

North Yorkshire County Council Scarborough & Whitby Constituency Committee – 3 December 2021 Whitby Swing Bridge - update

1.0 Purpose of the Report

1.1 To update members on maintenance issues regarding Whitby Swing Bridge.

2.0 **History of the Bridge Maintenance**

- 2.1 The Swing Bridge was built in 1909 mechanised in 1983 and from that time the revenue costs of maintenance and operation were shared between Scarborough Borough Council (SBC) and North Yorkshire County Council (NYCC) until the 1 February 2012.
- 2.2 An agreement between NYCC and SBC in 2012 placed the responsibility for the bridge maintenance with NYCC and responsibility for the staffing and operating of the bridge was with SBC. It was agreed that the daily maintenance of oiling, greasing and cleaning would be the responsibility of SBC.
- 2.3 NYCC at the time of signing the agreement invested £82,752 bringing the bridge operating system to a maintainable state and contracted with Fairfield Engineering to manage the maintenance and repair of the Bridge Systems and Hydraulics on an annual basis. Within the first three years of the new agreement the County Council had invested a total of £515,230 on improvements to the bridge.

3.0 Our Long Term Plan for the Bridge

- 3.1 Since NYCC became responsible for the maintenance of the bridge we have up rated the systems that operate the bridge and introduced remote monitoring of the systems that drive the bridge. Regular training has been provided for the SBC operators of the bridge to ensure the correct operation of the bridge and we have introduced regular servicing of the drive systems on the bridge, an annual service and an interim six monthly service which checks the various important service items.
- 3.2 We have improved the location of the sensors which operate the bridge over the past ten years and lifted those we could above the normal flood levels which has improved resilience and has coped with everything but an extreme tide which needed several sensors changing. In order to minimise delays for parts replacement we have a stock of items stored on the guay side so that spares are available for the engineers to fit. The bridge is still affected by extremely hot weather which we are currently investigating with a possible solution which avoids cutting off the ends of the bridge it give greater room of expansion of the two bridge leafs (the deck) which in extreme heat conditions bear on the road on to the bridge and prevent it operating.
- 3.3 Failures of the bridge operation have been reduced from twenty plus per year to approximately four per year since the arrangements set out in section 2.2 came into effect in 2012. However, it is likely that some of these closures have involved extremely high temperatures which prevented the bridge opening as described earlier.

- 3.4 The County Council is responsible for four mechanical bridges, including the bridge at Whitby. The Whitby Swing Bridge operates every day on two tides which is significantly more than any of the other three mechanical bridges we also maintain. In July the Bridge Manager attended a breakdown which was due to the failure of a limit switch on the East leaf of the bridge which indicated falsely that the leaf was closed and when the West leaf was closed it jammed at the centre of the bridge which left an open gap. After consulting the contractor, Fairfield we unjammed the bridge and manually closed the East leaf and that allowed the West leaf to close then the engineer arrived on site and replaced the faulty limit switch and bridge was tested and put back into use. The bridge was operational and checked within an hour of the arrival of the engineer. There was unfortunately disruption for the users for three hours while we unblocked the bridge leafs which had jammed. Fairfield's are currently looking into additional measures to ensure there is a secondary sensor or another way to ensure the bridge cannot be operated in this circumstance. There are numerous options and they are being evaluated before being implemented.
- 3.5 Failures of this type cannot be predicted as the limit switches are checked during the services which are carried out twice a year. The electronic sensors that we have introduced on the bridge can be remotely checked and if they are not operating correctly they can be swapped easily for a new one.
- 3.6 It should be remembered that this bridge operates in a very harsh environment and is open to the elements and the tidal river which is why we instigated the new maintenance regime of the annual service which covers the whole of the bridge and the six monthly service which checks the operating systems and fluid levels.

4.0 longer term issues

- 4.1 The bridge will need painting in ten years' time and the motors that drive the bridge leafs and the hydraulics will need overhauling in the next twenty years. Various sensors will have to be upgraded as they will become obsolete and unavailable but the market will have moved on and suitable replacements will be available.
- 4.2 The bridge structure with the current weight restriction will need work in the future to repair areas of corrosion in non-structural locations on the bridge but the main structure should be good for another 75 years. The current bridge is positioned in the best location for the shortest span across the river and it was built on the site of a fixed span footbridge on the downstream side of the current bridge. A new bridge in the current location would require a footbridge to be provided which was capable of opening to river traffic otherwise the removal of the existing bridge would lock the port and marina upstream of the swing bridge for a number of months. A new bridge for traffic in another location would be of a longer span and be more expensive.
- 4.3 On the morning of the 1 October 2021 an inspection by Fairfield's engineers and the Bridge Manager from NYCC into the operation of the East Leaf was carried out and it was found to be working properly in all respects and no repairs were necessary. Since carrying out this inspection we have called Fairfield's Engineers back to the site and they have checked the bridge staying in Whitby over night to carry out more test swings the next morning and the bridge performed correctly.
- 4.4 Appendix A details the call outs for issues which prevented the bridge operating for the last two years.

5.0 In Conclusion

5.1 The strategic importance of the swing bridge to Whitby is clear and this paper sets out the work that has been done to improve the resilience of the structure and to minimise the number of breakdowns and the length of time that there is disruption when it does unfortunately breakdown. However, like any complex mechanical system this bridge can fail in service and we have put arrangements in place that allows us to identify the failure quickly and resolve the matter as efficiently as possible. The bridge has many years of life left in it and the maintenance regime we have put in place ensures that the performance of the bridge is in our opinion good for a bridge operating in a difficult location open to a highly corrosive atmosphere and flooding and is in fact better than that of some of our other mechanical bridges which do not operate with the same intensity as this bridge does because of its importance to the economy of Whitby and the Port.

6.0 Recommendation

6.1 The contents of the report are noted.

Author: John Smith
Highways and Transportation
Business and Environmental Services
North Yorkshire County Council
05 November 2021

Schedule of maintenance as below since August last year.

Completion Date	Title
20/10/2021	Investigation into bridge getting stuck
18/10/2021	Investigation
26/08/2021	3 month service
10/08/2021	Steel walkway repairs
16/07/2021	Breakdown
07/05/2021	6 month service
08/03/2021	Redecking due to hanger failure
26/02/2021	3 month service
24/12/2020	West side - handrail repair
26/11/2020	6 month maintenance
28/08/2020	3 month service



Date:

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Electrical & Mechanical Service for Whitby Swing Bridge Service Visit

Customer	1	North Yorkshire	North Yorkshire County Council						
Contact D	etails:	Phillip Richards	on	Position:	Bridge Team	Tel No.	07812 088745		
Γ									
Location o		Whitby Swing B	Bridge, Bridge Street	t Whitby, Yo	O22 4BG				
Start Date	:								
Duration:		Service Visits (C	Quarterly, 6 Monthly	y, Annually)					
Revision	Date	Commercial Ref	Description of Ar	mendment					
A01	16/11/2021	NYCC4403	First Issue						
_	n of Works:	11.1/500) :!!							
		Ltd (FCS) will: s as per contract							
		rry out Mechanical s	ervice works.						
• Harke	r Hydraulics to	carry out Hydraulic	service works.						
The works	carried out in a	ccordance with the	service contract sch	nedule. (ele	ctrical)				
Signed:		SMHornsey							
Position Held Service Engineer									
For and On Behalf Of: Fairfield Control Systems Ltd									
Date:									
The works carried out in accordance with the service contract schedule. (mechanical)									
Signed:									
Position He	Position Held								
For and On Behalf Of: Corner Engineering									
Date:									
		<u> </u>							
The works	carried out in a	ccordance with the	service contract sch	nedule. (hyd	draulic)				
Signed:									
Position He	eld								
For and On	or and On Behalf Of: Harker Hydraulics								



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1. Electrical Inspection

INSPECTION NOTES & RECOMMENDATIONS

Inspect the East & West Control Panels as per checks below:

ITEM	ITEM LOCATION		DETAIL	WKG	FTY	COMMENTS
		Push	Secure	Ok		
		Buttons	Functional	Ok		
			Secure	Ok		
	Control	Pilot Lights	Functional	Ok		
	Panel	<u> </u>	Lamp Test	Ok		
	(exterior)	Key	Secure	Ok		
		Switches	Functional	Ok		
		Enclosure	Secure	Ok		
uc		Eficiosure	Clean	Ok		
ij			Condition	Ok		Trunking cracked
ě		MCBs	Secure	Ok		
Sp			Functional	Ok		
<u>_</u>		Fuses	Condition	Ok		
<u>e</u>			Secure	Ok		
an			Functional	Ok		
۵.		Relays	Condition	Ok		
<u>-</u>			Secure	Ok		
.e	.e.		Functional	Ok		
-	Control Panel	Terminations	Secure	Ok		
es	West Leaf - Panel Inspection		Secure	Ok		
≥			Functional	Ok		
			Healthy	Ok		
		PLC	Secure	Ok		
		FLC	Backed Up	Ok		
			Backup Battery	Ok		
			Healthy	Ok		
		НМІ	Secure	Ok		
			Backed Up	Ok		
		Remote Dial in	Functional			

PSU1 Voltages: In - 236.1VAC Out - 24.80VDC PSU2 Voltages: In - 236.8VAC Out - 24.70VDC



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ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		Push	Secure	Ok		
		Buttons	Functional	Ok		
			Secure	Ok		
	Control	Pilot Lights	Functional	Ok		
	Panel	gs	Lamp Test	Ok		
	(exterior)	Key	Secure	Ok		
		Switches	Functional	Ok		
		Enclosure	Secure	Ok		
<u>_</u>		Eficiosure	Clean	Ok		
tio			Condition	Ok		
C.		MCBs	Secure	Ok		
) ds			Functional	Ok		
<u> </u>		Fuses	Condition	Ok		
<u> </u>			Secure	Ok		
L C			Functional	Ok		
P.		Relays	Condition	Ok		
-			Secure	Ok		
ea	East Leaf - Panel Inspection		Functional	Ok		
		Terminations	Secure	Ok		
ast		Panel Heater	Secure	Ok		
шĭ			Functional	Ok		
			Healthy	Ok		
		PLC	Secure	Ok		
		120	Backed Up	Ok		
			Backup Battery	Ok		
			Healthy	Ok		
		НМІ	Secure	Ok		
			Backed Up	Ok		
		Remote Dial in	Functional			

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PSU Voltages: In – 238.8VAC

Out - 24.14VDC



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2. Support & Locking Systems

Inspect the East & West Support & Locking Systems as per checks below:

ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
	Tail End Junction Box	Enclosure	Clean	Ok		
	Garlotton Box	Terminations	Secure	Ok		
			Secure	Ok		
		Jack Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Jack Up	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	North West Jack/Wedge		Functional	Ok		
	Assembly		Secure	Ok		
	(seaside)	Wedge in	Adjustment	Ok		
E		Proximity Switch	Clean	Ok		
ē			Functional	Ok		
/st			Secure	Ok		
est Leaf - Support & Locking System		Wedge Out Proximity Switch	Adjustment	Ok		
<u>B</u>			Clean	Ok		
<u>:</u> ₹			Functional	Ok		
0		Jack Down Proximity Switch	Secure	Ok		
			Adjustment	Ok		
ر د			Clean	Ok		
or.			Functional	Ok		
ď			Secure	Ok		
й		Jack Up	Adjustment	Ok		
5	South West	Proximity Switch	Clean	Ok		
af	Jack/Wedge		Functional	Ok		
[e	Assembly (land side)	de) Wedge in	Secure	Ok		
; ;	, ,		Adjustment	Ok		
		Proximity Switch	Clean	Ok		
>	- William	Functional	Ok			
		Wedge Out	Secure	Ok		
			Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	C.71to11	Functional	Ok			
			Secure	Ok		
		Tail Pin-in	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	Tail Pin		Functional	Ok		
	Assembly		Secure	Ok		
		Tail Pin-Out	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		S.mon	Functional	Ok		
			Secure	Ok		



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		North West Nose Pin Assembly	Adjustment	Ok	
			Clean	Ok	
	(seaside)	Functional	Ok		
	Nose Bolt Assembly		Secure	Ok	
			Adjustment	Ok	
			Clean	Ok	
		(laliu side)	Functional	Ok	

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ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
		Engle	Secure	Ok		
	Tail End Junction Box	Enclosure	Clean	Ok		
	Junction Box	Terminations	Secure	Ok		
			Secure	Ok		
		Jack Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Jack Up	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	North East Jack/Wedge		Functional	Ok		
	Assembly		Secure	Ok		
	(seaside)	Wedge in	Adjustment	Ok		
E		Proximity Switch	Clean	Ok		
tel			Functional	Ok		
\s\			Secure	Ok		
East Leaf - Support & Locking System		Wedge Out	Adjustment	Ok		
L G		Proximity Switch	Clean	Ok		
<u>'</u>		O.m.o.r	Functional	Ok		
Ŏ		Jack Down Proximity Switch	Secure	Ok		
~			Adjustment	Ok		
+			Clean	Ok		
0			Functional	Ok		
dd			Secure	Ok		
Su		Jack Up	Adjustment	Ok		
1	North West	Proximity Switch	Clean	Ok		
af	Jack/Wedge		Functional	Ok		
Fe	Assembly (land side)	Wedge in	Secure	Ok		
st	,		Adjustment	Ok		
Еа		Proximity Switch	Clean	Ok		
		2.71011	Functional	Ok		
			Secure	Ok		
		Wedge Out	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Tail Pin-in	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	Tail Pin		Functional	Ok		
	Assembly		Secure	Ok		
		Tail Pin-Out	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		- Jwiton	Functional	Ok		
			Functional	Ok		



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3. Positional Sensors

Inspect the East & West Position Sensors Systems as per checks below:

ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
		Enclosure	Secure	Ok		
		Enclosure	Clean	Ok		
		Terminations	Secure	Ok		
		Dridge Class	Secure	Ok		
		Bridge Close Slow Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
S		Switch	Functional	Ok		
or			Secure	Ok		
ns		Bridge Closed	Adjustment	Ok		
West Leaf – Positional Sensors		Limit Switch	Clean	Ok		
a			Functional	Ok		
l in	Centre Pier	Bridge Open Slow Down Proximity Switch	Secure	Ok		
tic			Adjustment	Ok		
SSi			Clean	Ok		
Pc			Functional	Ok		
<u> </u>		Bridge Closed Limit Switch	Secure	Ok		
af			Adjustment	Ok		
Le			Clean	Ok		
st			Functional	Ok		
\ \ \			Secure	Ok		
>		Bridge Overtravel	Adjustment	Ok		
		Limit Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Slew Count	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		

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ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
		Fralesum	Secure	Ok		
		Enclosure	Clean	Ok		
		Terminations	Secure	Ok		
		Dridge Class	Secure	Ok		
		Bridge Close Slow Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
10		Switch	Functional	Ok		
East Leaf – Positional Sensors			Secure	Ok		
)S(Bridge Closed	Adjustment	Ok		
er		Limit Switch	Clean	Ok		
-			Functional	Ok		
na	Centre Pier	Bridge Open Slow Down Proximity Switch	Secure	Ok		
<u>.e.</u>			Adjustment	Ok		
sit			Clean	Ok		
Ъ			Functional	Ok		
1		Bridge Closed Limit Switch	Secure	Ok		
af			Adjustment	Ok		
Fe			Clean	Ok		
st			Functional	Ok		
ä		Bridge	Secure	Ok		
			Adjustment	Ok		
		Overtravel Limit Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Slew Count	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		

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4. Backup Generators

Inspect the East & West Generators as per checks below:

П	TEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
			Englosure	Secure	Ok		
١.		Enclosure	Clean	Ok			
J 4	or		Terminations	Secure	Ok		
ea	est Leaf- enerator Moom Moom	West Plant		Leaks	Ok		
				Overheating	Ok		
est		Generator	Filters	Ok			
Š	Ğ	G	Generator	Fuel Level	Ok		
				Functional	Ok		
				Batteries	Ok		

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		Enclosure	Secure	Ok		
			Clean	Ok		
J		Terminations	Secure	Ok		
East Leaf – Generator	East Plant Room	Generator	Leaks	Ok		
			Overheating	Ok		
			Filters	Ok		
			Fuel Level	Ok		
			Functional	Ok		
			Batteries	Ok		

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5. Hydraulic Power Packs

Inspect the East & West Hydraulic Power Packs as per checks below:

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
_		Secure	Ok			
HPU		Enclosure	Clean	Ok		
West Leaf – H	Terminations	Secure	Ok			
	Solenoid Valves	Secure	Ok			
		Connections	Ok			
	Level	Secure	Ok			
	Switches	Connections	Ok			
	Thermostat &	Secure	Ok			
	>	Oil Heater	Operational	Ok		

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
	Englosure	Secure	Ok			
HPU		Enclosure	Clean	Ok		
East Leaf – HF	Terminations	Secure	Ok			
	Solenoid Valves	Secure	Ok			
		Connections	Ok			
	Level	Secure	Ok			
	Switches	Connections	Ok			
		Thermostat &	Secure	Ok		
	Oil Heater	Operational	Ok			

INSPECTION NOTES & RECOMMENDATIONS

 ${\it East Leaf oil leak, filter loose.} \ {\it Tightened and retested.} \ {\it Ok.}$

Mechanical inspections conducted by Francis Corner Engineering and Harker Hydraulic



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6. Mechanical Inspections

Mechanically inspect East & West as per checks below:

ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
			Clean	Ok		
		Tail Pin	Greased	Ok		
			Functional	Ok		
			Leaks	Ok		
			Secure	Ok		
			Clean	Ok		
		North West Jack	Greased	Ok		
		Jack	Functional	Ok		
			Leaks	Ok		
			Secure	Ok		
			Clean	Ok		
	Under Bridge	North West Wedge	Greased	Ok		
	Diluge	vveuge	Functional	Ok		
ns			Leaks	Ok		
est Leaf – Mechanical Inspections			Secure	Ok		
<u>ک</u>			Clean	Ok		
be		South West Jack	Greased	Ok		
ns		Jack	Functional	Ok		
_			Leaks	Ok		
<u>.23</u>		South West	Secure	Ok		
an			Clean	Ok		
$\frac{3}{5}$			Greased	Ok		
<u>Je</u>		Wedge	Functional	Ok		
2			Leaks	Ok		
<u> </u>		Rotation	Secure	Ok		
a.		Gearbox	Oil Level	Ok		
Ľ			Tight	Ok		
sst			Clean	Ok		
\aleph		Ring Gear	Free of Debris	Ok		
_			Greased	Ok		
			Secure	Ok		
		Detetion	Rotate Freely	Ok		
		Rotation Wheels	Greased	Ok		
	West Pier	(inner & outer)	Free of Debris	Ok		
			Drain Channels	Ok		
	Fixings	Secure	Ok			
		Secure	Ok			
		Buffer	Functional	Ok		
			Free of Debris	Ok		
			Secure	Ok		
		Pintle	Clean	Ok		
		Bearings	Greased	Ok		
			Condition	Ok		



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		Condition	Ok	
5.1	Fixings	Cracks	Ok	
Bridge Structure	Tixings	Lose Bolts	Ok	
	Ctonowork		Ok	
	Stonework	Clamping Bands Secure		
		Secure	Ok	
		Clean	Ok	
	North West Nose Bolts	Greased	Ok	
	1 todo Bollo	Functional	Ok	
		Leaks	Ok	
Dridge Deels	Bridge Deck	Secure	Ok	
Blidge Deck		Clean	Ok	
	North West Nose Bolts	Greased	Ok	
	11000 = 0.110	Functional	Ok	
		Leaks	Ok	
	Access Gates	Secure	Ok	
	Access Gates	Functional	Ok	



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ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
			Clean	Ok		
		Tail Pin	Greased	Ok		
			Functional	Ok		
			Leaks	Ok		
			Secure	Ok		
			Clean	Ok		
		North East	Greased	Ok		
		Jack	Functional	Ok		
			Leaks	Ok		
			Secure	Ok		
			Clean	Ok		
	Under	North East	Greased	Ok		
	Bridge	Wedge	Functional	Ok		
			Leaks	Ok		
			Secure	Ok		
S			Clean	Ok		
l o		South East	Greased	Ok		
🚊		Jack	Functional	Ok		
) 60			Leaks	Ok		
dsı		South East Wedge	Secure	Ok		
<u> </u>			Clean	Ok		
<u>a</u>			Greased	Ok		
nic			Functional	Ok		
Jal			Leaks	Ok		
) SC			Secure	Ok		
		Rotation Gearbox	Oil Level	Ok		
_		- Courses	Tight	Ok		
Leaf – Mechanical Inspections			Clean	Ok		
		Ring Gear	Free of Debris	Ok		
			Greased	Ok		
East			Secure	Ok		
Ш						
		Rotation	Rotate Freely	Ok		
	East Diss	Wheels (inner & outer)	Greased Free of Debrie	Ok		
	East Pier	,	Free of Debris	Ok		
		Finding on a	Drain Channels	Ok		
		Fixings	Secure	Ok		
		D	Secure	Ok		
		Buffer	Functional	Ok		
			Free of Debris	Ok		
			Secure	Ok		
		Pintle Bearings	Clean	Ok		
		Bearings	Greased	Ok		
			Condition	Ok		
			Condition	Ok		
	Bridge	Fixings	Cracks	Ok		
	Structure		Lose Bolts	Ok		
		Stonework	Clamping Bands Secure	Ok		



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	Access Gates	Secure	Ok	
		Functional	Ok	

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7. Hydraulic Inspections

Hydraulically inspect East & West as per checks below:

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		HPU	Oil Level (top up if required)	Ok		
			Oil Temp (min 10DegC)	Ok		
			Secure	Ok		
Suc		Pressure Line	Clean (change if necessary)	Ok		
tic		Filters	Pressure Level	Ok		
ec			Replace Filter (12m only)	N/A		
Sp			Secure	Ok		
Ë		Return Line	Clean (change if necessary)	Ok		
<u>.2</u>	Under Bridge	Filters	Pressure Level	Ok		
			Replace Filters (12m only)	N/A		
· Hydraulic Inspections		Vibrations	Non excessive	Ok		
		Noise Levels	Non excessive	Ok		
		Solid Pipe Works	Secure	Ok		
-			Tight	Ok		
West Leaf			No Leaks	Ok		
		Flexible Hoses	Secure	Ok		
			Tight	Ok		
			No Leaks	Ok		
			Functional	Ok		
		Oil Sample	Oil Sample Required (12m only)	N/A		Max Dirt ISO DIS 4406 18/14 Water Content: -0.01%max

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ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
		LIBLI	Oil Level (top up if required)	Ok		
		HPU	Oil Temp (min 10DegC)	Ok		
			Secure	Ok		
ns		Pressure Line	Clean (change if necessary)	Ok		
<u>.e</u>		Filters	Pressure Level	Ok		
Sct			Replace Filter (12m only)	N/A		
b d			Secure	Ok		
ns		Return Line Filters	Clean (change if necessary)	Ok		
C			Pressure Level	Ok		
			Replace Filters (12m only)	N/A		
Га	Under Bridge	Vibrations	Non excessive	Ok		
Hydraulic Inspections	3	Noise Levels	Non excessive	Ok		
		Solid Pipe Works	Secure	Ok		
.1			Tight	Ok		
East Leaf			No Leaks	Ok		
Le		Flexible Hoses	Secure	Ok		
ıst			Tight	Ok		
Еа		Flexible Floses	No Leaks	Ok		
			Functional	Ok		
		Oil Sample	Oil Sample Required (12m only)	N/A		Max Dirt ISO DIS 4406 18/14 Water Content: -0.01%max

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Electrical & Mechanical Service for Whitby Swing Bridge Service Visit

Customer:	North Yorkshire County Council

Contact Details: Phillip Richardson Position: Bridge Team Tel No. 07812 088745

Location of Works: Whitby Swing Bridge, Bridge Street Whitby, YO22 4BG

Start Date:

Duration: Service Visits (Quarterly, 6 Monthly, Annually)

Revision	Date	Commercial Ref	Description of Amendment
A01	16/11/2021	NYCC4403	First Issue

Description of Works:

Fairfield Control Systems Ltd (FCS) will:

- Routine Service Visits as per contract
- Francis Corner to carry out Mechanical service works.
- Harker Hydraulics to carry out Hydraulic service works.

The works carried out in accordance with the service contract schedule. (electrical)		
Signed:	SMHornsey	
Position Held	Service Engineer	
For and On Behalf Of: Fairfield Control Systems Ltd		
Date: 26/08/2021		

The works carried out in accordance with the service contract schedule. (mechanical)		
Signed:	= Corner	
Position Held	Mechanical Engineer	
For and On Behalf Of:	Corner Engineering	
Date:	26/08/2021	

The works carried out in accordance with the service contract schedule. (hydraulic)		
Signed:) Harker	
Position Held	Hydraulic Engineer	
For and On Behalf Of:	Harker Hydraulics	
Date:	26/08/2021	



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1. Electrical Inspection

Inspect the East & West Control Panels as per checks below:

ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
		Push	Secure	Ok		
		Buttons	Functional	Ok		
			Secure	Ok		
	Control	Pilot Lights	Functional	Ok		
	Panel	Ligino	Lamp Test	Ok		
	(exterior)	Key	Secure	Ok		
		Switches	Functional	Ok		
		Frelegue	Secure	Ok		
n		Enclosure	Clean	Ok		
West Leaf - Panel Inspection			Condition	Ok		Trunking cracked
ec		MCBs	Secure	Ok		-
Sp			Functional	Ok		
드		Fuses	Condition	Ok		
<u> </u>			Secure	Ok		
an			Functional	Ok		
مَـ		Relays	Condition	Ok		
<u></u>			Secure	Ok		
e e			Functional	Ok		
-	Control Panel	Terminations	Secure	Ok		
es	(interior)	Danal Haster	Secure	Ok		
≥		Panel Heater	Functional	Ok		
			Healthy	Ok		
		DI C	Secure	Ok		
		PLC	Backed Up	Ok		
			Backup Battery	Ok		
			Healthy	Ok		
		НМІ	Secure	Ok		
			Backed Up	Ok		
		Remote Dial in	Functional	OK		

PSU1 Voltages: In - 236.1VAC Out - 24.80VDC PSU2 Voltages: In - 236.8VAC Out - 24.70VDC



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ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
		Push	Secure	Ok		
		Buttons	Functional	Ok		
			Secure	Ok		
	Control	Pilot Lights	Functional	Ok		
	Panel	<u> </u>	Lamp Test	Ok		
	(exterior)	Key	Secure	Ok		
		Switches	Functional	Ok		
		Enclosure	Secure	Ok		
<u>_</u>		Eficiosure	Clean	Ok		
East Leaf - Panel Inspection			Condition	Ok		
.Sa		MCBs	Secure	Ok		
) ds			Functional	Ok		
<u> </u>		Fuses	Condition	Ok		
<u>a</u>			Secure	Ok		
Ŭ E			Functional	Ok		
P.		Relays	Condition	Ok		
<u>'</u>			Secure	Ok		
ea	Control		Functional	Ok		
<u>`</u>	Panel	Terminations	Secure	Ok		
ast	(interior)	Panel Heater	Secure	Ok		
щ		Fanel Heatel	Functional	Ok		
			Healthy	Ok		
		PLC	Secure	Ok		
		FLC	Backed Up	Ok		
			Backup Battery	Ok		
			Healthy	Ok		
		НМІ	Secure	Ok		
			Backed Up	Ok		
		Remote Dial in	Functional			

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PSU Voltages: In – 238.8VAC

Out – 24.14VDC



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2. Support & Locking Systems

Inspect the East & West Support & Locking Systems as per checks below:

EM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
	Tail End Junction Box	Enclosure	Clean	Ok		
	Junction Box	Terminations	Secure	Ok		
			Secure	Ok		
		Jack Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		C III.G	Functional	Ok		
			Secure	Ok		
		Jack Up	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	North West Jack/Wedge	Ownon	Functional	Ok		
	Assembly		Secure	Ok		
	(seaside)	Wedge in	Adjustment	Ok		
,		Proximity Switch	Clean	Ok		
		Ownon	Functional	Ok		
))			Secure	Ok		
7		Wedge Out	Adjustment	Ok		
0		Proximity Switch	Clean	Ok		
		Owiteri	Functional	Ok		
))		Jack Down Proximity Switch	Secure	Ok		
l ,			Adjustment	Ok		
			Clean	Ok		
			Functional	Ok		
<u>-</u>			Secure	Ok		
-		Jack Up	Adjustment	Ok		
	South West	Proximity Switch	Clean	Ok		
	Jack/Wedge	2	Functional	Ok		
	Assembly (land side)		Secure	Ok		
· •	(,	Wedge in	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		OWITOIT	Functional	Ok		
			Secure	Ok		
		Wedge Out	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		2	Functional	Ok		
			Secure	Ok		
		Tail Pin-in	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
	Tail Pin	2	Functional	Ok		
	Assembly		Secure	Ok		
		Tail Pin-Out	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
		3	Functional	Ok		
			Secure	Ok		



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	North West Nose Pin Assembly (seaside) Nose Bolt Assembly South West Nose Pin Assembly (land side)	Nose Pin Assembly (seaside)	Adjustment	Ok	
			Clean	Ok	
			Functional	Ok	
			Secure	Ok	
			Adjustment	Ok	
			Clean	Ok	
		Functional	Ok		

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ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
	Tail End Junction Box	Enclosure	Clean	Ok		
	Junction Box	Terminations	Secure	Ok		
			Secure	Ok		
		Jack Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Jack Up	Adjustment	Ok		
	N 4 5 4	Proximity Switch	Clean	Ok		
	North East Jack/Wedge		Functional	Ok		
	Assembly		Secure	Ok		
	(seaside)	Wedge in	Adjustment	Ok		
Ε		Proximity Switch	Clean	Ok		
ast Leaf - Support & Locking System			Functional	Ok		
l Xs			Secure	Ok		
\ \cdot \cdo		Wedge Out Proximity	Adjustment	Ok		
l <u>:</u>		Switch	Clean	Ok		
ㅎ			Functional	Ok		
2		Jack Down Proximity Switch	Secure	Ok		
∞			Adjustment	Ok		
ا بر			Clean	Ok		
00			Functional	Ok		
ď			Secure	Ok		
Su		Jack Up Proximity	Adjustment	Ok		
1	North West	Switch	Clean	Ok		
ea1	Jack/Wedge Assembly		Functional	Ok		
<u> </u>	(land side)		Secure	Ok		
ıst		Wedge in Proximity	Adjustment	Ok		
E3		Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Wedge Out Proximity	Adjustment	Ok		
		Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Tail Pin-in Proximity	Adjustment	Ok		
		Switch	Clean	Ok		
	Tail Pin		Functional	Ok		
	Assembly		Secure	Ok		
		Tail Pin-Out Proximity	Adjustment	Ok		
		Switch	Clean	Ok		
			Functional	Ok		



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3. Positional Sensors

Inspect the East & West Position Sensors Systems as per checks below:

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		Enclosure	Secure	Ok		
		Enclosure	Clean	Ok		
		Terminations	Secure	Ok		
		Bridge Close	Secure	Ok		
		Slow Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
S		Switch	Functional	Ok		
or			Secure	Ok		
ns		Bridge Closed	Adjustment	Ok		
West Leaf – Positional Sensors		Limit Switch	Clean	Ok		
<u>a</u>			Functional	Ok		
l ii		Bridge Open Slow Down Proximity Switch	Secure	Ok		
tic			Adjustment	Ok		
SSi	Centre Pier		Clean	Ok		
Pc	_		Functional	Ok		
<u> </u>			Secure	Ok		
af		Bridge Closed	Adjustment	Ok		
Fe		Limit Switch	Clean	Ok		
st			Functional	Ok		
\			Secure	Ok		
>		Bridge Overtravel	Adjustment	Ok		
		Limit Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Slew Count	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		

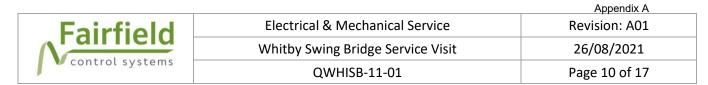
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ITEM	LOC	ATION	DETAIL	WKG	FTY	COMMENTS
		Fralesum	Secure	Ok		
		Enclosure	Clean	Ok		
		Terminations	Secure	Ok		
		Dridge Class	Secure	Ok		
		Bridge Close Slow Down	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
10		Switch	Functional	Ok		
East Leaf – Positional Sensors			Secure	Ok		
)S(Bridge Closed	Adjustment	Ok		
er		Limit Switch	Clean	Ok		
-			Functional	Ok		
na		Bridge Open Slow Down Proximity Switch	Secure	Ok		
<u>.e.</u>			Adjustment	Ok		
sit	Centre Pier		Clean	Ok		
Ъ			Functional	Ok		
1		Bridge Closed Limit Switch	Secure	Ok		
af			Adjustment	Ok		
Fe			Clean	Ok		
st			Functional	Ok		
ä			Secure	Ok		
		Bridge Overtravel	Adjustment	Ok		
		Limit Switch	Clean	Ok		
			Functional	Ok		
			Secure	Ok		
		Slew Count	Adjustment	Ok		
		Proximity Switch	Clean	Ok		
			Functional	Ok		

Inspection NOTES & RECOMMENDATIONS						



4. Backup Generators

Inspect the East & West Generators as per checks below:

П	TEM	LOCATION		DETAIL	WKG	FTY	COMMENTS	
		Enclosur		Englosure	Secure	Ok		
١.			Enclosure	Clean	Ok			
<u>_</u>	or		Terminations	Secure	Ok			
Leaf	ator	West Plant Room		Leaks	Ok			
	er			Overheating	Ok			
est	ener		Conorator	Filters	Ok			
Š	Ğ		Generator	Generator	Fuel Level	Ok		
				Functional	Ok			
				Batteries	Ok			

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		Chologura	Secure	Ok		
		Enclosure -	Clean	Ok		
J		Terminations	Secure	Ok		
eaf ato	East Leaf – Generator		Leaks	Ok		
Le			Overheating	Ok		
ıst			Filters	Ok		
Ea G			Fuel Level	Ok		
			Functional	Ok		
			Batteries	Ok		

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5. Hydraulic Power Packs

Inspect the East & West Hydraulic Power Packs as per checks below:

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
	West Plant Room Solenoid Valves Level Switches Thermostat &	Englosure	Secure	Ok		
HPU		Enclosure	Clean	Ok		
エ		Terminations	Secure	Ok		
<u> </u>		Solenoid	Secure	Ok		
Leaf		\/-	Connections	Ok		
		Level	Secure	Ok		
 est		Connections	Ok			
West		Thermostat &	Secure	Ok		
		Oil Heater	Operational	Ok		

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
			Secure	Ok		
HPU	East Plant Room	Enclosure	Clean	Ok		
宝		Terminations	Secure	Ok		
1		\/-1	Secure	Ok		
Leaf			Connections	Ok		
Le			Secure	Ok		
st			Connections	Ok		
East		Thermostat &	Secure	Ok		
		Oil Heater	Operational	Ok		

INSPECTION NOTES & RECOMMENDATIONS

East Leaf oil leak, filter loose. Tightened and retested. Ok.

Mechanical inspections conducted by Francis Corner Engineering and Harker Hydraulic



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6. Mechanical Inspections

Mechanically inspect East & West as per checks below:

ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
			Secure	OK		
			Clean	OK		
		Tail Pin	Greased	OK		
			Functional	OK		
			Leaks	OK		
			Secure	OK		
			Clean	OK		
		North West Jack	Greased	OK		
		Jack	Functional	OK		
			Leaks	OK		
			Secure	OK		
			Clean	OK		
	Under Bridge	North West Wedge	Greased	OK		
	Bridge	Woago	Functional	OK		
u			Leaks	OK		
.E			Secure	OK		
G G		South West Jack	Clean	OK		
d 0			Greased	OK		
<u>u</u>			Functional	OK		
<u></u>			Leaks	OK		
<u>.<u>ö</u></u>		South West Wedge	Secure	OK		
an			Clean	OK		
C			Greased	OK		
<u>Je</u>		Weage	Functional	OK		
est Leaf – Mechanical Inspections			Leaks	OK		
 		Rotation	Secure	OK		
G		Gearbox	Oil Level	OK		
<u>ٽ</u>		Ring Gear	Tight	OK		
est			Clean	OK		
\aleph			Free of Debris	OK		
			Greased	OK		
			Secure	OK		
		Rotation	Rotate Freely	OK		
		Wheels	Greased	OK		
	West Pier	(inner & outer)	Free of Debris	OK		
			Drain Channels	OK		
		Fixings	Secure	OK		
		_	Secure	ОК		
		Buffer	Functional	OK		
			Free of Debris	OK		
			Secure	OK		
		Pintle	Clean	ОК		
		Bearings	Greased	ОК		
			Condition	OK		



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			Condition	OK	
	Bridge	Fixings	Cracks	ОК	
	Structure		Lose Bolts	OK	
		Stonework	Clamping Bands Secure	OK	
			Secure	OK	
			Clean	OK	
		North West Nose Bolts	Greased	OK	
			Functional	OK	
	Bridge Deck		Leaks	OK	
D.:		North West Nose Bolts	Secure	OK	
Bri			Clean	OK	
			Greased	OK	
			Functional	OK	
			Leaks	OK	
		Access Gates	Secure	OK	
			Functional	OK	



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ITEM	LOC	CATION	DETAIL	WKG	FTY	COMMENTS
			Secure	OK		
		Tail Pin	Clean	OK		
			Greased	OK		
		1 4 1 1 1 1 1	Functional	OK		
			Leaks	OK		
			Secure	OK		
			Clean	OK		
		North East Jack	Greased	- OK	х	Grease Line Damaged – Replacement Required
			Functional	ОК		
1			Leaks	ОК		
			Secure	OK		
	Under		Clean	ОК		
	Bridge	North East	Greased	OK		
		Wedge	Functional	OK		
			Leaks	OK		
SI			Secure	OK		
o			Clean	OK		
cti		South East Jack	Greased	OK		
Leaf – Mechanical Inspections			Functional	OK		
ปรเ			Leaks	OK		
=		South East Wedge	Secure	OK		
g			Clean	OK		
Ë			Greased	OK		
aر			Functional	OK		
SC			Leaks	OK		
M			Secure	OK		
_		Rotation Gearbox	Oil Level	-		
. JE		Gearbox		OK		
.e.			Tight	OK		
		Ring Gear	Clean	OK		
East			Free of Debris	OK		
Ш			Greased	OK		
			Secure	OK		
		Rotation	Rotate Freely	OK		
		Wheels (inner & outer)	Greased	OK		
	East Pier	(minor di dator)	Free of Debris	OK		
			Drain Channels	OK		
		Fixings	Secure	OK		
			Secure	OK		
		Buffer	Functional	OK		
			Free of Debris	OK		
		Pintle Bearings	Secure	OK		
			Clean	OK		
			Greased	OK		
			Condition	OK		
			Condition	OK		
	Bridge	Fixings	1			
	Structure	Fixings	Cracks	OK		



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		Stonework	Clamping Bands Secure	OK	
	Access Gates	Access Cates	Secure	OK	
		Functional	OK		

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7. Hydraulic Inspections

Hydraulically inspect East & West as per checks below:

ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		LIDII	Oil Level (top up if required)	OK		
		HPU	Oil Temp (min 10DegC)	OK		
			Secure	OK		
l SU		Pressure Line	Clean (change if necessary)	OK		
Hydraulic Inspections		Filters	Pressure Level	OK		
l S			Replace Filter (12m only)	N/A		
Spo			Secure	OK		
<u> </u>		Return Line Filters	Clean (change if necessary)	OK		
<u>.2</u>	Under Bridge		Pressure Level	OK		
			Replace Filters (12m only)	N/A		
		Vibrations	Non excessive	OK		
\ \ \		Noise Levels	Non excessive	OK		
		Solid Pipe Works	Secure	OK		
<u> </u>			Tight	OK		
ea			No Leaks	OK		
<u> </u>			Secure	OK		
est		Flexible Hoses	Tight	OK		
West Leaf		FIEXIDIE HOSES	No Leaks	OK		
			Functional	OK		
		Oil Sample	Oil Sample Required (12m only)	N/A		Max Dirt ISO DIS 4406 18/14 Water Content: -0.01%max

INSPECTION NOTES & RECOMMENDATIONS								
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ITEM	LOCATION		DETAIL	WKG	FTY	COMMENTS
		HPU	Oil Level (top up if required)	OK		
		HPU	Oil Temp (min 10DegC)	OK		
			Secure	OK		
ns		Pressure Line	Clean (change if necessary)	OK		
Hydraulic Inspections		Filters	Pressure Level	OK		
Sct			Replace Filter (12m only)	N/A		
e d			Secure	OK		
ns		Return Line Filters	Clean (change if necessary)	OK		
C			Pressure Level	OK		
l iii			Replace Filters (12m only)	N/A		
Га	Under Bridge	Vibrations	Non excessive	OK		
λd		Noise Levels	Non excessive	OK		
		Solid Pipe Works	Secure	OK		
l ,i			Tight	OK		
Leaf			No Leaks	OK		
Le		Flexible Hoses	Secure	OK		
ıst			Tight	OK		
East			No Leaks	OK		
			Functional	OK		
		Oil Sample	Oil Sample Required (12m only)	N/A		Max Dirt ISO DIS 4406 18/14 Water Content: -0.01%max

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