

Technical Daylight Amenity Impact Assessment


Fibreline
Victoria Park Mills
Hard Ings Rd
Keighley
BD21 3ND

Prepared for: Bradford Metropolitan District Council

Prepared by: Michael Scanlan BSc (Hons) MRICS

Date: January 2017

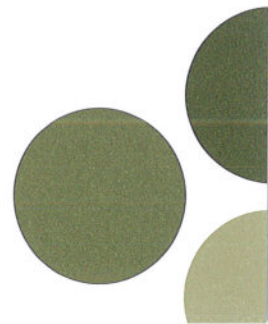
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Contents	Page
1. Executive Summary	3
2. Introduction	5
2.1 Background and Instructions	5
2.2 Scope of this Report	5
2.3 Professional Experience	5
2.4 The Fibreline Building	6
2.5 The Proposed Scheme	7
2.6 Information Relied upon and Site Specific Limitations	7
3. Technical Standards	9
3.1 BRE Site Layout Planning for Daylight and Sunlight	9
3.2 Vertical Sky Component ("VSC")	10
3.3 Daylight Distribution / No Sky Line ("NSL")	10
3.4 Average Daylight Factor	11
4. Assessment	12
4.1 Assessment Methodology	12
4.2 Vertical Sky Component Results	12
4.3 Daylight Distribution / No Sky Line Results	13
4.4 Average Daylight Factor Results	13
 Appendix 1: Existing and Proposed Massing Plans	
Appendix 2: Vertical Sky Component Results	
Appendix 3: No Sky Line Results	
Appendix 4: Average Daylight Factor Results	



1. Executive Summary

- 1.1.1 Bradford Metropolitan District Council is proposing a scheme for the widening of Hard Ings Road, requiring the construction of a new retaining wall in close proximity to the neighbouring building that we have referred to in this Report as the “Fibreline Building”.
- 1.1.2 FLD Limited own the Fibreline Building and have concerns that the construction of the new retaining wall would have a material adverse impact on the daylighting capability of the rooms within the single storey office block.
- 1.1.3 Gray Scanlan Hill is appointed to appraise the daylight impact of the proposed building works and this Report sets out our assessment methodology, findings and opinions.
- 1.1.4 Our appraisal is based on the provisions of the Building Research Establishment’s (“BRE”) *Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice*, which refers to the provisions of *British Standard BS8206-2:2008 Lighting to Buildings; Code of Practice for Daylighting*. Between them they provide an objective means for measuring and evaluating daylight amenity impact in the built environment.
- 1.1.5 The BRE Guidance and BS8206 between them confirm a number of different technical tests for evaluating daylight impact, including establishing the Vertical Sky Component (“VSC”) of a window, measuring the uniformity of daylight distribution within a room and calculating the Average Daylight Factor (“ADF”) of a room and we have performed these tests using market leading specialist computer software.
- 1.1.6 All office block windows will continue to achieve the BRE’s target 27% VSC, following the road widening and the construction of the new retaining wall. Further, the reduction in VSC is less than the 20% reduction considered permissible by the BRE and, on the grounds that the reduction would not be noticed by the room occupants.
- 1.1.7 At least 80% of each room’s area (measured at an internal working plane) receives access to direct sky light. The road widening and the construction of the new retaining wall will have no measurable negative impact on this position.
- 1.1.8 Six of the eight rooms served by the office block window provision currently achieve the BS8206 ADF aspirational target of 2%, and would continue to do so, following the construction of the new retaining wall. There are two rooms that do not currently achieve the BS8206’s 2% ADF - the construction of the new retaining wall will reduce these ADF values, but not to an extent that would be noticed by the room occupants.



1.1.9 On balance, in our professional opinion, the widening of Hard Ings Road and the construction of the new retaining wall on land adjacent to the Fibreline building will have no material adverse impact on the daylighting capabilities of the office block rooms.



2. Introduction

2.1 Background and Instructions

2.1.1 Bradford Metropolitan Borough District Council is proposing a scheme for the road widening of Hard Ings Road. To achieve that, BMDC need to acquire part of land owned by FLD Limited, located at Victoria Park Mills, Hard Ings Road, Keighley, West Yorkshire and freehold registered with the Land Registry under Title No. WYK683524.

2.1.2 The land being acquired is of sloping topography and it is necessary to construct a new retaining wall to facilitate the road widening. FLD have concerns that the construction of the retaining wall would have a material adverse impact on the existing daylighting conditions of the office block rooms of the adjacent "Fibreline Building".

2.1.3 Gray Scanlan Hill is appointed to appraise the daylight impact of BMDC's proposed works and this Report sets out our assessment methodology, findings and opinions.

2.2 Scope of this Report

2.2.1 Our appraisal is based on the provisions of the Building Research Establishment's ("BRE") *Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice*, which refers to the provisions of British Standard *BS8206-2:2008 Lighting to Buildings; Code of Practice for Daylighting*. Between them they provide an objective means for measuring and evaluating daylight amenity impact in the built environment.

2.2.2 We have undertaken a detailed daylight technical analysis and have scientifically measured, using computerised 3D massing simulations of the Site and specialist computer software, the amount of daylight that is available to the windows of the Fibreline Building offices, both in the existing and proposed conditions.

2.3 Professional Experience

2.3.1 This appraisal has been undertaken by Mike Scanlan, who is a Director at Gray Scanlan Hill. He has, over the course of the last 15 years, specialised in advising and representing his Clients on various third party development issues, including rights of light (common law), sunlight and daylight and overshadowing amenity assessments (for Town & Country Planning), Party Walls and access disputes / negotiations.



2.3.2 He commenced his training at building surveying Consultancy, Malcolm Hollis, until August 2005 when he became a founding Director of Gray Scanlan Hill, where he has continued to provide third party development consultancy advice to his Clients.

2.3.3 He has advised both developers and neighbouring adjoining owners on the impact of proposed developments. He has also accepted instructions to advise planning authorities on the practical application of the BRE guidelines.

2.3.4 A member of the Royal Institution of Chartered Surveyors ("RICS"), he has frequently lectured on third party development issues to fellow property professionals as part of numerous regional CPD programmes and conferences.

2.4 The Fibreline Building

The Fibreline building is a single storey, pitched roofed industrial building, located to the north of Hard Ings Road. It is supplemented by a single storey office block that has windows that directly overlook the proposed retaining wall that BMDC wish to construct.



2.4.1 The office block contains 14 separate windows, which serve eight individual rooms, most of which are of administrative office use, with some meeting room, kitchenette and storage facilities. A floor plan of the office block is provided at Appendix 3 below.

2.4.2 All internal walls comprise magnolia emulsion painted brick or plasterboard. Ceilings were a mixture of white painted plaster or timber board or mineral fibre suspended ceiling tiles in a lay-in grid. Fitted carpets are of various colours.

2.4.3 All rooms were noted to be supplemented with electric artificial lighting.

2.5 The Proposed Scheme

2.5.1 The building works proposed by BMDC can, in very general terms, be described as the widening of Hard Ings Road and the construction of a new retaining wall required to reconcile the obvious difference in topography / site levels between the existing public highway and the Fibreline Building. The massing images at Appendix 1 below illustrate the existing and proposed configuration between the two.

2.6 Information Relied upon and Site Specific Limitations

2.6.1 We have inspected the Site and walked its surroundings and in so doing have identified the window provision of the neighbouring building that overlooks the Site.

2.6.2 To facilitate the running of the computerised technical analysis, we have established digital 3D massing models of the Site and its immediate surroundings, both in its existing or baseline configuration and as is proposed. In establishing the 3D massing models, we have relied on the following information, provided to us by others:

- The results of a laser scan or Point Cloud Survey of the Site and its surroundings, commissioned and undertaken by BMDC Highways, enabling us to create a topographically accurate massing model of the existing Site and its surrounds.
- Proposed drawings of the road widening and the new retaining wall prepared by BMDC. OS levels and co-ordinates have been verified.

2.6.3 We have inspected the interior of the Fibreline office block, to better understand the physical relationship between the window provision and the rooms that it serves.

2.6.4 Our internal inspection also enabled us to identify room arrangements and take rooms measurements (using a "Disto") and also note the interior room finishes.



2.6.5 In performing the Average Daylight Factor calculations, we have used the following reflectance values for the internal surface finishes identified:

White painted plaster / timber board ceilings.	0.85
White mineral fibre suspended ceiling tiles plus grid.	0.85
Magnolia emulsion painted brick / plasterboard walls.	0.81
Light brown fitted carpets	0.3
Light red fitted carpets.	0.2
Dark grey fitted carpets.	0.1



3. Technical Standards

3.1 BRE Site Layout Planning for Daylight and Sunlight

3.1.1 This Guidance was produced following extensive consultation with architects, planning officers, consultants, professional institutions and Government officials.

3.1.2 The Guidance was first published in 1991 and superseded the Department of the Environment Guidance “Sunlight and Daylight Planning Criteria and Design of Buildings”. The current edition of the BRE Guidance was published in 2011.

3.1.3 Its overall purpose is to assist in evaluating the relationship between new and existing buildings / structures to ensure that each retains the potential to achieve a “fair share” of available daylight and sunlight given their relative siting, height and mass.

3.1.4 The provisions of the Guidance are not mandatory and the BRE have taken steps to confirm that it should not be read as an instrument of planning policy:

‘The guide is intended for building designers and their clients, consultants and planning officials. The advice given here is not mandatory and this document should not be seen as an instrument of planning policy. Its aim is to help rather than constrain the designer. Although it gives numerical guidelines, these should be interpreted flexibly because natural daylight is only one of many factors in site layout design’.

3.1.5 That said, the Guidance has become the industry standard methodology for assessing the adequacy of daylight and sunlight amenity in the built environment.

3.1.6 As confirmed above, to a great extent, the BRE Guidance aligns with British Standard *BS8206-2:2008 Lighting to Buildings; Code of Practice for Daylighting*.

3.1.7 The BRE Guidance and BS8206 between them confirm a number of different means or tests of evaluating daylight impact, including establishing the Vertical Sky Component of a window, the uniformity of daylight distribution within a room and calculating the Average Daylight Factor of a room. We have considered all of these measures in preparing this Report and a brief description of each test is set out below.



3.2 Vertical Sky Component ("VSC")

- 3.2.1 The VSC is a unit of measurement that represents the amount of visible sky that is capable of being received at the external face of a window. Daylight is derived directly from the sky. On that basis, the more unobstructed sky or sky visibility available to a window, the potential daylighting capability of the room served by it will increase.
- 3.2.2 The unit is expressed as a percentage, as it is the ratio between the amount of visible sky available to the window being tested, compared to that available from a totally unobstructed sky. To put this unit of measurement into perspective, the maximum percentage VSC value of a window located in a vertical plane is 50%, but in practice the VSC values do not typically exceed 40%, because of projecting window reveals and window heads which lessen / reduce the angles of measurement.
- 3.2.3 The BRE Guidance confirms that: *"... daylighting of an existing building may be adversely affected ... if ... the VSC measured at the centre of an existing ... window is less than 27%, and less than 0.8 times its former value"*.
- 3.2.4 In this regard, an aspirational target of 27% VSC is established for each window.
- 3.2.5 However, if a window already receives less than 27% VSC, then a reduction in the existing value of up to 20% (i.e. 0.8 x) is accepted as permissible on the basis that such a reduction is unlikely to be noticed by the building's occupants.
- 3.2.6 We would stress that should a window's VSC value be reduced by more than 20%, this does not mean that the window will ordinarily be left with inadequate levels of daylight; it simply means that the reduction in light will be more noticeable to the occupants.

3.3 Daylight Distribution / No Sky Line ("NSL")

- 3.3.1 BS8206 requires a uniformity of daylight distribution and recommends that a significant part (80%) of the room's area (measured at an internal working plane - BS8206 confirms that for offices this should be 700mm above internal floor level) receives direct sky light. This is evaluated through establishing the NSL within a room.
- 3.3.2 The NSL divides those parts of a room which can and cannot see the sky through its window provision. Those parts of a room beyond the NSL usually look dark and gloomy, compared with the rest of a room, because they receive no direct daylight.



3.3.3 The BRE Guidance confirms that it is permissible for the area of a room within the NSL to be reduced by 20% of its existing coverage, on the grounds that such a reduction in coverage would not be noticed by the room occupants.

3.4 Average Daylight Factor

3.4.1 The ADF is used as the measure of general illumination of a room from direct sky light.

3.4.2 The methodology for calculating the ADF a room emanates from BS8206.

3.4.3 The ADF is seen as a more representative test of internal daylight adequacy than other daylight amenity tests, as it is derived from the following variables:

- The Vertical Sky Component value measured at the face of the window.
- The size of the window (area of glazing).
- The size of the room being tested (internal surface area).
- The reflectance value of the internal finishes within the room being tested.
- The loss of transmittance through the glazing.
- The use of the room.

3.4.4 In order to achieve a predominantly day lit appearance, BS8206 suggests that the ADF of a room should be at least 2%, based on a CIE overcast sky.

3.4.5 BS8206 confirms that where a room is served by more than one window, the ADF should be calculated separately for each window and then summed / added together.



4. Assessment

4.1 Assessment Methodology

- 4.1.1 Our assessment follows the methodology set out in the BRE Guidance, which provides an objective means of calculating and measuring daylight amenity impact.
- 4.1.2 In order to scientifically appraise the impact that the massing of the Proposed Scheme will have on the daylight and sunlight amenity of the surrounding built environment, a computer generated 3D model has been established that simulates the massing of the Site and its surroundings in both its existing and proposed condition.
- 4.1.3 The assessment calculations have been undertaken using specialist computer software (known as "SOL", a widely used and market leading simulated light measurement software) to perform the BRE and BS8206 tests.
- 4.1.4 The information upon which the computer model and technical analysis is based, has been extracted from the information referred to in Section 2.6 of this Report.
- 4.1.5 Drawings showing the existing and proposed configuration of Hard Ings Road, the proposed retaining wall, and the Fibreline Building are provided at Appendix 1 below.

4.2 Vertical Sky Component Results

- 4.2.1 We have worked out the VSC for each of the windows of the office block of the Fibreline building in both the existing and proposed condition. The results of our Vertical Sky Component tests are tabulated at Appendix 2 below.
- 4.2.2 All 14 windows achieve in excess of the BRE's target 27% VSC in the existing condition. The results of our technical analysis have demonstrated that the construction of the new retaining wall will reduce the extent to which sky light is received from over that part of the public highway in front of the Fibreline building.
- 4.2.3 However, notwithstanding this measurable reduction in sky visibility, all windows will continue to achieve the BRE's target 27% VS, following the road widening and the construction of the new retaining wall. Further, the reduction in VSC is less than the 20% reduction considered permissible by the BRE and, in this regard, the measured reduction in VSC value will not be noticed by the room occupants.



4.2.4 On this basis, using the VSC measure, the proposed road widening and the construction of the new retaining wall will not have a material adverse impact on the daylighting conditions of the Fibreline office building.

4.3 Daylight Distribution / No Sky Line Results

4.3.1 We have measured the NSL for all office block rooms that that are served by the windows that overlook the proposed new retaining wall. The existing position of the NSL is shown edged red on the Contour Plots at Appendix 3.

4.3.2 To recap, those parts of the room within the NSL receive direct sky light at an internal working plane. In the existing condition, we have established that all eight rooms of the Fibreline office block receive direct sky light to in excess of 80% of each room's area.

4.3.3 Any movement in the NSL would be shown hatched green on the Contour Plots.

4.3.4 The results of our technical analysis confirm no movement in the NSL in any room and it can therefore be concluded that no room will suffer a measurable reduction in the extent to which direct sky light is distributed within the room.

4.3.5 On this basis, using the NSL measure, the proposed road widening and the construction of the new retaining wall will not have a material adverse impact on the internal distribution of direct sky light within the Fibreline office building.

4.4 Average Daylight Factor Results

4.4.1 We have calculated the existing and proposed ADF for all office block rooms and the tabulated results of this test are set out at Appendix 4 below.

4.4.2 In the existing condition we have established that six of the eight rooms achieve an ADF of in excess of BS8206's aspirational target of 2%. There are two rooms that have lower existing ADF values - a store (1.64% ADF) and a small office (1.98% ADF).

4.4.3 The results of our technical analysis have demonstrated that the construction of the new retaining wall will reduce ADF values. However, the six rooms that currently achieve the BS8206 2% ADF aspirational target will continue to do so.

4.4.4 The two rooms that do not achieve the 2% ADF aspirational targets suffer small reductions in ADF, but these reductions are significantly less than 20% of the existing measured ADF values and will therefore not be noticed by the room occupants.

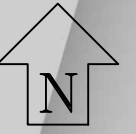


4.4.5 On this basis, using the ADF measure, the proposed road widening and the construction of the new retaining wall will not have a material adverse impact on the daylighting conditions of the Fibreline office building.



Appendix 1: Existing and Proposed Massing Plans







Fibreline

Hard Ings Road

Sources: City of Bradford Metropolitan District Council
Survey Info (received 24/11/16)
3D Laser Scan Survey

Proposed Info (received 07/11/16)
General Arrangement - Light Survey.dwg
Section_155,230.dwg

Key:  Existing Buildings
 Proposed Scheme

Project: Hard Ings Road
Keighley

Drawing Title: Plan View
Existing Site

Drawn By: JB

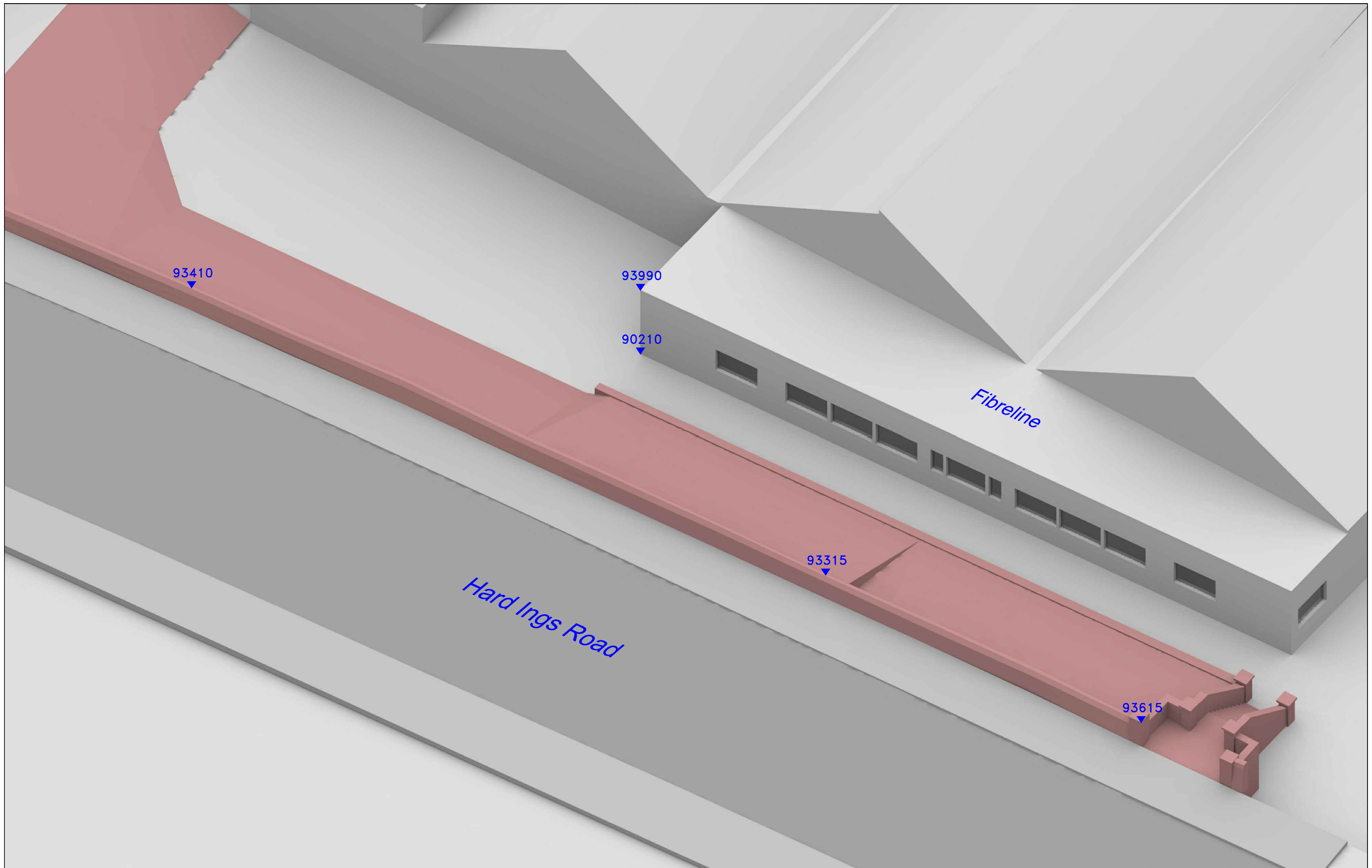
Date: Nov 16

Scale: 1:200 @ A3

Drawing No: W1021/01

7 Oasis Park,
Eynsham, Oxford,
OX29 4TP

t: 01865 881882
f: 01865 881891
@: www.waterslade.com



Sources: City of Bradford Metropolitan District Council
 Survey Info (received 24/11/16)
 3D Laser Scan Survey

Proposed Info (received 07/11/16)
 General Arrangement - Light Survey.dwg
 Section_155,230.dwg

Key: — Existing Buildings
— Proposed Scheme
 All Heights in mm AOD

Project: **Hard Ings Road
 Keighley**

Drawing Title: **3D View
 Existing Site**

Drawn By: **JB**

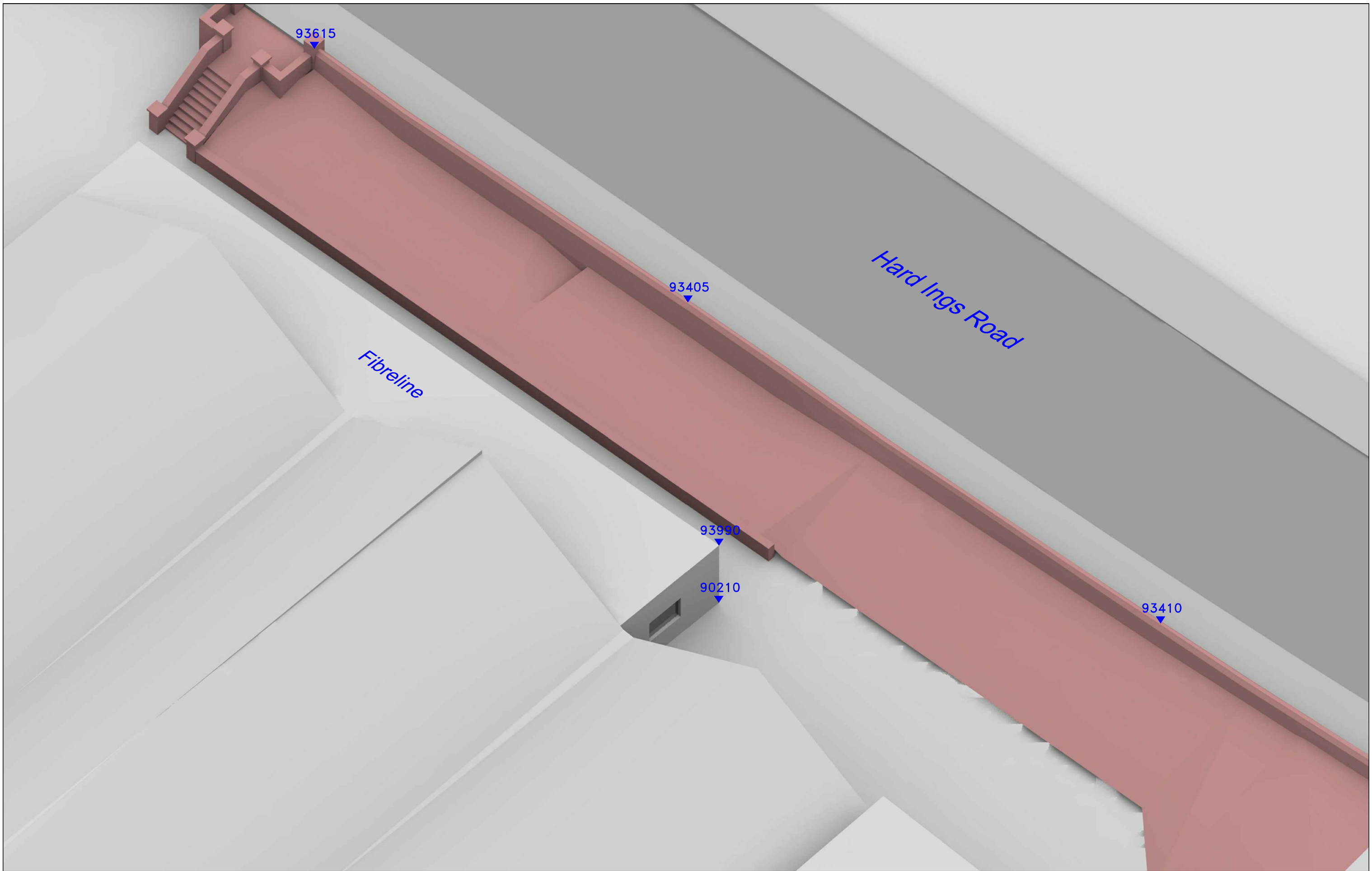
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Scale: **NTS @ A3**

Drawing No: **W1021/02**

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Sources: City of Bradford Metropolitan District Council
 Survey Info (received 24/11/16)
 3D Laser Scan Survey

Proposed Info (received 07/11/16)
 General Arrangement - Light Survey.dwg
 Section_155,230.dwg

Key: — Existing Buildings
— Proposed Scheme
 All Heights in mm AOD

Project: **Hard Ings Road
 Keighley**

Drawing Title: **3D View
 Existing Site**

Drawn By: **JB**

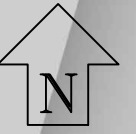
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Drawing No: **W1021/03**

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Fibreline

Hard Ings Road

Sources: City of Bradford Metropolitan District Council
Survey Info (received 24/11/16)
3D Laser Scan Survey

Proposed Info (received 07/11/16)
General Arrangement - Light Survey.dwg
Section_155,230.dwg

Key: — Existing Buildings
— Proposed Scheme

Project: **Hard Ings Road**
Keighley

Drawing Title: **Plan View**
Proposed Extension Dated 07/11/16

Drawn By: **JB**

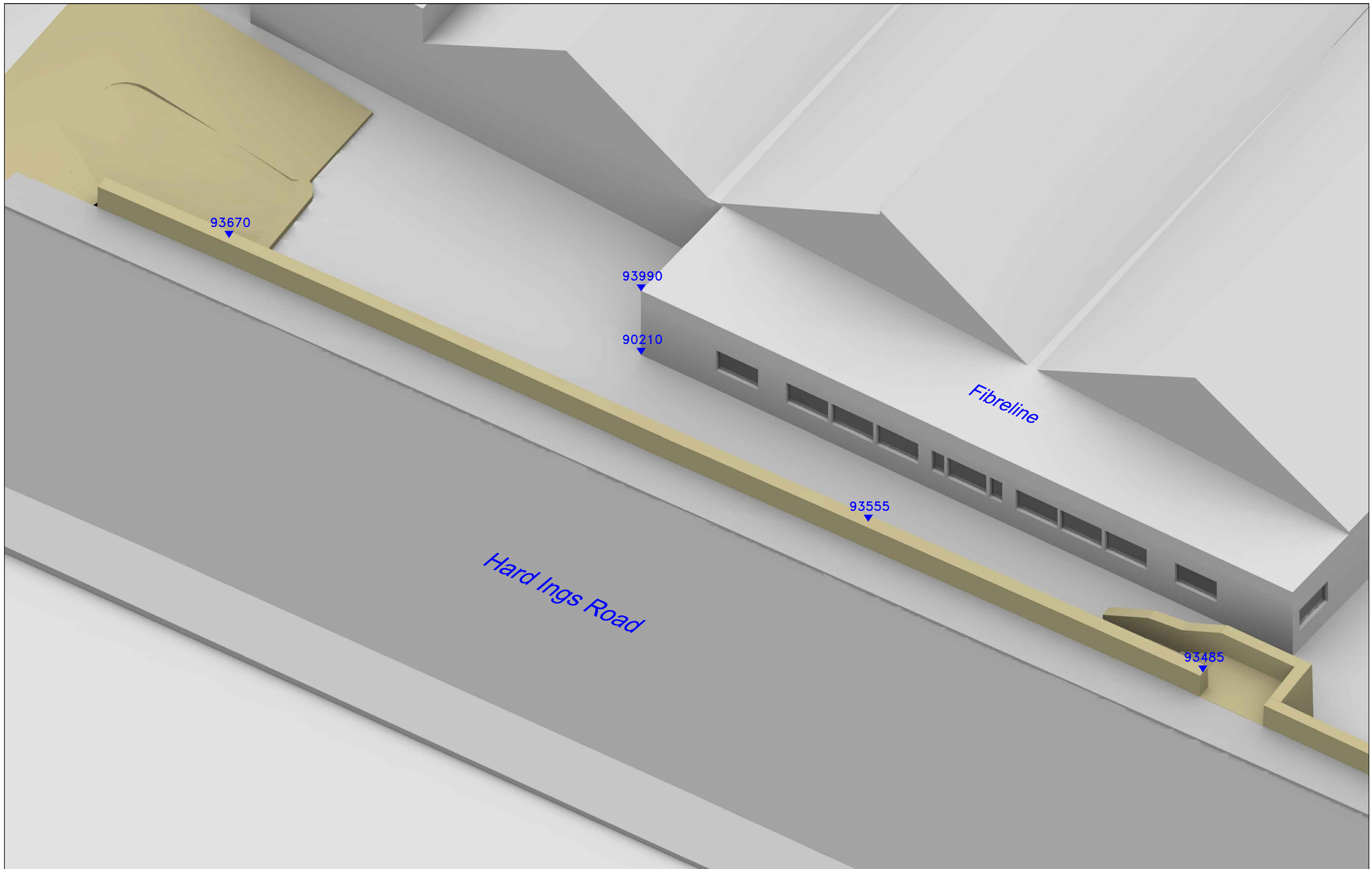
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Sources: City of Bradford Metropolitan District Council
 Survey Info (received 24/11/16)
 3D Laser Scan Survey

Proposed Info (received 07/11/16)
 General Arrangement - Light Survey.dwg
 Section_155,230.dwg

Key: — Existing Buildings
— Proposed Scheme
 All Heights in mm AOD

Project: **Hard Ings Road
 Keighley**

Drawing Title: **3D View
 Proposed Extension Dated 07/11/16**

Drawn By: **JB**

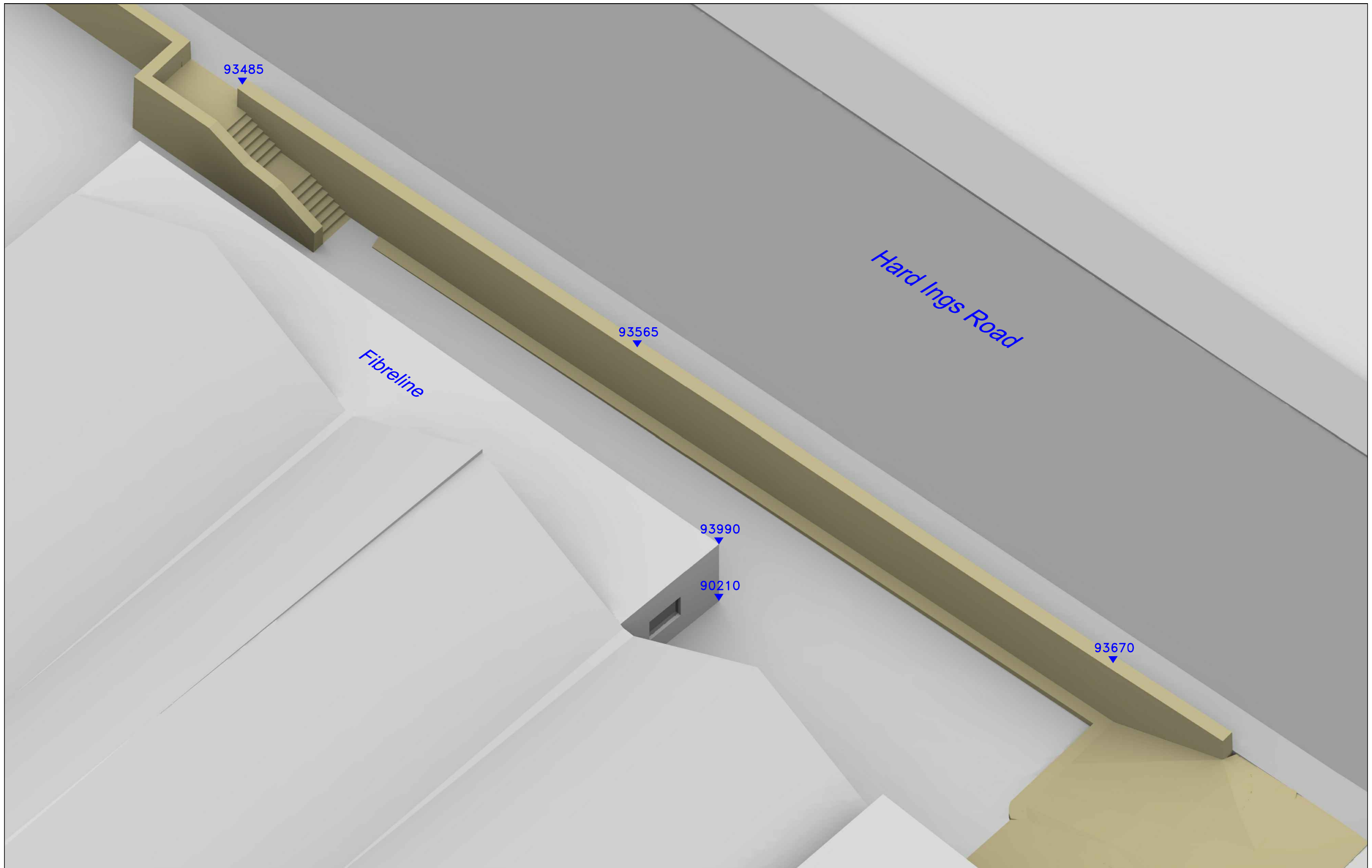
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Sources: City of Bradford Metropolitan District Council
 Survey Info (received 24/11/16)
 3D Laser Scan Survey

Proposed Info (received 07/11/16)
 General Arrangement - Light Survey.dwg
 Section_155,230.dwg

Key: — Existing Buildings
— Proposed Scheme
 All Heights in mm AOD

Project: **Hard Ings Road**
Keighley

Drawing Title: **3D View**
Proposed Extension Dated 07/11/16

Drawn By: **JB**

Date: **Nov 16**

Scale: **NTS @ A3**

Drawing No: **W1021/06**

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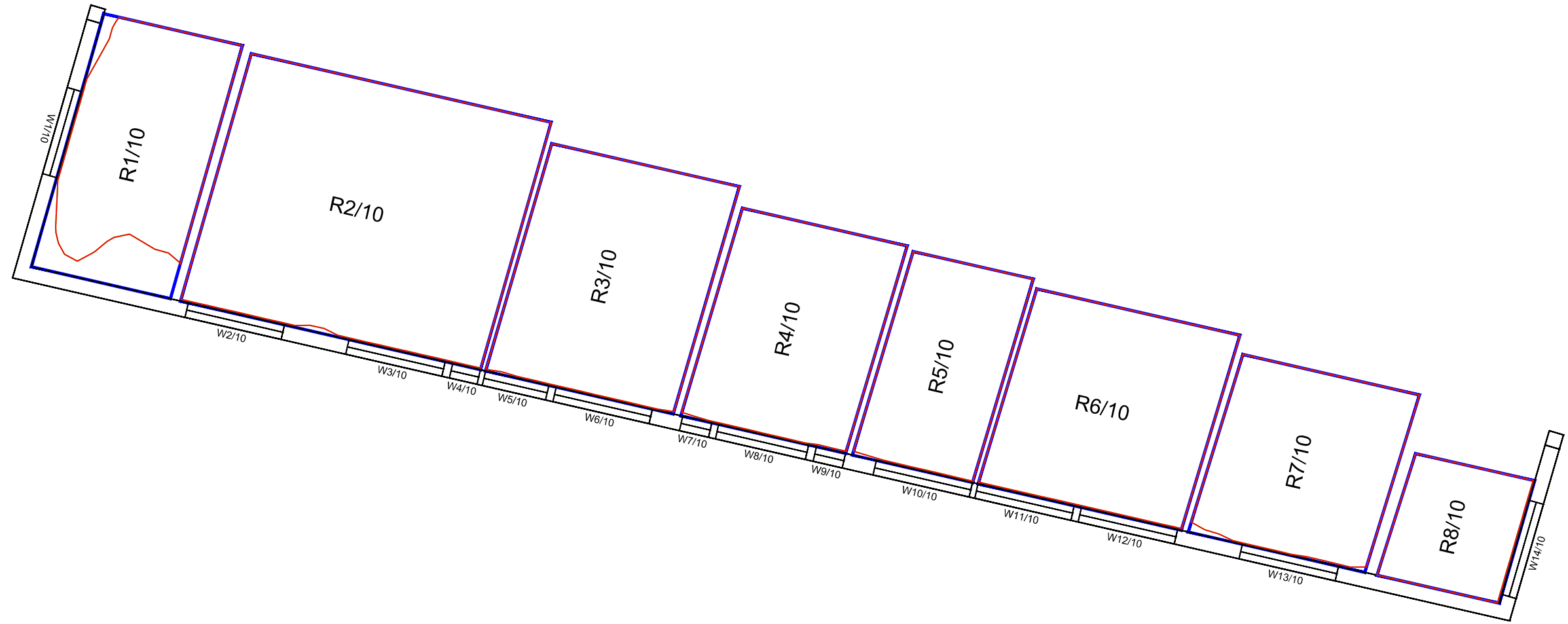
Appendix 2: Vertical Sky Component Results



Room	Room Use	Window	EXISTING VSC	PROPOSED VSC	LOSS VSC	%LOSS VSC	PASS/ FAIL
Fibreline							
R1/10	Store	W1/10	27.89	27.42	0.47	1.69	PASS
R2/10	Meeting Room	W2/10	35.54	31.70	3.84	10.80	PASS
R2/10	Meeting Room	W3/10	35.55	31.63	3.92	11.03	PASS
R2/10	Meeting Room	W4/10	35.57	31.60	3.97	11.16	PASS
R3/10	Office	W5/10	35.58	31.57	4.01	11.27	PASS
R3/10	Office	W6/10	35.61	31.53	4.08	11.46	PASS
R4/10	Office	W7/10	35.64	31.49	4.15	11.64	PASS
R4/10	Office	W8/10	35.66	31.46	4.20	11.78	PASS
R4/10	Office	W9/10	35.68	31.43	4.25	11.91	PASS
R5/10	Kitchen / Store	W10/10	35.71	31.39	4.32	12.10	PASS
R6/10	Office	W11/10	35.73	31.34	4.39	12.29	PASS
R6/10	Office	W12/10	35.76	31.21	4.55	12.72	PASS
R7/10	Office	W13/10	35.82	30.39	5.43	15.16	PASS
R8/10	Store	W14/10	39.39	37.13	2.26	5.74	PASS

Appendix 3: No Sky Line Results






Sources: City of Bradford Metropolitan District Council
 Survey Info (received 24/11/16)
 3D Laser Scan Survey

Proposed Info (received 07/11/16)
 General Arrangement - Light Survey.dwg
 Section_155,230.dwg

Key:

-  Existing NSL Contour
-  Proposed NSL Contour
-  Region of Loss / Gain

Project: **Hard Ings Road**
Keighley

Drawing Title: **No Sky-Line Contours**
Fiberline Building

Drawn By: **JB**

Date: **Nov 16**

Scale: **1:100 @ A3**

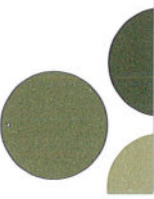
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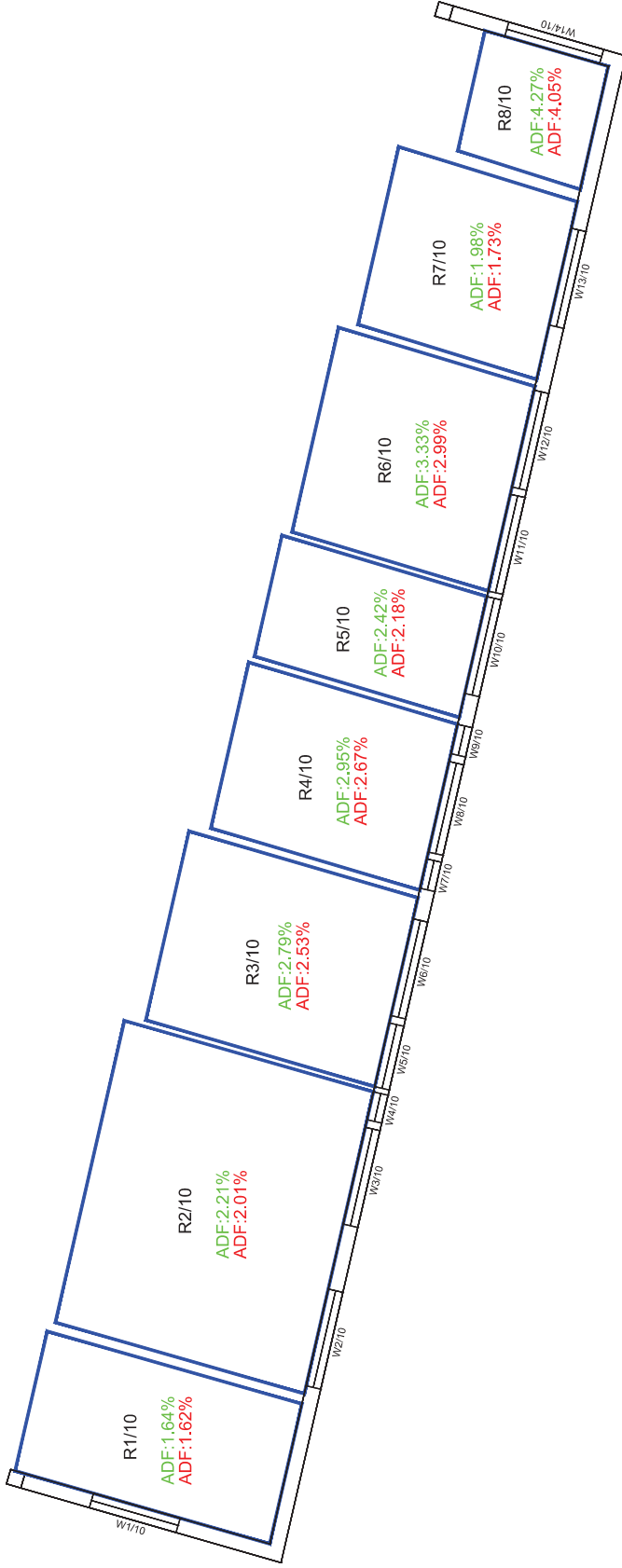
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Room/ Floor	Room Use	Whole Room	Prev sq ft	New sq ft	Loss sq ft	%Loss	Existing Coverage	Proposed Coverage
Fibreline								
R1/10	Store	164.5	135.5	135.5	0.0	0.0	82.37%	82.37%
R2/10	Meeting Room	347.2	344.4	344.4	0.0	0.0	99.19%	99.19%
R3/10	Office	199.9	198.4	198.4	0.0	0.0	99.25%	99.25%
R4/10	Office	160.5	159.2	159.2	0.0	0.0	99.19%	99.19%
R5/10	Kitchen / Store	114.7	113.7	113.7	0.0	0.0	99.13%	99.13%
R6/10	Office	186.0	184.3	184.3	0.0	0.0	99.09%	99.09%
R7/10	Office	147.3	145.0	145.0	0.0	0.0	98.44%	98.44%
R8/10	Store	69.3	68.3	68.3	0.0	0.0	98.56%	98.56%

Appendix 4: Average Daylight Factor Results





Sources: City of Bradford Metropolitan District Council
Survey info (received 24/11/16)
3D Laser Scan Survey

Proposed info (received 07/11/16)
General Arrangement - Light Survey.dwg
Section_155_230.dwg

Key:

Existing
Proposed

Project: Hard Ings Road
Keighley

Drawing Title: Average Daylight Factor Results
Fibertine Building

Drawn By: JB Date: Nov 16

Scale: 1:100 @ A3

Drawing No: W1021/ADF/01

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Room	Room Use	Window	EXISTING		PROPOSED		TOTAL LOSS	%LOSS ADF	PASS/ FAIL
			ADF	TOTAL	ADF	TOTAL			
Fibreline									
R1/10	Store	W1/10	1.64	1.64	1.62	1.62	0.02	1.16	PASS
R2/10	Meeting Room	W2/10	0.99		0.90				
R2/10	Meeting Room	W3/10	0.99		0.90				
R2/10	Meeting Room	W4/10	0.23	2.21	0.21	2.01	0.20	8.91	PASS
R3/10	Office	W5/10	1.09		0.99				
R3/10	Office	W6/10	1.70	2.79	1.54	2.53	0.26	9.22	PASS
R4/10	Office	W7/10	0.52		0.47				
R4/10	Office	W8/10	1.91		1.73				
R4/10	Office	W9/10	0.52	2.95	0.47	2.67	0.28	9.43	PASS
R5/10	Kitchen / Store	W10/10	2.42	2.42	2.18	2.18	0.24	9.75	PASS
R6/10	Office	W11/10	1.66		1.50				
R6/10	Office	W12/10	1.67	3.33	1.49	2.99	0.34	10.15	PASS
R7/10	Office	W13/10	1.98	1.98	1.73	1.73	0.25	12.43	PASS
R8/10	Store	W14/10	4.27	4.27	4.05	4.05	0.22	5.22	PASS