





Statens vegvesen

Ferry free E39 –Fjord crossings Bjørnafjorden

304624

Rev.	Publish date	Description	Made by	Checked by	Project appro.	Client appro.
0	15.08.2019	Final issue	JHE/KSV	SEJ	SEJ	
Client						
 Statens vegvesen						
Contractor			Contract no.:			
			18/91094			

Document name:

Preferred solution, K12 – Appendix C
Architectural evaluation

Document no.:

SBJ-33-C5-AMC-90-RE-103

Rev.:

0

Pages:

53

CONCEPT DEVELOPMENT, FLOATING BRIDGE E39 BJØRNAFJORDEN

Preferred solution, K12

Appendix C – Architectural evaluation

CLIENT

Statens vegvesen

DATE: / REVISION: 15.08.2019 / 0

DOCUMENT CODE: SBJ-33-C5-AMC-90-RE-103



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REPORT

PROJECT	Concept development, floating bridge E39 Bjørnafjorden	DOCUMENT CODE	SBJ-33-C5-AMC-90-RE-103
SUBJECT	Preferred solution, K12 Appendix C – Architectural evaluation	ACCESSIBILITY	Restricted
CLIENT	Statens vegvesen	PROJECT MANAGER	Svein Erik Jakobsen
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SUMMARY

This report contains the architectural evaluation done for the preferred alternative K12. In the process of ranking the different alternatives K11 to K14, architectural evaluations have played an important role. The K12 solution is found to be the superior compared to the others.

In addition, some visual improvements are proposed. These shall be evaluated in later phases of the project.

Please see enclosure 1 visualizations.

- Enclosure 1 – 10205546-07-NOT-195 Architectural visualizations – K12 (15.08.2019)

0	15.08.2019	Final issue	K. Svanberg J. Henriksen	S. E. Jakobsen	S. E. Jakobsen
REV.	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY

TABLE OF CONTENTS

1	Introduction.....	5
2	Alignment.....	5
3	Columns.....	5
4	Bridge girder	5
5	Pontoons	6
6	Cable stayed bridge	6
7	Tower	6
8	Enclosures	6

1 Introduction

An architectural evaluation is performed for the four bridge concepts. The following is concentrated on the preferred alternative K12. The evaluation focus on the aesthetical expression of the different floating bridge parts and cable stay bridge parts, including the overall alignment of the bridge concept.

2 Alignment

It is important to make the road and bridge alignment blend in with the surrounding landscape. As the landscape surrounding Bjørnafjorden is a very scenic environment, it is especially important to make the bridge alignment an extension of the approaching road network with its movement through the landscape. When viewed from shore, the bridge should follow the curvatures of the landscape as much as possible and thereby feel more coherent with the existing landscape.

From a driver's point of view, a curved alignment provide an opportunity to experience the bridge and its elements in a shifting perspective. The shifting perspective of the tower makes it visually interesting and enables the drivers to see the tower as more than just as a portal.

The C-curve as given for alternative K12 is a simple alignment which gently expresses the structural static system in the open waterscape. It seems very logical for a floating element, like a tensioned "Bow".

The curvature presents the main span and tower beautifully when approached from north. When continuing across the bridge, the drivers are guided smoothly towards it. From the south, the drivers will experience a dramatic "revealment" of the main span, tower, fjord and floating bridge when driving through the terrain cuts and onto the bridge.

3 Columns

Overall, the A-column is found to be the most aesthetical pleasing version. It describes in a logical way that the bridge is standing on its pontoons. The single column version seems irrational as it looks like a more conventional type standing on solid ground, not a column standing on a floating element. From an architectural point of view, it is recommended to perform a further investigation of the feasibility and costs for the A-column.

If the chosen concept is single vertical columns, we recommend investigating a round column. Its simple geometry plays well with the pontoons simple geometry.

A span length of 125m between the columns are preferred over 100m span length. This is to achieve the most open structure possible.

4 Bridge girder

A tapered bridge girder is preferred in order to keep the visual impression of the bridge girder as slender as possible. The bottom flange should preferably correspond with the width of the column shaft. It is also recommended to have the same bridge girder section on the floating bridge and cable stayed bridge in order to avoid any transitions.

5 Pontoons

In the following phase, we recommend a further investigation of the feasibility and costs for the shape of the pontoons. If possible, the visual expression of the pontoons should be enhanced without compromising safety or economy.

6 Cable stayed bridge

The inclining vertical profile and one-sided navigational span at the southern landing leads to an asymmetrical bridge. The “basecase” of our cable stayed side span has asymmetry to some degree and quite short spans. The side span stay arrangement is combined by two systems which can look unorganized from some angles.

The proposed “optional” side span underlines the asymmetry even more and extends the back span with 50%, which is more pleasing from an aesthetical point of view.

The fan stay arrangement has the same simplicity as the main span, which is our preferred option.

7 Tower

The A-tower stands out as the most logical structure for the mainspan, both structurally and aesthetically. The simple pointiness of the A-shaped tower creates a natural focus point in the landscape and has a strong “signal” effect. The flared legs below the deck feels like the right answer to the horizontal forces that needs to be taken in the deck.

The tower is located on Svarvhelleholmen adjacent to the navigational clearance area. This provides an opportunity to have tapered tower legs standing on a small area on the island and the foundation to be below the ground covered by rocks.

The preferred “optional” tower is more refined and has a lighthouse beacon on top. With an elegant light scheme, the tower will be visible from a great distance at night. It will visually give the tower a certain lightness and elegance – an Icon for the fjord crossing.

It is recommended that this is further investigated in the next phase.

8 Enclosures

Enclosure 1 – 10205546-07-NOT-195 Architectural visualizations – K12 (15.08.2019)

Concept development, floating bridge E39 Bjørnafjorden

Appendix C – Enclosure 1

10205546-07-NOT-195

Architectural visualizations – K12

MEMO

PROJECT	Concept development, floating bridge E39 Bjørnafjorden	DOCUMENT CODE	10205546-07-NOT-195
CLIENT	Statens vegvesen	ACCESSIBILITY	Restricted
SUBJECT	Architectural visualizations – K12	PROJECT MANAGER	Svein Erik Jakobsen
TO	Statens vegvesen	PREPARED BY	Kasper Svanberg Jesper Henriksen
COPY TO		RESPONSIBLE UNIT	AMC

SUMMARY

Architectural visualizations of the chosen bridge concept, K12.

REV.	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY
0	15.08.2019	Final issue	K. Svanberg J. Henriksen	S. E. Jakobsen	S. E. Jakobsen



BJØRNAFJORDEN

APPENDIX C: ARCHITECTURAL EVALUATION
2019.08.15

CONTENTS

01 ALIGNMENT

02 SPAN LENGTHS

03 CABLE STAYED BRIDGE

04 TOWER

05 LANDINGS

01 ALIGNMENT

SUMMARY – ALIGNMENT

The alignment is an important part of every bridge, especially on a bridge with this length in a very scenic environment.

The bridge alignment should be like an extension of the approaching road network with its movement through the landscape.

From a driver's point of view, a curved alignment usually gives the driver an opportunity to experience the bridge and its elements in a shifting perspective.

The Tower will be more visually interesting and one will be able to see the Tower as more than just as a portal.

When viewed from the shore, it is important that the bridge follows the curvatures of the landscape as much as possible and thereby feels more coherent with the existing landscape.

K12 C-curved, (end)anchored bridge

This is a simple alignment which gently expresses the static system in the open waterscape .

The c-curve seems very logical for a floating element, like a tensioned "Bow"

The curvature will present the Mainspan and Pylon beautifully when approached from the North where one will be guided smoothly towards the main span.

A dramatic "revelment" of the Main span, Fjord and floating bridge will occur when moving through the rather deep terrain cuts, approaching the bridge from south.





K12

K12 BASECASE













K12 BASECASE - APPROACH FROM SOUTH







K12 BASECASE - APPROACH FROM SOUTH



K12 BASECASE - APPROACH FROM NORTH