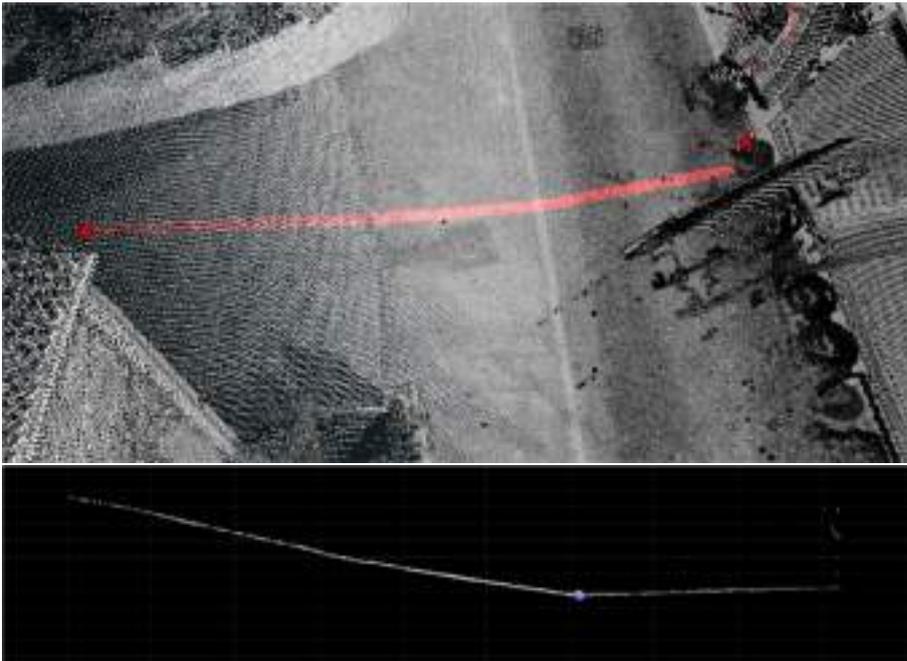
APPENDIX 2

LiDAR DATA IMAGES

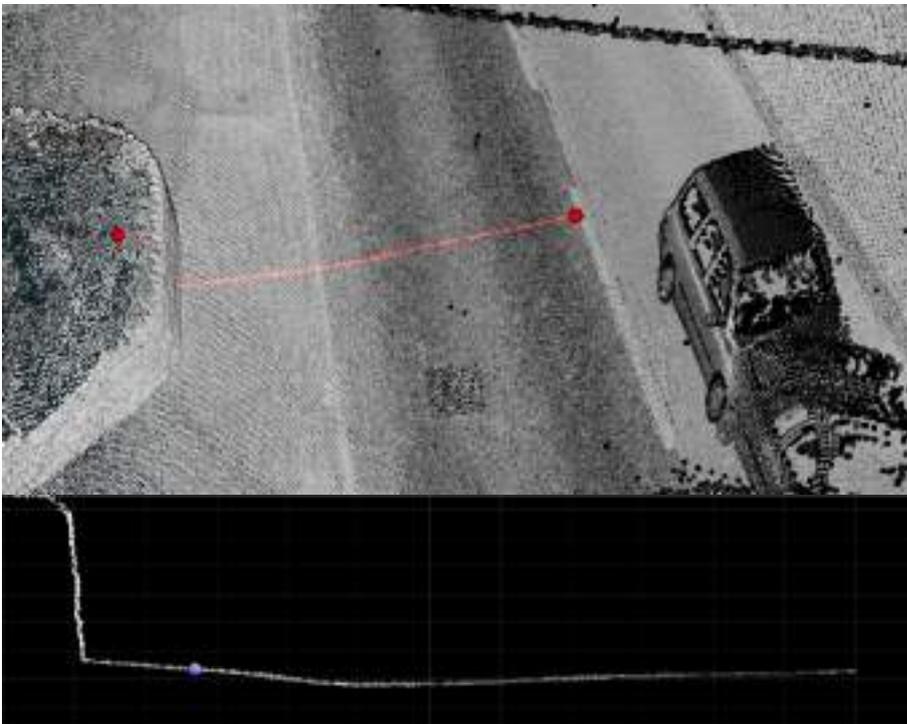
1. Approach to driveway 1



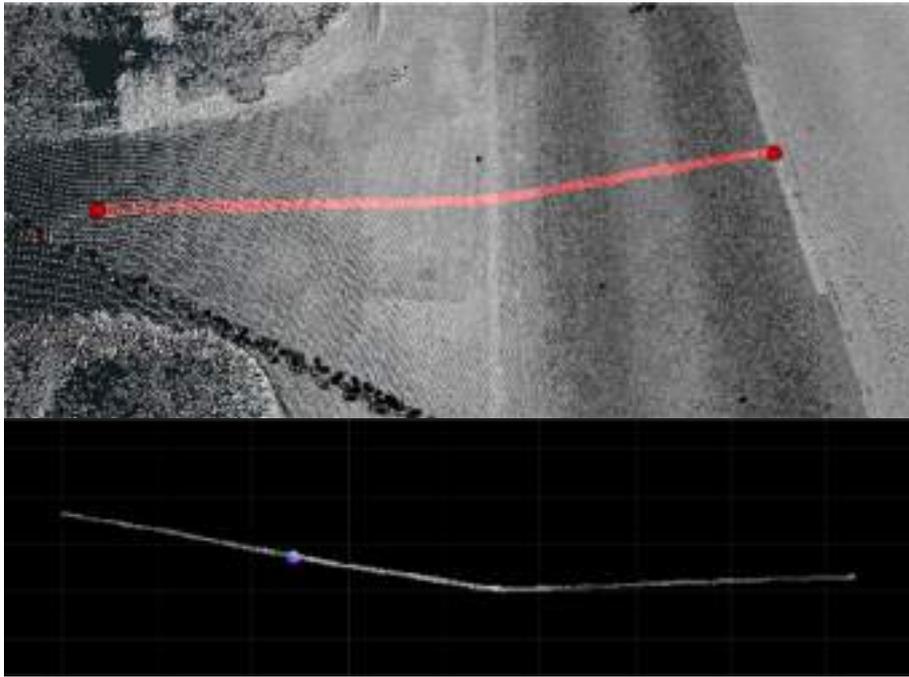
2. Driveway 1



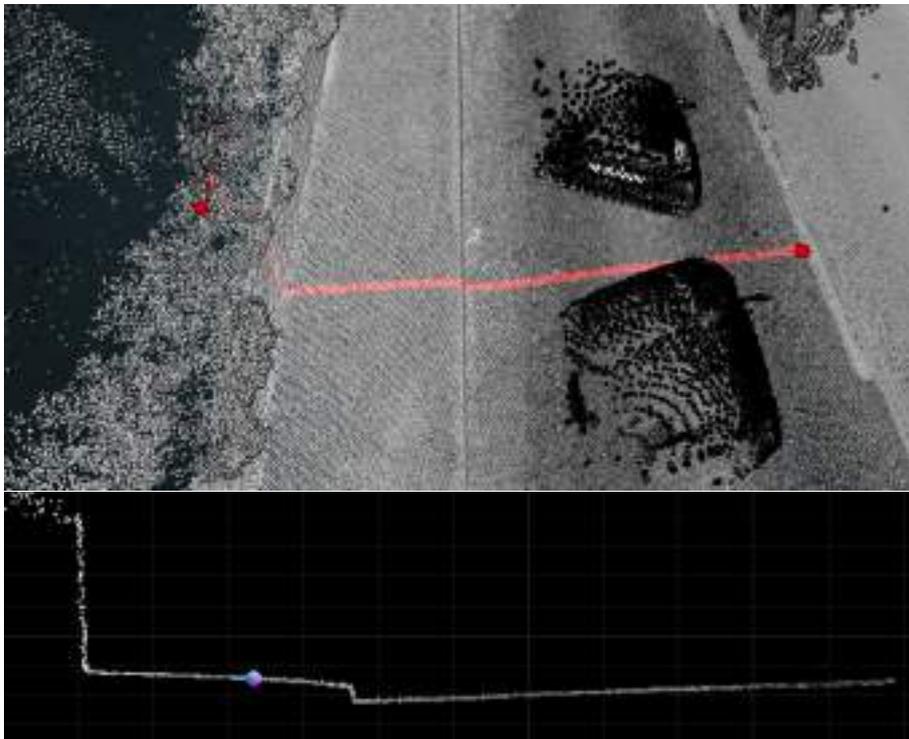
3. Driveway 3



4. Driveway 2



5. Beyond driveway 2.



APPENDIX 3

Photographs

View to the west showing driveways 1 and 2 to the right



View to the west showing footway crossfall



View into driveways 1 and 2



View into driveways 1 and 2



View to the east showing general highway arrangement



View to the east showing driveways 1 and 2



View to driveways 1 and 2 from southern side of carriageway

