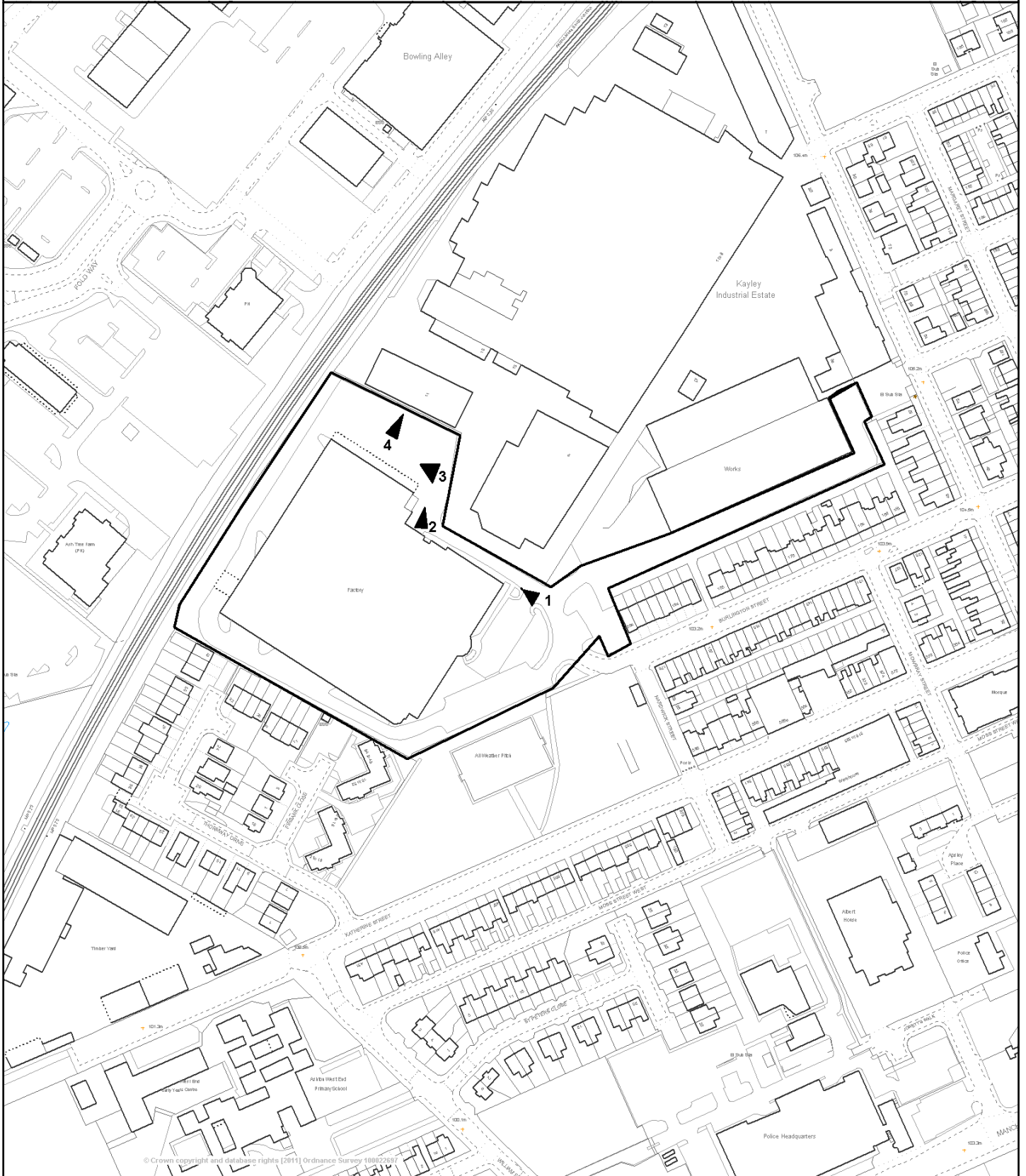


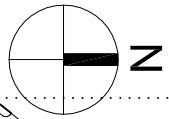
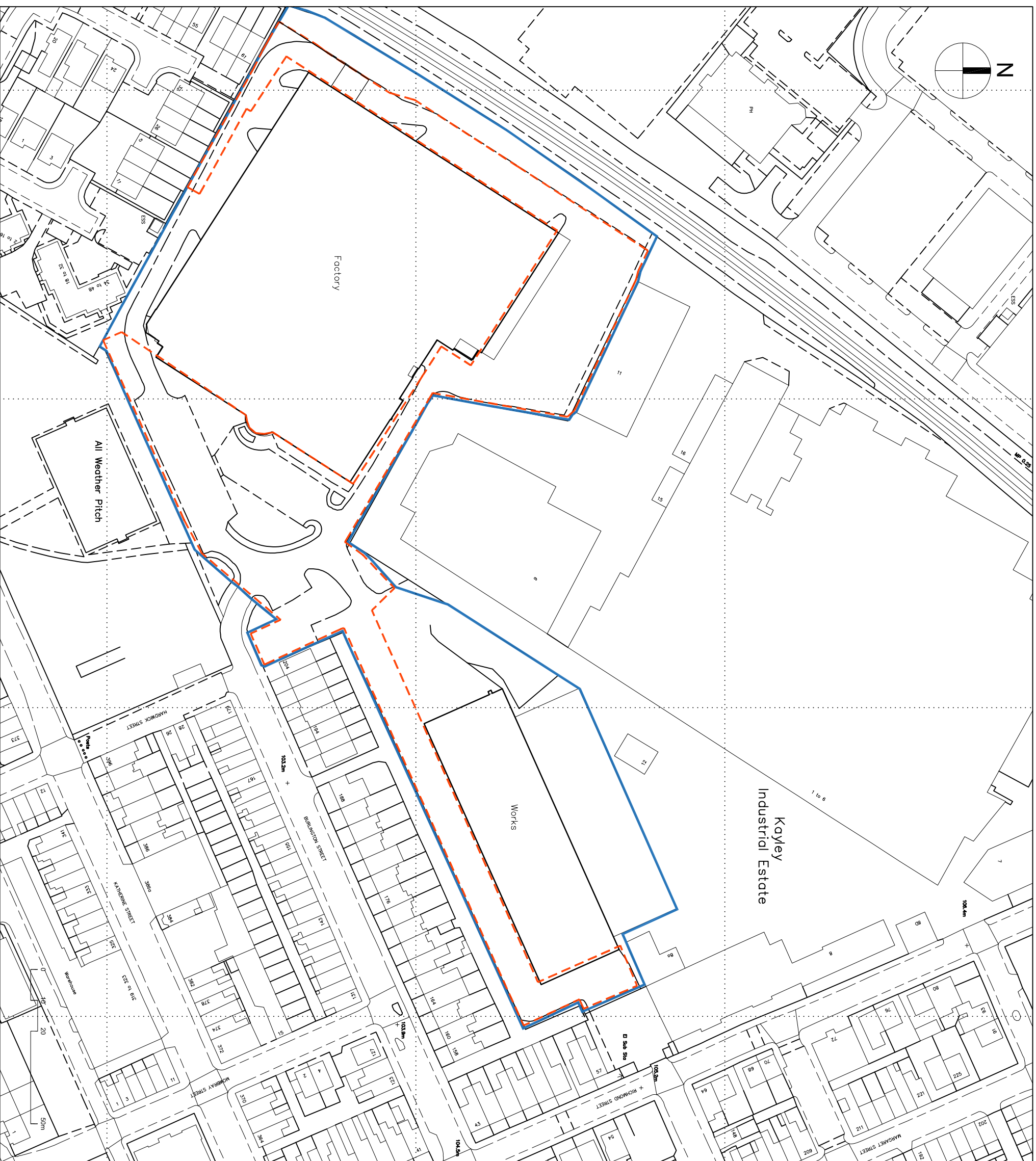
Planning Application 16/01066/FUL





Scale 1/2500 Date 6/2/2017

Centre = 392831 E 398876 N

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-  Denotes area of ownership
-  Denotes application boundary

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**Notes**

Rev	Date	Revision Note	By	Chk
A	05.10.16	Application boundary amended	MA	JPH

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**Project:**  
Whitecroft Factory Expansion

**Title:**  
Location Plan

**Drawn:** MA  
**Checked:** JPH

**Date:** SEPT 2016  
**Scale:** 1:1250@A3

**Status:** PLANNING  
**Number:** WSA.03339.P1.01  
**Revision:** A

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**NOTES**

- Denotes area of ownership
- Denotes application boundary
- Proposed building
- Existing Building
- Proposed car parking area  
Total: 233 spaces
- Existing car parking area
- Existing planted areas
- Proposed recycling and storage area



Proposed Site Plan

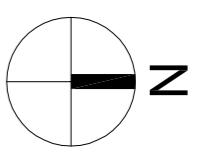
Rev	Date	Revision Note	By	Chk
G	16.11.16	Minor amendments made to parking zone strategy details. Motorcyclist parking removed.	GC	JPH
F	15.11.16	Minor amendments made to parking areas.	GC	JPH
E	02.11.16	Minor amendments made to parking areas. GC, JPH	GC	JPH
D	19.10.16	Parking amended. Waste skip added in line with client request.	SM	JPH
C	05.10.16	Building outline updated and application building layout amended.	MA	JPH
B	23.09.16	Vehicle tracking added. Building footprint and parking layout amended.	MA	JPH
A	16.09.16	Contextual information added.	MA	JPH

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Project: Whitecroft Factory Expansion  
Title: Proposed Site Plan  
Date: SEPT 2016  
Scale: 1:500 @ A1  
Sheet: WSA039.P1.03  
PLANNING

Author: JPH  
Number: 1:500 @ A1  
Revision: G



EXISTING SITE PLAN

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Notes

- Denotes area of ownership
- Denotes application boundary
- Existing Buildings
- Existing Planted areas
- Existing Parking Provision  
Total: 206 spaces
- Existing recycling and storage areas

Rev	Date	Revision Note	By	CHK
C	01.10.16	Minor amendment to parking areas	GC, JPH	
B	03.10.16	Application boundary amended	MA, JPH	
A	16.09.16	Contextual information added	MA, JPH	

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 Drawing: Existing Site plan  
 Title: SEP 2016  
 Date: 1:500@A1  
 Scale: 1:500@A1  
 Number: WSA.0399.P1.02  
 Revision: C  
 Author: JPH  
 Designer: JPH  
 Checker: JPH  
 Approver: JPH  
 Date: 1:500@A1  
 Scale: 1:500@A1  
 Number: WSA.0399.P1.02  
 Revision: C

Application Number: 16/01066/FUL

Photo 1



Photo 2

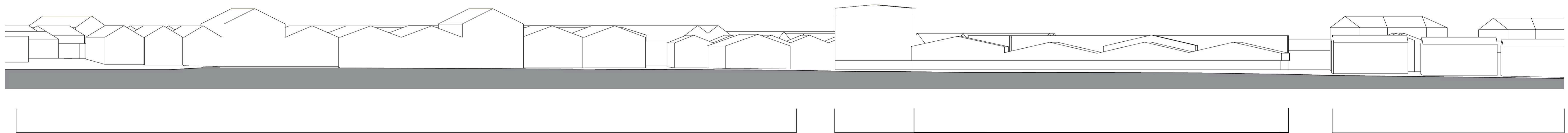
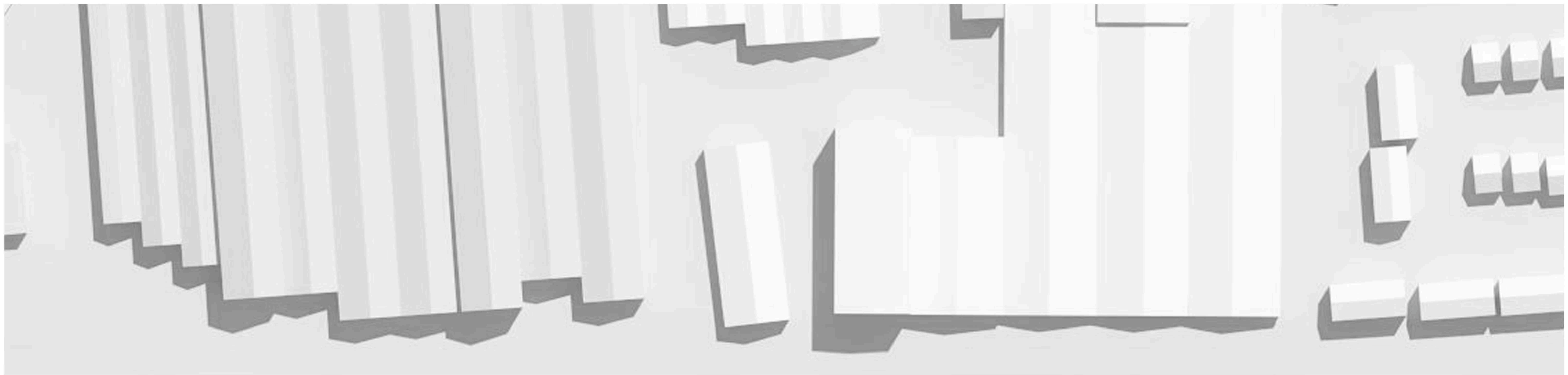


Photo 3



Photo 4





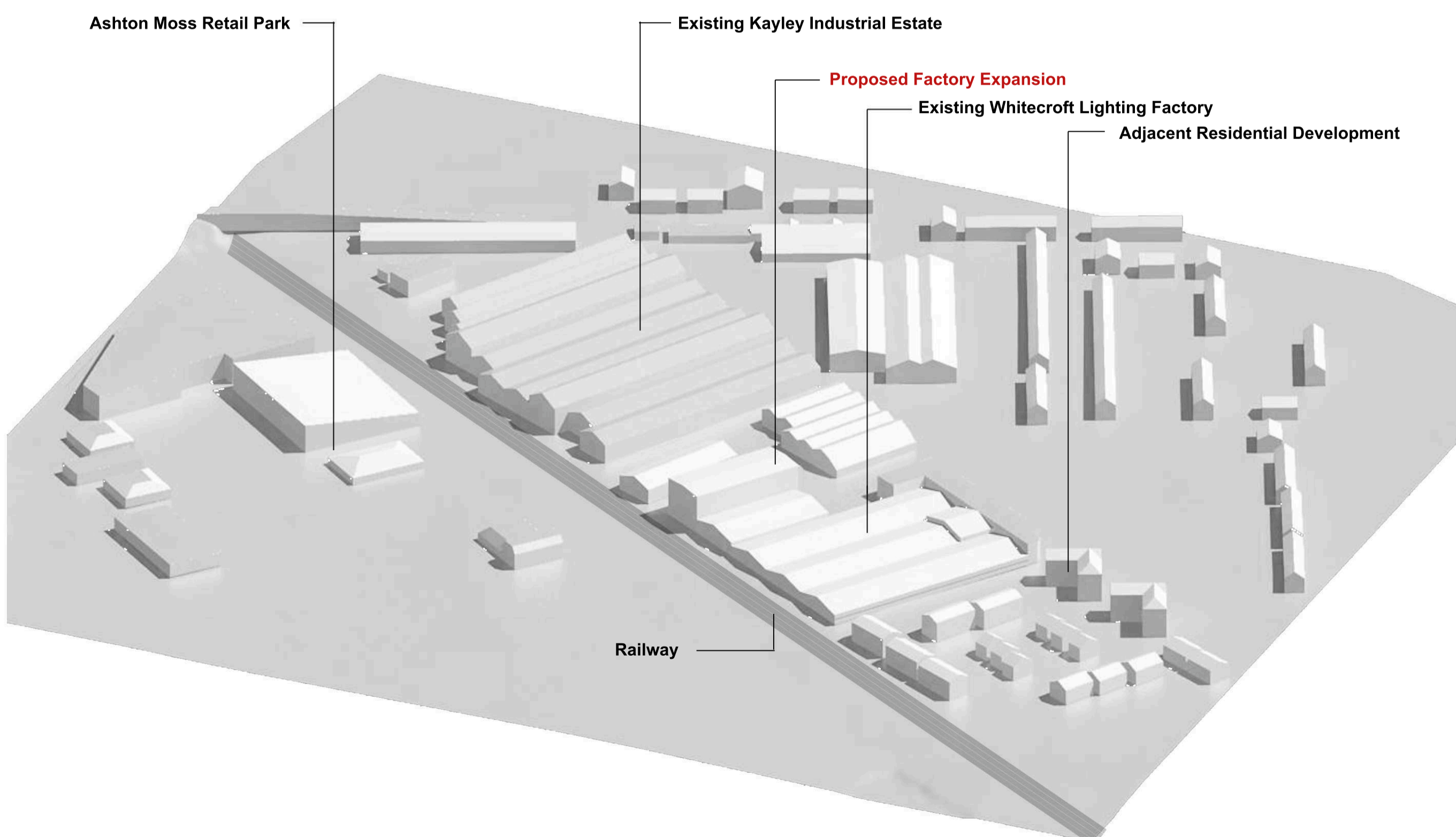
Context elevation along railway

Existing Kayley Industrial Estate

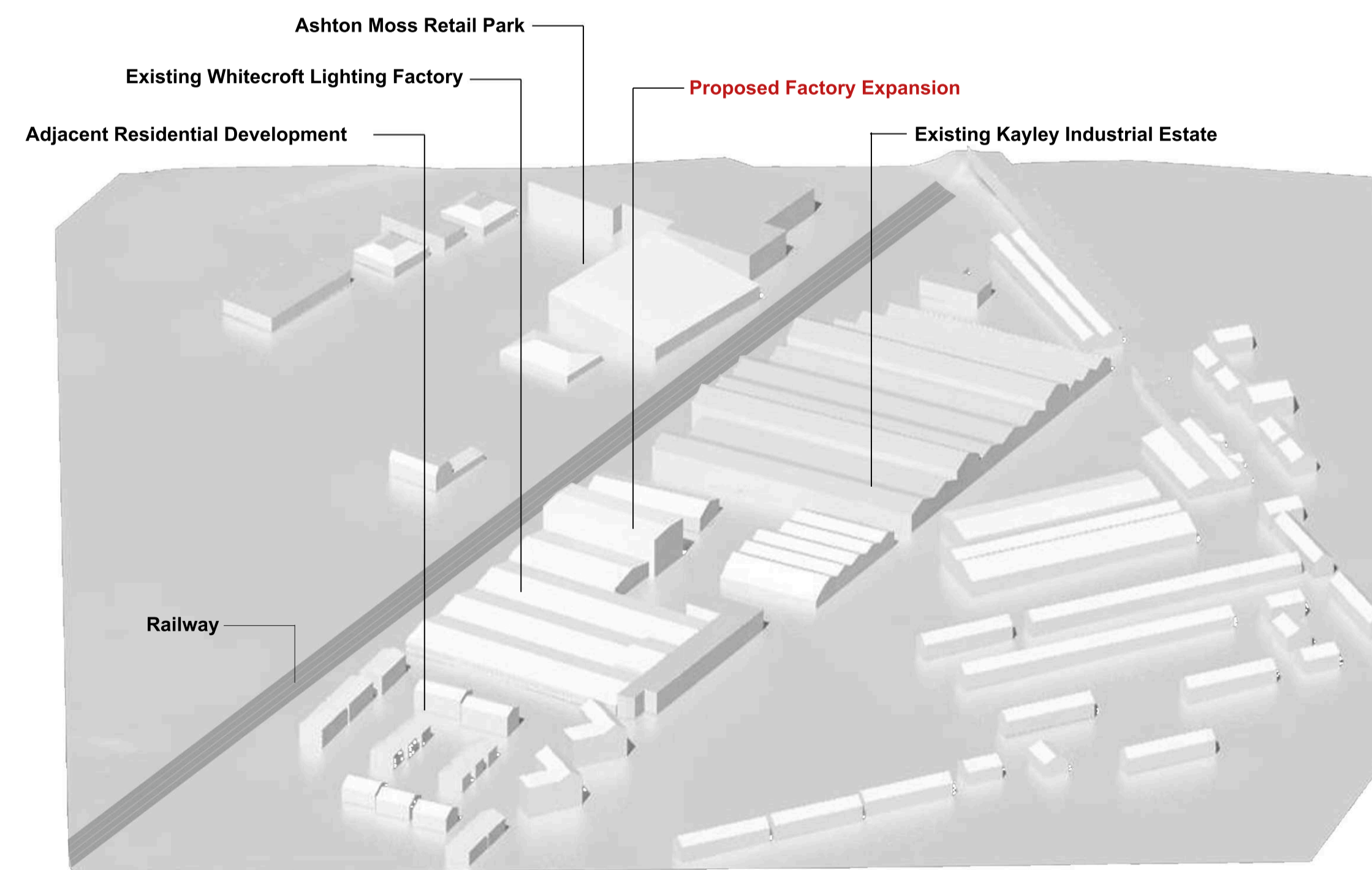
Proposed Factory Expansion

Existing Whitecroft Lighting Factory

Adjacent Residential Development



3D massing view from south-west



3D massing view from south-east

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Notes

Rev	Date	Revision Note	By	Chk

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Project: Factory Expansion Project  
 Title: Context Massing  
 Drawn: SM  
 Status: PLANNING  
 Checked: JP  
 Date: JAN 2017  
 Number: -  
 Scale: 1:500@A1  
 Revision: WSA.0339.P1.13



**PAGERPOWER**

## **TV Interference Mitigation Scheme**

**Prepared for Walker Simpson**

**Whitecroft Lighting – Factory  
Expansion Project**

January, 2017





## ABOUT PAGER POWER

Pager Power is a dedicated consultancy company based in Suffolk, UK. The company has undertaken projects in 43 countries within Europe, Africa, America, Asia and Australia.

The company comprises a team of experts to provide technical expertise and guidance on a range of planning issues for large and small developments.

Pager Power was established in 1997. Initially the company focus was on modelling the impact of wind turbines on radar systems. Over the years, the company has expanded into numerous fields including:

- Renewable energy projects.
- Building developments.
- Aviation and telecommunication systems.

Pager Power prides itself on providing comprehensive, understandable and accurate assessments of complex issues in line with national and international standards. This is underpinned by its custom software, longstanding relationships with stakeholders and active role in conferences and research efforts around the world.

Pager Power's assessments withstand legal scrutiny and the company can provide support for a project at any stage.

## INTRODUCTION

### Purpose of this Document

This document sets out the approach for investigation and alleviation of potential disruption to TV services as a result of the Whitecroft Lighting Factory Expansion Project. This document also sets out the process to be followed regarding baseline and post-construction reception surveys. This document will be supported by completion of a TV baseline reception survey in potentially affected areas.

### Introduction

Building developments can cause disruption to TV signals. In cases where interference attributed to a building is experienced, the developer has the responsibility to mitigate the impact.

This document sets out the recommended procedure for:

- 1) Quantifying the interference effect.
- 2) Determining whether the interference is due to the development.
- 3) Provision of mitigation.

Any reported interference will be thoroughly investigated by means of signal measurement, comparison with the baseline survey measurements and desk-based modelling where appropriate. The modelling approach to be implemented is described within this document.

The cause of any reported interference will be investigated further by quantifying the television signal strength and quality during a television reception survey.

A schedule of mitigation options which could be employed in the event of interference being experienced is provided within this document.

## METHOD

### TV Signals

Terrestrial television signals propagate from transmitters to receiving aerials which in turn are connected to television receiving equipment. Terrestrial TV coverage in the vicinity of the proposed extension is likely to be provided by the Winter Hill main transmitter. This transmitter broadcasts digital services.

Standard receiving aerials are directional meaning that signals from the direction of the transmitter are amplified and signals from other angles are attenuated.

There are two ways that buildings can cause interference to television reception, these are described below.

### Obstruction of the signal

This is caused by the building physically blocking the transmitted TV signal, reducing the strength of the carrier signal in the shadow of the building. In the case of Winter Hill transmissions, this would affect residences to the southeast of the development.

- The highest losses (greatest interference) will be located immediately behind the building.
- Losses near the edge of the shadow zone will be less significant due to diffraction effects (bending of the signal).

Ofcom has produced a document<sup>1</sup> offering guidance on this issue. It is stated within this document that:

*“In general, there will be three ‘zones’ behind the structure:*

*Zone A - close behind the structure (typically a few tens of metres) there may be a large reduction in signal level with a possible complete loss of reception*

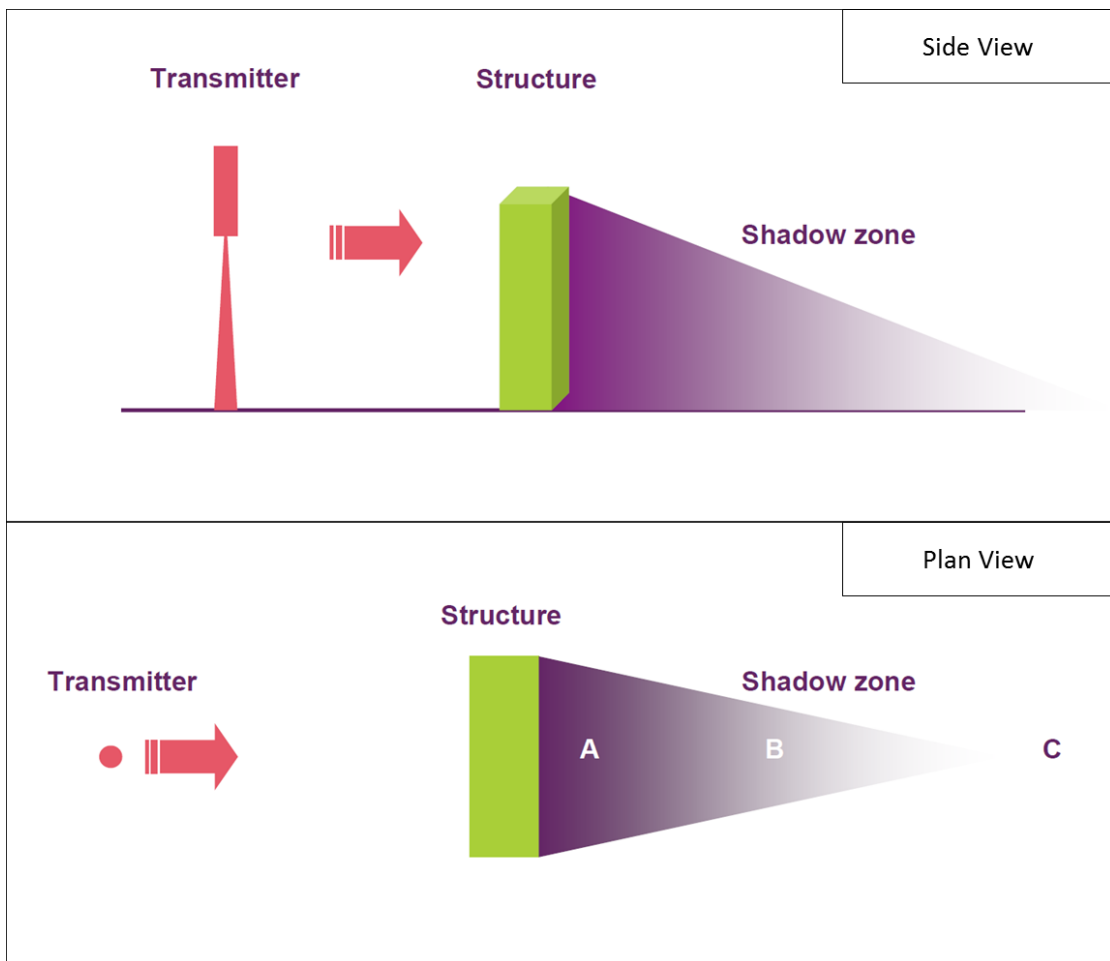
*Zone B - further away (typically a few hundred metres) the signal reduction is less severe and the shadow will be smaller as diffraction effects partially fill in the shadow. Depending on the size of the structure, some locations could still lose reception completely*

*Zone C - some distance away (1-5km) the shadow will effectively have disappeared.”*

The zones mentioned are illustrated in the figure on the following page, taken from Section 3.2 of the Ofcom guidance regarding the impact of buildings on broadcast signals.

---

<sup>1</sup> Ofcom (2009): Tall Structures and their impact on broadcast and other wireless services

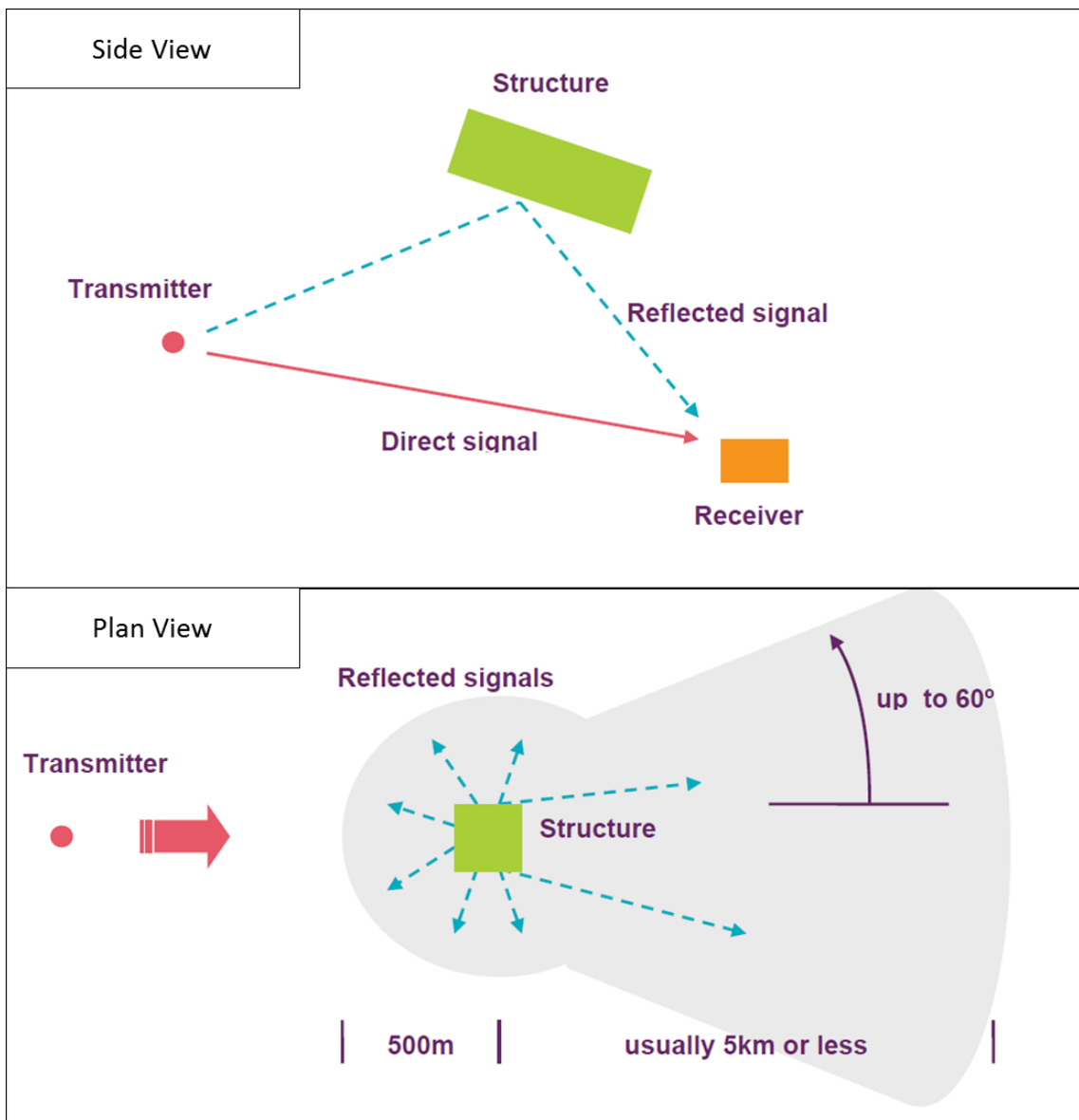


*Diffraction Loss Zones (Source: Ofcom guidance)*

### Reflection of the signal

For large developments with straight edges, the transmitted signal can be reflected by the building itself. This causes an effect known as 'multipath interference' whereby the signal is received twice by an aerial at different times. The direct signal arrives first because it has a shorter distance to travel.

The figure on the following page (taken from Section 3.3 of the Ofcom guidance referenced above) illustrates this effect.



Reflection Zones (Source: Ofcom guidance)

In practice, it is considered highly unlikely that reflections will have an effect for receivers in front of the building or on either side when viewed from the location of the transmitter. For digital transmissions in particular, it is unlikely that issues will occur if the angle between the direct signal and the reflected signal is more than 30 degrees<sup>2</sup>.

The reflection zone has been constructed in accordance with the Ofcom approach, however the angle considered is 30 degrees rather than 60 degrees. This is in order to represent a more realistic scenario for digital transmissions.

<sup>2</sup> This is the angle that Arqiva considers when safeguarding its Television Re-Broadcast Links with regard to reflections from wind turbines – whilst wind turbines cause issues that are different to buildings this particular issue is similar for the two.

No location can be affected by both diffraction (shadowing) and direct reflections for this development.

Reflection issues are most likely to cause a noticeable impact if:

- The direct signal from transmitter to receiver is weak (e.g. obstructed by terrain or buildings).
- The reflected signal from the building is strong (e.g. clear radio line of sight from the transmitter to the building and the building to the receiver).

The worst case scenario is for both of the above conditions to be satisfied. The best case scenario is for neither of the above conditions to be satisfied.

### Schedule of Mitigation Options – TV

Below is a list of standard actions to mitigate TV reception issues caused by building developments:

1. Replacement of receiving aerial with a more directional, or higher gain, aerial.
2. Repositioning the receiving aerial so that its received signal is stronger.
3. Directing the receiving aerial to an alternative transmitter that covers the area and retuning the television accordingly.
4. Upgrading antenna cabling and connections.
5. Installation of signal amplifiers.
6. Development of a bespoke local solution using a receiving aerial some distance from the dwelling.
7. A combination of the above.
8. Replacing terrestrial reception equipment with satellite or cable reception equipment.

Actions 1-5 are unlikely to occur as individual solutions and are likely to be deployed in combination.

Actions	Basis
Combination of #1-5 aerial system upgrade	Per residence
#6 bespoke reception system	Per residence / per area
#7 combination of 1-6	Per residence / per area
#8 satellite installation	Per residence

The requirement for the implementation of such measures will be addressed on a case-by-case basis.

## RECEPTION SURVEY

### Overview

Reception surveys support desk-based modelling in order to determine the cause of interference. By characterising the signal and quantifying any changes in received power, the effect of a building development on reception quality can be evaluated.

### Purpose

The purpose of a reception survey is to:

- Confirm which TV transmitters are serving the relevant areas.
- Quantify the current TV reception quality.
- Characterise the signal behaviour.

### Survey Process

Measurements will be taken using a wideband UHF TV aerial, extended to 10 metres above ground level in order to simulate a typical household aerial. Measurements will be taken using an advanced signal analyser that records the required data.

## **PROTOCOL FOR DEALING WITH ANY COMPLAINTS FOLLOWING COMPLETION OF THE FACTORY EXTENSION**

### **Overview**

Notification of complaints regarding TV interference will be limited to a fixed period of 12 months from the commissioning of the development. Complaints will be made to the LPA or to the building developer. If it is found that the interference is attributable to the development, mitigation will be put in place. Investigation of any issues will be undertaken within six weeks of the developer being notified of a complaint in writing. Any required mitigation will be installed within eight weeks of completion of the investigation.

### **Protocol**

The recommended process for addressing complaints is as follows.

- Step 1** Consider the location of the reported interference with reference to the transmitters and the factory extension and the desk-based analysis and the baseline reception survey.
- Step 2** Carry out measurements at relevant locations (where complaints have been received). Characterise interference to determine the cause. Investigate receiving equipment where appropriate.
- Step 3** Determine whether the interference is attributable to the Whitecroft Lighting Factory Expansion Project based on steps 1 and 2.
- Step 4** Apply mitigation if required, based on step 3. The requirement for the implementation of such measures will be addressed on a case-by-case basis.

### **References**

The following published works have been considered in the process of devising Pager Power's modelling approach:

1. Ofcom (2009), *Tall Structures and their impact on broadcast and other wireless services*
2. Bacon, DF, 2002, *A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance*, Radio Communications Agency
3. BBC, The impact of large buildings and structures (including wind farms) on terrestrial televisions reception



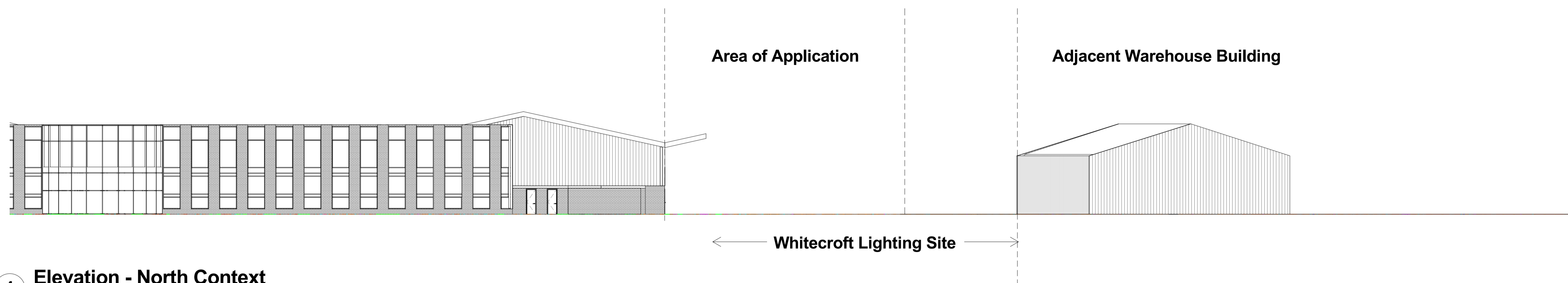


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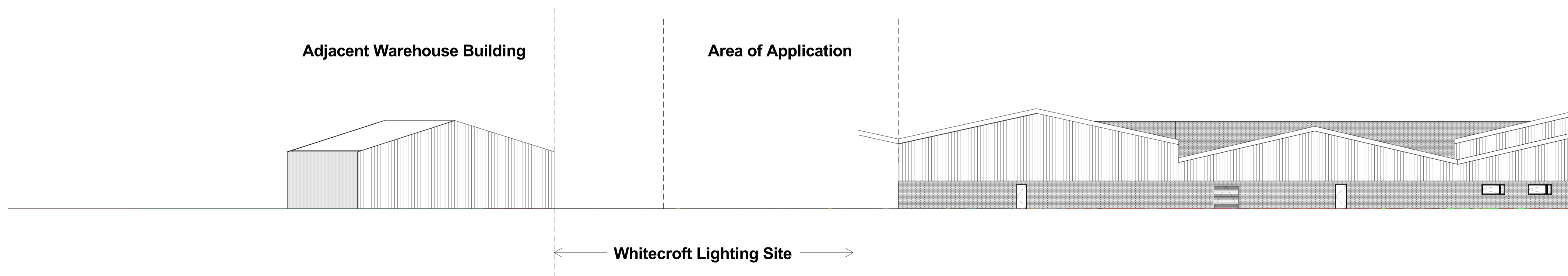
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**1** Elevation - North Context  
1 : 200



**2** Elevation - South Context  
1 : 200

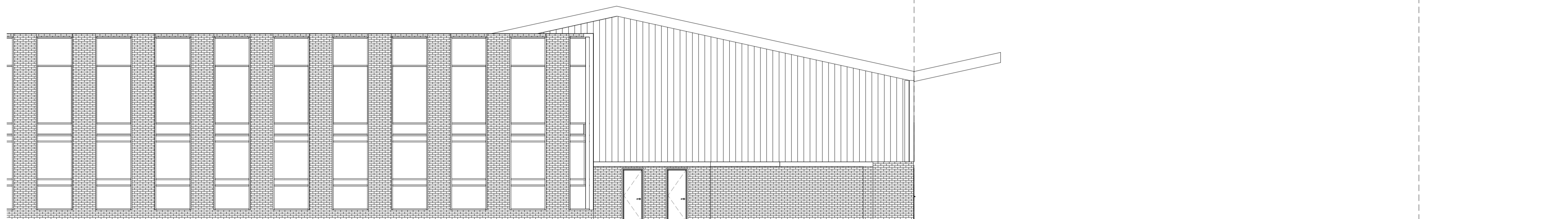
Rev	Date	Revision Note	By	Chk
B	16/11/16	Notes added for clarification	GC	JPH
A	05/10/16	Note added to clarify ownership boundary	GH	JPH

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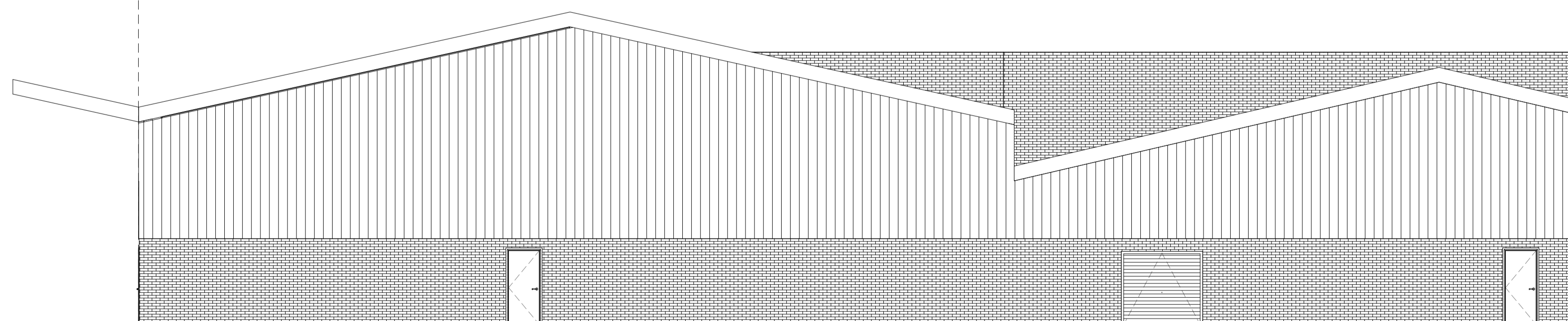
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 Title: Existing Context Elevations  
 Drawn: GH  
 Checked: BM  
 Date: 29.09.16  
 Status: Planning  
 Scale: 1 : 200 @ A1  
 Revison: B  
 Number: WSA.0339.P1.04

Area of Application



**1** Elevation\_E  
1 : 100

Area of Application



**2** Elevation\_W  
1 : 100

A 06/10/16 Amendments to existing site plan incorporated. Notes added GH JPH



Rev	Date	Revision Note	By	Chk

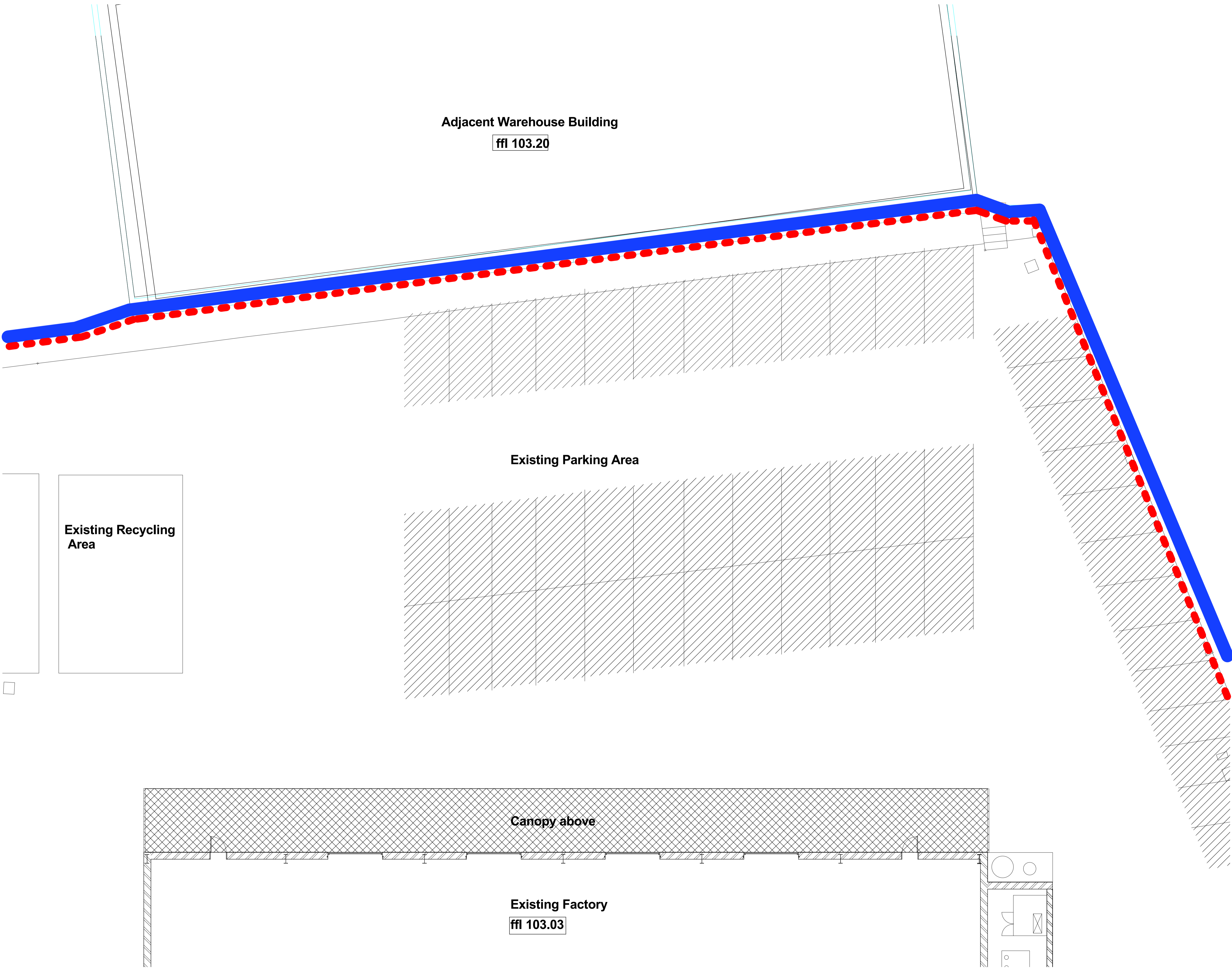
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Project: Factory Expansion Project  
 Title: Existing Elevations- East & West  
 Drawn: GH Checked: BM Date: 29/09/16 Scale: 1 : 100 @ A1  
 Status: Planning Number: WSA.0339.P1.09 Revision: A

Notes

-  Denotes area of ownership
-  Denotes application boundary

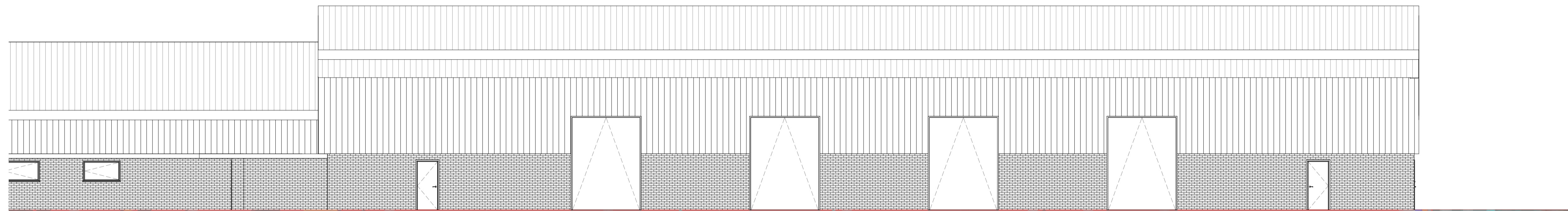


Rev	Date	Revision Note	By	Chk
B	16/11/2016	Notes added for clarification	GC	JPH
A	06/10/2016	Building footprint amended	AC	JPH

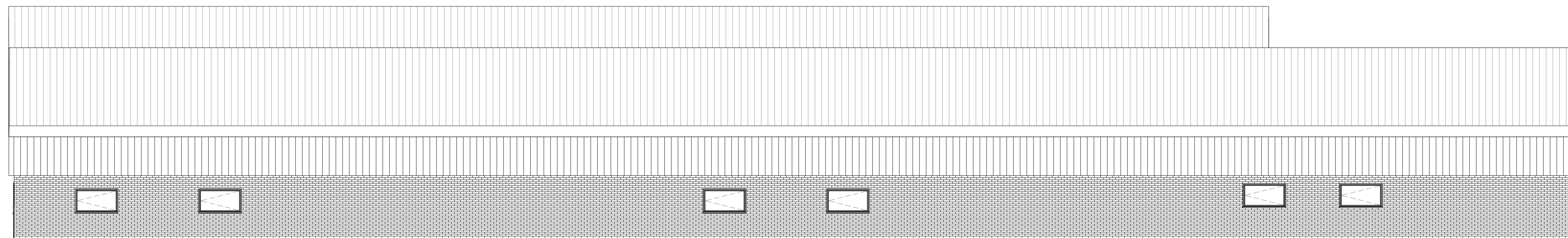
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Project: Factory Expansion Project  
 Title: Existing Ground Floor Plan

Drawn: AC	Checked: JPH	Date: 23/09/16	Scale: 1:100@A1
Status: Planning	Number: WSA.0339.P1.06	Revised: B	



1 Elevation\_N  
1 : 100



3 Elevation\_S  
1 : 100

A 05/10/16 Amendments to existing site plan incorporated; updated roller shutters and doors on North Elevation GH JPH

Rev	Date	Revision Note	By	Chk

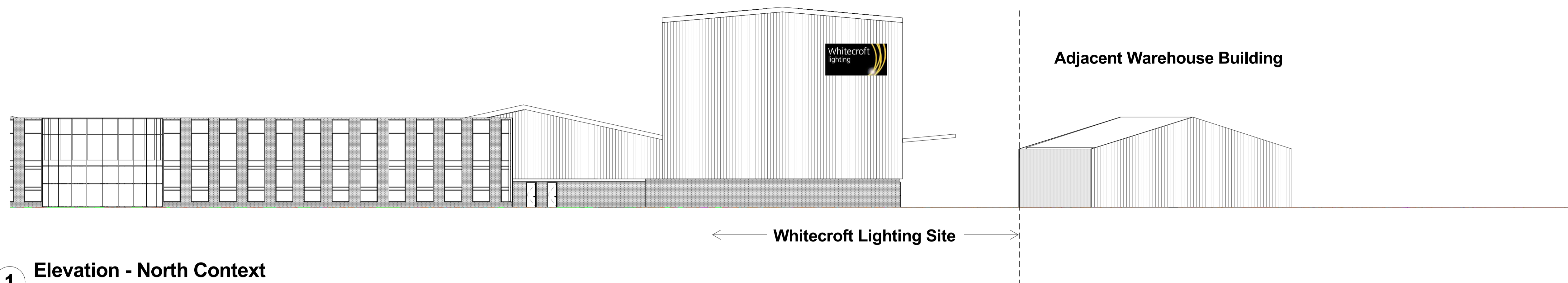
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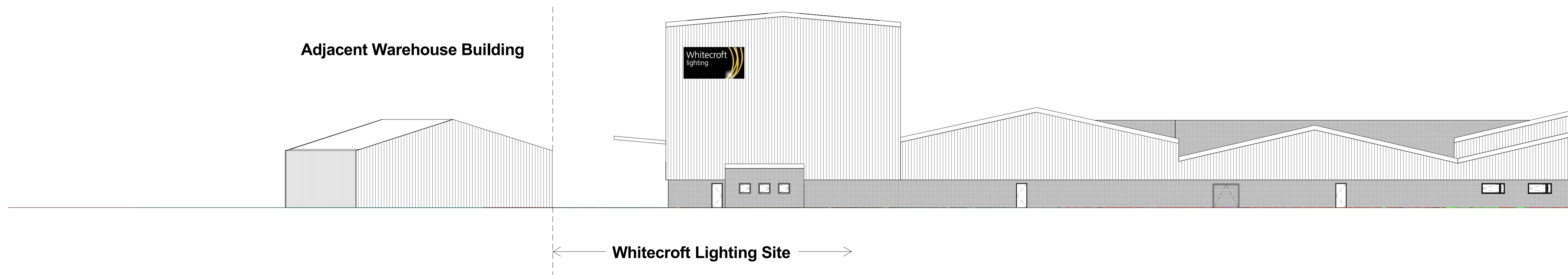
Project: Factory Expansion Project

Title: Existing Elevations- North & South

Drawn	Checked	Date	Scale
GH	BM	29/09/16	1 : 100 @ A1
Status:	Number:	W.S.A.0339.P1.10	Revised: A



**1 Elevation - North Context**  
1 : 200



**2 Elevation - South Context**  
1 : 200

C	16/11/16	Notes amended for clarification	GC	JPH
B	05/10/16	Notes added to clarify ownership boundary	GH	JPH
A	23/09/16	Building footprint amended	AC	JPH
Rev	Date	Revision Note	By	Chk

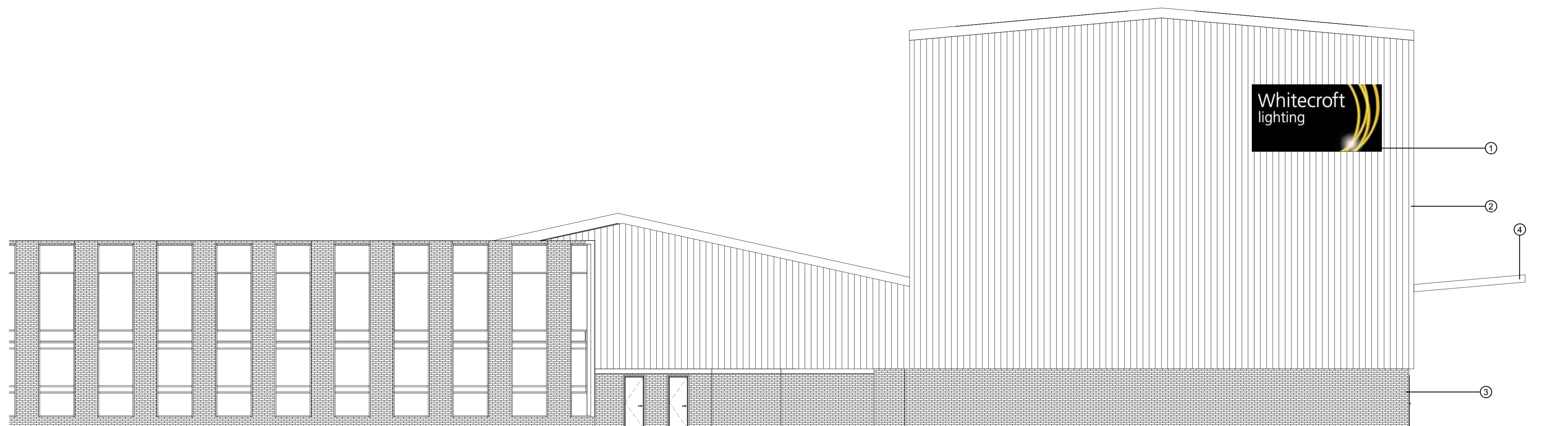
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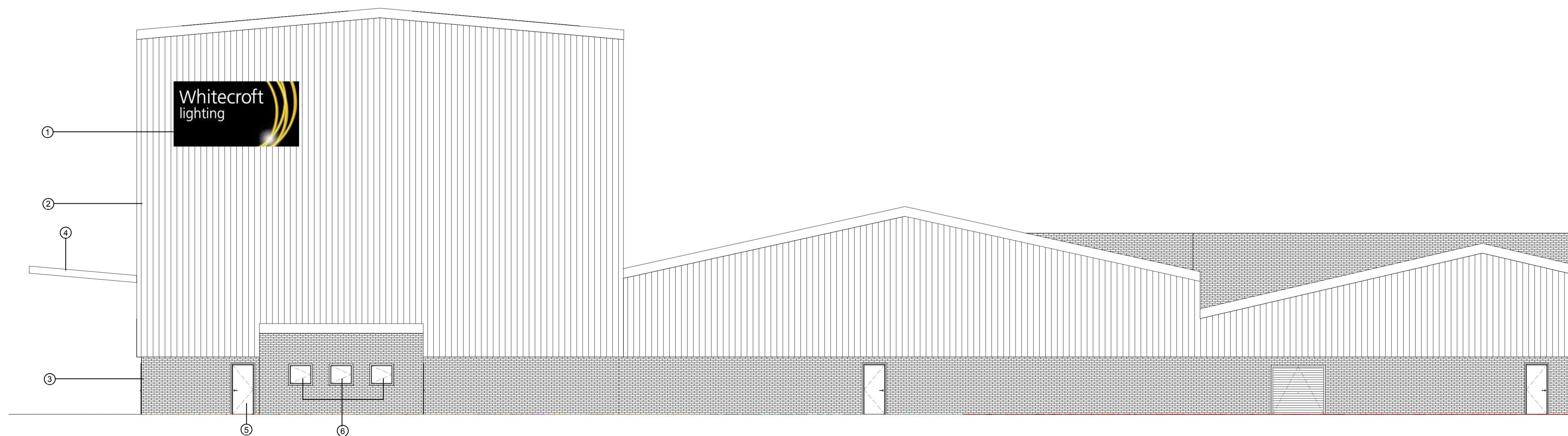
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 Title: Proposed Context Elevations  
 Drawn: SM  
 Checked: JPH  
 Date: 14.09.16  
 Status: Planning  
 Scale: 1 : 200 @ A1  
 Revison: C  
 Number: WSA.0339.P1.05

Notes

- ① Illuminated Signage
- ② Metal Insulated Cladding
- ③ Facing Brickwork
- ④ Canopy Element
- ⑤ PPC Aluminium Door
- ⑥ PPC Aluminium Window
- ⑦ Roller Shutter Door



**1** Elevation\_E  
1 : 100



**2** Elevation\_W  
1 : 100

B	05/10/16	Amendments to building footprint incorporated	GH	JPH
A	23/09/16	Building footprint amended	AC	JPH
Rev	Date	Revision Note	By	Chk

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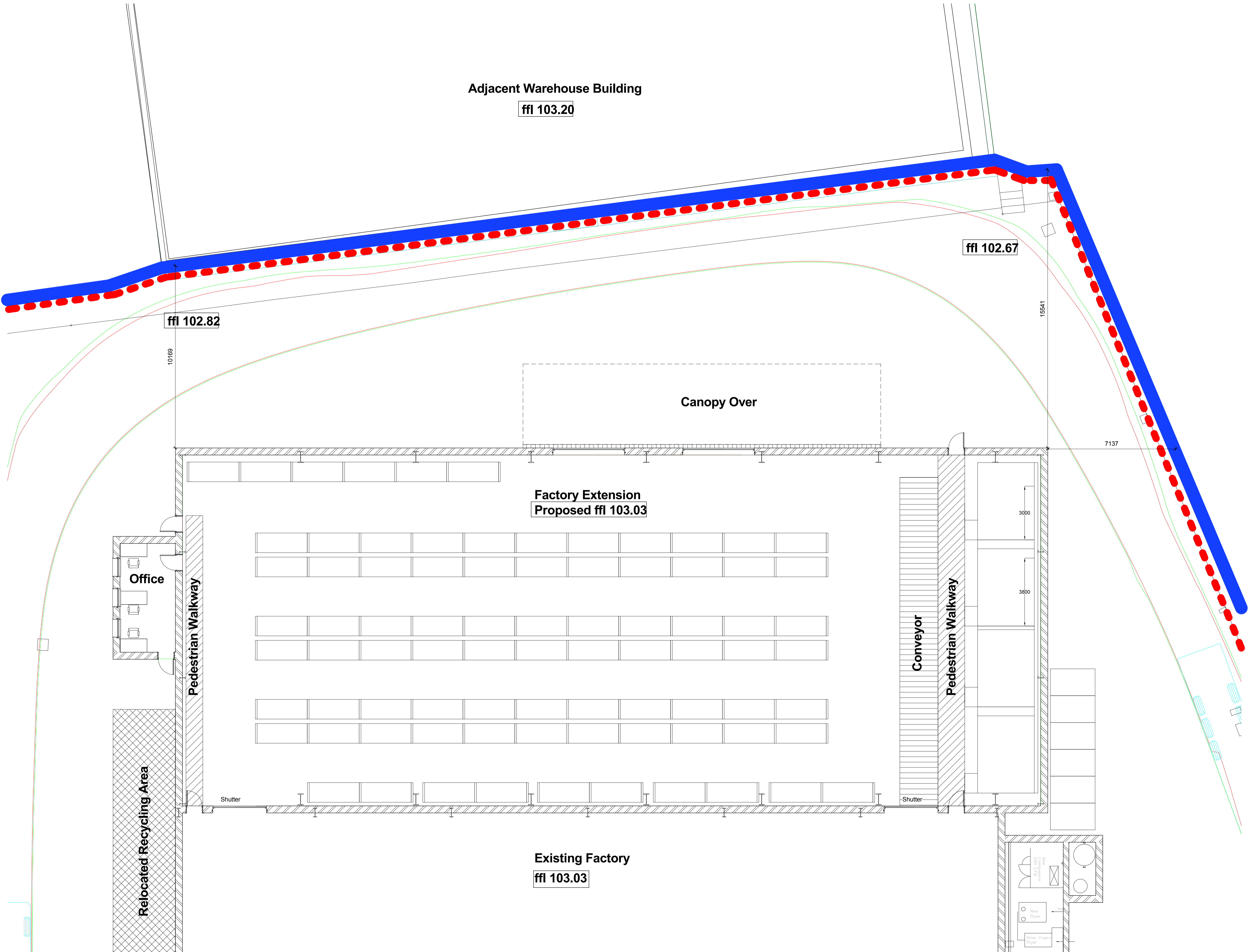
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Project: Factory Expansion Project  
 Title: Proposed Elevations- East & West  
 Drawn: AC Checked: JPH Date: 09/14/16 Scale: 1 : 100 @ A1  
 Status: Planning Number: WSA.0339.P1.11 Revisor: B

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Notes

- Denotes area of ownership
- Denotes application boundary



B	06/10/16	Roof canopy position and roller shutter position amended; dimensions updated; Sections added; area of ownership and application boundary lines added; annotations added	GH	JPH
A	23/09/16	Building footprint amended	AC	JPH

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Project: Factory Expansion Project  
 Title: Proposed Ground Floor Plan  
 Scale: 1 : 100 @ A1

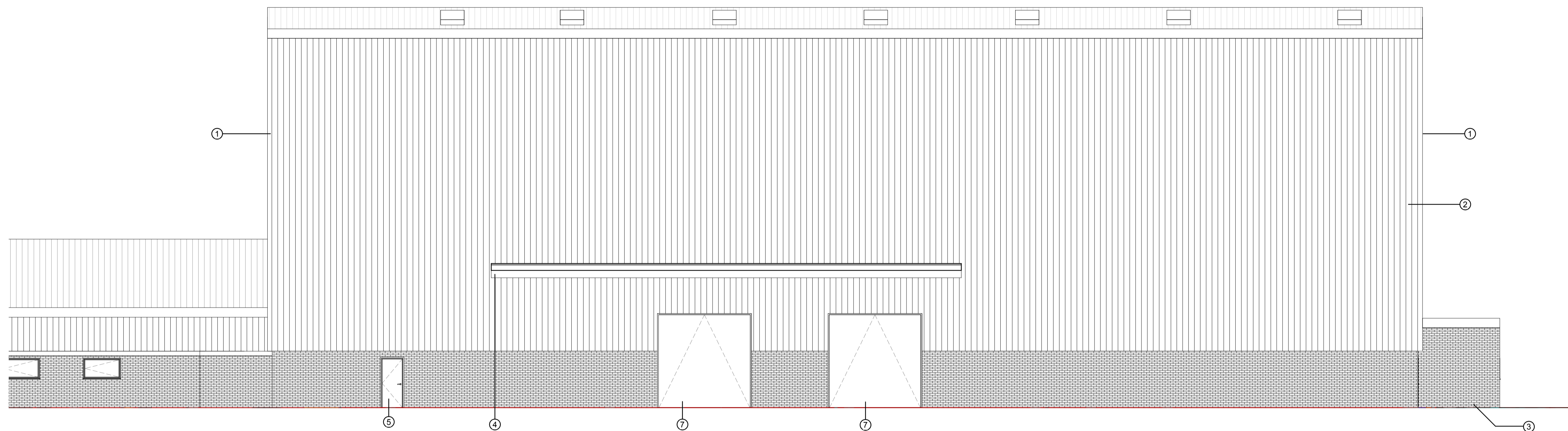
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AC	JHP	09/23/16	1 : 100 @ A1
Status:	Number:	Revision:	
Planning	WSA.0339.P1.07	B	

1 0 - Ground Floor\_Proposed  
 1 : 100

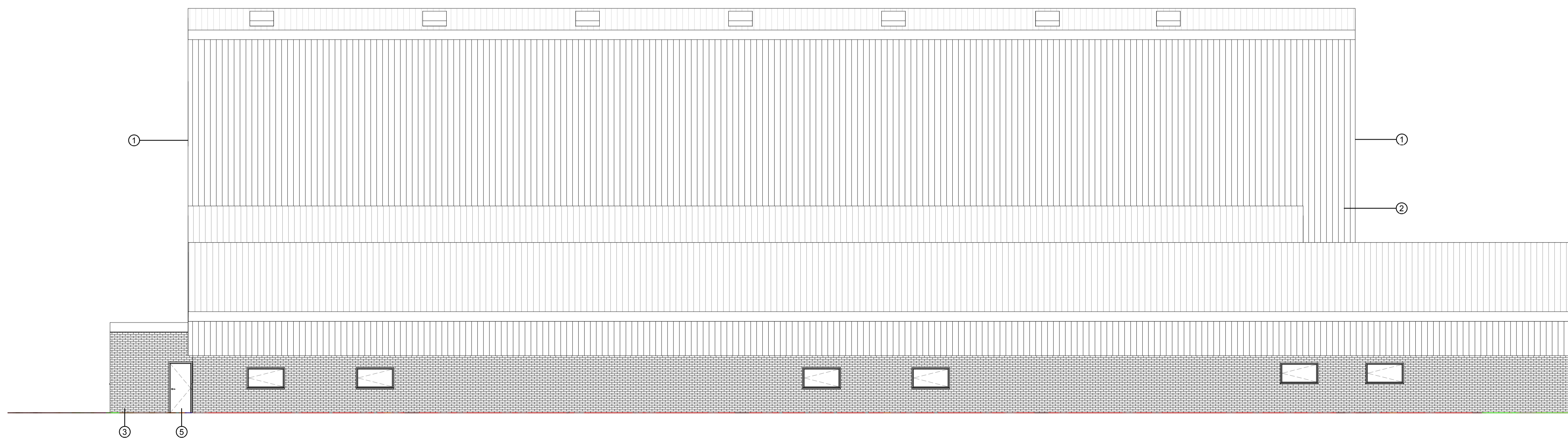


Notes

- ① Illuminated Signage
- ② Metal Insulated Cladding
- ③ Facing Brickwork
- ④ Canopy Element
- ⑤ PPC Aluminium Door
- ⑥ PPC Aluminium Window
- ⑦ Roller Shutter Door



**1** Elevation\_N  
1 : 100



**3** Elevation\_S  
1 : 100

B	05/10/16	Roof canopy position and roller shutter position amended	GH BM
A	23/09/16	Building footprint amended	AC JPH
Rev	Date	Revision Note	By   Chk

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Project: Factory Expansion Project  
 Title: Proposed Elevations- North & South  
 Drawn: AC Checked: JPH Date: 09/14/16 Scale: 1 : 100 @ A1  
 Status: Planning Number: WSA.0339.P1.12 Revisor: B