Chartered Surveyors & Chartered Engineers

Inspection of: Link Bridge
St. Catherine's College
Priory Road
Eastbourne
BN23 7BL

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Contents

Executive Summary

Priory Road is located on the South Coast of the United Kingdom. Eastbourne is a town and seaside resort in East Sussex, on the south coast of England, 19 miles (31 km) east of Brighton and 54 miles (87 km) south of London.
Eastbourne is immediately east of Beachy Head, the highest chalk sea cliff in Great Britain and part of the larger Eastbourne Downland Estate. Our inspection was carried out on Tuesday 30th August 2022. The inspection was carried out during daylight hours. Weather conditions during the inspection were bright and dry.

This report outlines the structure details and the previous inspection / maintenance history, subject to the availability of records, and comments upon the current condition based upon the Principal Inspection undertaken in accordance with *DMRB BD 63/17 'Inspection of Highway Structures'* and also following the *Code of Practice for Bridge Management* and the *Bridge Inspection Manual (BIM)*. The inspection findings are described and discussed on an element-by-element basis for each component part of the structure and recommendations are included for remedial works or other measures deemed necessary to maintain the serviceability and safe use of the structure.

The Principal Inspection has found that the bridge structure to the St.Catherine's Link Bridge currently in **GOOD CONDITION**, based upon the below BCI Average and **FAIR** Condition Critical condition ratings calculated from the overall inspection when considering all spans:

BCI Scores	**BCI (Av)**	**BCI (Crit)**
Span (West)	99.27 %	58.00 %
Span (Centre)	97.50%	100%
Span (East)	87.62 %	50.32%
Overall BCI Scores	94.90%	69.44%

The most significant defects observed were:

- Considerable corrosion to the underside deck panels.
- Corrosion to holding down bolts both East and West foundation blocks.
- Missing holding down bolt to West foundation block.
- Moss to West side deck landing.
- Significant moss to East side deck landing.
- Lack of safety rails to West side deck.
- Lack of safety rails to East side deck.
- Light to moderate corrosion to the steel intermediate pier supports.
- Light corrosion to the steel pier struts.
- Delamination of grout to base plate East foundation block.
- Leaks to upper deck roof covering.
- Concrete repairs to foundation block.
- Light washer corrosion to strut connection plate fixings.
- Moderate pitting and corrosion to piers
- Moderate pitting and corrosion to bracing struts
- Light corrosion to base plates at foundation blocks

The following actions are recommended as a high priority either to ensure public safety or structural integrity, as appropriate:

- Remove and replace underside deck panels & inspect deck.
- Treat and address corrosion to holding down bolts both East & West foundation blocks
- Missing holding down bolt to West foundation block replaced (inc above).
- Remove moss to West side deck landing.
- Remove moss to East side deck landing
- Install safety rails/fall arrest to West side deck.
- Install safety rails/fall arrest to East side deck
- Repair grout to base plate East foundation block
- Undertake concrete repairs to damaged foundation block.
- Undertake further testing to both foundation blocks
- Corroded washers to be treated before painting and fixings checked.
- Moderate pitting and corrosion to piers – Treat, seal & paint
- Moderate pitting and corrosion to bracing struts – Treat, seal & paint
- Light corrosion to base plates at foundation blocks – Treat, seal & paint

It is also recommended that the below remedial works are undertaken in order to address defects which may impact upon the ongoing durability of the structure and, if left unattended, will result in a higher cost penalty to rectify at a later stage:

- Improve safety signage to critical areas
- Replace sections of the flash band to the exterior with permanent repair
- Repairs to roof & drainage channels – lowering the outlets
- Leaks to upper deck roof covering – lining channel & lower outlets/improve falls
- Stair nosing's to be improved to main stair
- Undertake a full painting scheme of the piers, cross bracing & all exposed steelwork (Priority: High).
- Bridge height indicators installed to both approaches

The following works should be carried out as part of routine maintenance of the structure:

- Check fixings and replace where needed annually.
- Visual inspection at six-month intervals.
- Inspect all fall arrest & edge protection annually or as required by manufacturer.
- Clean bridge landing West side at six-month intervals.
- Clean bridge landing East side at six-month intervals.
- Remove/cut back vegetation to West foundation block.

1. Introduction

1.1 General Information

St.Catherine's College link bridge is located at Priory Road on the College site. The bridge links two sections of the school together for pedestrian access for students. The OS Grid Reference at the structure location is grid reference TQ 63454 02427 – 563454E, 102427N. We understand that the Diocese of Chichester Academy Trust are the

Maintaining Authority. As part of a review of the maintenance plan and forecast of the maintenance budget. GTA have been requested to commission a Principal Inspection as part of a review of the site and to address the maintenance policy associated with the structure.

A map of the structure location and site plan are included in Appendix A.

The Principal Inspection was undertaken on Tuesday 30th August during off-peak daytime working hours, The Weather conditions during the inspection were bright and dry with temperatures ranging between 15°C and 18°C. Access to most parts of the structures were possible on the day of the inspection.

1.2 Scope of Report

This report outlines the structure details and the previous inspection / maintenance history, subject to the availability of records, and comments upon the current condition based upon the Principal Inspection undertaken on the date(s) indicated in Section 1.1.

The Principal Inspection was carried out in accordance with *DMRB BD 63/17 'Inspection of Highway Structures' (see *Note below)* and also following the *Code of Practice for Bridge Management and the Bridge Inspection Manual (BIM)*. Due to the lack of prior inspection records and lack of as built information. The content of this report does contain derogations from the guidance which should be noted. This inspection report comments upon the severity and extent of any defects identified and makes recommendations for appropriate remedial works, monitoring or other measures deemed as necessary to maintain structural integrity and the safe operation of the structure.

The structure condition ratings identified during the Principal Inspection are summarised on the *Bridge Condition* Indicator (BCI) results outlined within the report. The inspection scoring system used is taken from the County Surveyors Society (CSS) Volume 2: Bridge Inspection Reporting.

**Note (BD 63/17): DMRB BD 63/17 was introduced in 2017, superseding BD 63/07, and includes new requirements for competency levels of bridge inspectors.*

The personnel involved with the inspection of the structure discussed in this report include Chartered/Incorporated Civil Engineers, Engineers/Assistant Engineers with a relevant degree in Civil or Structural Engineering and also suitably experienced inspection professionals. The undertaking organisations have not participated in the BICS to date, although we consider that the personnel involved with the inspection satisfy the inspector competency requirements set out in Section 9 of BD 63/17.

2. Structure Details

2.1 General Description

St. Catherine's College was originally constructed around 1957 and is a secondary and sixth form College for the immediate catchment area. The link bridge was believed to have been constructed much later estimated to be circa 1990's or slightly later and was believed to be an open pedestrian bridge which has seen alteration and adjustment to account for the changes in approaches to health and safety legislation and for the welfare of students. The bridge is in close proximity to the highway and links two sections of the school together to allow pupils and staff to access both the East and West sections of the site in a safe and secure manner. The school have 1060 students using the bridge on a daily basis.

Span (West): The western section of the bridge is formed from a sectional steel box beam deck which sits on the main West building where there are a number of exposed steel members connecting the bridge to the main building.

Span 2 (Centre): The centre section of the structure consists of a steel box beam deck supported by two inverted 'A' frame piers to support the span with four pier struts each side with cross bracing. These supports are connected to two foundation blocks to the West and East sites. The centre span is the main section of the bridge, which spans the main highway.

Span (East): The furthest section of the structure is formed from a sectional steel box beam construction. This aspect of the bridge also connects to the main East building and has an enclosed external stair leading to the East outside space.

The parapets to the west side of the bridge are nonstandard in nature and appear to be listing. Sections of the parapets have been repaired and replaced in recent years (March 2021) following collision damage.

2.2 Key Data

Structure Ref:	
OS Ref:	TQ 63454 02427 – 563454E , 102427N
Deck construction type:	Steel beam deck
No of Spans:	1x West, 1x Centre, 1 x East
Skew Angle:	N/A
Bridge Code:	05
Material Code:	E

2.3 Deck Elements

2.3.1 Primary Deck Element

St. Catherine's Link Bridge has a total of three spans, one West, one Centre and one East. The three spans are simply supported by the East and West main buildings being built in each of the structures, abutments consist of rolled steel beams placed on and within the main building structures and a combination of hollow steel box sections. Either side of the center span is inverted steel 'A' frame with eight pier struts supporting the East and West span connections and the center span these are formed of hollow box sections with cylindrical pier bracing struts as seen in the photographic schedule. These elements connect to foundation blocks to the West and East elevations. There are no records of the bridge construction and/or previous inspection records which have restricted the production of this report.

2.3.2 Half-Joints

There are no half joints present to the structure.

2.3.3 Deck bracing

There are no recorded drawings of the structural steelwork or the bracing, but site observations confirm that it is likely that in most spans the main support members are likely to be braced by steel channels bolted to or welded to

stiffeners positioned at regular intervals along the main members. The removal of the under-deck panels will confirm the form of deck bracing once exposed.

2.4 Load Bearing Substructure

2.4.1 Foundations

The abutments are built into the West and East structures. As a result, most are covered by the main building materials. There are some elements that area exposed. It is assumed that these connect to either piled foundations or reinforced deep strips. Further load bearing elements are provided by the East and West foundation blocks. There are no inspection records or design details to determine the substructure. These blocks are likely to also act as pile caps and it is assumed that both blocks are piled. The depth of which is unknown due to the lack of records available. It is assumed that these are reinforced, and attempts obtain the as built drawings have not yielded any further information.

2.4.2 Abutments/Landings

The abutments to the East and West spans are effectively built into the buildings on the East and West sites. These are referred to as landings due to their non-traditional form of construction and dual purpose.

2.4.3 Pier/ Column

Inspection photos show that St. Catherine's Link Bridge has a total of four inverted 'A' frame piers reinforced with pier struts/cross braces as detailed within the photographic schedule. The 'A' frames consist of hollow box section with cross struts with connection details mid strut with sole plates and head plates connecting the structure to the deck and foundation blocks.

2.5 Durability Elements

2.5.1 Superstructure Drainage

There are no records available regarding the systems put in place for superstructure drainage. There are currently issues associated with seepage that will need to be addressed through further investigation or alteration of the outlets. There is a central box gutter than runs the entire length of the upper deck roof. This has a small number of outlets which have a raised profile compared to the bottom of the channel.

2.5.2 Movement / Expansion Joints

There were no visible expansion of movement joints visible on the day of the inspection.

2.5.3 Finishes: Deck Elements

The finishes to the deck consist of a braced profile steel and aluminum deck weathering system enclosing the upper section of the deck to create a water tight pedestrian section of the deck. This links to the internal aspects of the East and West buildings and an external stair which has also bee clad with glazing and paneling. There are a number of ventilation grills to the deck covering to permit a free flow of air through the structure.

2.6 Safety Elements

2.6.1 Handrails / Parapets / Safety Fences

The East span has a galvanized set of external grade steps which have been enclosed with curtain walling to all elevations. These generally appear to be in the expected condition. Other than normal wear and tear considering the high footfall.

There is a lack of edge protection or fall arrest/restraint provision to the East and West landing external connection areas, at the external parapet walls. What is in place, would appear to be too far back to enable safe inspection. These areas will need to be accessed at least twice a year in order for regular inspection and maintenance to be carried out. Therefore, additional measures are required as outlined.

There are barriers to the internal outer edges of the bridge deck. Openings to the external landings have been created with gated sections to the barriers at these locations. Both areas were locked and secure on the day of the inspection. The steps down from these access points could be further improved.

2.6.2 Bridge Surfacing

The surface finish to the internal aspects of the bridge consists of an industrial grade carpet with galvanized checker plate steps to the stair section. The substrate below could not be sufficiently inspected due to the internal damage this would cause. There were no undulations or imperfections in the floor levels of floor finishes on the day of the inspection.

2.7 Other Bridge Elements

2.7.1 Highway

The distance from the highway road surface to the under side of the deck is approximately 7.3m. There are no significant changes in land levels to the East and West foundation blocks or landing junctions. The highway would appear to be in good general condition and traffic does not generally appear to be significant, even in peak times.

2.7.2 Collision Protection

Both sets of piers and the foundation block are sited away from the main carriage way which is a 30mph limit section of carriageway. This is further protected by pedestrian railings and traffic lights to serve the pedestrian crossing. The boundary to the site is also protected by 8ft palisade fencing to each boundary. Both foundation blocks sit behind this arrangement. The center span over the highway is set at a significant distance from the road surface to address high sided impact. Signage could be improved.

2.7.3 Landing Support Walls

The East & West landing appears to be supported by the main structure and buildings on the East and West sites. However, there are no records to provide construction details. We have not carried out a full building survey on these structures. There was no signs of stress fractures or distortion at these intersections with the structure.

2.8 Structure History

2.8.1 General

St. Catherine's Bridge was constructed after the school opened. This is believed to be related to the increase in traffic flow and risk associated with the children needing to cross the carriageway. The school numbers have also significantly increased since its original construction. It is believed to have been designed as an open deck bridge with restraint systems either side estimated to be in the mid-nineties. At some point the deck has been framed and clad with a lightweight walling and glazing system and profiled steel roof deck. The bridge has largely remained as is until today. There have been a number of minor repairs to areas of the external cladding in order to address leak's to the structure. These repairs can be seen in the photographic schedule attached to this report.

A full summary of the results of the last General Inspection is given in Section 3.1.

2.8.2 Inspection History

The known inspection history of the structure is limited in terms of the information provided the Diocese have no available records of the bridge construction and/or inspection history. This should be obtained where possible as the lack of information is detrimental to the ongoing maintenance and management of the bridge. The lack of information has required derogation form the core standards and codes of practice.

2.8.3 Assessment

An initial assessment must have been undertaken at some point on the past, most certainly, the design will have been checked prior to commissioning. These records were not available for inspection which has impacted on the content of the report. The assessed capacity is therefore unknown. The design is presumed to ensure that the superstructure

complies with the serviceability requirements of BD 37/01, BD 56/96 and BD 21/01. The primary (and assumed only) loading is footfall from the students and is therefore very low in terms of live loadings.

3. Summary of Condition

3.1 Previous Condition

The last General inspection of St. Catherine's link bridge is unknown, therefore the BCI_{Av} score and a risk ranking as defined by the table below is unknown. The BCI_{CRIT} score of the structure is also unknown, therefore a risk ranking score has not previously been determined.

The defects identified from the last general inspection would ordinarily be outlined below. As these are absent, the recordings cannot be detailed. Therefore, degradation of the bridge and its elements are not recorded to enable condition assessment history to determine element failure/degradation time frames.

3.2 Current Condition

Based on the visual observations and site testing and measurements carried out, the nature, severity and extent of the defects found are described in Section 5 and then further discussed in Section 6 of this report

The BCI Scores derived from the inspection BCI inspection are given below:

BCI Scores	BCI (Av)	BCI (Crit)
Span (West)	99.27 %	58.00 %
Span (Centre)	97.50%	100%
Span (East)	87.62 %	50.32%
Overall BCI Scores	94.90%	69.44%

St. Catherine's Link bridge has been the subject of a Special Inspection with reference to the *Code of Practice for Bridge Management and the Bridge Inspection Manual (BIM)*. As far as could be inspected, the structure was found to be in **GOOD** condition, with a BCI_{Av} score of 94.90% and a risk ranking score of **LOW** as defined by the table below. According to the BCI_{CRIT} score of 69.44% the structure is in **FAIR** condition with a risk ranking score of **MEDIUM**.

BCI Score Range	Overall Condition of the Structure	Condition of Critical Elements	RISK RANKING
90 100 Very Good	No significant defects in any elements; Structure is in a "Very Good" condition overall	Insignificant defects/damage; Capacity unaffected	**LOW**
80 89 Good	Mostly minor defects/damage, but may also be some moderate defects; Structure in "Good" condition overall	Minor defects/damage; Capacity unlikely to be affected	

65–79 Fair	Minor-to-moderate defects/damage; Structure is in a fair condition overall; One or more functions of the bridge may be significantly affected	Superficial defects/damage; Capacity may be slightly affected	MEDIUM
40–64 Poor	Moderate-to-severe defects/damage; Structure is in poor condition overall; One or more of functions of the structure may be severely affected	Moderate defects/damage; Capacity may be significantly affected	
0–39 Very Poor	Severe defects/damage on a number of elements; One or more elements have failed; Structure is in very poor condition; Structure is unserviceable	Possible failure or actual failure of critical element; Severe defects/damage; Capacity may be severely affected; Structure may need to be weight restricted or closed to traffic	HIGH

4. Inspection Details

4.1 General

The Inspection was carried out on 28th August 2022 utilising the access arrangements and equipment identified in Section 4.2 below. The activities undertaken during the inspection period are outlined below, together with the weather conditions encountered on the day of the inspection.

Date / Shift Info: **28th August 2022 between 08:12hrs and 16:22hrs**

Key Activities: Visual inspection.

Weather Conditions: Dry & Warm (18-22°C)

4.2 Access and Equipment

Access to the underside of the deck and the outside of the deck at spans 1-3 were undertaken by use of a mobile elevated platform (MEWP) was used on the day of the inspection by provision of a TG22S working outreach platform. This was placed on the highway under East Sussex Highway Permit number ESH00020964. Traffic control was undertaken and placed on the highway with a marshal. Both sets of pedestrian traffic lights were isolated. The inspection was carried out using PPE by means of safety harness, safety surface radios, probe, hardhats, boots.

Access to spans 1-3 upper deck were undertaken on foot by internal inspection. Access to the landing areas were also undertaken on foot. The roof of the upper deck was also inspected by the use of the MEWP. The engineer was able to reach the relevant parts of the structure for inspection.

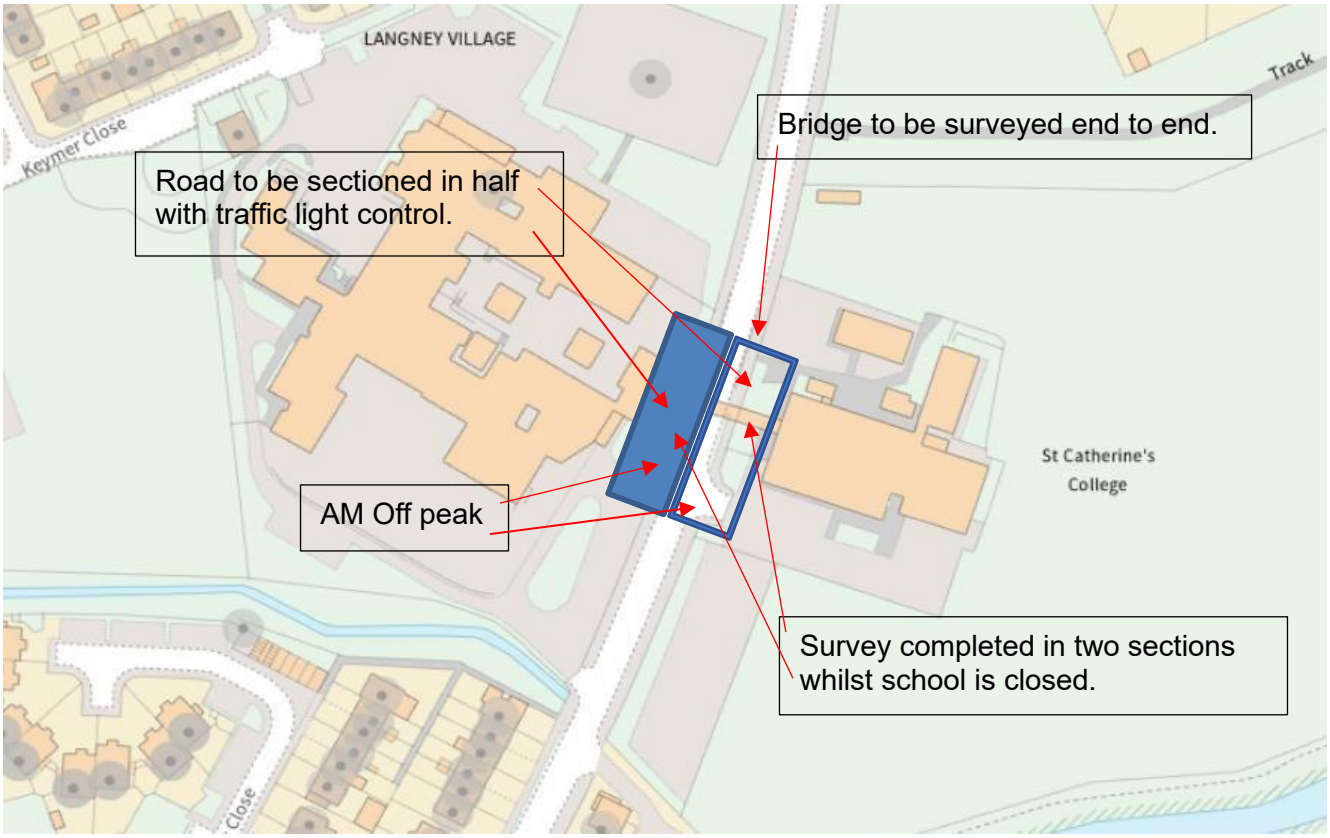
4.3 Inspection Methodology

The condition of the structures was evaluated by means of a close visual inspection of the visible elements, carried out to within touching distance as far as was practicably achievable and ensuring that sufficient information was obtained for each element.

Aids used for the inspection included a digital camera; a crack-gauge; a laser distometer and steel tape measures, demolition screwdriver and a hand-held hammer was used to identify areas of hollow or delaminated concrete. No destructive testing of the reinforced concrete elements was undertaken. A copy of the inspection strategy has been included within this report.

In order to undertake the inspection, the carriageway was split with East side inspection during AM and the West side during PM. Both sides were outside of peak hours. The pedestrian crossing was shut down during the inspection. Due to the location of the underside of the deck and the unknown construction no destructive testing was undertaken as safe reinstatement could not be determined.

Inspection Methodology – Areas of Inspection



4.3.1 Visual Observations – Cracking

In this report, cracks in concrete described as being 'hairline' have widths estimated to be less than or equal to 0.3mm and, in most cases, are typically minor in nature. Current guidance for the design of reinforced concrete stipulates that cracking should be contained to widths not exceeding 0.3mm and that wider cracks are detrimental to the durability of the element. An actual measurement is therefore stated for any cracks exceeding 0.3mm as these defects are considered to be potentially significant and may indicate a structural problem requiring further investigation and / or repair.

4.3.2 Photographs

Appendix B contains a selection of the photographs recorded during the inspection, including general photographs of the structure and detailed photographs of the elements and key observations.

4.3.3 Headrooms

The minimum headroom clearances from the bridge deck soffit to the highway level passing below were checked using a distometer.

The minimum recorded headroom from the bridge deck soffit to the highway were as follows:

- Span West = 7.0m
- Span East = 7.1m
- Span Centre = 7.3m

4.4 Testing of Reinforced Concrete

In situ and laboratory testing to evaluate the likelihood of existing and future corrosion of the steel reinforcement bars were not undertaken as part of this inspection, due to the unknown construction of the concrete sections. Testing should be undertaken in accordance with the general guidance contained in DMRB BA 35/90 '*Inspection and Repair of Concrete Highway Structures'*. Chlorides are most commonly introduced to the concrete by means of de-icing salts dissolved in surface water run-off or in surface spray from vehicles.

The testing would normally include a range of tests carried out both in-situ during the inspection and also under laboratory conditions, using samples collected during the in-situ testing. The test areas would ordinarily be located at a selection of areas where the concrete surfaces may potentially be exposed to water containing dissolved chlorides. Particularly where there is seepage evident. However, it is accepted in this instance that the foundation blocks are some distance from the highway being located within the school grounds. The test types and general methodology for each particular test is outlined below:

4.4.1 Concrete Cover to Reinforcement

A concrete cover to reinforcement survey of the test areas was carried out using an accurate 'Covermeter' over a 0.5m x 0.5m test grid. This showed cover at approx. 75mm-100mm.

4.4.2 Depth of Concrete Carbonation

The depth of Concrete Carbonation (Carbon Dioxide penetration) was not undertaken. These are advised under further testing using standard test methods for the determination of carbonation depth in hardened concrete using a phenolphthalein indicator.

4.4.3 Half Cell Potential Testing

Half cell testing was not carried out using the standard test method described in *ASTM C 876* using a standard saturated copper/copper sulphate reference electrode (CSE). Due to the isolated and minimal area of the foundation blocks.

4.4.4 Chloride Content

Chloride content samples were not sent to the testing companies nominated laboratory as the chloride-ion content was not required using standard test procedures given in *BS 1881: Part 124*. No incremental samples were used to determine depth of penetration of chloride contaminates into the structure.

4.4.5 Cement Content

The cement content of the existing hardened concrete should be undertaken using amalgamated dust samples such that the Chloride percentage content by mass of cement can be determined. The samples should comprise of concrete dust collected from the drill holes made for any half-cell test, producing a separate amalgamated sample for each structural element.

4.4.6 Other Testing

Samples of the failed grout were taken and the results were inconclusive due to the samples being contaminated. This requires further investigation along with those further tests outlined above.

5. Findings of the Inspection

5.1 General

The reporting of the condition of individual elements is based on the Inspection Pro Forma as presented in CSS Guidance Note – *Bridge Condition Indicators Volume 2 (BCI Vol. 2)* July 2004 version (and Addendum dated August 2004).

Unless stated otherwise all visible elements of the structure were inspected and any defects of note detailed individually under each element heading. Any element of the structure present, but not accessible for inspection is also included in the following section of this report together with an appropriate comment.

Note: All photos referred to in Sections 5.2-5.7 are contained in Appendix B.

5.2 Deck elements

5.2.1 Primary Deck Element

Span East – Over boundary

The East Span is generally in the expected condition considering the history and age of the structure and the lack of inspection and maintenance. The primary defect is surface corrosion at the piers and pier connections and the moss associated with the landing sections. Moss will lead to accelerated degradation. At the pier connection locations, the steelwork is suffering from moderate corrosion with some areas of minor delamination. (Under deck section Photos 1-38). (End landings East Photos 6-24). Much of the primary deck elements are concealed by the cladding attached to the upper deck sections. This will need to be removed to fully expose sections of the primary deck.

The end bearings to the East could be visually inspected. There would appear to be light corrosion to some sections of the steel sections which should be addressed in order to prevent any further degradation of the beams. There have been repairs undertake at the junctions with the main building which conceal some areas of the connections.

Span Centre – Over Highway

The center span is the main section, which runs over the highway. There would appear to be corrosion and delamination to the secondary under-deck panels. Much of this may relate to the drainage of the bridge which is unsatisfactory and a likely contributor to the external elements of corrosion. Therefore removal of these panels is key to determine the full extent of corrosion to the primary deck elements, this is an operation that needs to be pre planned and is likely to require closure of the highway for a period of 24/48 hrs in order to expose the main structure.

Light corrosion and pitting was noted at the support plates and washers appear to be delaminating and require attention. (Under deck section Photos 1-38).

Span West – Over Boundary

The West Span is generally in the expected condition considering the history and age of the structure and the lack of inspection and maintenance. The primary defect is also surface corrosion at the piers and pier connections and the moss associated with the landing sections which does not appear to be as significant as the East section. At the pier connection locations, the steelwork is suffering from moderate corrosion with some areas of minor delamination. (Under deck section Photos 1-38). (End landings West Photos 1-13). Much of the primary deck elements are concealed by the cladding attached to the upper deck sections. This will need to be removed to fully expose sections of the primary deck.

The end bearings of the steel sections were dressed with lead flashings these could be lifted to expose the end bearings which were found to be in the expected condition. Some areas of the lead should be improved where possible. It was noted that there were not significant repair work to the connecting junctions as seen on the East sections. This section of the structure is a little less exposed.

5.2.2 Secondary deck Elements

Span East

The secondary deck elements conceal much of the primary sections of the bridge to the East span. This section of the bridge is covered with cladding panels and trims. The under section of the deck is suffering from moderate to heavy corrosion. Particularly at the edges of the panels and at the connections with the end channels. Rivets would appear to be delaminating at the channel connections (Under deck section, Photos 138). Blistering of the panels is evident and pitting of the panels is present on almost all of the East panels. These will need to be removed and replaced and the primary deck elements exposed for further inspection.

The cladding to this section of the bridge appears to have been repaired at a number of locations. Flash band has been used to address these areas. This should be seen as a temporary fix and consideration will need to be given to the permanent repair and replacement of these sections.

Span Centre

The secondary center span elements would appear to have suffered from the most corrosion. The under deck panels to this location are suffering from heavy corrosion at the joints and connections. Some panels are affected to the center of the panel also. Drainage outlets are also present at this location which free drain on to the deck structure. Pitting and blistering to the panels is evident across the entire span. These elements will need to be removed and replaced. A number of the panels could be penetrated by hand using a demolition screwdriver. (Under deck section Photos 1-38).

Span West

The secondary deck elements conceal much of the primary sections of the bridge to the West span. This section of the bridge is also covered with cladding panels and trims. The under section of the deck is suffering from moderate corrosion. Particularly at the edges of the panels and at the connections with the end channels (Under deck section, Photos 1-38). Blistering of the panels is evident and pitting of the panels is present on almost all of the East panels. These will need to be removed and replaced and the primary deck elements exposed for further inspection.

5.2.3 Deck Bracing

All Spans

Deck bracing is obscured by the under-deck panels and the cladding to the upper deck structure. Exposure of the bracing will need to be undertaken as outlined above. These areas are not currently exposed to the elements but may be suffering from the issues associated with the poor drainage.

5.3 Load Bearing Substructure

5.3.1 Foundations

The below ground foundations were not visible for inspection; however, the overall inspection findings did not find any evidence of settlement, adverse movement or distress of the foundations. It is assumed that the foundation blocks are piled and these elements do have some areas, which require attention.

Level checks were undertaken and the foundation blocks were considered to be within the expected tolerances (Block level section Photos 45-57 refer).

5.3.2 West Block

The West block foundation appeared to require remedial works in order for the block and associated fixings to be in the expected condition see (West Block section photos 29-38). Light cracking to the grout is evident as detailed in figure 29 at approx. 1mm in width. Vegetation is also encroaching on to the block and this should be cut back to prevent excessive weathering to the block. Minor staining to the block is evident, but not significant to affect the long-term condition. There is a missing holding bolt and washer/packer which should be replaced. There is moderate corrosion to all bolts, threads and washers. It was also noted that some washers/packers are not driven home and level to the block head. There is minor corrosion evident to the baseplates.

5.3.3 East Block

The East block foundation appeared to require remedial works in order for the block and associated fixings to be in the expected condition see (East Block section photos 1-28). Extensive degradation to the grout is evident as detailed in figures 7-10. Minor staining to the block is evident, but not significant to affect the long-term condition. There is moderate corrosion to all bolts, threads and washers/packers, but not as extensive as the West block. It was also noted that bolts and washers are driven home at this location. Corrosion to the baseplates on this block is light, but still evident. There is cracking and leaching to this block as identified in photo 27. Crack widths extend to 2mm max as seen in photo 27-28 . The cracking to this area is likely to be a result of corrosion to the holding down rod which is possible due to it being cast to close to the surface and not having adequate cover, leaching as a result of the fracture. This should be investigated further and repaired.

5.3.4 Piers & Struts

There is light moderate corrosion to the hollow box section piers which is consistent across all piers which requires attention in order to address the long-term condition of the structure (See Pier & Struts Section Photos 1-38). Pitting can be seen in photos 3,4,7,8,14,15,31,32,34,37,38. This requires treatment and repair in order to prevent degradation of the sections further.

All welds appear to be intact and in the expected condition for the age and form of the structure. Connection plates for the cross bracing appear to be in the expected condition as seen in photos 23-34. There is evidence of pitting at some locations which needs to be addressed. Photo 20 denotes a slightly bent connection plate which should be noted. The connection bolts to the upper plate connections appear to be suffering from moderate corrosion.

There appears to be very light impact damage to the hollow box pier section and some of the cross braces. This is consistent with installation damage. These areas have suffered from light corrosion as a result and should be treated and repaired.

There is pigeon guano staining to the pier head bracing as seen in photos 31-32, 37-38. The bracing section do appear to be suffering from the effects of corrosion and pitting at a more accelerated pace than that of the remaining structure. These should be cleaned treated and painted. Bird spikes should then be placed at critical locations.

5.4 Durability Elements

5.4.1 Superstructure Drainage

There appears to be a single drainage channel that is placed within the roof deck. (Bridge deck photos 16-19 refer). The are outlets at either end of the channel with a raised center outlet to the West half of the deck. The drainage channel is appears to have a very shallow fall and is split in the center of the deck. This area has weathered, and we would advise lining the channel and adding addition all fall or drainage points that are not raised. This is due to the number of raised fixing in the trays and the connections made.

The design of the roof deck is such that the roll of the front and rear projecting soffits will aid water falling against the cladding and glazing panels. Staining to the soffits can be seen in photos 24-27. Leading to additional weathering to the finishes.

5.4.2 Finishes: Deck Elements

Generally, the deck elements consist of aluminum panel cladding and glazing to the upper deck covering. The roof consists of profiled steel sheeting with a sectional box gutter and rolled soffit these appear to be in the expected condition

for the age of the bridge. However, there are areas where the system has broken down and is allowing corrosion to develop (Bridge deck Photos refer 1-30). These areas are generally in the areas around the cladding joints and junctions, where exposed to water seeping through the joint seals and poor drainage and design defects. There are a number of areas where the joints have failed, and flash band has been used to seal the defective areas.

These areas should be repaired and replaced with the combination of improved drainage these elements should have an extended life span as a result. Some fillets and trims should also be checked once a permanent working platform has been created.

5.4.3 Finishes: Substructure Elements

The galvanized sections of steel are currently suffering from the effects of corrosion and should be treated and painted in order to address these issues. There are a number of treatments and methos for applying a panted finish to these elements. These will need to be explored and agree prior to specifying any remedial works.

5.5 Safety Elements

5.5.1 Access

The west section of the connection to the main building has significant moss and is considered to be hazardous to access this area. Particularly as a result of the lack of edge protection available. The edge protection should be improved and/or fall restrain added to these areas which may require regular inspection and maintenance.

Footbridge Surfacing

The footbridge surfacing has been enclosed with internal finishes, which required destructive inspection.
The nosing to the internal stairs should be re-painted to improve the visual safety elements.

Signage

It was noted that the bridge does not currently have height indicators. This is likely to be as a result of the high level of the deck. These could be added as an additional feature.

5.6 Testing of Reinforced Concrete

No testing of any reinforced concrete was undertaken on the day of the inspection. The reinforced concrete sections were limited to the foundation block on the East and West side of the bridge. These have a small surface area and destructive testing would potentially affect the overall condition of the structure.

6. Discussion & Conclusions

6.1 General

The inspection and has identified defects that could affect both the long-term structural capacity and the durability of the load-bearing elements. The structure is considered to be in good overall condition considering the age and form of the bridge. The primary defects are reprised as follows:

- Considerable corrosion to the underside deck panels.
- Corrosion to holding down bolts both East and West foundation blocks.
- Missing holding down bolt to West foundation block.
- Moss to West side deck landing.
- Significant moss to East side deck landing.
- Lack of safety rails to West side deck.
- Lack of safety rails to East side deck.

- Light to moderate corrosion to the steel intermediate pier supports.
- Light corrosion to the steel pier struts.
- Delamination of grout to base plate East foundation block.
- Leaks to upper deck roof covering.
- Concrete repairs to foundation block.
- Light washer corrosion to strut connection plate fixings.
- Moderate pitting and corrosion to piers
- Moderate pitting and corrosion to bracing struts
- Light corrosion to base plates at foundation blocks

6.2 Deck elements

The condition of the deck cannot be fully determined due to the enclosure of the deck structure. However, due to the fact that it is enclosed it is not exposed to the elements and thus degradation should not occur.

The steel beam and section box beam superstructure is thought to be in fair overall condition. But suffering from a lack of maintenance and general investment. The connections to the buildings at the East and West appeared to be in the expected condition and require regular maintenance and upkeep as outlined.

6.3 Load Bearing Substructure

The load bearing substructure appears to be level and under no undue stress or suffering from the effects of significant degradation. Other than those elements exposed and unmaintained, such as the holding down bolt connections. The grouting and the small cracking to the East and West blocks should be addressed as soon as possible to prevent any further issues arising.

Due to the lack of design information and previous inspection records we would advise on further testing and investigation of the foundation blocks.

The supporting piers and cross bracing present no significant deflection, damage or signs of distress. Degradation of these elements is present and should be address before the corrosion deteriorates further.

6.4 Durability Elements

The durability elements of the structure are considered to be fair in terms of their condition and function and again, these require regular maintenance and investment. The defective areas should be addressed as advised and regular and ongoing maintenance of the structure should take place in accordance with the proposed policy and associated guidance.

6.5 Safety Elements

The safety elements of the structure are largely in place and general risks appear to be managed. Changes in legislation and modernisation of the structure have helped address most of the issues. There are areas that do require further investment and consideration by the managing organization.

6.6 Conclusions

The inspection has found that St. Catherine's Link Bridge is currently in **GOOD CONDITION** over all – with elements of the spans which are in **FAIR** condition mostly attributable to the foundation block defects which require improvement and further investigation. Coupled with the pier and brace degradation which requires remedial works. The primary observations arising from the inspection are summarised below:

7. Recommendations

Taking into consideration the findings of the inspection the following matters are recommended in order to maintain the safe use and operation of the structure and maintain the value of the asset over the longer term:

7.1 Safety

The following actions are recommended as a high priority to address more immediate safety concerns:

- Remove and replace underside deck panels & inspect deck (£25,000-£30,000).
- Treat corrosion to holding down bolts both East & West foundation blocks (£1,000).
- Missing holding down bolt to West foundation block replaced (inc above).
- Remove moss to West side deck landing (£1,200)
- Remove moss to East side deck landing (£1,200).
- Install safety rails/fall arrest to West side deck (£2,000).
- Install safety rails/fall arrest to East side deck (£2,000).
- Repair grout to base plate East foundation block (£500).
- Undertake concrete repairs to damaged foundation block (£1,000).
- Undertake further testing to both foundation blocks (£4,000).
- Corroded washers to be treated before painting and fixings checked.
- Moderate pitting and corrosion to piers – Treat, seal & paint
- Moderate pitting and corrosion to bracing struts – Treat, seal & paint
- Light corrosion to base plates at foundation blocks – Treat, seal & paint

7.2 Maintenance Work

The following maintenance work is recommended to address defects which, if left unattended, may lead to increases in the scope and cost of future works:

- Improve safety signage to critical areas (£350)
- Replace the flash band to the exterior with permanent repair (£3,500-£7,000)
- Repairs to roof & drainage channels – lowering the outlets (£550)
- Leaks to upper deck roof covering – lining channel & lower outlets/improve falls (£8,000)
- Stair nosing's to be improved to main stair (£1,000).
- Undertake a full painting scheme of the piers, cross bracing & all exposed steelwork (Cost: £32,000 – Priority: High).
- Bridge height indicators installed to both approaches (£500).

- Install pigeon spikes to high risk areas (£1,200).
- Investigation work, tests and as built records (Allowance £7,000)
- On-going inspections in accordance with policy & guidance.

7.3 Further Investigation

The following matters are recommended for further investigation:

- Carry out inspection of the deck elements once panels are removed.
- Carry out further information gathering tests to the foundation blocks as detailed.
- Review the as built structure and obtain information and records.

7.4 Monitoring

- Regular monitoring, management and inspection needs to take place in accordance with the policy and guidance for managing structures of this nature. You are advised to budget £2,500 per annum for expert advice and inspection as required.

7.5 Routine Maintenance

The following actions should be addressed as part of routine maintenance regime for the structure:

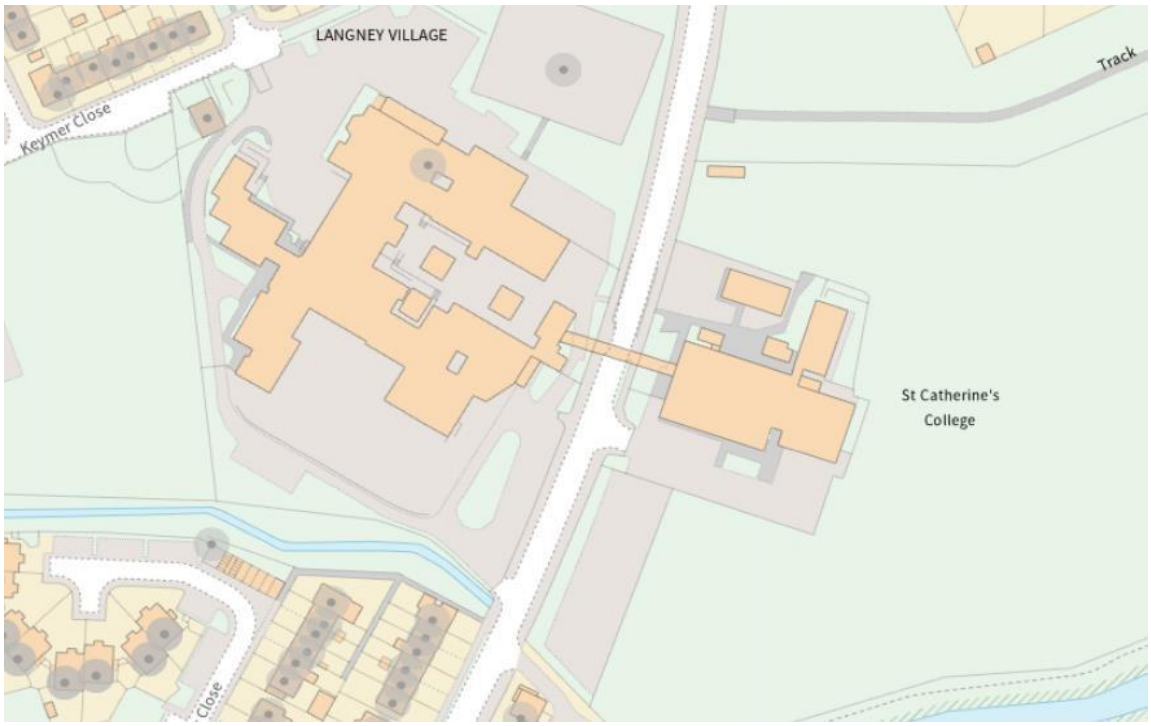
- Check fixings and replace where needed annually.
- Visual inspection at six-month intervals.
- Inspect all fall arrest & edge protection annually or as required by manufacturer.
- Clean bridge landing West side at six-month intervals.
- Clean bridge landing East side at six-month intervals.
- Remove/cut back vegetation to West foundation block.
- Implement a robust inspection and management policy.

Appendix A. – Location & Site Plan

Location Plan

Site Plan shows area bounded by: 563376.36, 102348.65 563517.78, 102490.07 (at a scale of 1:1250), OSGridRef: TQ6344 241. The representation of a road, track or path is no evidence of a right of way. The representation of features as lines is no evidence of a property boundary.

Site Plan


LANGNEY VILLAGE
Keymer Close
Track
St Catherine's
College
Close

Appendix B. – Photographic Schedule

GTA

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Photographic Schedule
Approach to Link Bridge at

St Catherine's College
Priory Road
Eastbourne
East Sussex BN23 7BL

cabe

CorporateLiveWire
SOUTH ENGLAND
PRESTIGE AWARDS
2021/22 WINNER
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1. Screen shot of area around St Catherine's

2. Screen shot of bridge

3. Approach

4. Approach

5. Approach

6. Approach

7. Bridge Survey Area

8. Approach

9. Opposite approach

10. Opposite approach

11. Long view from highway

12. Road width view

St Catherine's College Eastbourne BN23 7BL on 31st August, 2022

East Block

Figure 1: Foundation block East

Figure 2: Foundation block East seepage

Figure 3: Foundation block seepage

Figure 4: HD Bolt damage

Figure 5: Staining to foundation block

Figure 6: Moss to foundation block

Figure 7: Corrosion to HD bolt & thread

Figure 8: Degradation to grout

Figure 9: Degradation to grout & corrosion to pier

Figure 11: Light corrosion to baseplate

Figure 10: Corrosion to HD bolt & thread

Figure 12: Corrosion to pier

Figure 13 – Pitting damage & corrosion

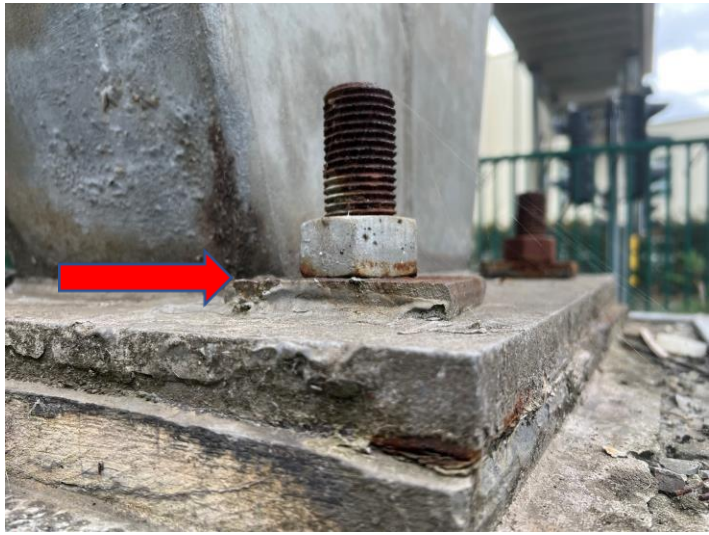


Figure 14 – corrosion to base plate and HD bolt

Figure 15: Moderate corrosion to HD bolt & packer

Figure 16: Light corrosion to pier

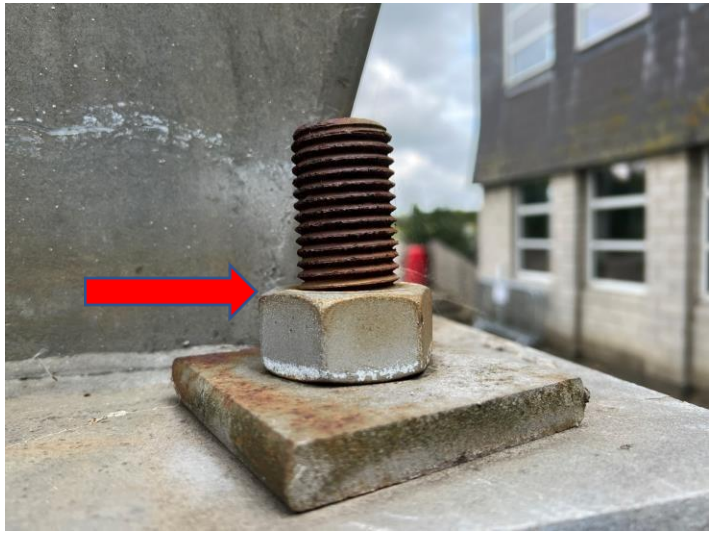


Figure 17: Light corrosion to HB bolt & thread

Figure 18: Moderate corrosion to HD bolt & packer

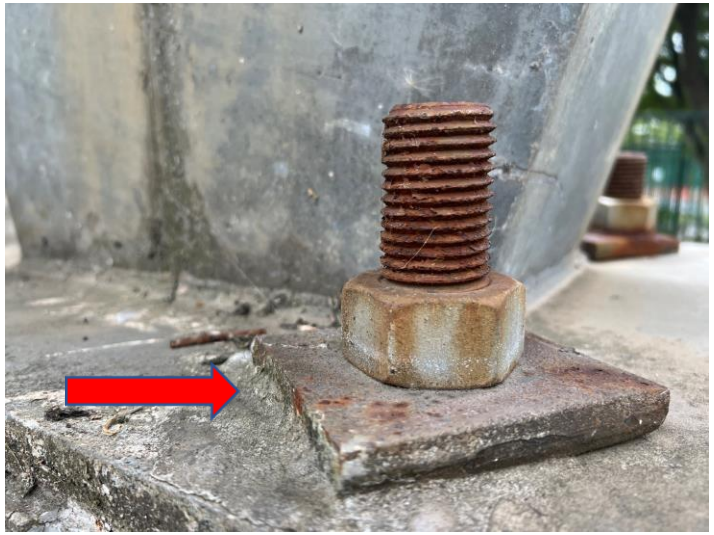


Figure 19: Moderate corrosion

Figure 20: Moderate corrosion

Figure 21 – Staining to foundation block & corrosion to pier

Figure 22 – Corrosion to HD bolt and washer

Figure 23 – Corrosion to HD bolt and washer

Figure 24 – Moderate to heavy corrosion to washer & HD bolt

Figure 25: Moderate corrosion

Figure 26: Degradation of grout to baseplate

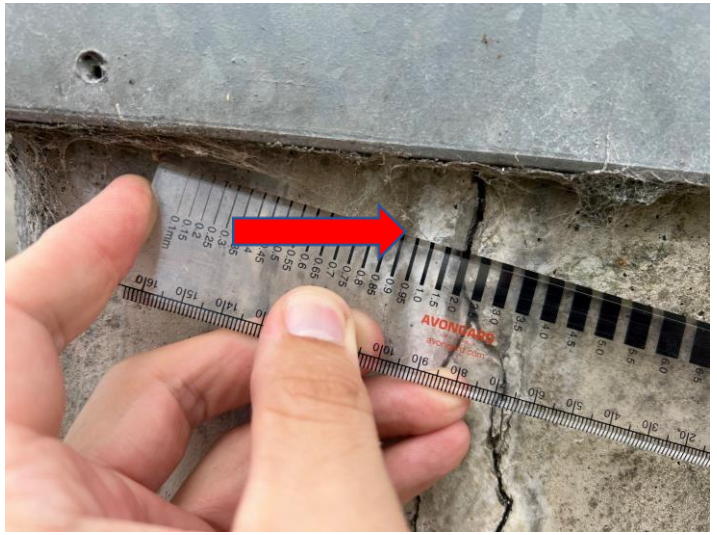


Figure 27: Cracking to East block upper section

Figure 28: Cracking to East Block upper section

West Block

Figure 29: Cracking to grout

Figure 30: West block vegetation

Figure 31: Staining to West block

Figure 32: Light staining to West Block

Figure 33: Light corrosion to HD Bolt & Packer

Figure 34: Missing HD Bolt West

Figure 35: Missing HD Bolt West

Figure 36: Moderate corrosion to HD Bolt West

Figure 38: Moderate to significant corrosion to thread

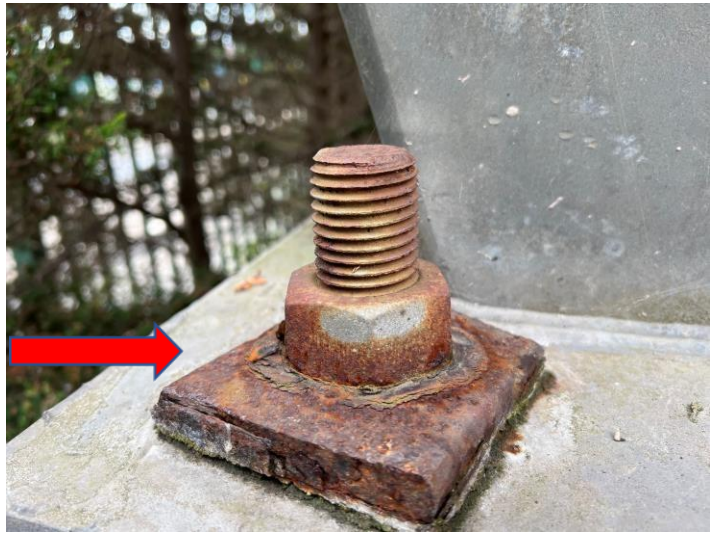


Figure 37: Moderate corrosion

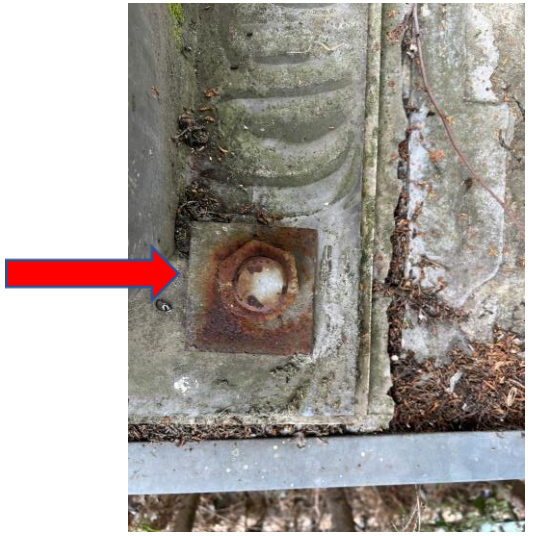


Figure 39: Moderate corrosion

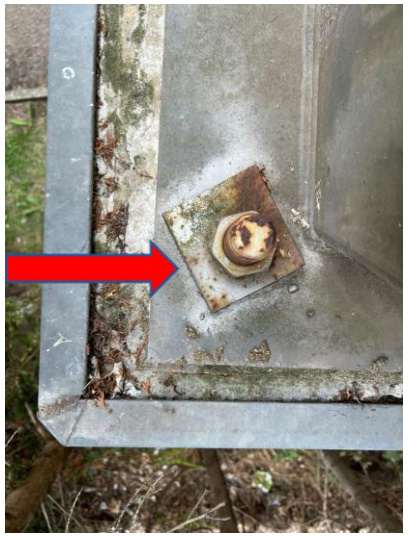


Figure 40: Moderate corrosion

Figure 41: Moderate corrosion

Figure 42: Moderate corrosion

Figure 43: Light pitting to baseplate

Figure 44: Moderate corrosion

Block Levels

Figure 45: Within tolerance

Figure 46 : Within tolerance

Figure 47 : Within tolerance

Figure 48 : Within tolerance

Figure 49 : Within tolerance

Figure 50 : Within tolerance

Figure 51 : Within tolerance

Figure 52 : Within tolerance

Figure 53 : Within tolerance

Figure 55 – Within tolerance

Figure 56 – Within tolerance

Figure 57 – Very minor listing

Dimensions

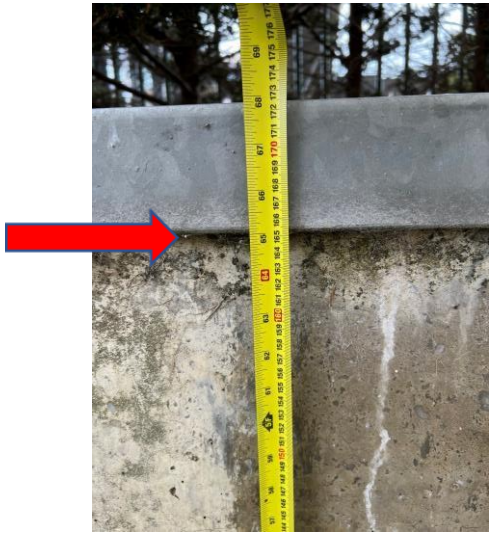


Figure 58 : Within tolerance

Figure 60

Figure 59

Figure 61

Figure 62

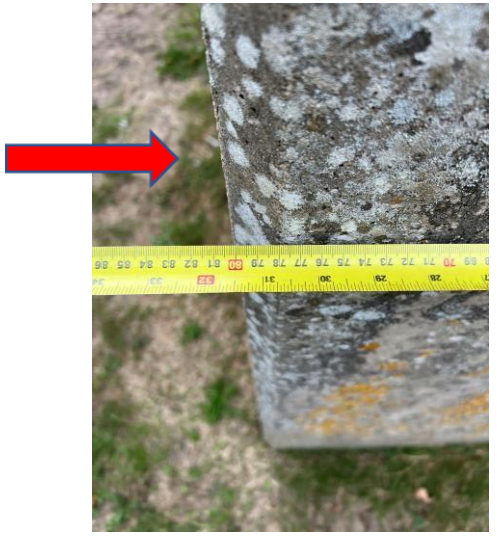


Figure 63

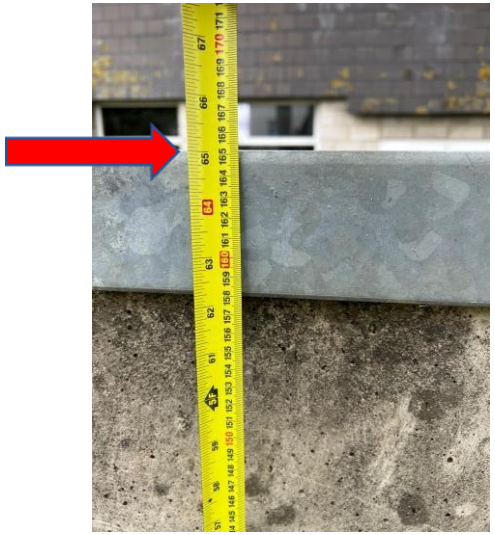


Figure 64

Figure 65

GTA Chartered Surveyors & Chartered Engineers

Photographic Schedule
Piers & Struts

St Catherine's College Eastbourne BN23 7BL on 31st August, 2022

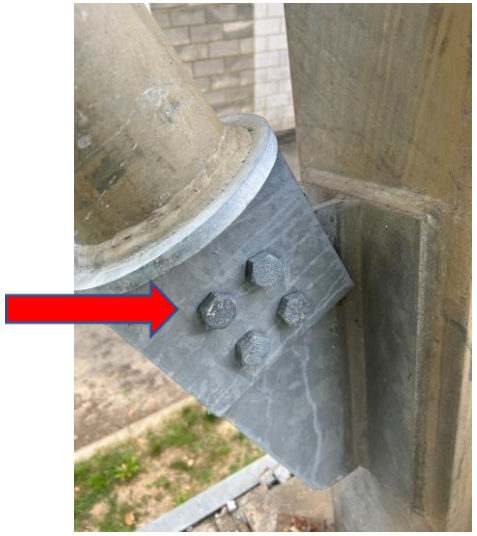


Fig 1: Bracing strut connection

Fig 2: Bracing strut connection

Fig 3: Pitting to connection plate

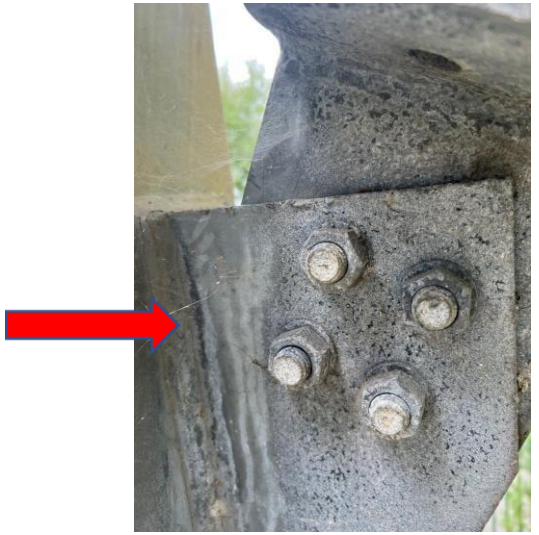


Fig 4: Pitting to connection plate

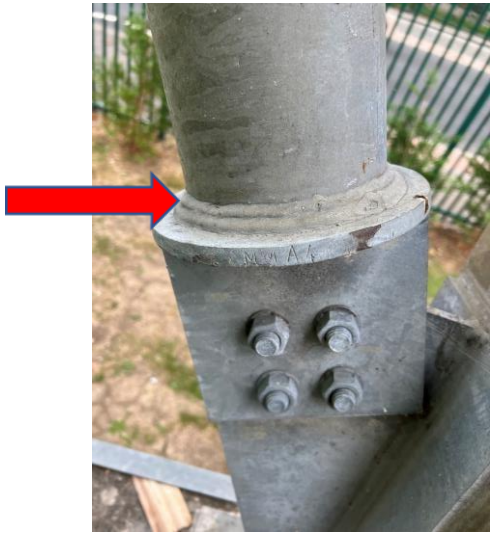


Fig 5: Light corrosion

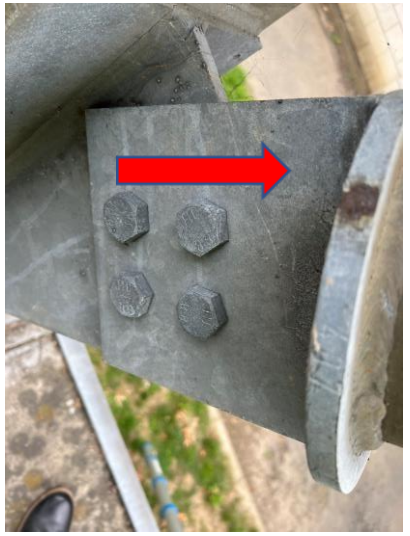


Fig 6: Light corrosion

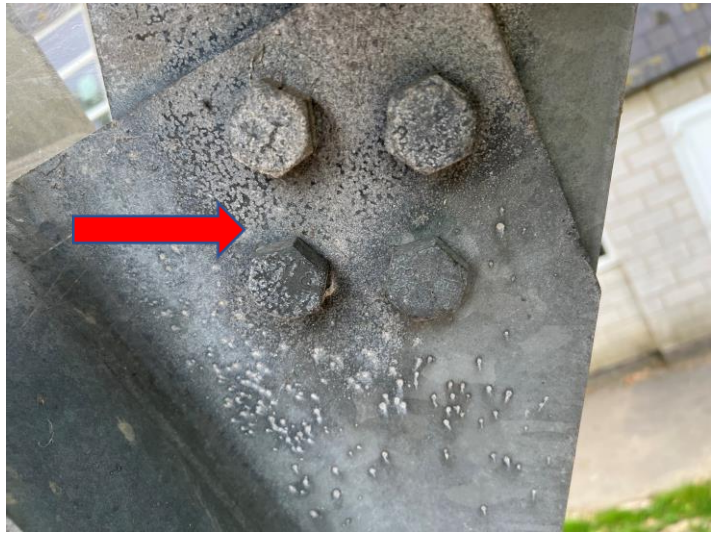


Fig 7: Pitting & light corrosion

Fig 8: Pitting

Fig 9: Light corrosion to bracing strut

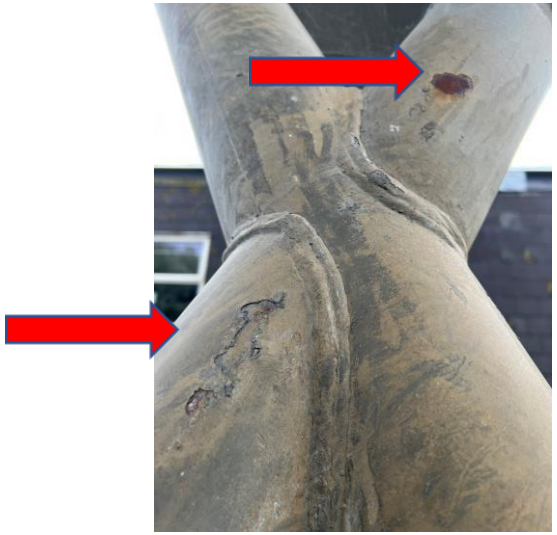


Fig 11: Light corrosion/damage

Fig 10: Light corrosion to bracing strut

Fig 12: Light corrosion

Fig 13: Light corrosion

Fig 14: Corrosion to struts

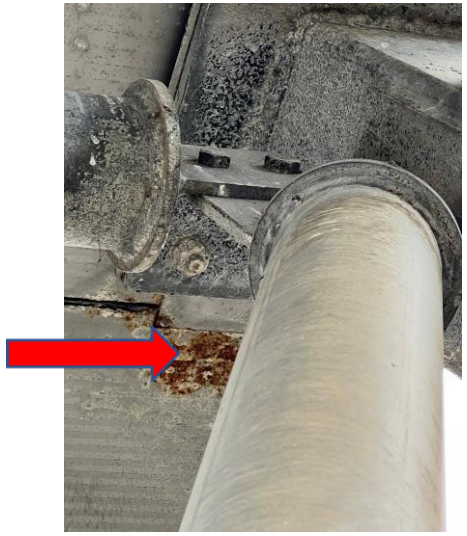


Fig 15: Moderate corrosion

Fig 16: Lower connection

Fig 17: Light corrosion

Fig 18: Light corrosion

Fig 19: Light corrosion

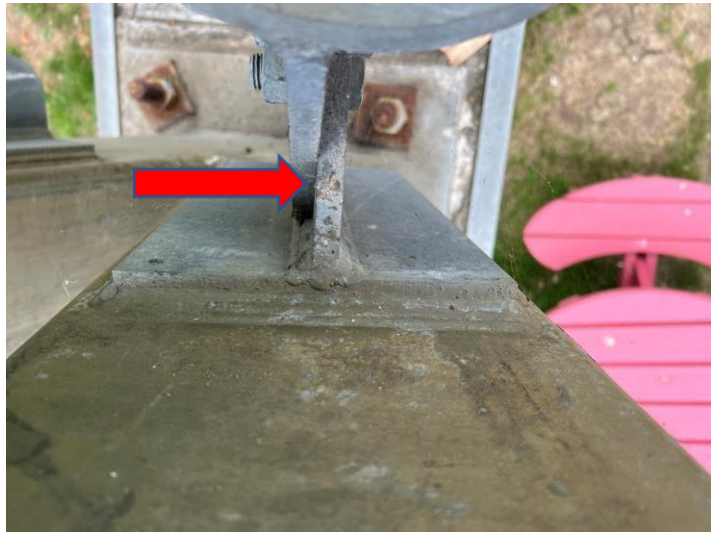


Fig 20: Light corrosion minor displacement

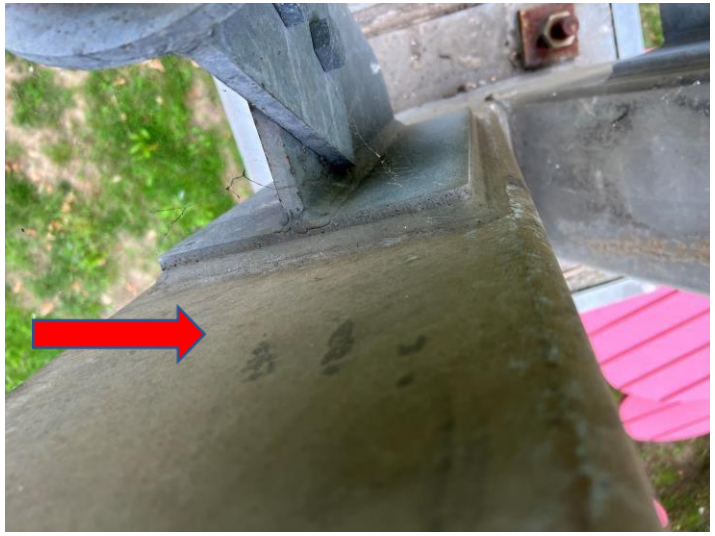
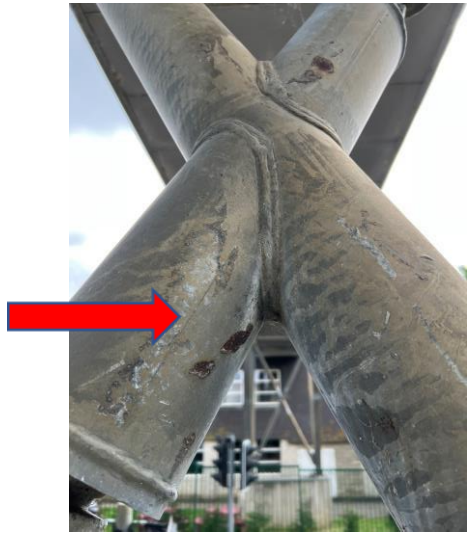


Fig 21: Light corrosion

Fig 23: Light corrosion

Fig 22: Remove vegetation West

Fig 24: remove vegetation West



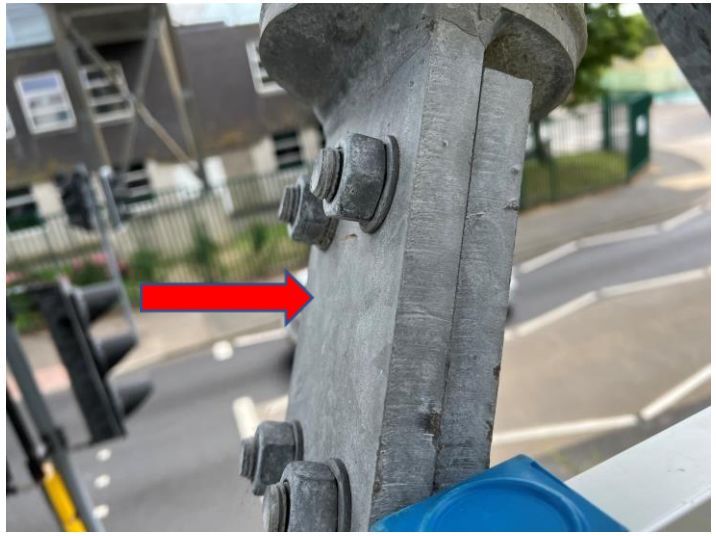


Fig 25: Strut junction light damage

Fig 26: Connection plate

Fig 27: Connection plate

Fig 28: Strut junction light damage

Fig 29: Connection plate

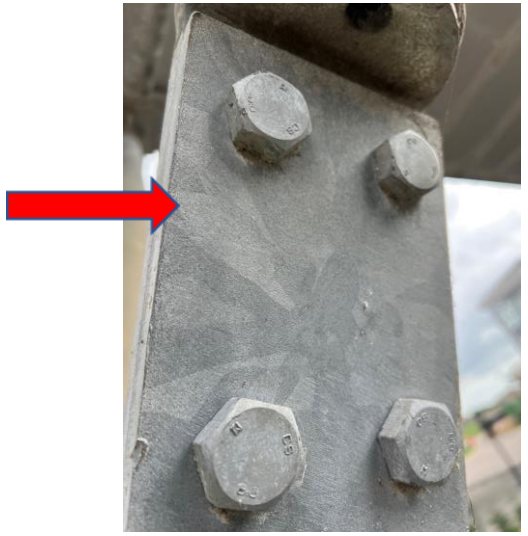


Fig 30: Connection plate

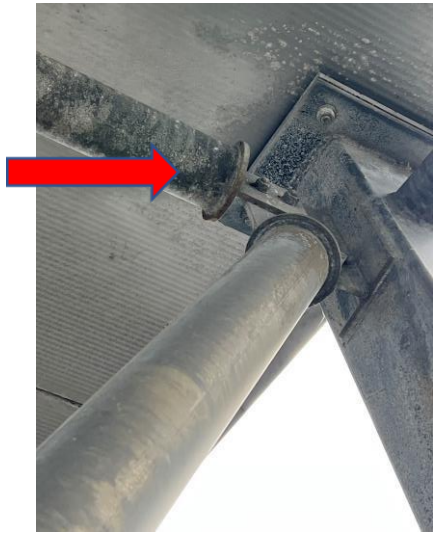


Fig 31: Moderate corrosion & pitting

Fig 33: Light damage

Fig 32 : Moderate corrosion & pitting

Fig 34: Pitting & corrosion

Fig 35: Connection plate

Fig 36: Light corrosion

Fig 37: Moderate corrosion & pitting & pigeon guano

Fig 38: Moderate corrosion & pitting & pigeon guano

GTA Chartered Surveyors & Chartered Engineers

Photographic Schedule End Landing/Bearings West

St Catherines
on 20th October,
2022

Figure 1: Lack of edge protection

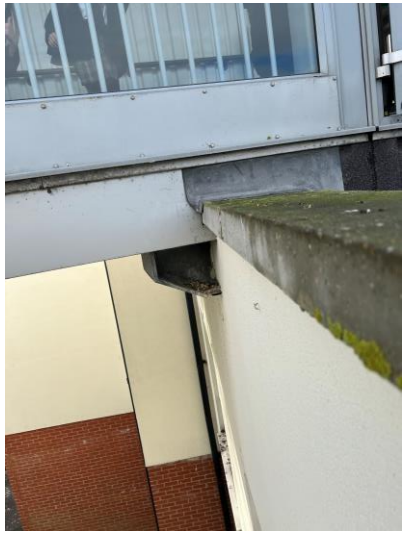


Figure 2: Connection

Figure 3 : Slip hazard to link access

Figure 4: Connection dressing – Bridge side West

Figure 5: Beam dressing West side aft

Figure 6: Light wear to sill West

Figure 7: Staining to soffit

Figure 8: Staining to soffit West

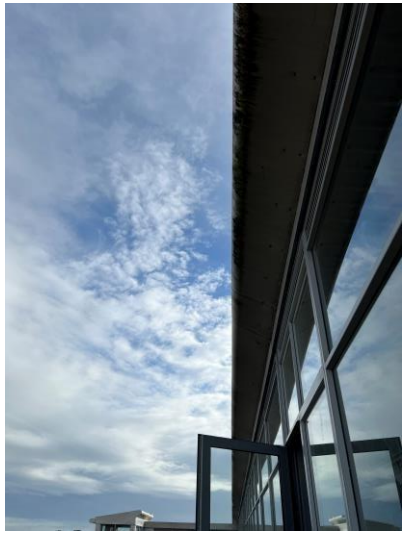


Figure 9: Staining to soffit West

Figure 10: Lead dressing West

Figure 11: Lead dressing West

Figure 12: Lead dressing West

Figure 13: Poor dressing West aft

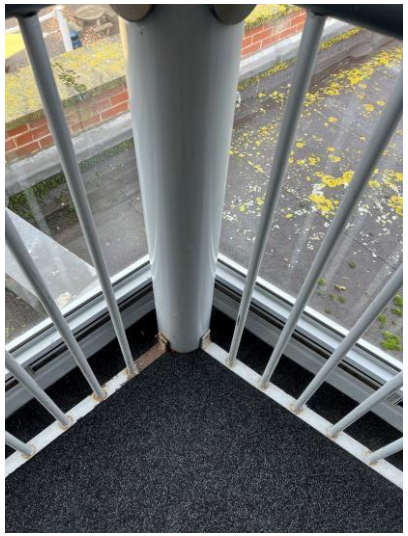


Figure 14: Upright post light corrosion

Figure 15: Upright mid section light corrosion

Figure 16: Upright light corrosion roof connection

Figure 18: Roof deck connection

Figure 17: Profile roof deck connection

GTA Chartered Surveyors & Chartered Engineers

Photographic Schedule End Landing/Bearing East

St Catherine's
on 20th October,
2022

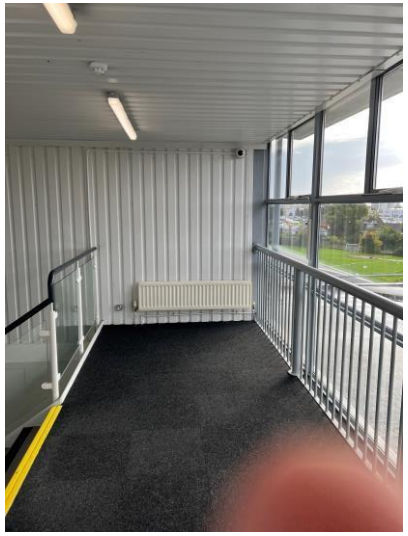


Image 1: Stair connection

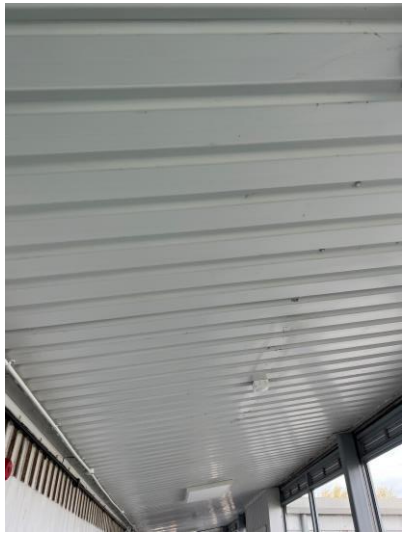


Image 2: Profile roof deck

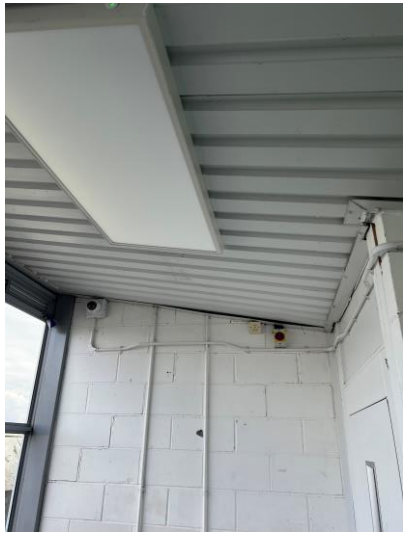


Image 3: Profile roof deck

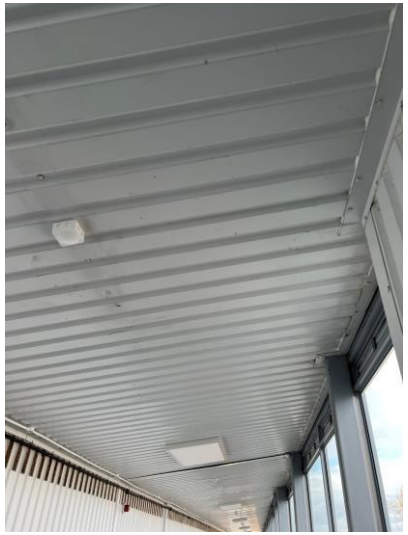


Image 5: Profiled roof deck

Image 4: Corrosion to ventilation grill

Image 6: Flash band to external cladding

Image 7: Flash band to external cladding

Image 8; Flash band to external cladding

Image 9: Flash band to external cladding

Image 10: Moss to roof slip hazard

Image 11: Moss to connection

Image 12: Previous repairs & poor lead dressing

Image 13: Flash band

Image 14: Light corrosion

Image 15: Lack of edge protection

Image 16: Lack of edge protection

Image 17: Moss to area

Image 18: Moss & light corrosion

Image 19: Poor repairs

Image 20: Poor repairs

Image 21: Moss to area

Image 22: Void & missing bird control

Image 23: Lack of edge protection

Image 24: Moss to area

Image 25: Moss to area

Image 26: Poor repairs

Image 27: Poor repairs

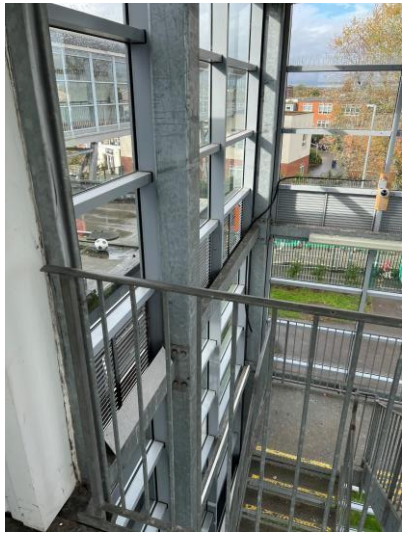


Image 28: Poor repairs

Image 29: Internal stair

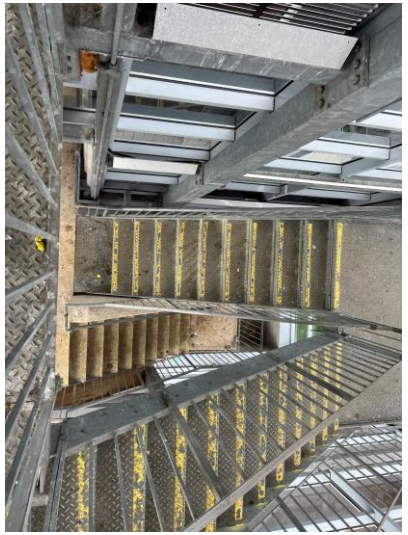


Image: Internal stair poor nosing's

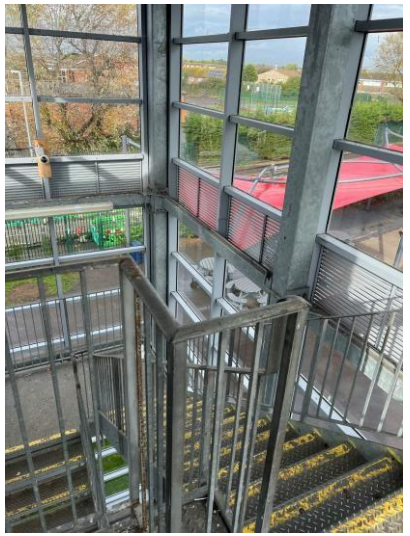
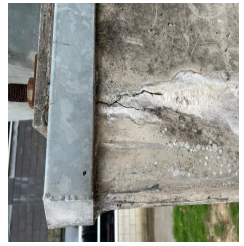


Image 30: Internal stair

GTA Chartered Surveyors & Chartered Engineers

Photographic Schedule
Under Deck

St Catherine's College Eastbourne BN23 7BL on 31st August, 2022



cabe

Fig 1 Moderate corrosion

Fig 2 Heavy corrosion

Fig 3 Heavy corrosion at joint

Fig 4 Heavy delamination

Fig 5 Delamination

Fig 6 Delamination

Fig 7 Moderate corrosion

Fig 8 Light corrosion & pitting

Fig 9 Moderate corrosion

Fig 10 Moderate corrosion

Fig 11 Surface corrosion

Fig 12 Pigeon Guano

Fig 13 Moderate corrosion

Fig 14 Moderate corrosion

Fig 15 Moderate corrosion

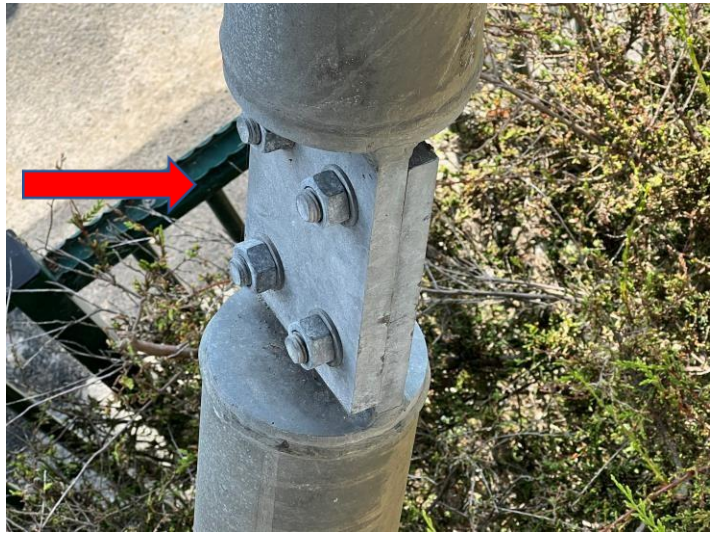


Fig 16 Brace mid connection

Fig 17 Moderate corrosion

Fig 18 Heavy corrosion

Fig 19 Heavy corrosion

Fig 20 Heavy corrison

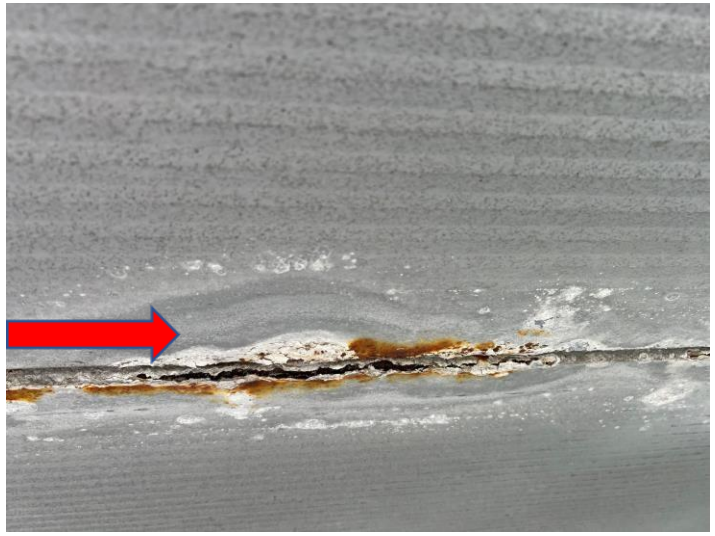


Fig 21 Heavy corrosion & delamination

Fig 22 Delamination

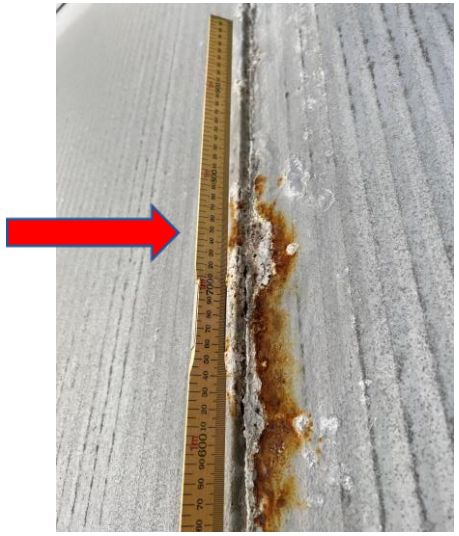


Fig 23 Heavy corrosion

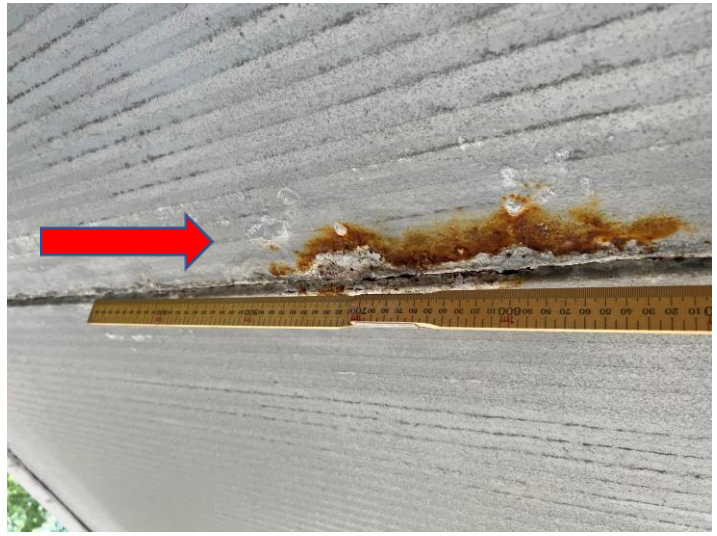


Fig 24 Heavy corrosion

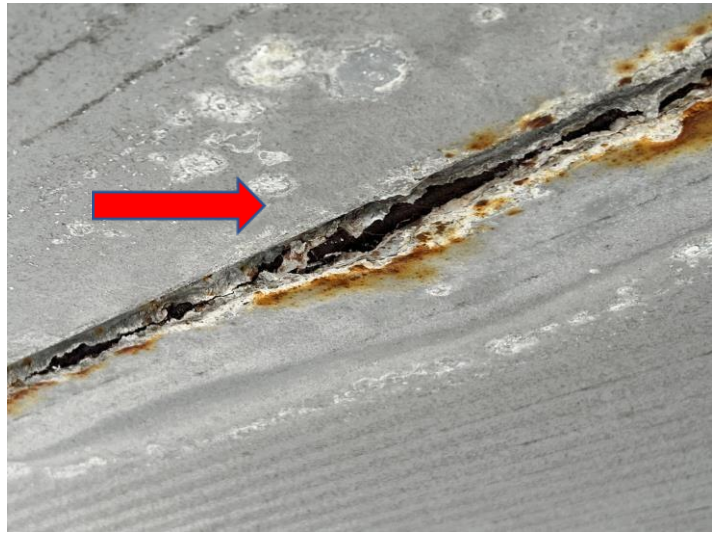


Fig 25 Delamination & heavy corrosion

Fig 26 Delamination

Fig 27 Delamination

Fig 28 Pitting

Fig 29 Heavy corrosion

Fig 30 Heavy corrosion

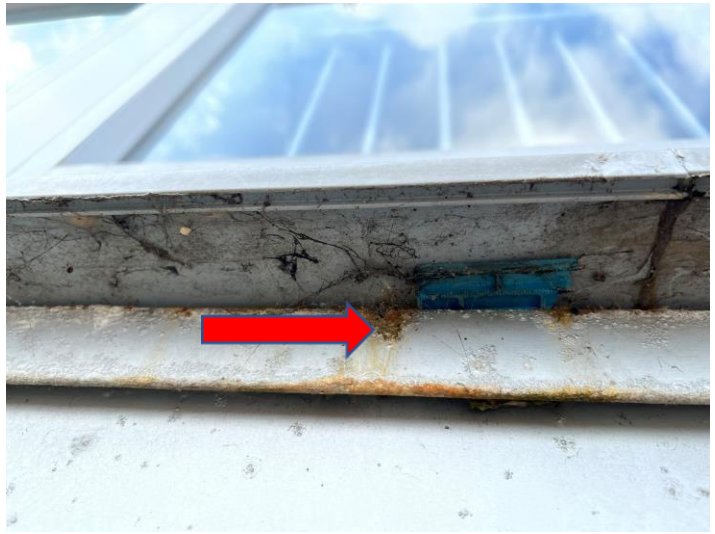


Fig 31 Heavy corrosion

Fig 33 Corrosion at all panel junctions

Fig 32 Moderate corrosion

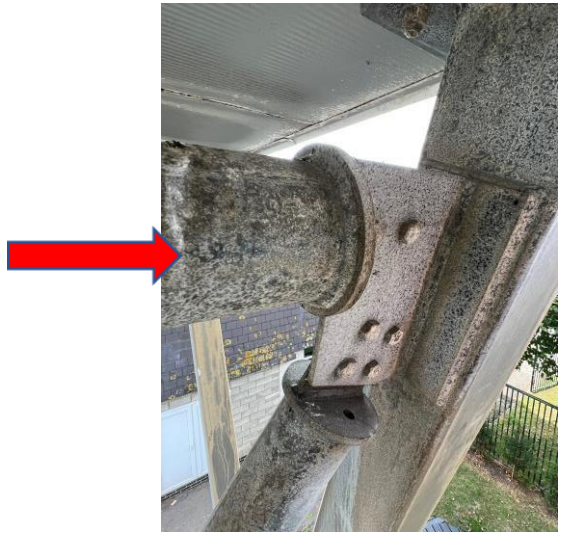


Fig 34 Moderate surface corrosion

Fig 35 Surface pitting

Fig 36 Moderate corrosion & washer corrosion

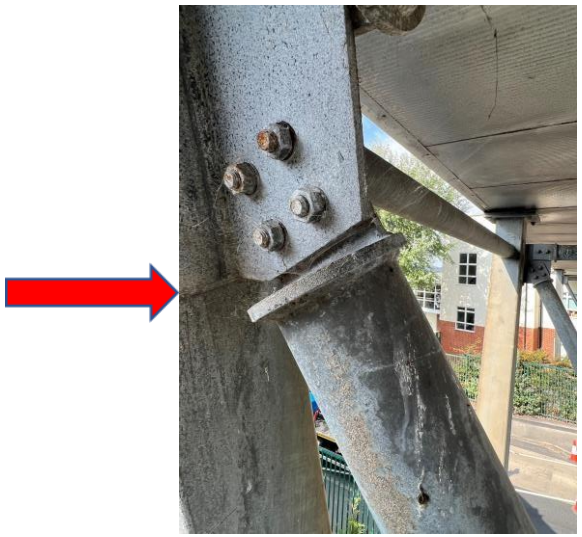


Fig 37 Surface corrosion & washer corrosion

Fig 38 Heavy mid panel corrosion

GTA Chartered Surveyors & Chartered Engineers

Photographic Schedule
Bridge Deck

St Catherine's College Eastbourne BN23 7BL on 31st August, 2022

Fig 1 Light corrosion

Fig 2 Light corrosion

Fig 3 Light pitting

Fig 4 Moderate corrosion

Fig 5 Moderate corrosion

Fig 6 Moderate corrosion

Fig 7 Moderate pitting

Fig 8 Moderate pitting

Fig 9 Moderate corrosion

Fig 10 moderate corrosion

Fig 11 Moderate pitting

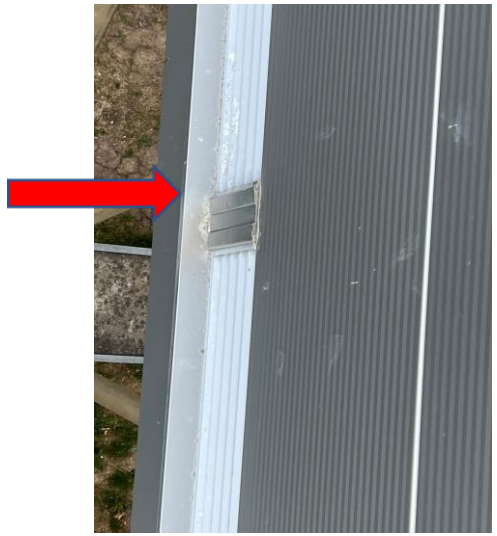


Fig 12 Moss to soffit roll

Fig 13 Light corrosion

Fig 1 Staining to soffit

Fig 15 Moderate corrosion

Fig 16 Debris to channel

Fig 17 Proud outlet to channel

Fig 18 Lack of fall to channel

Fig 19 Laps to channel

Fig 20 Infill panels poorly fitted

Fig 21 Gaps to infill panels

Fig 22 Gaps to infill panels

Fig 23 Rolled joints

Fig 24 Soffit

Fig 25 Cladding panels

Fig 26 Cladding panels

Fig 27 Rain water outlet

Fig 28 Light pitting to cover fillet

Fig 29 Louvres

Fig 30 Poor jointing