

BRIDGE & STRUCTURE EXAMINATION REPORT BRIDGE & STRUCTURE UNDERWATER EXAMINATION REPORT



ELR: KYL		Contract	Mileage: 055m 002	2yrds	ch -	Struc. Ref: 3	03/128			
Examination	Туре:	Unde	rwater Examination	Examin	ation Date	e:	30/10/2018			
Previous Exam	minatio	n Date:	Not Advised	Penulti	mate Exa	mination Dat	e:	4 -		
Area:		Sc	otland	BRS:	-	OS Ref:	NG 84262	33915		
Structure Na	me:	RIV	/ER FERNAIG	Туре:	-	Exam ID:				
Route:			Dingwall to Kyle of Lo	chalsh		Complete E	xamination:	Yes		

Examiners Name:	A. Forsyth	Examiners Signature:	[Redacted]

Section A: To Be Completed By The Examining Organisation											
	Part	Reason									
HIDDEN PARTS NOT EXAMINED (EXCLUDING FOUNDATIONS)	Nil										
		5									

Parameter	YES/NO	With Reference to Previous Report: (Unknown)	With Reference to Penultimate Report: (Unknown)
Changes in bed profile	N/A	No previous data	No previous data
Changes in bed material	N/A	No previous data	No previous data
Evidence of scour	N/A	No previous data	No previous data
Change of construction	N/A	No previous data	No previous data
Works since last exam	N/A	No previous data	No previous data

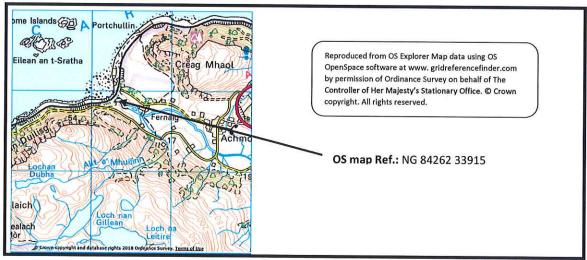
Scour Assessment Data Inclusion: No	one



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	0022 YDS		- CH
Exam Date:	30/10/	2018			Route:	Dingwall to Kyle of Lochalsh						
Group:		Area:	SCO		OS Ref:	NG 8	4262 3391	5	Nº of S	Spans:		1
Structure Na	me:	River Fern	aig						Page:	2	of	37



ELEVATION OF STRUCTURE



OS MAP - LOCATION OF STRUCTURE

Access route:

From Kyle of Lochalsh, follow the A87 East towards Auchtertyre for 5.5miles. Turn left on to the A890 and follow the road for 5.4miles. Turn left in to Achmore ad follow the road for 0.2miles. Take a left here then the first right. Follow the road past West Highland Dairy to a small rail over road bridge. The access to the structure is to the left of this bridge, next to a no parking/dead end sign post.

Description:

Br. 303/128 is a single span bridge constructed of masonry and spanning the River Fernaig. The structure is of masonry construction with wingwalls. The bridge is located within an embankment that separates Loch Carron and the land to the east of the bridge. The embankments on the downstream side of the bridge are protected from tidal action in this area by large rock armour. At high tide, the land upstream of the bridge is flooded.



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Group:		Area:	SCO		OS Ref:	NO	84262 3391	5	N° of	Spans:		1
Structure Na	me:	River Fern	aig	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					Page:	: 3	of	37

	G – Good	Remarks
Name of Part:	F – Fair P – Poor	(Refer to parts by name)
WEATHER		Overcast with Occasional Rain
WATERCOURSE	-	River Fernaig
SALT OR FRESH		Fresh at low tide, Salt at high tide
FLOW/TIDAL		Flow – Moderate / Tidal
BED MATERIAL		Sand / Pebbles / Small Gravel
INVERT	Р	Old concrete weir present – possible part of an old invert. Areas of spalling are visible
BED PITCHING	: <u>=</u>	-
APRONS	Р	Old concrete apron present. In poor condition
PILING	1=1	-
BANKING	F	-
FOUNDATIONS	N/E	No information supplied
SIDEWALLS	=	
ABUTMENTS	F	Masonry abutments
WING/RETAINING WALLS	F	Wing walls on both upstream and downstream side of both abutments
PIERS	3 	-
COLUMNS/CYLINDERS	_	-
FENDERS	-	-
HEADWALLS	-	-
POINTING	F	Isolated loss / spalling
PAINTING	2	÷
VEGETATION	-	-
NUMBER PLATES	G	Located on both upstream and downstream left wing walls
DEBRIS	/ -	
NAVIGATION	12	
DATUM USED	10	Underside of capstone on upstream right wing wall
INACCESSIBLE PARTS	-	i.
MORTAR TABS OR AVONGUARDS	/ = /	-
MONITORING OR PLUMB POINTS	-	
CHANGE TO HIGH WATER MARK	: =	-
WORKS DONE WITH EXAM	-	Aecom conditional survey
TRESTLES/CROSSHEADS	-	-
BEDSTONES/CILLS		•
SOFFIT/FLOORPLATE	(= .	-
BARREL	-	-



ELR:	KYL	Structu	re No:	30	303/128		Mileage:	055	м 0022 yds			- CH
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Group:		Area:	sco		OS Ref:	NO	84262 3391	5	N° of	Spans:		1
Structure Na	me:	River Fern	liver Fernaig						Page	: 4	of	37

Name of Part:	G – Good F – Fair P – Poor	Remarks (Refer to parts by name)	
ARCH RINGS	-	-	
RAIL BEARERS	i.e.	: 	
CROSS GIRDERS	-	12	
MAIN GIRDERS	-		
BEARINGS	-	·-	
WATERPROOFING	N/E	-	



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	002	2 yds		-CH
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Group:		Area:	sco		OS Ref:	NO	84262 3391	5	N° of	Spans	s:	1	1
Structure Na	me:	River Fern	aig						Page	:	5	of	37

Condition:

The examination of the structure was undertaken during daylight hours and followed detailed underwater examination procedures. The examination includes all elements of the structure from 2m above the normal water level for the structure, down to the river bed. The examination does not include any part of the structure that is greater than 2m above the normal water level or any buried elements e.g. foundations.

Personnel: Examiner; A Forsyth Assistant; D Walls

No Live Significant Defects within remit of underwater examination.

Watercourse

River Fernaig exhibited a moderate flow during the examination. The examination was carried out at low tide when the land surrounding the upstream side of the river was not flooded by tidal water. The river flows from South-East to North-West towards Loch Carron.

No significant changes in the watercourse levels were noted during the examination.

Bed Material

The bed material of the river consisted of sand and pebbles with small rocks.

Abutments

Low Mileage (Stromeferry) Side

Constructed from masonry and concrete and is in fair condition (Photo 5).

Isolated areas of pointing loss to the abutment at various locations (Photo 6, Photo 7 and Photo 8). Masonry in good condition.

Vegetation growth (seaweed) to lower areas of the abutment.

No scour or undermining of the abutment was found during the examination.

High Mileage (Plockton) Side

Constructed from masonry and is in fair condition (Photo 9).

Isolated areas of pointing loss to the abutment at various locations (Photo 10 and Photo 11).

Masonry in good condition.

Vegetation growth (seaweed) to lower areas of the abutment.

No scour or undermining of the abutment was found during the examination.

Pointing has been previously repaired in multiple areas over the whole structure.



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Structure Na	me:	River Fern	aig						Page	:	6	of	37

Wing Walls

Located on the upstream and downstream side of both abutments. All wing walls are in fair condition with areas of pointing loss (Photo 12 to Photo 19).

Hairline cracking was seen to the upstream, low mileage wing wall (Photo 17).

Vegetation

Seaweed growth to both abutments and all wingwalls within the tidal zone (Photo 20 and Photo 21).

Number Plates

Present on upstream high mileage and downstream low mileage wing walls.

Waterproofing

Not examined.

Banks

Upstream banks in this area are shaped by the tidal movement of the water. At low tide the river "bank" is a sandy area that is the seabed at high tide (Photo 22 and Photo 23).

At the grass line where high tide reaches, no erosion was noted. In the downstream side, the river feeds directly in to Loch Carron.

Weir / Apron

An old concrete weir is present within the span of the structure (Photo 24). The weir is potentially part of an invert that was previously within the structure. This does not extend across the full span and is in poor condition with areas of spalling.

A large concrete apron is present on the downstream end of the structure, surrounding part of the high mileage abutment and wing wall at this location (Photo 25 and Photo 26). This is in poor condition with areas of spalling. This could be providing some protection to the abutment and wing wall from scour while it is still present.



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Structure Na	me:	River Fern	aig						Page	:	7	of	37

Conclusions and Recommendations

The structure is overall in fair condition. Minor remediation only is required to limit any further deterioration.

- a) Repair to the various areas of pointing loss around the structure
- b) Monitoring of the concrete apron on the downstream, high mileage side to prevent further deterioration and loss of protection to the downstream, high mileage abutment and wing wall
- c) Consider repair or replacement to the old weir present within the span

Cross Sections and Radials:

Cross sections and radials were appropriate for this structure and are presented following the photographs. No previous data for the structure was available. A section 30m downstream from the structure was unable to be taken due to the proximity of the bridge to Loch Carron. However, a section of the river "mouth", approximately 12m downstream, was taken for completeness.

Evidence of Scour:

No evidence of scour was noted during the examination of the structure.

Changes in Bed Profile:

No significant changes in bed profile were noted during the examination. However, as no previous data is available, a comparison with previous examinations cannot be made until the next examination is completed.

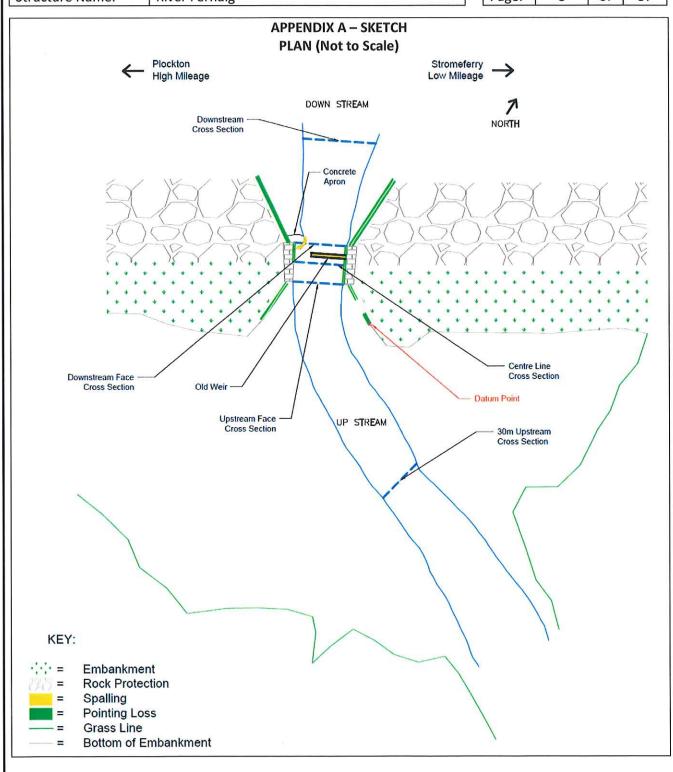
Foundation Details:

None supplied.

	Print Name	Signature	Date
Prepared By: (Examiner)	A. Forsyth	[Redacted]	14/12/2018
Checked By:	R. Wallace	[Redacted]	14/12/2018

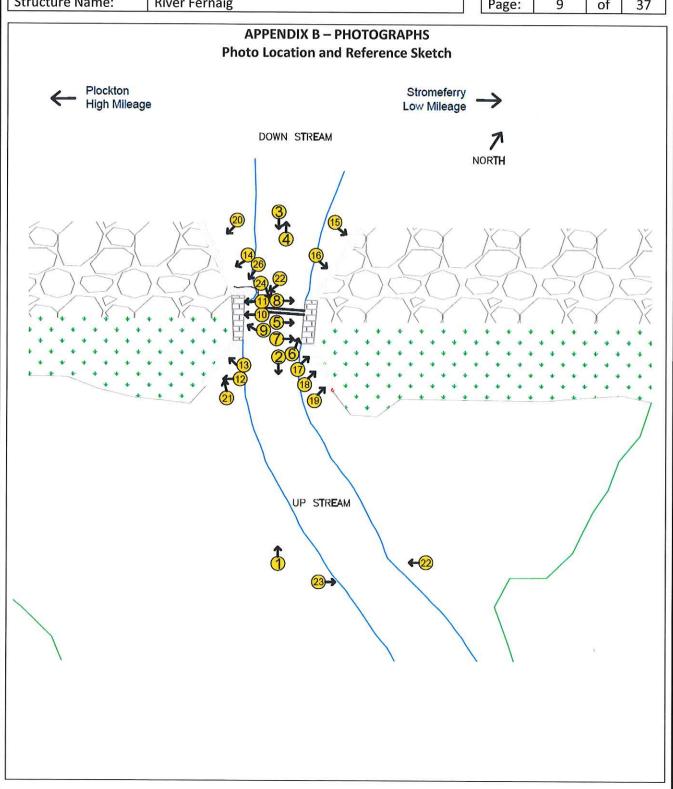


ELR:	KYL	Structu	re No:	30	303/128		Mileage:	055	М	0	022 yds		- CH
Exam Date:	30/10/	2018			Route:	Di	ngwall to Kyl	e of Lo	chalsh				
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Structure Na	me:	River Fern	aig						Page	:]	8	of	37





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Exam Date:	30/10/	2018				gwall to Kyl	e of Loc	halsh			-
Group:		Area:	SCO	OS Ref:	NG	84262 3391	.5	Nº of	Spans:		2
Structure Na	River Fern	aig					Page:	9	of	37	





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Exam Date:	30/10/2	2018		Route:			gwall to Kyle	of Loc	halsh		*		٦
Group:		Area:	sco		OS Ref:	NG	84262 3391	5	N° of	Spans:		1	
Structure Na	me:	River Fern	aig						Page:	10	of	37	٦



Photo 1: Upstream elevation of structure

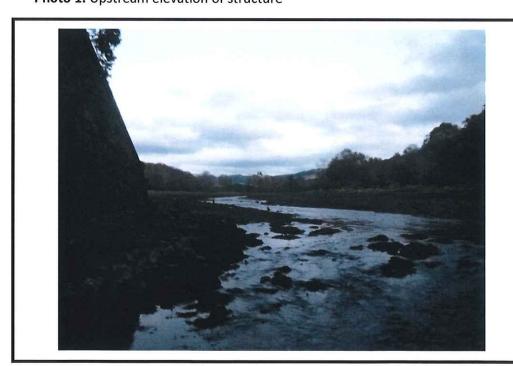


Photo 2: Looking upstream from structure



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	0022 YDS		- CH
Exam Date:	30/10/	2018			Route:	Dir	ngwall to Kyle	e of Loc	halsh			
Group:		Area:	SCO		OS Ref:	NG	84262 3391	.5	Nº of	Spans:		1
Structure Na	me:	River Fern	aig						Page:	11	of	37

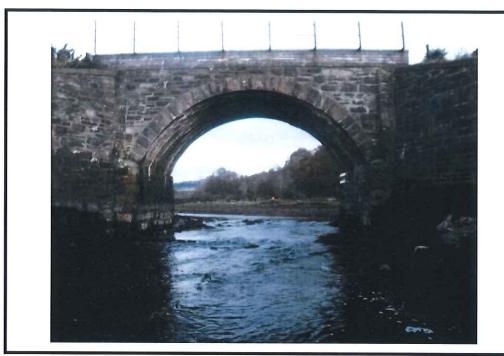


Photo 3: Downstream elevation of structure

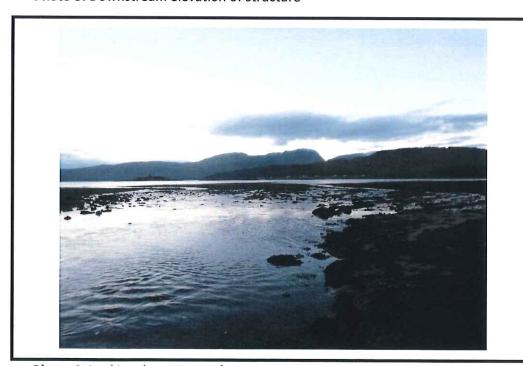


Photo 4: Looking downstream from structure



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	00	022 YDS		- CH
Exam Date:	30/10/2	2018	06	Г	Route:	Dir	igwall to Kyle	of Lo	chalsh				
Group:		Area:	sco		OS Ref:	NG	84262 3391	5	Nº of	Spa	ıns:	3	1
Structure Na	me:	River Fern	aig						Page	:	12	of	37



Photo 5: Showing low mileage abutment



Photo 6: Showing pointing loss to upstream face of low mileage abutment



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Exam Date:	30/10/	2018			Route:	Din	gwall to Kyle	of Loc	halsh			
Group:		Area:	SCO		OS Ref:	NG	84262 3391	5	Nº of	Spans:		1
Structure Na	me:	River Fern	aig						Page:	13	of	37



Photo 7: Showing pointing loss near centre of low mileage abutment



Photo 8: Showing pointing loss near downstream end of low mileage abutment



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	;	М	0022 YDS		- CH
Exam Date:	30/10/2	2018			Route:	Dir	ngwall to Kyle	e of Lo	ЭC	halsh	17.		
Group:		Area:	sco		OS Ref:	NG	84262 3391	.5		N° of S	pans:		1
Structure Name: River Fernaig										Page:	14	of	37



Photo 9: Showing high mileage abutment.



Photo 10: Showing pointing loss at centre of high mileage abutment



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	002	2 yds	1	- CH
Exam Date:	30/10/2	2018			Route:	Dir	gwall to Kyle	of Loc	halsh		*		
Group:		Area:	SCO		OS Ref:	NG	84262 3391	5	N° of	Spans	s:	9	1
Structure Na	me:	River Fern	aig						Page	:	15	of	37



Photo 11: Showing pointing loss to downstream end of high mileage abutment

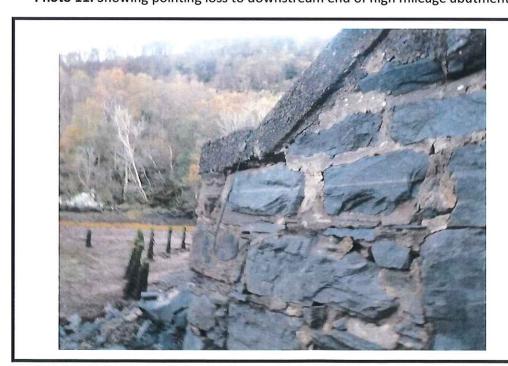


Photo 12: Showing pointing loss to upstream, high mileage wing wall



ELR:	KYL	Structu	re No:	3	03/128		Mileage:	055	М	0022 YD		- CH
Exam Date:	30/10/2					Dir	ngwall to Kyle	e of Loc	chalsh			
Group:		Area:	SCO		OS Ref:	NO	84262 3391	.5	Nº of	Spans:		1
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Photo 13: Showing pointing loss to upstream, high mileage wing wall



Photo 14: Showing pointing to repaired pointing on downstream, high mileage wing wall



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Structure Na	me:	River Fern	aig		•					Page:	17	of	37



Photo 15: Showing pointing loss to downstream, low mileage wing wall



Photo 16: Showing pointing loss to downstream, low mileage wing wall



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Group:		Area:	sco		OS Ref:	NG	84262 3391	.5		N° of	Spans:		1
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Photo 17: Showing pointing loss and cracking to upstream, low mileage wing wall



Photo 18: Showing pointing loss to upstream, low mileage wing wall



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Group:		Area:	sco		OS Ref:	NG	84262 3391	.5	N° of	Spans:		1
Structure Na	me:	River Fern	aig						Page:	: 19	of	37



Photo 19: Showing pointing loss to upstream, low mileage wing wall

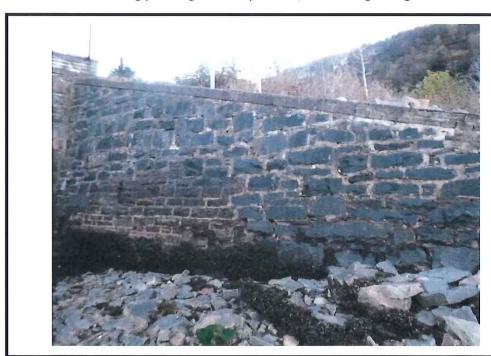


Photo 20: Showing downstream, high mileage wing wall and vegetation growth in the tidal zone



ELR:	KYL	Structu	Structure No: 303/128				Mileage:	055	М	0022 YDS		- CH
Exam Date:	30/10/	2018		Route: Dingwall to Kyle of Lo					chalsh			
Group:		Area:	sco		OS Ref: NG 84262 33915 N° of Spans:							1
Structure Na	me:	River Fern	aig		Page: 20 o					of	37	

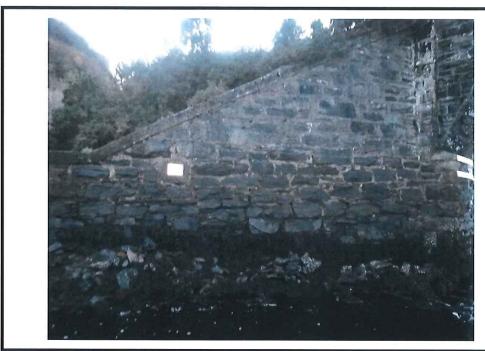


Photo 21: Showing upstream, high mileage wing wall and vegetation growth in the tidal zone



Photo 22: Showing high mileage side upstream at low tide. Note the river "bank" is the bed when the tide is high. Extent of high tide seen at grass line



ELR:	KYL	Structu	re No:	o: 303/128			Mileage:	055	М	0022 YDS		- CH
Exam Date:	30/10/	2018			Route:	Di	ngwall to Kyle	of Loc	halsh			
Group:		Area:	SCO		OS Ref:	NG	84262 3391	5	N° of	Spans:		1
Structure Na	me:	River Fern	aig	200					Page:	21	of	37



Photo 23: Showing low mileage side upstream at low tide. Note the river "bank" is the bed when the tide is high. Extent of high tide seen at grass line



Photo 24: Showing old weir present within structure. This does not extend across the full span



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Group:		Area:	sco		OS Ref: NG 84262 33915 N° of Spans:							1
Structure Na	me:	River Fern	aig		•	Page: 22 c					of	37



Photo 25: Showing concrete apron at downstream high mileage abutment and wing wall



Photo 26: Showing edge of concrete apron in process of eroding



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Exam Date:	30/10/	2018			Route:	Din	gwall to Kyl	e of Loc	halsh			
Group:		Area:	sco	1	OS Ref:	NG	84262 3391	.5	Nº of S	Spans:		1
Structure Na	me:	River Ferr	aig	•					Page:	23	of	37

APPENDIX C - RIVERBED SAMPLES

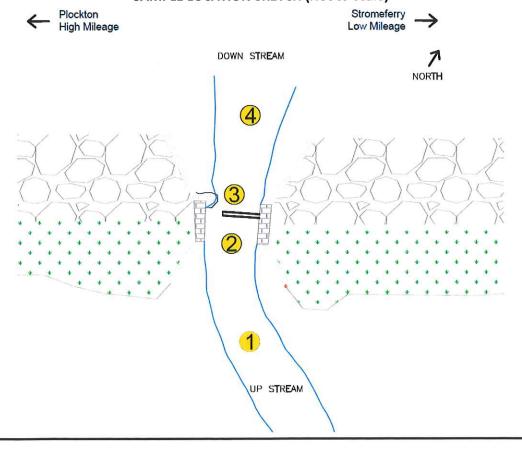
Description	Clay	Silt	Sand	Gravel	Gravel/Stone
Particle Size(mm)	<0.002	0.002-0.06	0.06-2.0	2.0-20	>20
Sample Ref. No.					
4			V	V	1

1	X	Х	
2	X	Х	
3	X	Х	
4	Х	Х	

SAMPLE LOCATION TABLE

Sample 1	5m from upstream face of structure	
Sample 2	Upstream face of structure	
Sample 3	Downstream face of structure	
Sample 4	5m from downstream face of structure	

SAMPLE LOCATION SKETCH (Not to Scale)





ELR:	KYL	Structu	re No:	o: 303/128			Mileage:	055	М	00	022 YDS		- CH
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Structure Na	me:	River Fern	aig						Page	:	24	of	37

APPENDIX D – OPERATIONAL RECORDS

No Diving Operations Were Undertaken on The Structure.



BRIDGE & STRUCTURE EXAMINATION REPORT



Underwater Examination

ELR: KYL	Cont	ntract Mileage: 055m 0022yrds ch Struc. Ref: 303/128										
Examination 7	Гуре:	Underwater Exam	NR ID:	12		Exam	Date:	30/:	10/2018			
Area:		Scotland	BRS:		09	Ref:	NG	84262	33915			
Structure Na	ne:	RIVER FERNAIG	Туре:	=	Еха	ım ID:		-				
Route:		Dingwall to Kyle	of Lochalsh		Com	plete Ex	camina	tion:	Yes			

	Section A: To Be Completed By The Examining Organisation HIDDEN PARTS NOT EXAMINED Part Reason												
200 March 200 C	DEN PARTS CLUDING F						Part					Re	ason
ITEM	C	ESCRIPT	ION		LOCA ⁻	ΓΙΟΝ	Est. Cost £+/- 20%	Priority Within	Quantity	Severity	Probability	Risk Score	Works Category
1		(#)			-								18
2												3. =	
	History of Live Significant Defects												
No	Description	Location	Exam Date	Access Gained	Exam Type	Rec Raised	Risk Score	Access Req'd	Deter- ioration	Repaired	Flag Fo Clos	r	Engineer Comment
	11734												
	Engineer Notes												
Signe For Emp	Signed Redacted Name: Ryan Wallace Date: 14/12/2018												