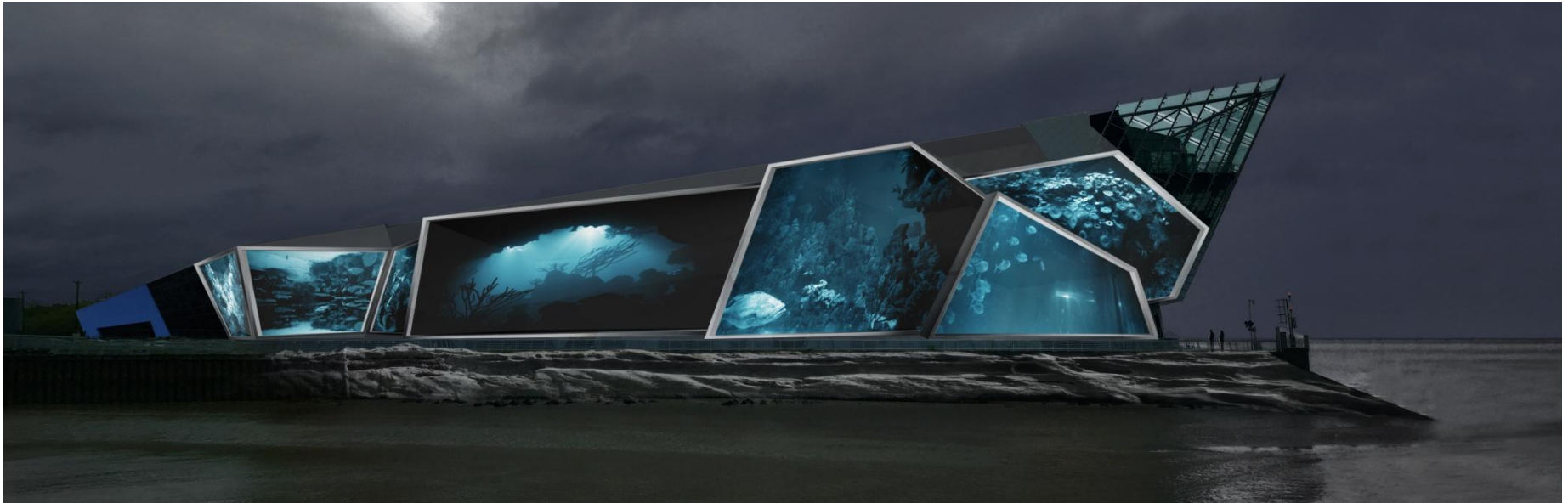


**Hull 2017 - Look Up - Tell the World**

*Deep*



**Concept Proposal for a Projection Event for The Deep**

**Artists: Anna Heinrich & Leon Palmer**

## Introduction

'Deep' is a proposal for a spectacular, large scale projection event and soundscape that will 'virtually' reshape, and remodel the architecture and facade of The Deep. We want this to have a drama and depth that will reflect the processes and environments within the present day Submarium and its links with the study of interconnected ecosystems around the world. It will be a celebration of The Deep as an iconic international venue and the transformative role it has played in helping Hull to redefine itself as a key city within the North.

Our proposal has evolved from the architects' vision and conceptual approach to the design of The Deep as a geological metaphor rising out of the ground. The form, colour and materiality of the building were conceived by the architect Sir Terry Farrell to '*have metaphorical associations with wave or glacier like forms*'.

The interior design of the building continues with these references with the inner tanks of water conceived as 'boulders of water' and the circulation spaces as voids. The interior displays are strongly influenced by the physical nature of the ocean and the dramatic lighting and design of the aquaria reinforce this sense of immersion within an ocean environment. Looking at the architect's sketch books it is clear to see how this vision has influenced the design, but it is also interesting to see how their observations of aquatic and organic life had an impact on the colours, forms and overall feel of the building.

## The Idea

We would like to use digital projection mapping to visually articulate the material, form and surface qualities of The Deep to convey the geological and biological processes which inspired its original design, whilst also give a sense of the rich aquatic life and activity currently happening with the building. Our approach is to take the building through a number of different states using moving imagery to create these different architectural identities. We have developed five phases through which we would like the building to transform. These are:

- Start from an ambient state and then establish the ground and geological transformations
- Defining space with water and filling of tanks
- Sea life
- Pattern and colour
- Transformation back to ambient state.

We envisage that the ambient state would run between each of the full shows. A soundscape will be developed in response to the imagery.

## Methodology for creating content

We will use a mixture of the following to create the visual content:

- Building and filming of physical scale models which are designed to visually 'fit' with the architectural facade of The Deep
- High speed filming of physical processes such as water and particles falling.
- Taking high resolution film of the aquatic life living within The Deep.
- Photographing and filming geological forms, then editing and combining these using Photoshop, Adobe After Effects and Premiere Pro.
- Recording sounds samples and using these to create a rhythmical soundscape for the visual content.

The video will be edited together to fit within a visual architectural framework that will be projection mapped onto the facade of The Deep. The 3D model created from 3D scans of the building will enable us to map the single image precisely onto the facade using a series of linked projectors. The final projection will be at projected virtual 8K resolution. Much of our research has focused on developing a conceptual framework and evaluating the best way to create the visual content to ensure that we take full advantage of image resolution in relation to the surface and architecture of The Deep. The test on 26<sup>th</sup> September will inform our final decision based on assessing how different types of imagery works with the different surfaces and materials.

## Outline Technical Information

QED will use a series of Panasonic laser projectors which will be linked together wirelessly.

The exact models will be specified after the test on the 26<sup>th</sup> September. For the test QED will use the [Panasonic PT-DZ21KE](#). Information on this projector can be found on the link provided and a PDF of the Product Specification can be found in the appendices.

The following gives an outline specification for this model.

**Lumen Output and Resolution:** 20,000 Lm of brightness - WUXGA resolution

**Power Supply:** 200-240V AC, 50/60 HZ (Max. current requirements: 12A @200V)

**Power Consumption:** 2,300W (0.3W with standby mode set to eco, 9W with standby mode set to normal.)

Approximate cost to run one projector for 6 hours based on cost of 13p per 1Kw hour = £1.79. **Weight:** Approximately 43kg.

**Operation noise:** 49dB (quad lamp operation)

**Operating environment:** Operating temperature: 0-45°C (32-113°F) Operating humidity: 10-80% (no condensation)

### Projection sites

Our aim is to have the equipment discretely installed so that we can avoid obstructed views. Two potential sites have been identified which can be used to project onto the west facing elevation and the adjacent left hand corner section which faces out towards the Bridge Control Room. Both sites offer elevated positions and will negate the need to build scaffold towers.

**C4DI Building:** The AV equipment will be installed by QED on the 3<sup>rd</sup> floor balcony of the C4Di building. Permission to do this has been provisionally granted by the landlord Wykeland with the proviso that the set up of the equipment has an applied load less than 1.86k/N m<sup>2</sup>. QED will provide plans and drawings of the layout of the equipment after the site test on 26.09.17 when they will have a clearer idea of the exact number and positions of the projectors/equipment required.

**Bridge Control Room:** The Bridge control Room would be the ideal location for the set up to project onto the white rendered section of the corner facade. We and QED are currently liaising with Andrew Knight and Peter Curry, Engineer Hill City Council to see if this is possible and we will know more after our site visit and meeting with Peter Curry on the 26<sup>th</sup> September.



## Outline Costs

All costs exclude VAT which will added at current standard rate

### Production & Hire Costs:

Materials for physical models:	350
Subscription to Adobe Creative Cloud Production Suite:	150
1 week hire of high speed cameras with lens package:	2,100
1 week hire of flicker free LED Lamps:	260
2 day hire of 4K digital SLR camera and lenses:	350
Insurance cover for hire of cameras/equipment:	200
<b>Total =</b>	<b>3,410</b>

QED's costs based on information known to date (for outline breakdown see appendices) **57,900**

### Artists' fees based on daily rate of £250 per artist day

**73 days: 1 artist x 56 days + 1 artist x 17 days**

Estimated breakdown:

Design/fabrication of models (4 days):	1,000
Filming and photography (10 days):	2,500
Editing images, video production and liaising with QED (54 days)	13,500
On site for set up/event in Hull: 5 days	1,250
Travel for 2 artists based on 4 return trips to Hull from Portsmouth	1,000
Accommodation/subsistence based on 2 artists x 4 nights @£75 per night/day	600

### Other costs

Security/Marshalls	2,000
Contingency	1,840
<b>Grand total</b>	<b>85,000</b>

## Outline Procurement and Installation Strategy

We will procure the services of QED Productions who will be our technical consultants for the project. QED are one of the longest established and most experienced companies in the audio visual industry and they will take overall responsibility for the technical set up of all their equipment, its running and maintenance during the event in consultation with the artists and Hull2017.

QED will provide a full risk assessment and method statement after the test and site visit on 26<sup>th</sup> September.

The projection equipment will be installed on the top floor balcony of the C4DI building. QED have been informed of the loading constraints of the balcony (Ref: email from Andrew Knight 09.04 on 13.09.17) which should not exceed the maximum recommended by Wykelands consultant engineers - 2.5k/N m2. QED will provide drawings and plans for the layout of their equipment to Wykelands engineers to ensure that the load is distributed to within satisfactory limits. Paul Wigfield, Director QED, has provisionally advised that this can be achieved using aluminium decking.

*Note: The Made in Hull Production which projected from the same balcony in January used a similar amount of equipment and achieved an applied load of less than 1.86k/N m2 achieved by using steel decking to spread the load.*

During the event QED's technicians will be onsite to oversee the running of the event and manage any technical issues should they arise. Back up projectors will be on site in case they are required. QED have been advised that they need to take into account the weather conditions and the possibility that high wind speeds can occur in this area.

### **Access:**

QED will require access to C4DI building and the Bridge Control Room to set up the equipment on the 5, 6 and 7<sup>th</sup> December. The event will run in the evening from 5 pm from 8 – 10<sup>th</sup> December (exact performance times tbc). De-rig will be undertaken on 11<sup>th</sup> December.

## Schedule

DATE	ARTISTS	QED	OTHERS/NOTES	Week 1
26 SEPTEMBER	Plan film shoot at The Deep, assess test with QED	3D scan and test onto The Deep	Low Tide 16:05 = 1.8m High Tide: 21:49 = 6.5 m (Albert Dock)	
27	Present concept proposal to steering group	Process scan information/create 3 D model		
28	Video test/render			
29	Video test/render			
30				
1 OCTOBER				
2	Design and fabrication of models			Week 2
3	Design and fabrication of models			
4	Design and fabrication of models			
5	Design and fabrication of models			
6	Hire of high speed camera/Prep			
7	Hire of high speed camera – filming/editing			
8	Hire of high speed camera – filming/editing			
9	Hire of high speed camera – filming/editing			Week 3
10	Hire of high speed camera - filming/editing			
11	Hire of high speed camera - filming/editing			
12	Hire of high speed camera - filming/editing			
13	Hire of high speed camera - filming/editing	3D Model from scan complete		
16	Hire of 4 K Camera/Prep			Week 4
17	Site visit Hull to film @ The Deep (exact date tbc)			
18	Content production/editing			
19	Content production/editing			
20	Content production/editing			
21				
22				
23	Content production/editing			Week 5
24	Content production/editing			
25	Content production/editing			
26	Content production/editing			
27	Content production/editing			

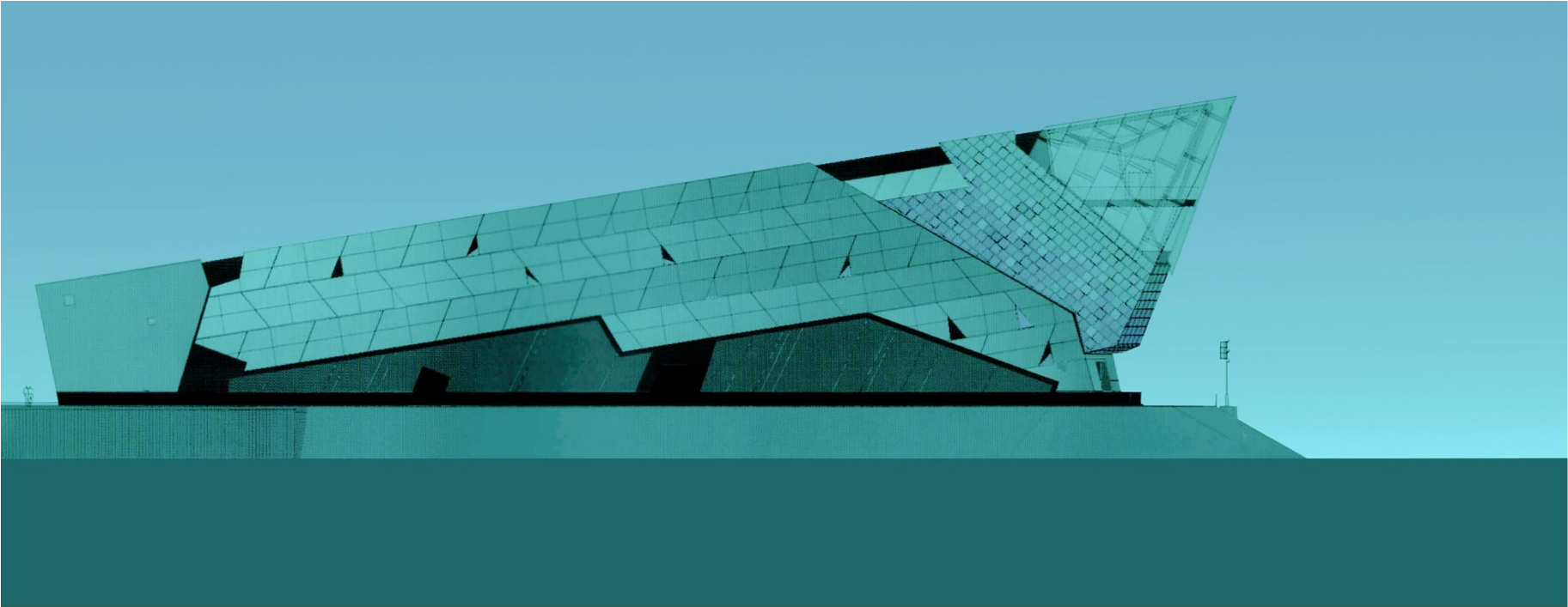
28				
29				
30	Content production/editing			Week 6
31	Content production/editing			
DATE	ARTISTS	QED	OTHERS/NOTES	
1 NOVEMBER	Content production/editing	Drawings/Layout of AV equipment/ RAMS		
2	Content production/editing			
3	Content production/editing			
4				
5				
6	Content production/editing			Week 7
7	Content production/editing			
8	Content production/editing			
9	Content production/editing			
10	Content production/editing			
11				
12				
13	Content production/editing/sound			Week 8
14	Content production/editing/sound			
15	Content production/editing/sound			
16	Content production/editing/sound			
17	Content production/editing/sound			
18				
19				
20	Content production/editing/sound			Week 9
21	Editing/sound			
22	Editing/sound			
23	Editing/sound			
24	Complete video			
25				
26				
27	Test/edit with QED			Week 10
28	Test/edit with QED			
29	Test/edit with QED			
30	Test/edit with QED			

DATE	ARTISTS	QED	OTHERS/NOTES	
1 DECEMBER	Test/edit with QED			
2				
3				
4	Test/edit with QED			Week 11
5	ON SITE	SET UP		
6		SET UP		
7		SET UP		
8	ON SITE/DOCUMENT	EVENT	High Tide: 21:35 Sunset: 15:41	
9	ON SITE	EVENT	High Tide: 22:30 Sunset: 15:41	
10	ON SITE	EVENT	High Tide: 23:35 Sunset: 15:41	
11		De-Rig COMPLETE		

*Deep*

**Sketch Visualisations**

The Deep - West Facing Facade

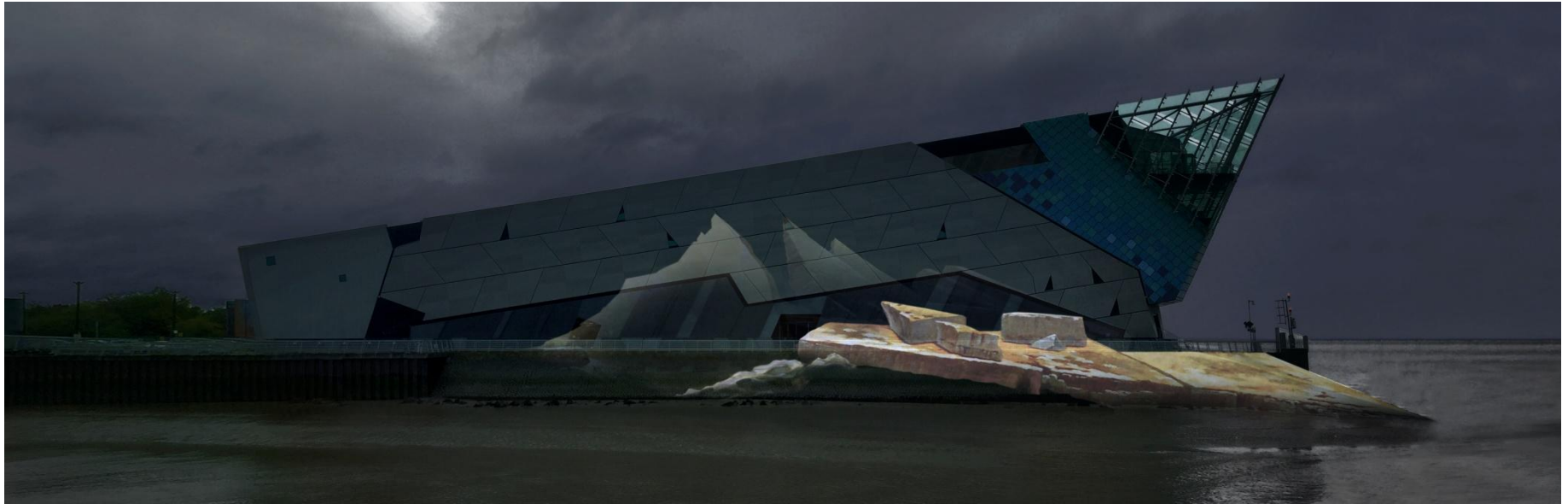


## Ice Forms

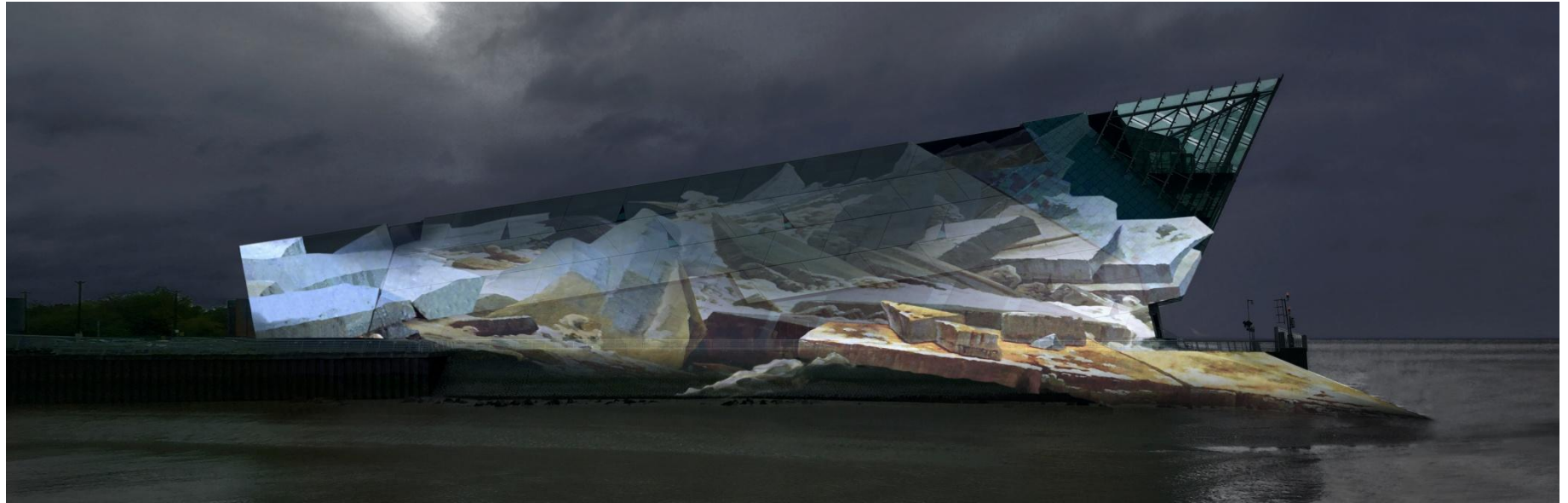


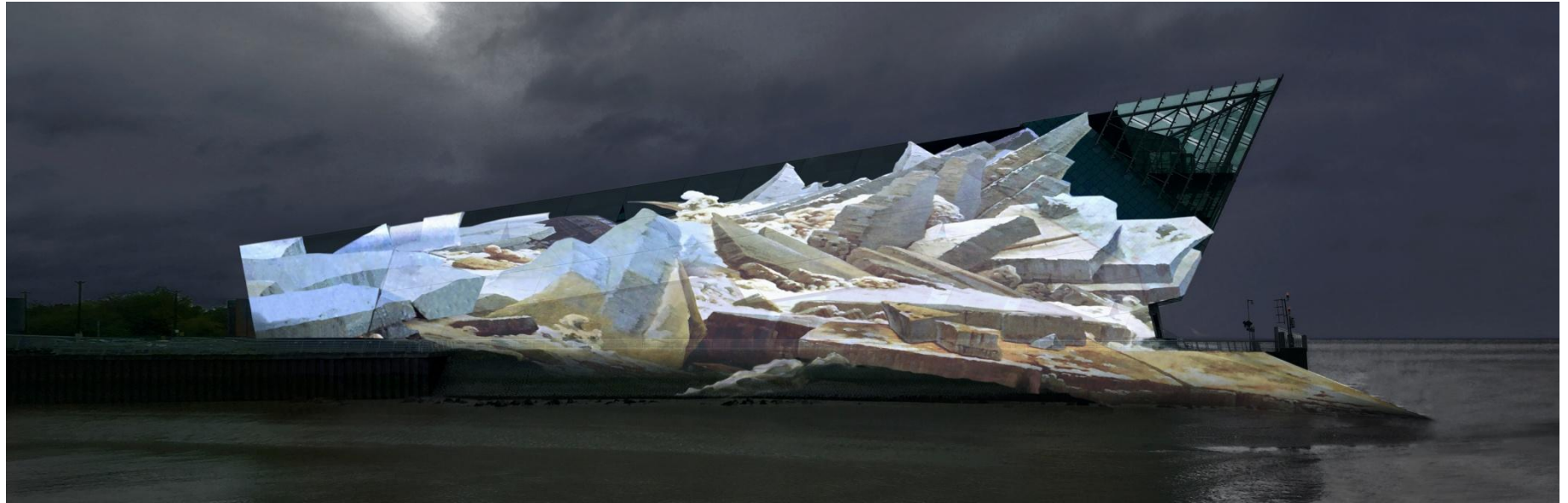


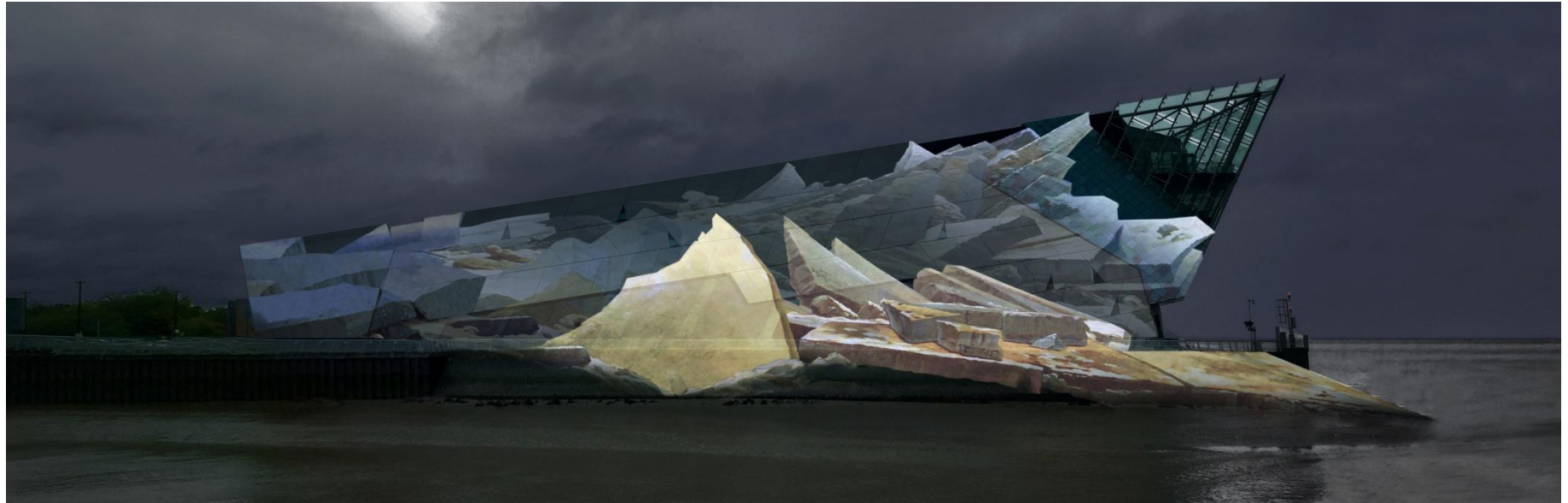
## Geological Transformations



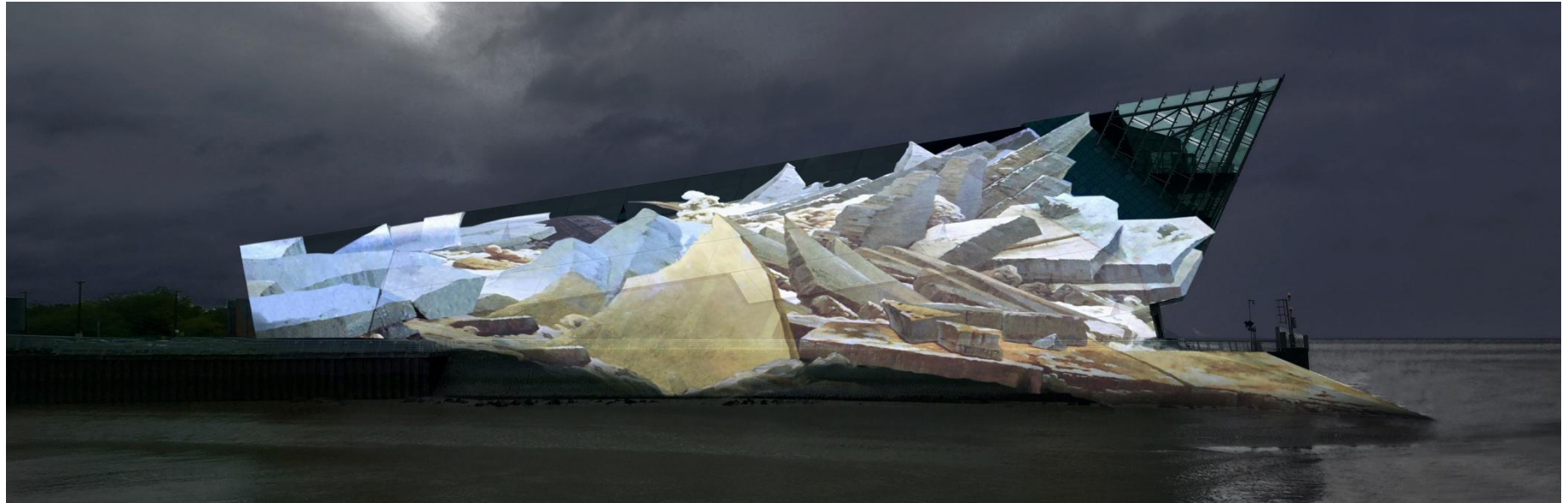












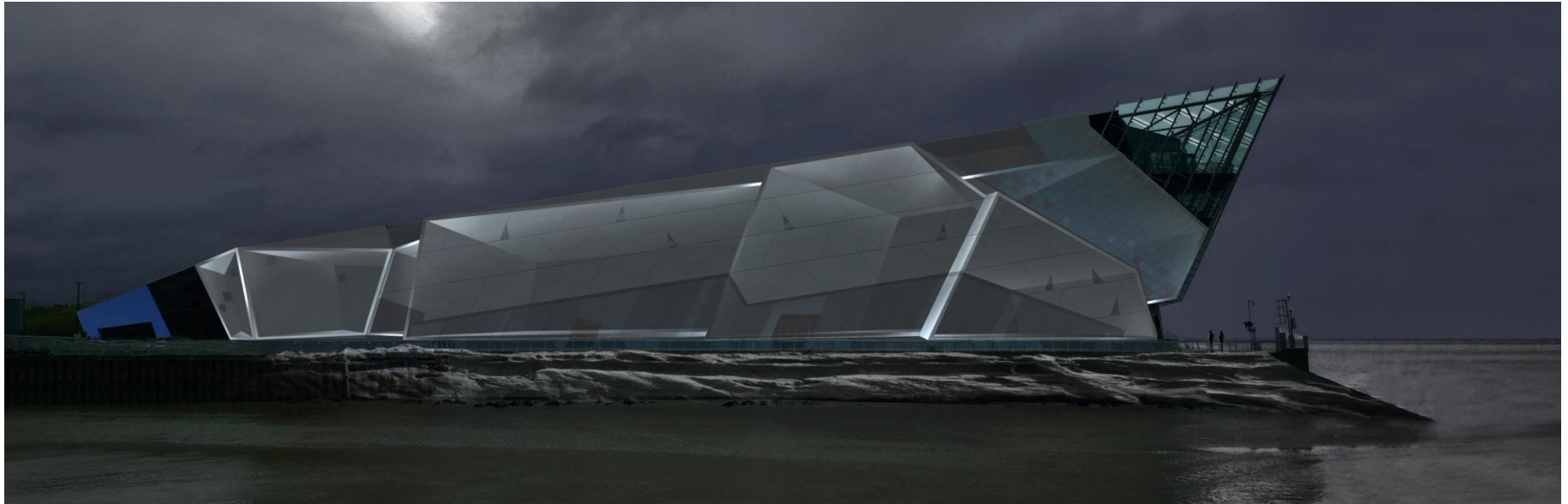


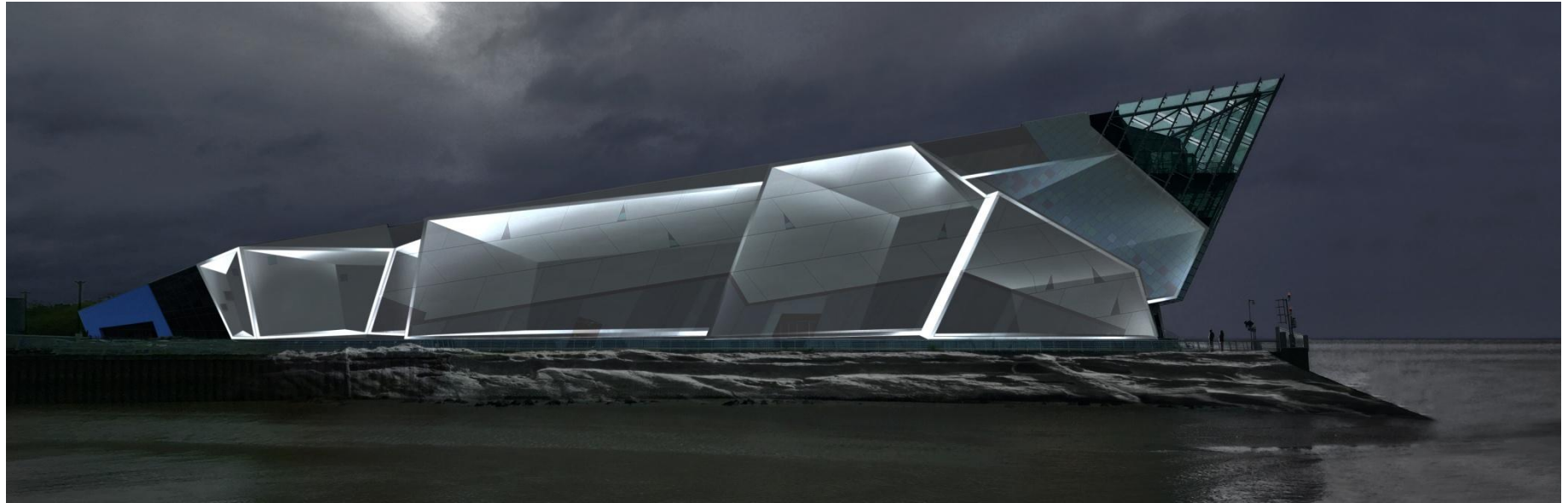


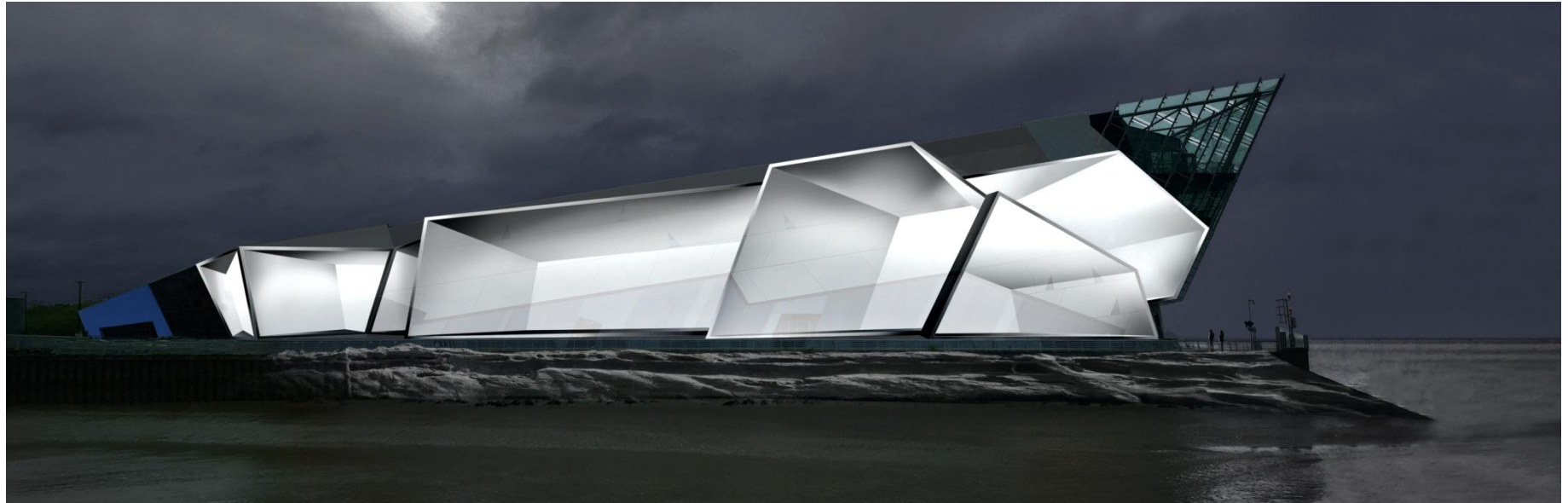




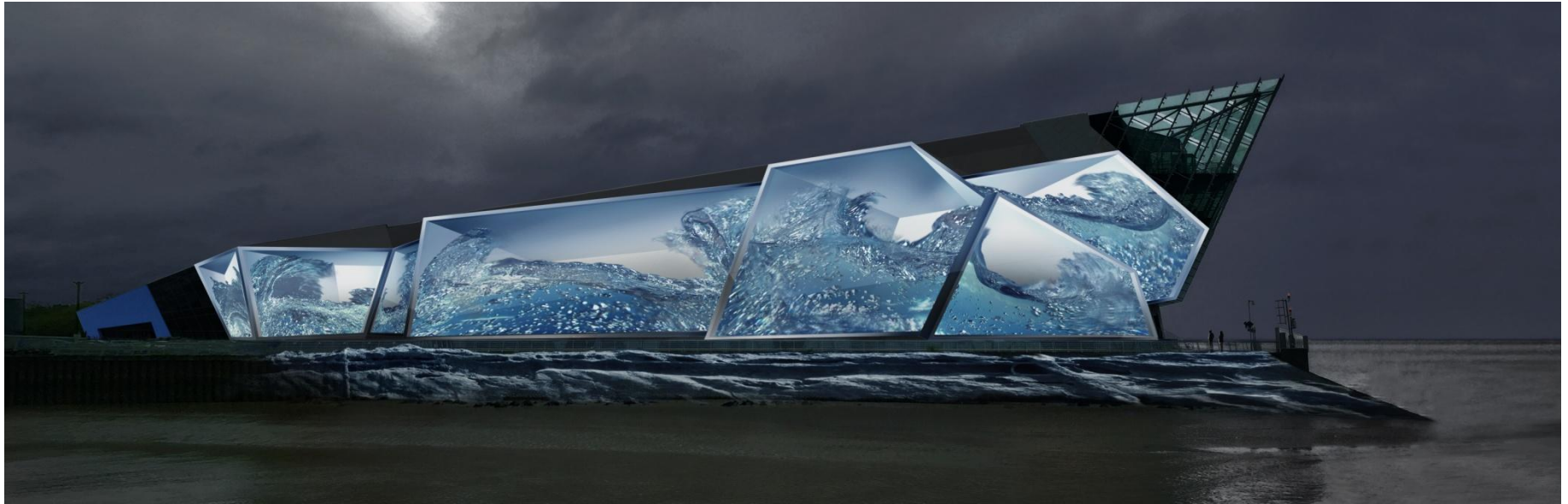
## Aquaria - Evolving Forms





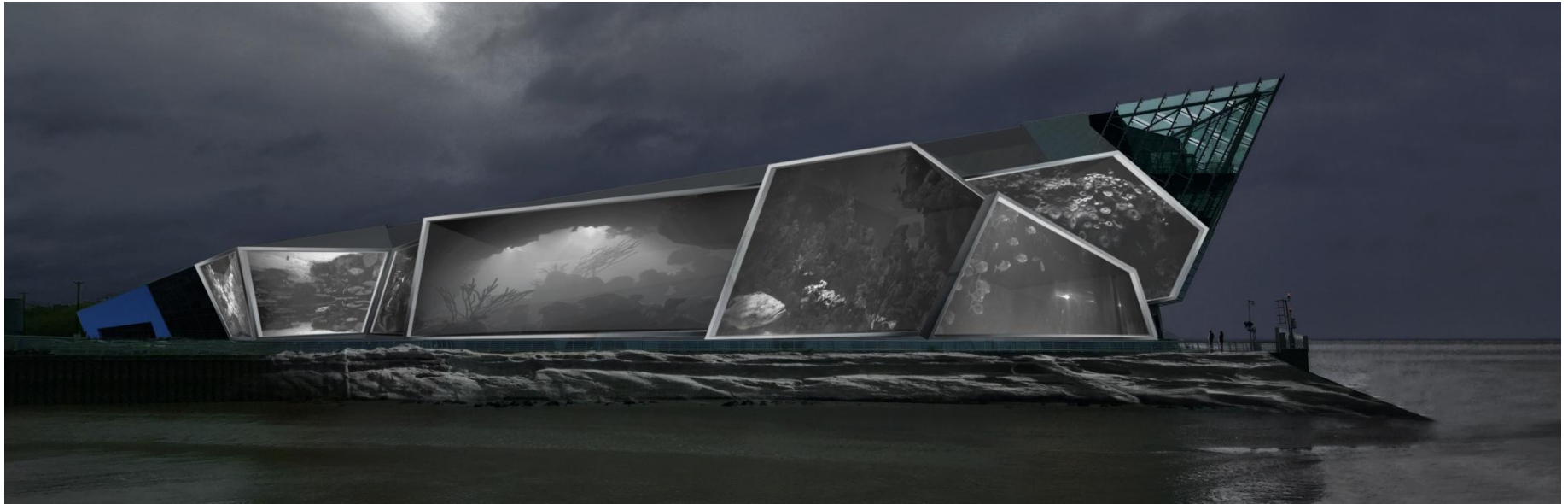


## Defining Form With Water - High Speed Film Sequences

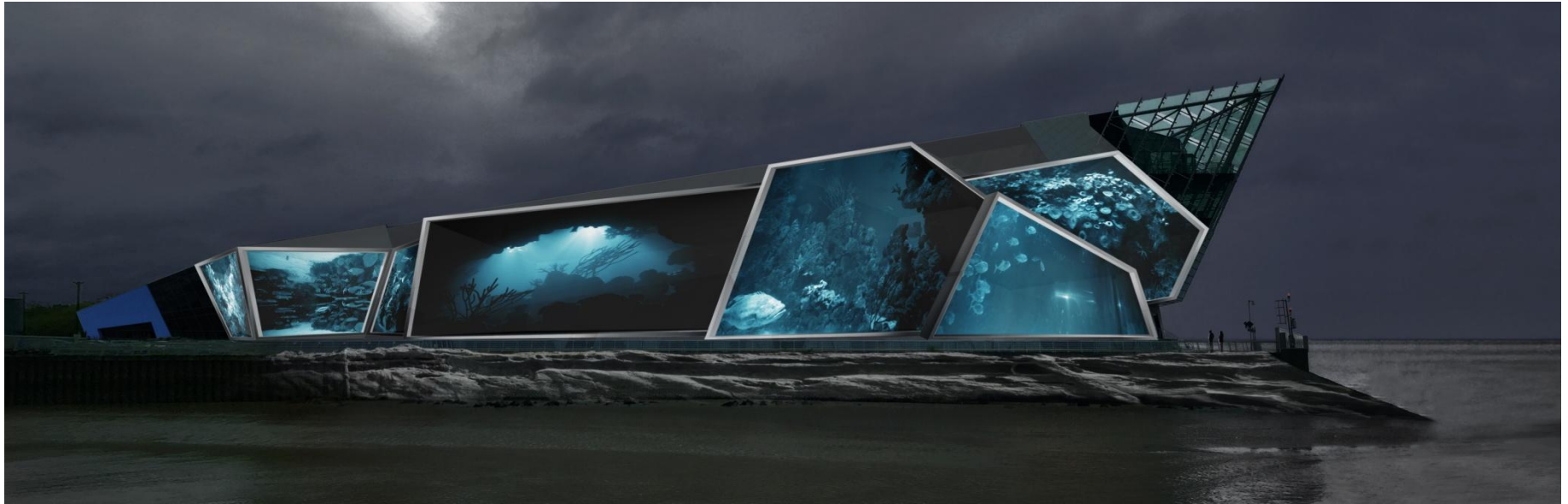




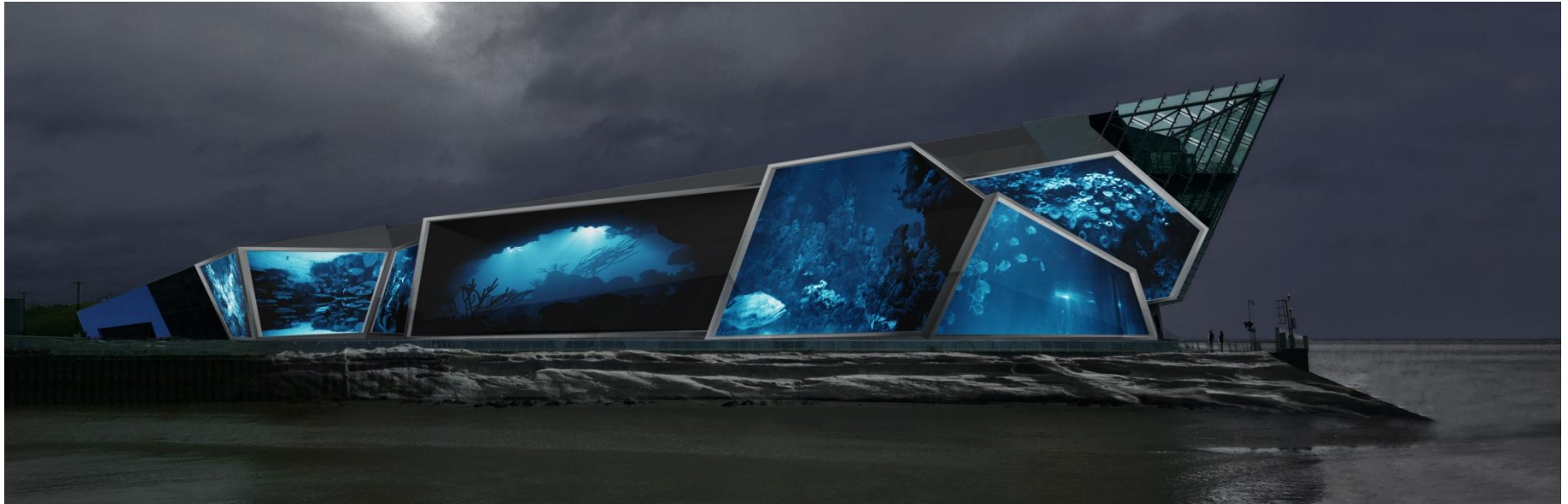
## Aquatic Life



## Aquatic Life 2



## Aquatic Life 3





## **Research & Development**

**Imagery which has inspired our proposal**







Freeze Thaw Weathering





Freeze Thaw Weathering

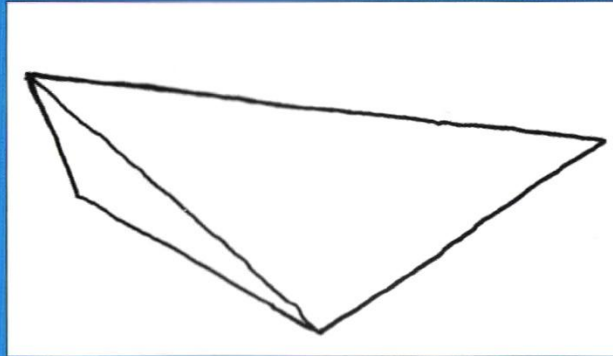




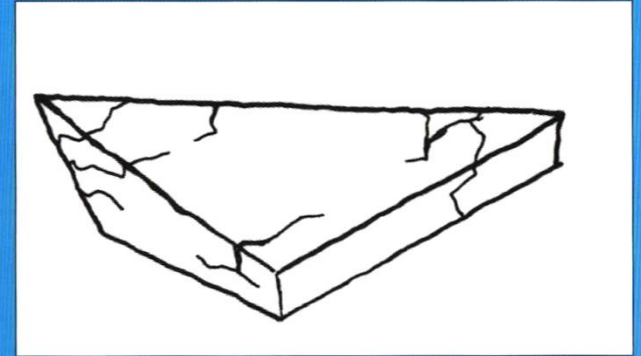
Caspar David Friedrich – The Sea of Ice

Early concept sequence showing the erosion of the monolith.

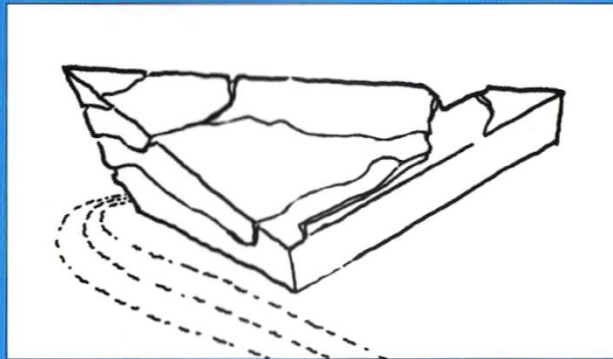
- 1 Upheaval of land creates monolith
- 2 Ground fault fractures  
Principal fault lines apparent
- 3 Major fissures created  
Erosion starts  
Wind/rain  
First material from monolith falls at base
- 4 Fissures enlarge  
Greater definition of fissures  
Flood water erosion by stream  
Revetment material builds up
- 5 Minor fissures created  
Further erosion around and into base of building  
Revetment as a defined form  
Roof erosion defined
- 6 Man's intervention  
Access/habitability  
Regularisation of lines of erosion



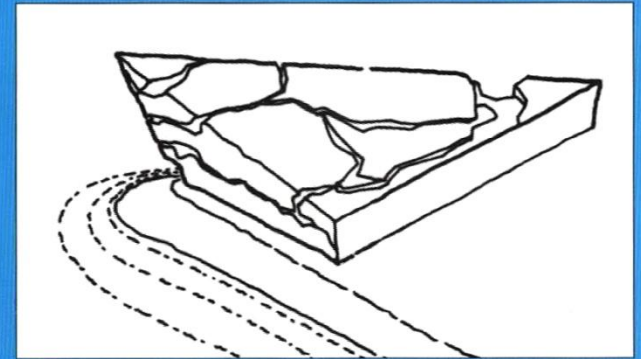
1



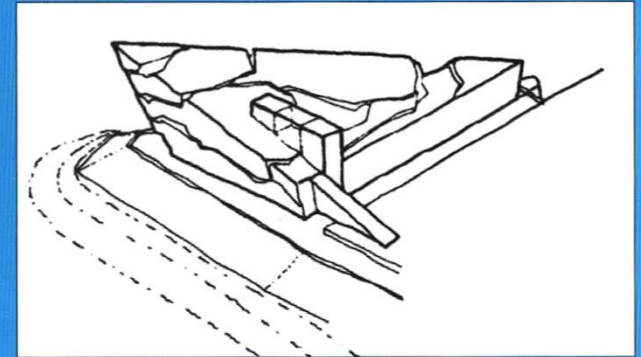
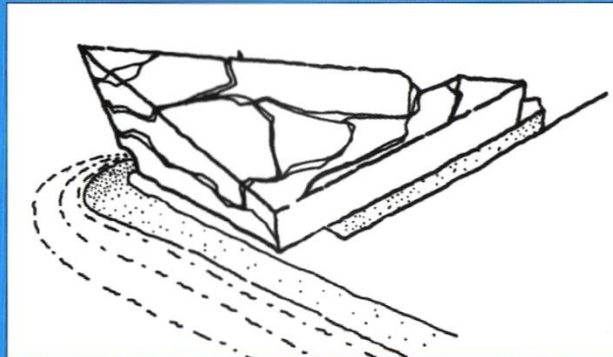
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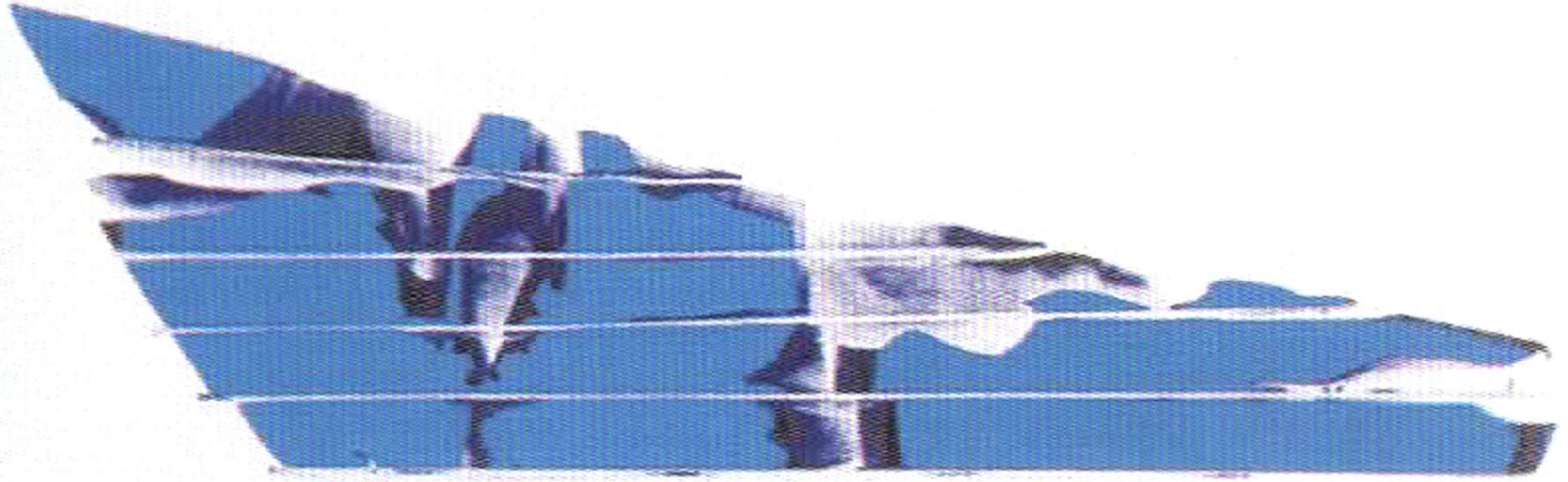
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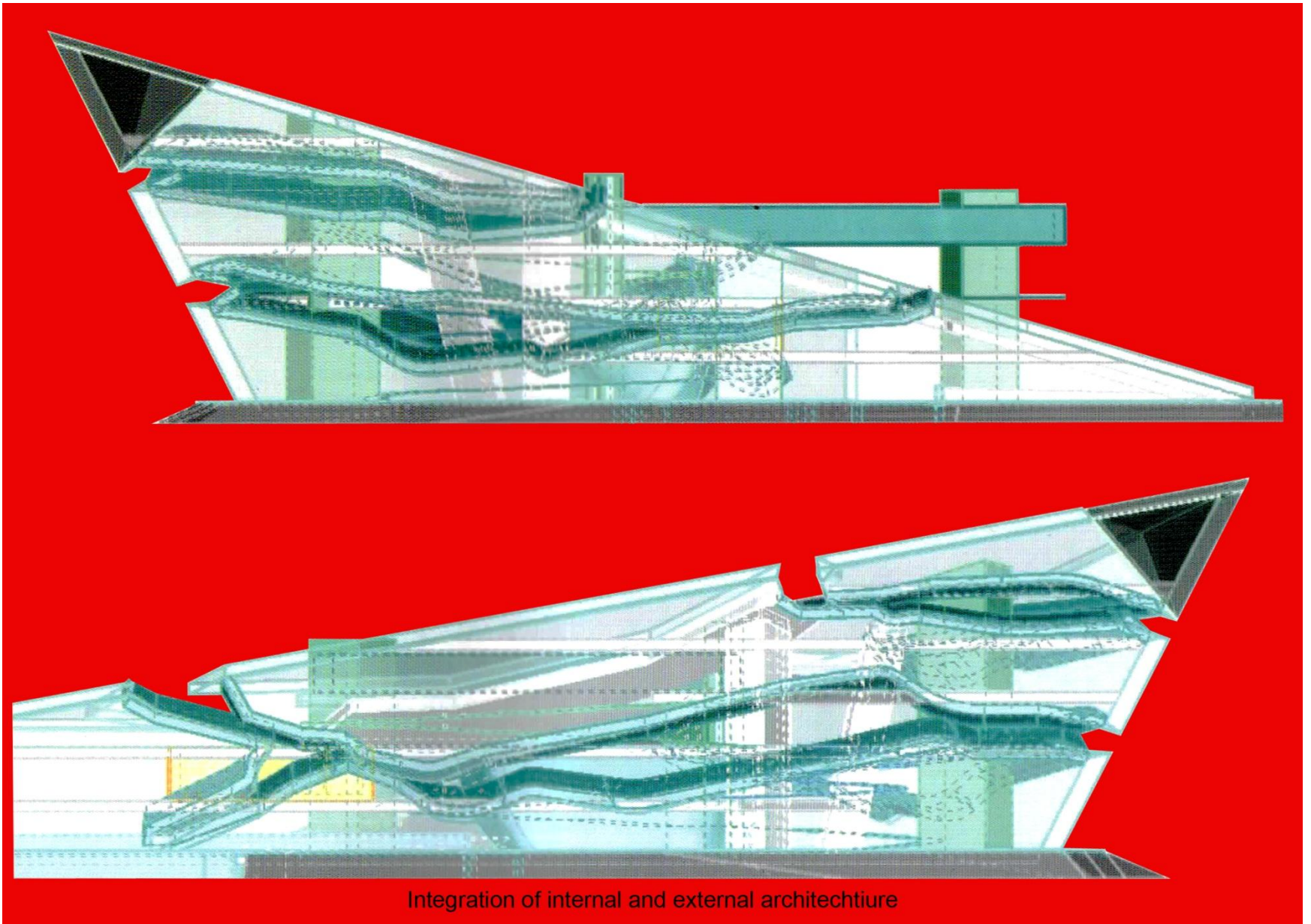
4





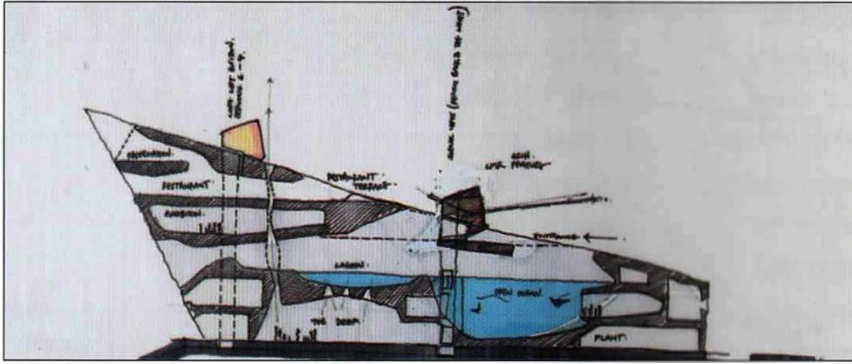


Section through concept model.

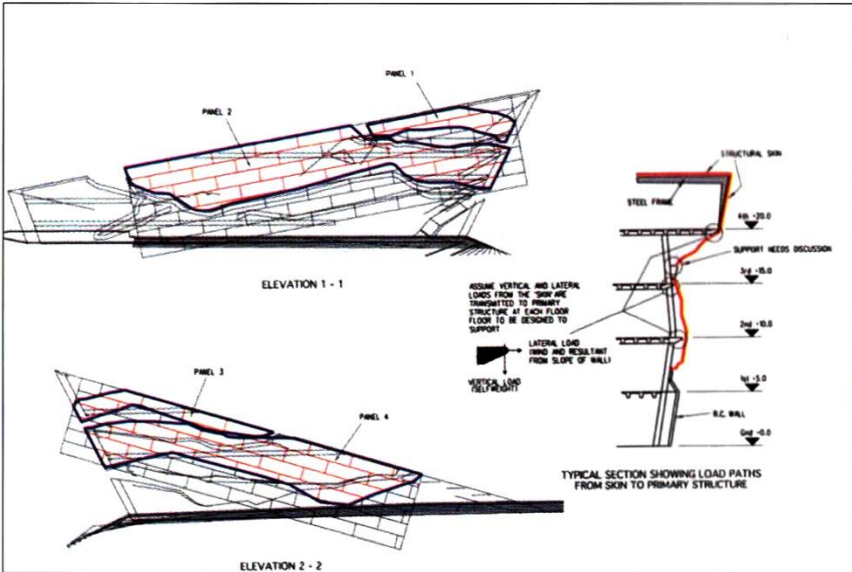
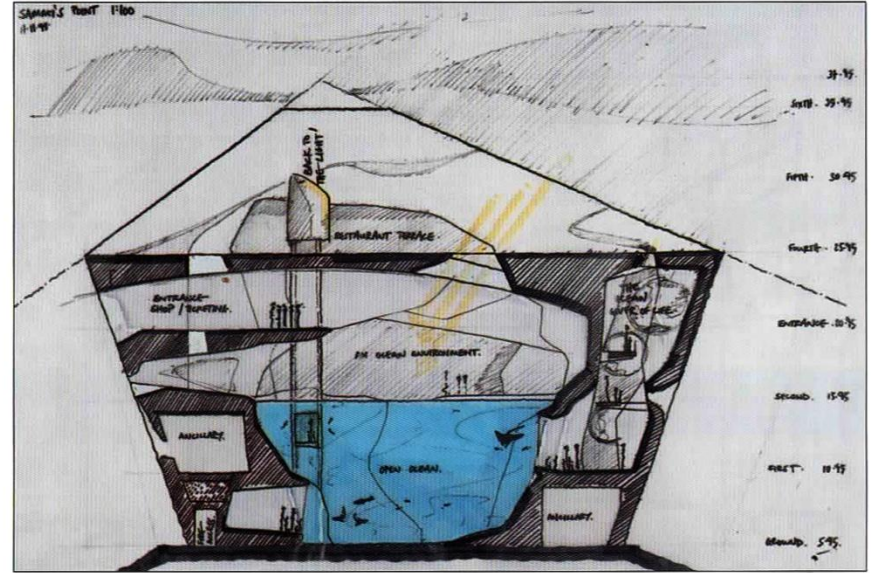


Integration of internal and external architecture

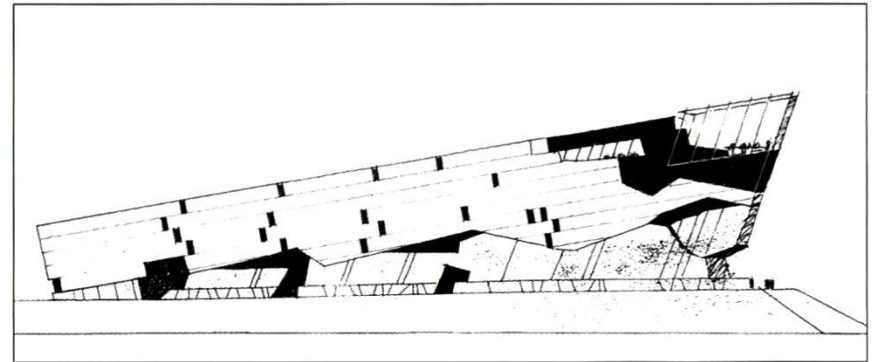




Early concept drawings.



Early concept drawings of steel plate cladding.



Early concept drawings for The Deep - Terry Farrell & Partners





Aquatic Life at The Deep





Aquatic Life at The Deep



Aquatic Life at The Deep



Aquatic Life at The Deep





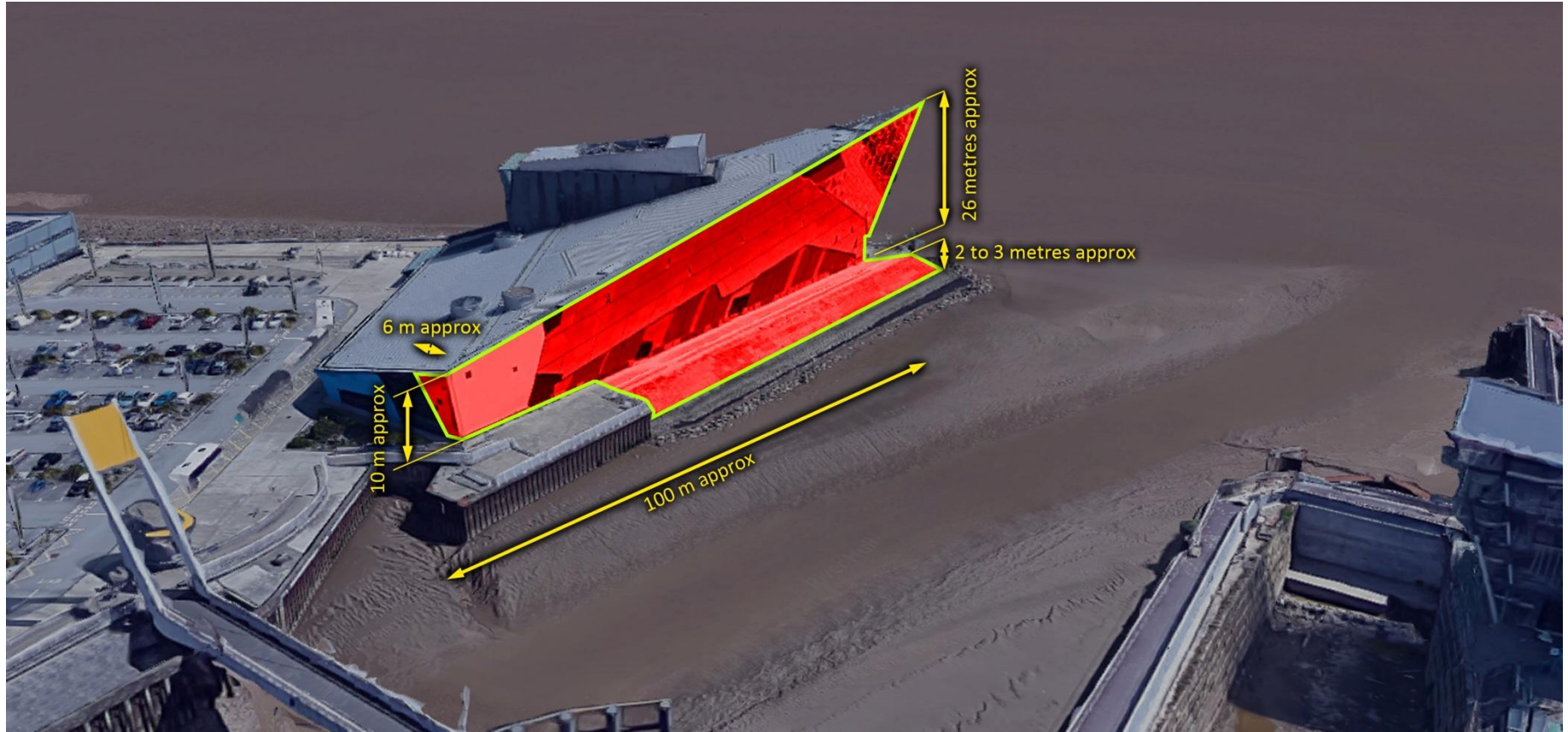
Aquatic Life at The Deep

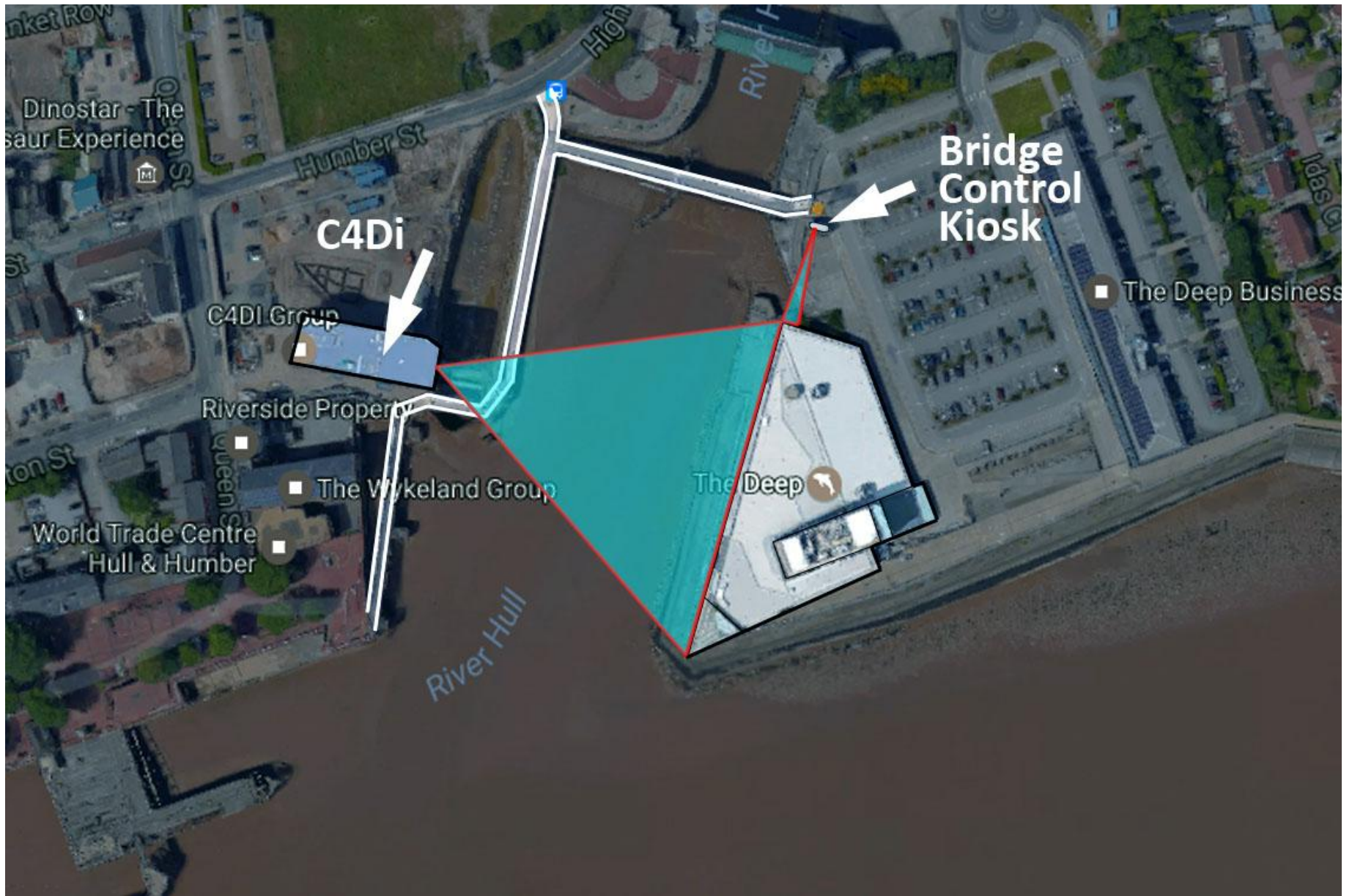




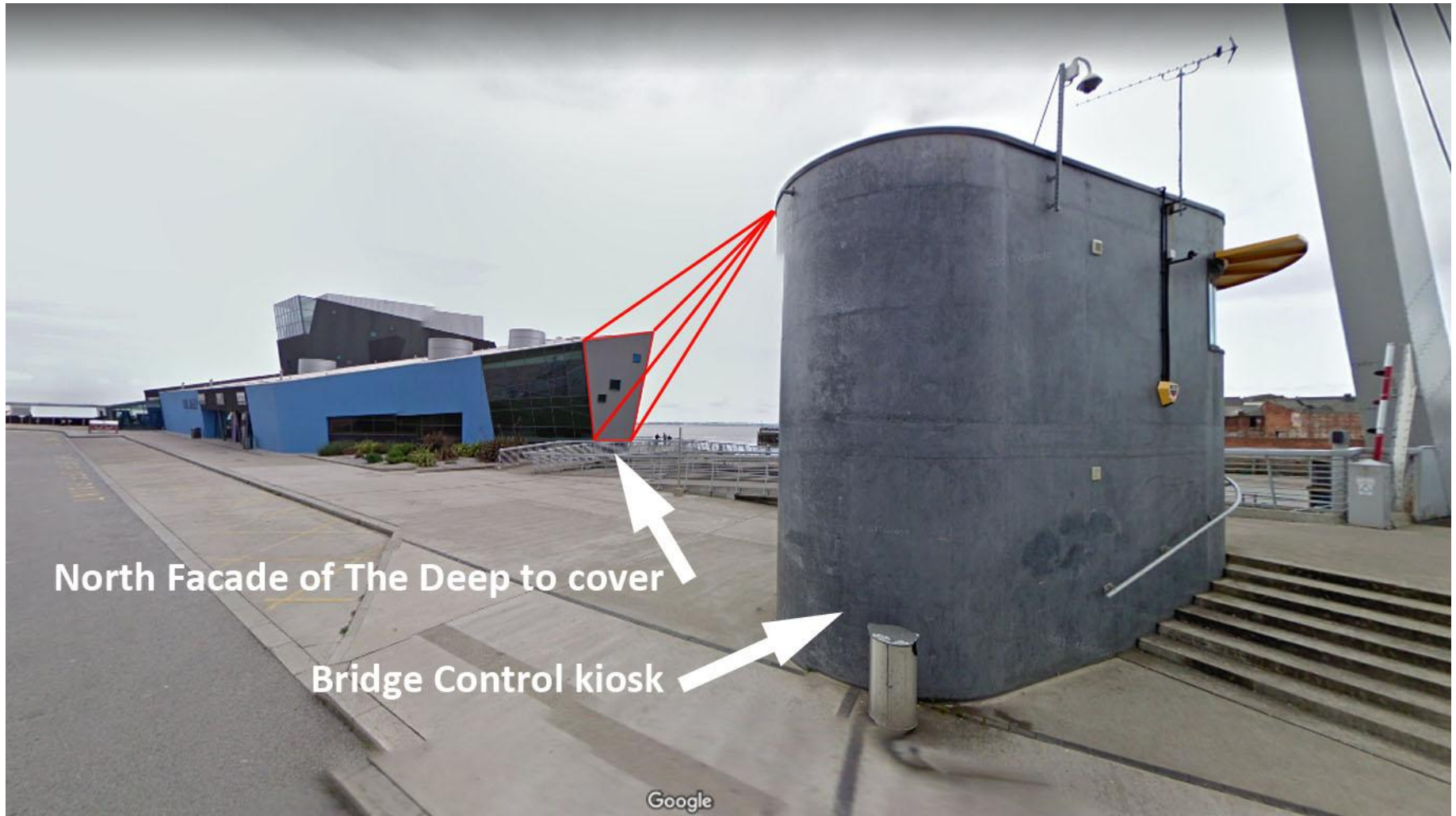
Aquatic Life at The Deep

## Technical Set Up









North Facade of The Deep to cover

Bridge Control kiosk



The Deep



## Appendices

**Client: Heinrich & Palmer**

**Venue: The Deep, Hull**

**Set-up 28-30 November 2017**

**Event Dates: 1st to 3rd December 2017 (tbc)**

	Qty	Days	Daily rate	Discount	£ Total
<b>Projection</b>					
Panasonic RZ31K laser projector (30k lumens)	12	3	3,000.00	75%	27,000.00
Panasonic zoom lens (tbc)	12	3	150.00	75%	1,350.00
Apple Macbook Pro (projector control)	2	3	150.00	100%	0.00
<b>Media Servers/Control</b>					
d3 4x4pro media server rack (main & back-up)	1	3	6,000.00	75%	4,500.00
Dell 24"Ultrasharp LCD monitor	4	3	50.00	100%	0.00
Lightware 32x32 DVI matrix switcher	1	3	2,000.00	100%	0.00
Harris Predator 16x16 multiviwer	1	3	500.00	100%	0.00
<b>Signal Distribution</b>					
12-channel DVI/Ethernet Fibre TX rack	1	3	600.00	75%	450.00
4-channel fibre multicore	12	3	50.00	75%	450.00
DVI/Ethernet Fibre Shoe	12	3	50.00	75%	450.00
DVI/Cat5 video cabling	1	3	100.00	100%	0.00
<b>Labour</b>					
QED Technician	3	7	400.00		8,400.00
<b>Accommodation</b>					
Accommodation (tbc)	3	6	100.00		1,800.00
<b>Subsistence/Expenses</b>					
Subsistence/Travel Expenses (tbc)	3	6	50.00		900.00
<b>Local labour</b>					
Set-up/de-rig labour (tbc)	4	2	200.00		1,600.00
<b>Equipment Transportation</b>					
Delivery & Collection (tbc)	1	1	3,500.00		3,500.00
<b>Production</b>					
Design/Project Management/H&S	1	4	500.00	100%	0.00
				<b>ex VAT Total</b>	<b>£50,400.00</b>

<b>Contingencies</b>					
Laser scan & model	1	1	7,500.00		7,500.00
Test projection	1				
Projector structures (tbc)	1				
Mains Power	1				

## S P E C F I L E



The PT-DZ21K is not equipped with a lens.

Product Number : **PT-DZ21K**

Product Name : 3-Chip DLP™ Projector

## Specifications

## Main unit

Power supply		200–240 V AC, 12 A, 50/60 Hz (3-wire single-phase)
Power consumption		2,300 W (2,350 VA) (0.3 W with STANDBY MODE set to ECO.* <sup>1</sup> 9 W with STANDBY MODE set to NORMAL.), max. 7,848 BTU (without light output: 7,585 BTU )
DLP™ chip	Panel size	24.4 mm (0.96 inches) diagonal (16:10 aspect ratio)
	Display method	DLP™ chip × 3 (R, G, B), DLP™ projection system
	Pixels	2,304,000 (1,920 × 1,200) × 3, total of 6,912,000 pixels
Lens		Optional powered zoom/focus lenses
Lamp		465 W UHM lamps (× 4) (four lamp system)
Screen size		1.78–15.24 m (70–600 inches) (1.78–7.62 m (70–300 inches) with the ET-D75LE50), 16:10 aspect ratio
Brightness* <sup>2</sup>		20,000 lumens (four lamp)
Center-to-corner uniformity* <sup>2</sup>		90%
Contrast* <sup>2</sup>		10,000:1 (full on/full off, in dynamic iris 3 mode)
Resolution		1,920 × 1,200 pixels (Input signals that exceed this resolution will be converted to 1,920 × 1,200 pixels.)
Scanning frequency	SDI	Dual-link HD-SDI signal (RGB 4:4:4 12-bit/10-bit): SMPTE ST 372 compliant: 1080/50i, 1080/60i, 1080/25p, 1080/24p, 1080/24sF, 1080/30p, Dual-link HD-SDI signal (X'Y'Z' 4:4:4 12-bit): SMPTE ST 372 compliant: 2048 × 1080/24p, 2048 × 1080/24sF, 3G-SDI signal (RGB 4:4:4 12-bit/10-bit): SMPTE ST 424 compliant: 1080/50i, 1080/60i, 1080/25p, 1080/24p, 1080/24sF, 1080/30p, 3G-SDI signal (YPbPr 4:2:2 10-bit): SMPTE ST 424 compliant: 1080/50p, 1080/60p, HD-SDI signal (YPbPr 4:2:2 10-bit): SMPTE ST 292 compliant: 720/50p, 720/60p, 1035/60i, 1080/50i, 1080/60i, 1080/25p, 1080/24p, 1080/24sF, 1080/30p, SD-SDI signal (YCbCr 4:2:2 10-bit): SMPTE ST 259 compliant: 480i, 576i
	HDMI/DVI-D	480p, 576p, 720/60p, 720/50p, 1080/60i, 1080/50i, 1080/24p, 1080/24sF, 1080/25p, 1080/30p, 1080/60p, 1080/50p, VGA (640 × 480)–WUXGA (1,920 × 1,200), compatible with non-interlaced signals only, dot clock: 25–162 MHz
	RGB	Horizontal: 15–100 kHz, vertical: 24–120 Hz, dot clock: 162 MHz or less
	YPbPr (YCbCr)	480i (525i): f <sub>H</sub> 15.75 kHz; f <sub>V</sub> 60 Hz, 576i (625i): f <sub>H</sub> 15.63 kHz; f <sub>V</sub> 50 Hz, 480p (525p): f <sub>H</sub> 31.50 kHz; f <sub>V</sub> 60 Hz, 576p (625p): f <sub>H</sub> 31.25 kHz; f <sub>V</sub> 50 Hz, 720 (750)/60p: f <sub>H</sub> 45.00 kHz; f <sub>V</sub> 60 Hz, 720 (750)/50p: f <sub>H</sub> 37.50 kHz; f <sub>V</sub> 50 Hz, 1035/60i: f <sub>H</sub> 33.75 kHz; f <sub>V</sub> 60 Hz, 1080 (1125)/60i: f <sub>H</sub> 33.75 kHz; f <sub>V</sub> 60 Hz, 1080 (1125)/50i: f <sub>H</sub> 28.13 kHz; f <sub>V</sub> 50 Hz, 1080/25p: f <sub>H</sub> 28.13 kHz; f <sub>V</sub> 25 Hz, 1080/24p: f <sub>H</sub> 27.00 kHz; f <sub>V</sub> 24 Hz, 1080/24sF: f <sub>H</sub> 27.00 kHz; f <sub>V</sub> 48 Hz, 1080/30p: f <sub>H</sub> 33.75 kHz; f <sub>V</sub> 30 Hz, 1080/60p: f <sub>H</sub> 67.50 kHz; f <sub>V</sub> 60 Hz, 1080/50p: f <sub>H</sub> 56.25 kHz; f <sub>V</sub> 50 Hz
	Video/S-Video	f <sub>H</sub> : 15.75 kHz, f <sub>V</sub> : 60 Hz [NTSC/NTSC4.43/PAL-M/PAL60] f <sub>H</sub> : 15.63 kHz, f <sub>V</sub> : 50 Hz [PAL/PAL-N/SECAM]



Optical axis shift	Vertical Horizontal	±55% (±44% with the ET-D75LE6) from center of screen, powered ±20% (±15% with the ET-D75LE6) from center of screen, powered <b>NOTE: Optical axis shift function cannot be operated when used with the ET-D75LE50.</b>
Keystone correction range		Vertical ±40°, horizontal ±15° (vertical ±22° and horizontal ±15° with the ET-D75LE50, vertical ±28° and horizontal ±15° with the ET-D75LE6)
Keystone correction range when using the optional upgrade kit ET-UK20*3		Vertical ±45°, horizontal ±40° (vertical ±22° and horizontal ±15° with the ET-D75LE50, vertical ±28° and horizontal ±15° with the ET-D75LE6, vertical ±40° and horizontal ±40° with the ET-D75LE10/D75LE20)
Installation		Ceiling/floor, front/rear
Terminals	SDI IN 1	BNC × 1, Dual-link HD-SDI signal: SMPTE ST 372 compliant (Link-A) 3G-SDI signal: SMPTE ST 424 compliant HD-SDI signal: SMPTE ST 292 compliant SD-SDI signal: SMPTE ST 259 compliant
	SDI IN 2	BNC × 1, Dual-link HD-SDI signal: SMPTE ST 372 compliant (Link-B) HD-SDI signal: SMPTE ST 292 compliant SD-SDI signal: SMPTE ST 259 compliant
	HDMI IN	HDMI 19-pin × 1, Deep Color, compatible with HDCP, 480p, 576p, 720/60p, 720/50p, 1080/60i, 1080/50i, 1080/24p, 1080/24sF, 1080/25p, 1080/30p, 1080/60p, 1080/50p VGA (640 × 480)–WUXGA*4 (1,920 × 1,200), dot clock: 25 MHz–162 MHz <b>NOTE: Compatible with non-interlaced signals only.</b>
	DVI-D IN	DVI-D 24-pin × 1, DVI 1.0 compliant, HDCP compatible, for single link only 480p, 576p, 720/60p, 720/50p, 1080/60i, 1080/50i, 1080/24p, 1080/24sF, 1080/25p, 1080/30p, 1080/60p, 1080/50p, VGA (640 × 480)–WUXGA*4 (1,920 × 1,200), dot clock: 25 MHz–162 MHz <b>NOTE: Compatible with non-interlaced signals only.</b>
	RGB 1 IN R, G, B	BNC × 5 R: 0.7 Vp-p, 75 ohms, G: 0.7 Vp-p (G: 1.0 Vp-p for sync on G), 75 ohms, B: 0.7 Vp-p, 75 ohms HD, VD/SYNC: TTL, high impedance, positive/negative automatic <b>NOTE: SYNC/HD and VD terminals do not accept tri-level sync signals.</b>
	Y, PB, PR (Y, CB, CR) S-Video signal	Y: 1.0 Vp-p (including sync signal), PB/PR (CB/CR): 0.7 Vp-p, 75 ohms Y: 1.0 Vp-p, C: 0.286 Vp-p, 75 ohms
	RGB 2 IN R, G, B	D-sub HD 15-pin (female) × 1 R: 0.7 Vp-p, 75 ohms, G: 0.7 Vp-p (G: 1.0 Vp-p for sync on G), 75 ohms, B: 0.7 Vp-p, 75 ohms HD, VD/SYNC: TTL, high impedance, positive/negative automatic <b>NOTE: SYNC/HD and VD terminals do not accept tri-level sync signals.</b>
	Y, PB, PR (Y, CB, CR) VIDEO IN	Y: 1.0 Vp-p (including sync signal), PB/PR (CB/CR): 0.7 Vp-p, 75 ohms BNC × 1, 1.0 Vp-p, 75 ohms
	3D SYNC 1 IN/OUT	BNC × 1, 1.0 Vp-p, 75 ohms Input: TTL, high impedance. Output: TTL, max. 10 mA
	3D SYNC 2 OUT	BNC × 1, 1.0 Vp-p, 75 ohms, TTL, max. 10 mA
	SERIAL IN	D-sub 9-pin (female) × 1 for external control (RS-232C compliant)
	SERIAL OUT	D-sub 9-pin (male) × 1 for link control
	REMOTE 1 IN	M3 jack × 1 for wired remote control
	REMOTE 1 OUT	M3 jack × 1 for link control

REMOTE 2 IN LAN	D-sub 9-pin × 1 for external control (parallel) RJ-45 × 1 for network connection, 100Base-TX/10Base-T, compliant with PLink™ (class 1)
Power cord length	3.0 m (9 ft 10 in)
Cabinet materials	Molded plastic
Dimensions (W × H × D):	620 × 291* <sup>5</sup> × 800* <sup>6</sup> mm (24-7/16 × 11-15/32* <sup>5</sup> × 31-1/2* <sup>6</sup> inches) (without lens)
Weight* <sup>7</sup>	Approx. 43 kg (94.8 lbs) (without lens)
Operation noise* <sup>2</sup>	49 dB (quad lamp operation)
Operating temperature	0°–45°C (32°–113°F)* <sup>8</sup>
Operating humidity	10%–80% (no condensation)

**Remote control unit**

Power supply	3 V DC (AA type battery × 2)
Operation range* <sup>9</sup>	Approx. 30 m (98 ft 5 in) when operated from directly in front of the signal receptor
Dimensions (W × H × D)	51 × 176 × 28 mm (2 × 6-15/16 × 1-3/32 inches)
Weight	Approx. 134 g (4.7 oz) (including batteries)

**Supplied accessories**

Power cord with security lock (× 1)  
Wireless/wired remote control unit (× 1)  
Batteries for remote control (AA type × 2)  
Software CD-ROM (Logo Transfer Software, Multi Projector Monitoring & Control Software) (× 1)

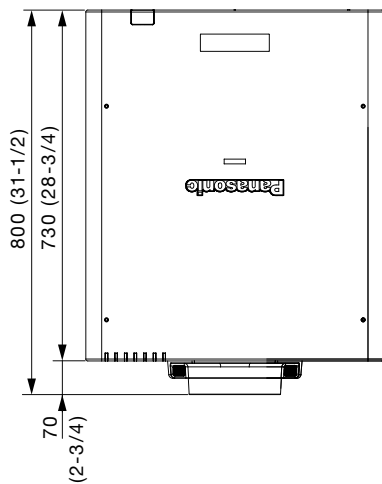
**Optional accessories**

Zoom lens (0.9–1.1:1)	ET-D75LE6
Zoom lens (1.3–1.7:1)	ET-D75LE10
Zoom lens (1.7–2.4:1)	ET-D75LE20
Zoom lens (2.4–4.7:1)	ET-D75LE30
Zoom lens (4.6–7.4:1)	ET-D75LE40
Zoom lens (7.3–13.8:1)	ET-D75LE8
Fixed-focus lens (0.7:1)	ET-D75LE50
Lens motor cover	ET-D75MC1
Ceiling mount bracket	ET-PKD510H (for high ceilings) ET-PKD510S (for low ceilings)
Frame	ET-PFD510
Smoke cut filter	ET-SFR510
Upgrade kit	ET-UK20
Replacement lamp unit	ET-LAD510 (one bulb) ET-LAD510F (a set of four bulbs)
Replacement filter unit	ET-EMF510

Weights and dimensions shown are approximate. Specifications and appearance are subject to change without notice.

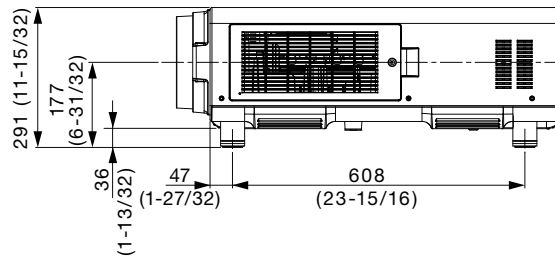
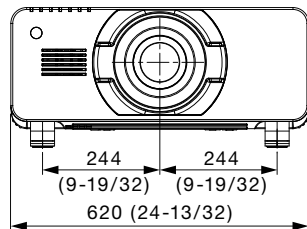
- \*1 When the standby mode is set to eco, network functions such as power on over the LAN network will not operate, and the serial output terminal cannot be used. Also, only certain commands can be received for external control using the serial terminal.
- \*2 Measurement, measuring conditions, and method of notation all comply with ISO 21118 international standards.
- \*3 Up to a total of ±55° during simultaneous horizontal and vertical correction.
- \*4 WUXGA resolution is supported only when the signals are compliant with VESA CVT-RB (Coordinated Video Timing-Reduced Blanking).
- \*5 With legs at shortest position.
- \*6 Excluding the optional lens.
- \*7 Average value (excluding the optional lens). May differ depending on models.
- \*8 The operating temperature range is 0 °C to 40 °C (32 °F to 104 °F) when the fan control is set to High Altitude mode (for altitudes from 1,400 m to 2,700 m (4,593 ft to 8,858 ft) above sea level). When the projector is used with the ET-SFR510 Smoke Cut Filter, the operating temperature range is 0 °C to 35 °C (32 °F to 95 °F), and the projector cannot be used in places at high altitude.
- \*9 Operation range differs depending on environments.

Dimensions

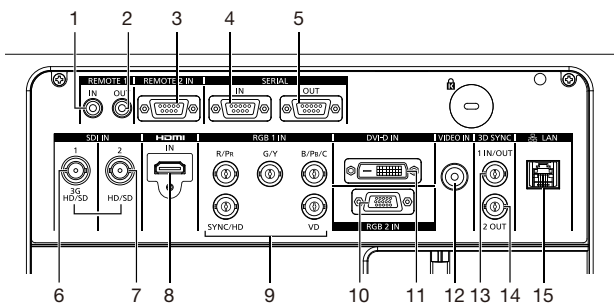


unit : mm (inch)

NOTE: This illustration is not drawn to scale.

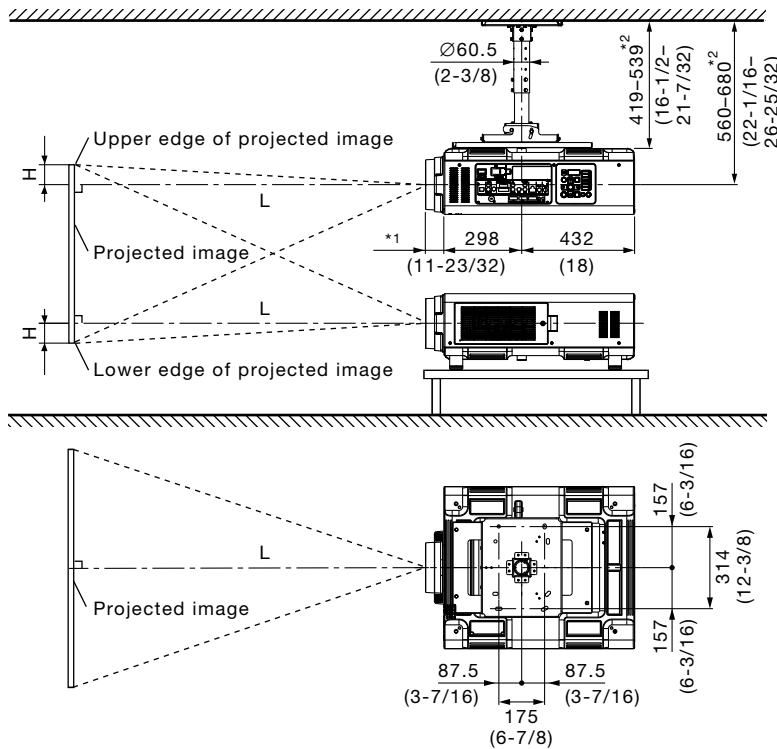


Terminals



- 1 Remote 1 input
- 2 Remote 1 output
- 3 Remote 2 input
- 4 Serial input
- 5 Serial output
- 6 SDI 1 input
- 7 SDI 2 input
- 8 HDMI input
- 9 RGB 1 input
- 10 RGB 2 Input
- 11 DVI-D input
- 12 Video input
- 13 3D sync 1 input/output
- 14 3D sync 2 output
- 15 LAN connector

Standard setting-up position



\*1 When the lens protrudes to the maximum.  
 212 mm (8-11/32) with the ET-D75LE6  
 125 mm (4-29/32) with the ET-D75LE10  
 121 mm (4-3/4) with the ET-D75LE20  
 121 mm (4-3/4) with the ET-D75LE30  
 124 mm (4-7/8) with the ET-D75LE40  
 254 mm (10) with the ET-D75LE8  
 203 mm (8) with the ET-D75LE50

\*2 Adjustable in 40 mm (1-9/16) steps.

unit : mm (inch)

NOTE:

Illustrations show the projector installed using optional ceiling mount bracket ET-PKD510H and an optional lens. This illustration is not drawn to scale.

Caution:

- All construction work should be done by a qualified technician.
- When mounting to the ceiling, use the special mounting bracket. To prevent the projector from swaying or dropping, attach the wire that is included with the projector between the mounting bracket and the ceiling.



**Projection distance for 16:10 aspect ratio screen**  
(ET-D75LE6/D75LE10/D75LE20/D75LE30/D75LE40/D75LE8/D75LE50)

Unit: meters

Screen size (diagonal)	Distance to screen (L)												Height from the edge of screen to center of lens (H)					
	Zoom											Fixed-focus	Zoom lenses		Fixed- focus lens			
	ET-D75LE6 Zoom lens		ET-D75LE10 Zoom lens		ET-D75LE20 Zoom lens		ET-D75LE30 Zoom lens		ET-D75LE40 Zoom lens		ET-D75LE8 Zoom lens		ET-D75LE50 Fixed-focus lens	Except ET-D75LE6		ET-D75LE6		
[m] / [in]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.						
1.78 / 70	1.35	1.62	1.90	2.46	2.46	3.58	3.56	6.94	6.87	11.05	10.78	20.56	1.01	-0.05	-0.99	0.06	-0.89	0.47
2.03 / 80	1.56	1.86	2.19	2.83	2.83	4.11	4.08	7.96	7.88	12.65	12.38	23.55	1.16	-0.05	-1.13	0.07	-1.01	0.54
2.29 / 90	1.76	2.10	2.47	3.20	3.19	4.64	4.61	8.98	8.88	14.25	13.97	26.54	1.32	-0.06	-1.27	0.07	-1.14	0.61
2.54 / 100	1.96	2.34	2.76	3.56	3.55	5.17	5.13	9.99	9.88	15.85	15.57	29.53	1.47	-0.07	-1.41	0.08	-1.27	0.67
3.05 / 120	2.36	2.82	3.32	4.30	4.28	6.22	6.18	12.03	11.89	19.05	18.76	35.51	1.78	-0.08	-1.70	0.10	-1.52	0.81
3.81 / 150	2.96	3.55	4.18	5.40	5.37	7.81	7.75	15.08	14.90	23.85	23.54	44.47	2.24	-0.10	-2.12	0.12	-1.90	1.01
5.08 / 200	3.97	4.75	5.60	7.24	7.19	10.45	10.38	20.17	19.93	31.86	31.52	59.41	3.01	-0.14	-2.83	0.16	-2.53	1.35
6.35 / 250	4.98	5.96	7.02	9.07	9.01	13.09	13.00	25.25	24.95	39.86	39.49	74.36	3.78	-0.17	-3.53	0.20	-3.16	1.68
7.62 / 300	5.99	7.17	8.44	10.91	10.82	15.73	15.62	30.34	29.97	47.87	47.47	89.30	4.56	-0.20	-4.24	0.24	-3.80	2.02
10.16 / 400	8.00	9.58	11.28	14.58	14.46	21.01	20.86	40.51	40.01	63.87	63.42	119.19	-	-0.27	-5.65	0.32	-5.06	-
12.70 / 500	10.01	11.99	14.12	18.25	18.09	26.29	26.11	50.68	50.05	79.88	79.37	149.08	-	-0.34	-7.07	0.40	-6.33	-
15.24 / 600	12.03	14.40	16.96	21.93	21.73	31.58	31.35	60.85	60.09	95.89	95.32	178.96	-	-0.40	-8.48	0.49	-7.59	-

Unit: feet

Screen size (diagonal)	Distance to screen (L)												Height from the edge of screen to center of lens (H)					
	Zoom											Fixed-focus	Zoom lenses		Fixed- focus lens			
	ET-D75LE6 Zoom lens		ET-D75LE10 Zoom lens		ET-D75LE20 Zoom lens		ET-D75LE30 Zoom lens		ET-D75LE40 Zoom lens		ET-D75LE8 Zoom lens		ET-D75LE50 Fixed-focus lens	Except ET-D75LE6		ET-D75LE6		
[m] / [in]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.						
1.78 / 70	4.4	5.3	6.2	8.1	8.1	11.7	11.7	22.8	22.5	36.2	35.4	67.5	3.3	-0.2	-3.2	0.2	-2.9	1.6
2.03 / 80	5.1	6.1	7.2	9.3	9.3	13.5	13.4	26.1	25.8	41.5	40.6	77.3	3.8	-0.2	-3.7	0.2	-3.3	1.8
2.29 / 90	5.8	6.9	8.1	10.5	10.5	15.2	15.1	29.5	29.1	46.7	45.8	87.1	4.3	-0.2	-4.2	0.2	-3.7	2.0
2.54 / 100	6.4	7.7	9.0	11.7	11.7	16.9	16.8	32.8	32.4	52.0	51.1	96.9	4.8	-0.2	-4.6	0.3	-4.2	2.2
3.05 / 120	7.7	9.3	10.9	14.1	14.0	20.4	20.3	39.5	39.0	62.5	61.5	116.5	5.8	-0.3	-5.6	0.3	-5.0	2.7
3.81 / 150	9.7	11.6	13.7	17.7	17.6	25.6	25.4	49.5	48.9	78.3	77.2	145.9	7.3	-0.3	-7.0	0.4	-6.2	3.3
5.08 / 200	13.0	15.6	18.4	23.7	23.6	34.3	34.0	66.2	65.4	104.5	103.4	194.9	9.8	-0.4	-9.3	0.5	-8.3	4.4
6.35 / 250	16.3	19.6	23.0	29.8	29.5	42.9	42.6	82.8	81.8	130.8	129.6	244.0	12.3	-0.6	-11.6	0.7	-10.4	5.5
7.62 / 300	19.6	23.5	27.7	35.8	35.5	51.6	51.2	99.5	98.3	157.0	155.7	293.0	14.9	-0.7	-13.9	0.8	-12.5	6.6
10.16 / 400	26.2	31.4	37.0	47.8	47.4	68.9	68.5	132.9	131.3	209.6	208.1	391.0	-	-0.9	-18.6	1.1	-16.6	-
12.70 / 500	32.9	39.3	46.3	59.9	59.4	86.3	85.7	166.3	164.2	262.1	260.4	489.1	-	-1.1	-23.2	1.3	-20.8	-
15.24 / 600	39.5	47.3	55.6	71.9	71.3	103.6	102.9	199.6	197.1	314.6	312.7	587.1	-	-1.3	-27.8	1.6	-24.9	-

- The value for L (distance to screen) varies slightly within ±5% depending on the zoom lens characteristics.
- At the shortest projection distance, the zoom lens characteristics may cause slight image distortion.
- When vertical keystone correction is used, the image is corrected in the direction that reduces its projected size.

NOTE: When the ET-D75LE50 is mounted, the optical lens shift function cannot be used.

**Projection distance for 16:9 aspect ratio screen**  
(ET-D75LE6/D75LE10/D75LE20/D75LE30/D75LE40/D75LE8/D75LE50)

Unit: meters

Screen size (diagonal)	Distance to screen (L)												Height from the edge of screen to center of lens (H)					
	Zoom											Fixed-focus	Zoom lenses		Fixed- focus lens			
	ET-D75LE6 Zoom lens		ET-D75LE10 Zoom lens		ET-D75LE20 Zoom lens		ET-D75LE30 Zoom lens		ET-D75LE40 Zoom lens		ET-D75LE8 Zoom lens		ET-D75LE50 Fixed-focus lens	Except ET-D75LE6		ET-D75LE6		
[m] / [in]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.						
1.78 / 70	1.39	1.66	1.96	2.53	2.53	3.68	3.66	7.14	7.07	11.36	11.09	21.14	1.04	-0.09	-0.96	0.00	-0.87	0.44
2.03 / 80	1.60	1.91	2.25	2.91	2.91	4.23	4.20	8.19	8.10	13.00	12.73	24.22	1.20	-0.10	-1.10	0.00	-1.00	0.50
2.29 / 90	1.81	2.16	2.54	3.29	3.28	4.77	4.74	9.23	9.13	14.65	14.37	27.29	1.36	-0.11	-1.23	0.00	-1.12	0.56
2.54 / 100	2.01	2.41	2.83	3.67	3.65	5.31	5.28	10.28	10.16	16.29	16.01	30.36	1.51	-0.13	-1.37	0.00	-1.25	0.62
3.05 / 120	2.43	2.90	3.42	4.42	4.40	6.40	6.36	12.37	12.23	19.58	19.29	36.50	1.83	-0.15	-1.64	0.00	-1.49	0.75
3.81 / 150	3.05	3.65	4.29	5.55	5.52	8.03	7.97	15.50	15.32	24.52	24.21	45.72	2.31	-0.19	-2.06	0.00	-1.87	0.93
5.08 / 200	4.08	4.89	5.76	7.44	7.39	10.74	10.67	20.73	20.48	32.75	32.40	61.08	3.10	-0.25	-2.74	0.00	-2.49	1.25
6.35 / 250	5.12	6.13	7.22	9.33	9.26	13.46	13.36	25.96	25.64	40.97	40.60	76.44	3.89	-0.31	-3.42	0.00	-3.11	1.56
7.62 / 300	6.15	7.37	8.68	11.21	11.13	16.17	16.06	31.18	30.80	49.20	48.80	91.79	4.68	-0.37	-4.11	0.00	-3.74	1.87
10.16 / 400	8.22	9.85	11.60	14.99	14.86	21.60	21.45	41.64	41.12	65.65	65.19	122.51	-	-0.50	-5.48	0.00	-4.98	-
12.70 / 500	10.29	12.33	14.52	18.76	18.60	27.03	26.84	52.09	51.44	82.11	81.59	153.23	-	-0.62	-6.85	0.00	-6.23	-
15.24 / 600	12.36	14.81	17.44	22.54	22.33	32.46	32.23	62.54	61.76	98.56	97.98	183.95	-	-0.75	-8.22	0.00	-7.47	-

Unit: feet

Screen size (diagonal)	Distance to screen (L)												Height from the edge of screen to center of lens (H)					
	Zoom											Fixed-focus	Zoom lenses		Fixed- focus lens			
	ET-D75LE6 Zoom lens		ET-D75LE10 Zoom lens		ET-D75LE20 Zoom lens		ET-D75LE30 Zoom lens		ET-D75LE40 Zoom lens		ET-D75LE8 Zoom lens		ET-D75LE50 Fixed-focus lens	Except ET-D75LE6		ET-D75LE6		
[m] / [in]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.						
1.78 / 70	4.6	5.5	6.4	8.3	8.3	12.1	12.0	23.4	23.2	37.3	36.4	69.4	3.4	-0.3	-3.2	0.0	-2.9	1.4
2.03 / 80	5.2	6.3	7.4	9.6	9.5	13.9	13.8	26.9	26.6	42.7	41.8	79.4	3.9	-0.3	-3.6	0.0	-3.3	1.6
2.29 / 90	5.9	7.1	8.3	10.8	10.8	15.6	15.5	30.3	30.0	48.1	47.1	89.5	4.4	-0.4	-4.1	0.0	-3.7	1.8
2.54 / 100	6.6	7.9	9.3	12.0	12.0	17.4	17.3	33.7	33.3	53.5	52.5	99.6	5.0	-0.4	-4.5	0.0	-4.1	2.0
3.05 / 120	8.0	9.5	11.2	14.5	14.4	21.0	20.8	40.6	40.1	64.2	63.3	119.8	6.0	-0.5	-5.4	0.0	-4.9	2.5
3.81 / 150	10.0	12.0	14.1	18.2	18.1	26.3	26.2	50.9	50.3	80.4	79.4	150.0	7.6	-0.6	-6.7	0.0	-6.1	3.1
5.08 / 200	13.4	16.0	18.9	24.4	24.2	35.2	35.0	68.0	67.2	107.4	106.3	200.4	10.2	-0.8	-9.0	0.0	-8.2	4.1
6.35 / 250	16.8	20.1	23.7	30.6	30.4	44.1	43.8	85.2	84.1	134.4	133.2	250.8	12.8	-1.0	-11.2	0.0	-10.2	5.1
7.62 / 300	20.2	24.2	28.5	36.8	36.5	53.1	52.7	102.3	101.1	161.4	160.1	301.2	15.4	-1.2	-13.5	0.0	-12.3	6.1
10.16 / 400	27.0	32.3	38.0	49.2	48.8	70.9	70.4	136.6	134.9	215.4	213.9	401.9	-	-1.6	-18.0	0.0	-16.3	-
12.70 / 500	33.8	40.4	47.6	61.6	61.0	88.7	88.0	170.9	168.8	269.4	267.7	502.7	-	-2.0	-22.5	0.0	-20.4	-
15.24 / 600	40.6	48.6	57.2	73.9	73.3	106.5	105.7	205.2	202.6	323.4	321.5	603.5	-	-2.5	-27.0	0.0	-24.5	-

- The value for L (distance to screen) varies slightly within ±5% depending on the zoom lens characteristics.
- At the shortest projection distance, the zoom lens characteristics may cause slight image distortion.
- When vertical keystone correction is used, the image is corrected in the direction that reduces its projected size.

NOTE: When the ET-D75LE50 is mounted, the optical lens shift function cannot be used.

**Calculation of the projection distance**

For a screen size different from the above, use the equation below to calculate the projection distance.

**Aspect ratio 16:10****Zoom lenses**

ET-D75LE6	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0201 - 0.0566$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0241 - 0.0736$
ET-D75LE10	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0284 - 0.0857$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0367 - 0.1085$
ET-D75LE20	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0364 - 0.0832$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0528 - 0.1162$
ET-D75LE30	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0524 - 0.1131$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1017 - 0.1765$
ET-D75LE40	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1004 - 0.1577$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1601 - 0.1615$
ET-D75LE8	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1595 - 0.3862$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.2989 - 0.3598$

**Fixed-focus lens**

ET-D75LE50	$L (m) = (\text{diagonal screen size in inches}) \times 0.0154 - 0.0713$
------------	--

**Aspect ratio 16:9****Zoom lenses**

ET-D75LE6	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0207 - 0.0566$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0248 - 0.0736$
ET-D75LE10	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0292 - 0.0857$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0377 - 0.1085$
ET-D75LE20	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0374 - 0.0832$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0543 - 0.1162$
ET-D75LE30	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.0539 - 0.1131$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1045 - 0.1765$
ET-D75LE40	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1032 - 0.1577$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1645 - 0.1615$
ET-D75LE8	minimum	$L (m) = (\text{diagonal screen size in inches}) \times 0.1640 - 0.3862$
	maximum	$L (m) = (\text{diagonal screen size in inches}) \times 0.3072 - 0.3598$

**Fixed-focus lens**

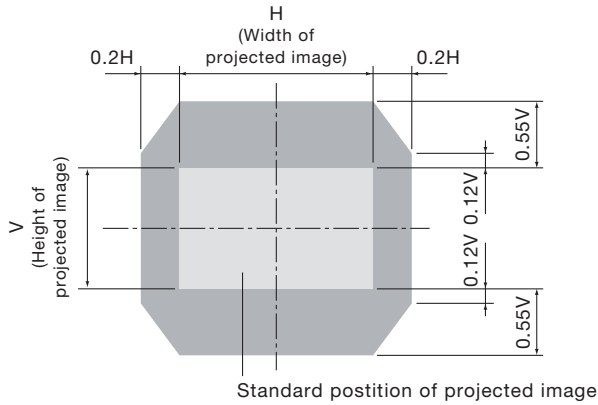
ET-D75LE50	$L (m) = (\text{diagonal screen size in inches}) \times 0.0159 - 0.0713$
------------	--

• Distances calculated with the above equations will include slight deviations.

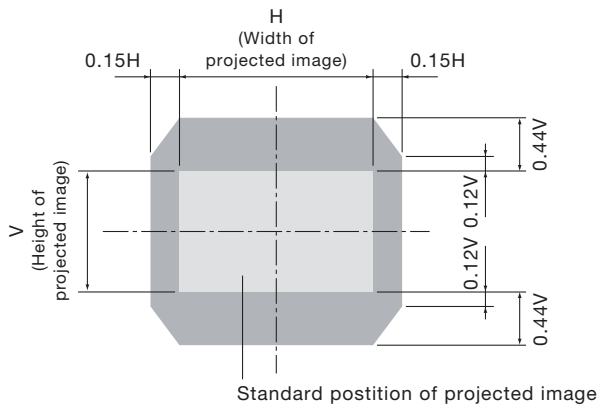
**Shift range**

Optical axis shift function allows to shift the position of a projected image as shown below.

- When the lens except the ET-D75LE6 is mounted



- When the ET-D75LE6 is mounted



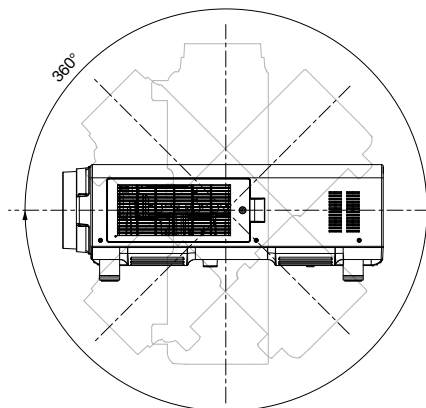
- Because the ET-D75LE50 is a fixed short-throw lens, the lens shift function cannot be used with it.

**Installable angle**

Install the projector at an angle within the range shown below.

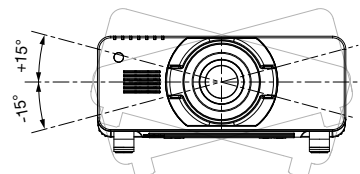
- **Vertical direction**

The projector may be installed at a vertical angle of 360°.



- **Horizontal direction**

The projector may be installed at a horizontal angle of ±15°.





## List of compatible signals

The signals that can be input to this projector are shown in the table below. Horizontal scanning frequencies of 15 kHz to 100 kHz, vertical scanning frequencies of 24 Hz to 120 Hz, and a dot clock of 162 MHz maximum can be input.

**NOTE:** The native resolution of this projector is 1,920 × 1,200 pixels. If the display resolution of the input signal is different from the native resolution, image compression or expansion will be used to convert the input signal to a level within the native resolution.

Display mode	Display resolution (dots)*1	Scanning frequency		Dot clock frequency (MHz)	Format
		H (kHz)	V (kHz)		
NTSC/NTSC4.43/PAL-M/PAL60	720 × 480i	15.7	59.9	–	VIDEO/S-VIDEO
PAL/PAL-N/SECAM	720 × 576i	15.6	50.0	–	
480i (525i)	720 × 480i	15.7	59.9	13.5	SDI/RGB/YCbCr
576i (625i)	720 × 576i	15.6	50.0	13.5	
480p (525p)	720 × 483	31.5	59.9	27.0	HDMI/DVI-D/ RGB/YCbCr
576p (625p)	720 × 576	31.3	50.0		
720/60p	1280 × 720	45.0	60.0	74.3	SDI/HDMI/DVI-D/ RGB/YpPr
720/50p		37.5	50.0		
1080/60i	1920 × 1080i	33.8	60.0		
1080/50i		28.1	50.0		
1080/24p	1920 × 1080	27.0	24.0		
1080/24sF	1920 × 1080i				
1080/25p	1920 × 1080	28.1	25.0		
1080/30p		33.8	30.0		
1080/60p		67.5	60.0	148.5	SDI*2/HDMI/DVI-D/ RGB/YpPr
1080/50p		56.3	50.0		
2K/24p	2048 × 1080	27.0	24.0	74.3	SDI*3
2K/24sF					
VGA400	640 × 400	31.5	70.1	25.2	HDMI/DVI-D/RGB
		37.9	85.1	31.5	
VGA480	640 × 480	31.5	59.9	25.2	
		35.0	66.7	30.2	
		37.9	72.8	31.5	
		37.5	75.0	31.5	
		43.3	85.0	36.0	
SVGA	800 × 600	35.2	56.3	36.0	
		37.9	60.3	40.0	
		48.1	72.2	50.0	
		46.9	75.0	49.5	
		53.7	85.1	56.3	
MAC16	832 × 624	49.7	74.6	57.3	
XGA	1024 × 768	39.6	50.0	51.9	
		48.4	60.0	65.0	
		56.5	70.1	75.0	
		60.0	75.0	78.8	
		65.5	81.6	86.0	
		68.7	85.0	94.5	
		81.4	100.0	113.3	
		98.8	120.0	139.1	
MXGA	1152 × 864	53.7	60.0	81.6	
		64.0	71.2	94.2	
		67.5	74.9	108.0	
		76.7	85.0	121.5	
MAC21	1152 × 870	68.7	75.1	100.0	

\*1 The "i" appearing after the resolution indicates an interlaced signal.

\*2 SDI 1 only.

\*3 For dual-link connection only.

Display mode	Display resolution (dots)	Scanning frequency		Dot clock frequency (MHz)	Format
		H (kHz)	V (kHz)		
1280 × 720	1280 × 720	37.1	49.8	60.5	HDMI/DVI-D/RGB
		44.8	59.9	74.5	
		76.3	100.0	131.8	
		92.6	120.0	161.6	
1280 × 768	1280 × 768	39.6	49.9	65.3	
		47.8	59.9	79.5	
	1280 × 768*	47.4	60.0	68.3	
	1280 × 768	60.3	74.9	102.3	
1280 × 800	1280 × 800	68.6	84.8	117.5	
		41.3	50.0	68.0	
	49.7	59.8	83.5		
	1280 × 800*	49.3	59.9	71.0	
1280 × 800	1280 × 800	62.8	74.9	106.5	
		71.6	84.9	122.5	
		60.0	60.0	108.0	
		52.4	50.0	88.0	
MSXGA	1280 × 960	64.0	60.0	108.0	
SXGA	1280 × 1024	72.3		125.0	
		78.2		135.1	
		80.0	66.3	135.0	
		91.1	72.0	157.5	
		47.7	75.0	85.5	
1366×768	1280 × 768	39.6	85.0	69.0	
		54.1	59.8	99.9	
SXGA+	1400 × 1050	64.0	49.9	108.0	
		65.2	50.0	122.6	
		65.3	60.0	121.8	
		78.8		149.3	
		82.2	72.0	155.9	
WXGA+	1440 × 900	55.9	75.0	106.5	
		46.3	59.9	86.8	
UXGA60	1600 × 1200	75.0	49.9	162.0	
WSXGA+	1680 × 1050	65.3	60.0	146.3	
		54.1	50.0	119.5	
1920×1080	1920 × 1080	55.6	49.9	141.5	
	1920 × 1080*	66.6	59.9	138.5	
	1920 × 1080	67.2	60.0	173.0	
WUXGA	1920 × 1200				RGB
		61.8	49.9	158.3	HDMI/DVI-D/RGB
	1920 × 1200*	74.0	60.0	154.0	
	1920 × 1200	74.6	59.9	193.3	

\* Compliant with VESA CVT-RB (Coordinated Video Timing-Reduced Blanking).

**List of compatible 3D signals**

The 3D signals that can be input to this projector are shown in the table below.

Display mode	Display resolution (dots)*1	Scanning frequency		Dot clock frequency (MHz)	HDMI			DVI			
		H (kHz)	V (kHz)		Frame packing	Side by side*2	Top and bottom	Side by side*2	Top and bottom	Line by line	Frame sequential
720/60p	1280 × 720	45.0	60.0	74.3	Yes	Yes	Yes	Yes	Yes	Yes	-
720/50p		37.5	50.0	74.3							
1080/60i	1920 × 1080i	33.8	60.0	74.3	-		-				-
1080/50i		28.1	50.0	74.3							
1080/24p	1920 × 1080	27.0	24.0	74.3	Yes		Yes				
1080/24sF	1920 × 1080i	27.0	24.0	74.3	-	-	-				
1080/25p	1920 × 1080	28.1	25.0	74.3							
1080/30p		33.8	30.0	74.3							
1080/60p		67.5	60.0	148.5							
1080/50p		56.3	50.0	148.5							
VGA480	640 × 480	31.5	59.9	25.2		-	-		-		
SVGA	800 × 600	37.9	60.3	40.0							
MAC16	832 × 624	49.7	74.6	57.3							
XGA	1024 × 768	39.6	50.0	51.9							
		48.4	60.0	65.0							
		81.4	100.0	113.3				-			Yes
		98.8	120.0	139.1							
MXGA	1152 × 864	53.7	60.0	81.6				Yes			-
1280 × 720	1280 × 720	37.1	49.8	60.5							
		44.8	59.9	74.5							
		76.3	100.0	131.8				-			Yes
		92.6	120.0	161.6							
1280 × 768	1280 × 768	39.6	49.9	65.3				Yes			
		47.8	59.9	79.5							
	1280 × 768 *3	47.4	60.0	68.3							
1280 × 800	1280 × 800	41.3	50.0	68.0							
		49.7	59.8	83.5							
		49.3	59.9	71.0							
MSXGA	1280 × 960	60.0	60.0	108.0							
SXGA	1280 × 1024	52.4	50.0	88.0							
		64.0	60.0	108.0							
1366 × 768	1280 × 768	47.7	59.8	85.5							
		39.6	49.9	69.0							
SXGA+	1400 × 1050	54.1	50.0	99.9							
		64.0	60.0	108.0							
		65.2	60.0	122.6							
		65.3	60.0	121.8							
WXGA+	1440 × 900	55.9	59.9	106.5							
		46.3	49.9	86.8							
UXGA60	1600 × 1200	75.0	60.0	162.0							
WSXGA+	1680 × 1050	65.3	60.0	146.3							
		54.1	50.0	119.5							
1920 × 1080	1920 × 1080	55.6	49.9	141.5							
	1920 × 1080 *3	66.6	59.9	138.5							
WUXGA	1920 × 1200	61.8	49.9	158.3							
	1920 × 1200 *3	74.0	60.0	154.0						Yes	

\*1 The "i" appearing after the resolution indicates an interlaced signal.  
 \*2 Compatible with half-resolution signals.  
 \*3 Compliant with VESA CVT-RB (Coordinated Video Timing-Reduced Blanking).

Display mode	Display resolution (dots)*1	Scanning frequency		Dot clock frequency (MHz)	RGB1/RGB2				SDI1/SDI2			HDMI & DVI	RGB1 & RGB2	SDI1 & SDI2	3G-SDI Level B																
		H (kHz)	V (kHz)		Side by side*2	Top and bottom	Line by line	Frame sequential	Side by side*2	Top and bottom	Line by line					Simultaneous	Simultaneous	Simultaneous	Simultaneous												
720/60p	1280 × 720	45.0	60.0	74.3	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes*3															
720/50p		37.5	50.0	74.3																											
1080/60i		1920 × 1080i	33.8	60.0													74.3	-	-												
1080/50i			28.1	50.0													74.3														
1080/24p		1920 × 1080	27.0	24.0													74.3	-	-	-	-	-	-	-	-	-	-	-	-		
1080/24sF			27.0	24.0													74.3														
1080/25p			28.1	25.0													74.3														
1080/30p			33.8	30.0													74.3														
1080/60p			67.5	60.0													148.5													Yes*3	Yes*3
1080/50p			56.3	50.0													148.5														
VGA480	640 × 480		31.5	59.9	25.2	-	-	-	-	-	-	-	-	-	-	-	-														
SVGA	800 × 600		37.9	60.3	40.0																										
MAC16	832 × 624	49.7	74.6	57.3																											
XGA	1024 × 768	39.6	50.0	51.9																											
		48.4	60.0	65.0																											
		81.4	100.0	113.3	-													-	-	-	-	-	-	-	-	-	-				
		98.8	120.0	139.1																											
MXGA	1152 × 864	53.7	60.0	81.6	Yes													-	-	-	-	-	-	-	-	-	-	-			
1280 × 720	1280 × 720	37.1	49.8	60.5																											
		44.8	59.9	74.5																											
		76.3	100.0	131.8	-	-	-	-	-	-	-	-	-	-	-																
		92.6	120.0	161.6																											
1280 × 768	1280 × 768	39.6	49.9	65.3	Yes	-	-	-	-	-	-	-	-	-	-	-															
		47.8	59.9	79.5																											
1280 × 800	1280 × 768 *4	47.4	60.0	68.3	-	-	-	-	-	-	-	-	-	-	-	-	-														
		41.3	50.0	68.0																											
1280 × 800	1280 × 800	49.7	59.8	83.5	-	-	-	-	-	-	-	-	-	-	-	-	-														
		49.3	59.9	71.0																											
MSXGA	1280 × 960	60.0	60.0	108.0	-	-	-	-	-	-	-	-	-	-	-	-	-														
SXGA	1280 × 1024	52.4	50.0	88.0																											
		64.0	60.0	108.0																											
1366 × 768	1280 × 768	47.7	59.8	85.5	-	-	-	-	-	-	-	-	-	-	-	-	-														
		39.6	49.9	69.0																											
SXGA+	1400 × 1050	54.1	50.0	99.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-													
		64.0	60.0	108.0																											
		65.2	60.0	122.6																											
		65.3	60.0	121.8																											
WXGA+	1440 × 900	55.9	59.9	106.5	-	-	-	-	-	-	-	-	-	-	-	-	-														
		46.3	49.9	86.8																											
UXGA60	1600 × 1200	75.0	60.0	162.0	-	-	-	-	-	-	-	-	-	-	-	-	-														
WSXGA+	1680 × 1050	65.3	60.0	146.3																											
54.1		50.0	119.5																												
1920 × 1080	1920 × 1080	55.6	49.9	141.5	-	-	-	-	-	-	-	-	-	-	-	-	-														
		66.6	59.9	138.5																											
WUXGA	1920 × 1200	61.8	49.9	158.3	-	-	-	-	-	-	-	-	-	-	-	-	-														
		74.0	60.0	154.0																											
							Yes																								

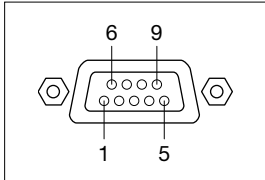
\*1 The "i" appearing after the resolution indicates an interlaced signal.  
 \*2 Compatible with half-resolution signals.  
 \*3 SDI 1 only.  
 \*4 Compliant with VESA CVT-RB (Coordinated Video Timing-Reduced Blanking).



**Serial connector**

The serial connector complies with RS-232C. To control the projector from a personal computer, commands must be input through communication software, based on the format and satisfying the communication conditions shown below.

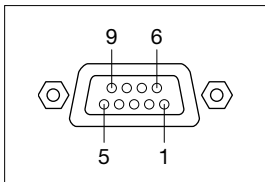
**Pin assignments and signal names**



D-sub 9-pin (female) Serial input

No.	Signal name	Description	No.	Signal name	Description
1	-	NC	6	-	NC
2	TXD	Send data	7	CTS	Connected internally
3	RXD	Receive data	8	RTS	Connected internally
4	-	Connected internally	9	-	NC
5	GND	Ground			

**Pin assignments and signal names**



D-sub 9-pin (male) Serial output

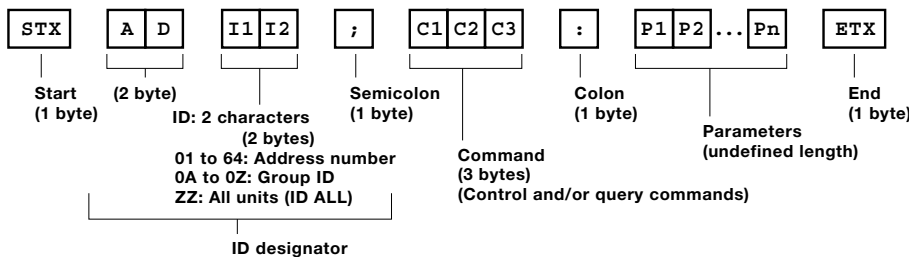
No.	Signal name	Description	No.	Signal name	Description
1	-	NC	6	-	NC
2	RXD	Receive data	7	RTS	Connected internally
3	TXD	Send data	8	CTS	Connected internally
4	-	Connected internally	9	-	NC
5	GND	Ground			

**Communication conditions (factory setting)**

Signal level	RS-232C-compliant
Synchronization method	Start-stop synchronization
Baud rate	9,600 bps
Parity	None
Character length	8 bits
Stop bit	1 bit
X parameter	None
S parameter	None

**Basic format**

Transmission from the computer begins with STX, then the ID, command, parameter, and ETX are sent in this order. Add parameters according to the details of control.



**CAUTION**

- It may not be possible to send or receive commands for about 10 to 60 seconds when the lamp is first turned on. If this occurs, wait for 60 seconds, then try sending or receiving again.
- When sending multiple commands, be sure to wait for at least 0.5 second after receiving a response from the projector before sending the next command.
- Additional time is sometimes required for response due to processing inside the projector. Set the time-out period for command response to 10 seconds or more.
- When using two or more units:
  - 1) Set different IDs for each unit.
  - 2) Designate only one unit as RESPONSE (ID ALL) ON and the rest as RESPONSE (ID ALL) OFF.
  - 3) Each group should have only one RESPONSE (ID GROUP) ON and the rest should be RESPONSE (ID GROUP) OFF.

**Cable specifications**

Projector		PC (DTE)	
1	NC	NC	1
2			2
3			3
4	NC	NC	4
5			5
6	NC	NC	6
7			7
8			8
9	NC	NC	9

**Control commands**

Command : Parameter	Function		Callback
PON	POWER (STANDBY)	Standby power on	PON
POF		Standby power off	POF
IIS:SD1	INPUT SELECT	SDI 1	IIS:SD1
IIS:SD2		SDI 2	IIS:SD2
IIS:HD1		HDMI	IIS:HD1
IIS:DVI		DVI	IIS:DVI
IIS:RG1		RGB 1	IIS:RG1
IIS:RG2		RGB 2	IIS:RG2
IIS:VID		Video	IIS:VID
LPM:0		LAMP SELECT	Quad (four lamps)
LPM:1	Lamp 1 + 4		LPM:1
LPM:2	Lamp 2 + 3		LPM:2
LPM:3	Dual (two lamps)		LPM:3
LPM:4	Lamp 1 + 2 + 3		LPM:4
LPM:5	Lamp 1 + 2 + 4		LPM:5
LPM:6	Lamp 1 + 3 + 4		LPM:6
LPM:7	Lamp 2 + 3 + 4		LPM:7
LPM:8	Triple (three lamps)		LPM:8
LPM:9	Lamp 1		LPM:9
LPM:10	Lamp 2		LPM:10
LPM:11	Lamp 3		LPM:11
LPM:12	Lamp 4		LPM:12
LPM:13	Single lamp		LPM:13
OSH:0	SHUTTER	Shutter off	OSH:0
OSH:1		Shutter on	OSH:1
OPP:0	P IN P SELECT	Off	OPP:0
OPP:1		User 1	OPP:1
OPP:2		User 2	OPP:2
OPP:3		User 3	OPP:3
OAS	AUTO SETUP		OAS
VPM:NAT	PICTURE MODE	Natural	VPM:NAT
VPM:STD		Standard	VPM:STD
VPM:DYN		Dynamic	VPM:DYN
VPM:CIN		Cinema	VPM:CIN
VPM:GRA		Graphic	VPM:GRA
VPM:DIC		DICOM	VPM:DIC
VXX:DLVI0=+00000	SYSTEM DAYLIGHT VIEW	Off	VXX:DLVI0=+00000
VXX:DLVI0=+00001		1	VXX:DLVI0=+00001
VXX:DLVI0=+00002		2	VXX:DLVI0=+00002
VXX:DLVI0=+00003		3	VXX:DLVI0=+00003
OTE:4	COLOR TEMPERATURE	User 1	OTE:4
OTE:9		User 2	OTE:9
OTE:10		Default	OTE:10
OTE:p1p2p3p4		3200 K – 9300 K (100 K steps)	OTE:p1p2p3p4
TSD:y1y2y3y4m1m2d1d2w	DATE	Date setting	TSD:y1y2y3y4m1m2d1d2w
TST:h1h2m1m2s1s2	TIME	Time setting	TST:h1h2m1m2s1s2
OOS:0	ON SCREEN	On-screen display off	OOS:0
OOS:1		On-screen display on	OOS:1

\* Do not send PON, POF, OSH, or OLP commands continuously in a short period of time. Doing so may burst the lamp or shorten the lamp replacement cycle.

\* When a command that cannot be executed, the projector will send an ER401 command in reply.

## Status request commands

Command:Parameter	Function	Callback	Description
QPW	Main power status	000	Off
		001	On
QSH	Shutter function status	0	Off
		1	On
QFZ	Freeze function status	0	Off
		1	On
QIN	Input signal status	SD1	SDI 1
		SD2	SDI 2
		HD1	HDMI
		DVI	DVI
		RG1	RGB 1
		RG2	RGB 2
QOS	On-screen display status	VID	Video
		0	Off
QST		1	On
Q\$L:1	Projector run time	p1p2p3p4p5	0000h-9999h
Q\$L:2	Lamp 1 run time	p1p2p3p4	0000h-9999h
Q\$L:3	Lamp 2 run time	p1p2p3p4	0000h-9999h
Q\$L:4	Lamp 3 run time	p1p2p3p4	0000h-9999h
QSL	Lamp 4 run time	p1p2p3p4	0000h-9999h
			Lamp operation mode status
		0	Quad (four lamps)
		1	Lamp 1 + 4
		2	Lamp 2 + 3
		3	Dual (two lamps)
		4	Lamp 1 + 2 + 3
		5	Lamp 1 + 2 + 4
		6	Lamp 1 + 3 + 4
		7	Lamp 2 + 3 + 4
		8	Triple (three lamps)
		9	Lamp 1
		10	Lamp 2
11	Lamp 3		
12	Lamp 4		
QPM	Picture mode status	13	Single lamp
		NAT	Natural
		STD	Standard
		DYN	Dynamic
		CIN	Cinema
		GRA	Graphic
QVX:DLVIO	System daylight view status	DIC	DICOM
		DLVIO=+00000	Off
		DLVIO=+00001	1
		DLVIO=+00002	2
QPP	P in P status	DLVIO=+00003	3
		0	Off
		1	User 1
		2	User 2
QTM:0	Temperature status	3	User 3
		p1p2p3p4/p5p6p7p8*1	p0 = Intake air
			p1 = Around lamp
QGD			p2 = Optics module
QGT	Date setting status	y1y2y3y4m1m2d1d2w	yyyymmdd (day of week)*2
	Time setting status	h1h2m1m2s1s2	hhmmss*3

\*1 p1p2p3p4: Celsius (°C), p5p6p7p8: Fahrenheit (°F)

\*2 Day of week: Monday = 1, Tuesday = 2, ... Sunday = 7

\*3 Set the date and time to UTC (universal time coordinated).

\* When a wrong command is sent, the projector will send an ER401 or ER402 command in reply.

**Command example**

To set the on-screen display off, send the command as shown below.

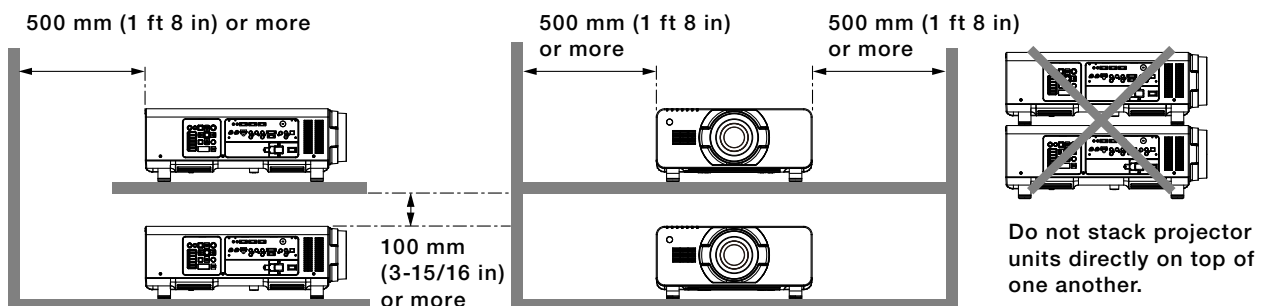
<b>STX</b>	<b>ADZZ</b>	<b>;</b>	<b>OOS</b>	<b>:</b>	<b>0</b>	<b>ETX</b>
Start	ID Address		Command		Parameter	End

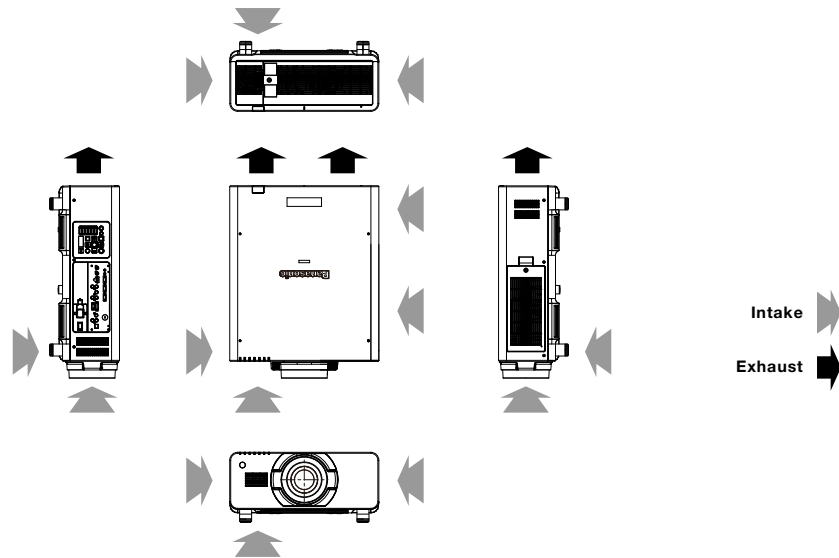
**NOTE:** When sending commands without parameters, a colon (:) is not necessary.

**Notes on projector placement and operation**

The projector uses a high-wattage lamp that becomes very hot during operation. Please observe the following precautions.

1. Never place objects on top of the projector while it is operating.
2. Make sure there is an unobstructed space of 500 mm (1 feet 8 inches) or more around the projector's exhaust openings.
3. Do not stack projector units directly on top of one another. If two units must be stacked for back-up use in ordinary projection, use a method as shown below and provide ample space between the units to ensure that exhaust heat does not accumulate near the intake opening or around the units. Dual stacked projection is not recommended.
4. Make sure that nothing blocks the projector's air intake and exhaust openings. Also, install the projector so that cool or hot air from other air conditioning equipment does not flow directly toward the projector's air intake or exhaust openings.
5. Do not install the projector in an enclosed space. If it is necessary to install it in an enclosed space, add a separate ventilation system. If ventilation is insufficient, hot air will accumulate at the intake opening. This may cause the projector's protective circuit to interrupt projector operation.
6. If the projector is installed in an enclosed space, ensure that the temperature of the air surrounding the projector is between 0°C and 40°C (32°F and 104°F). Also make sure that the projector's intake and exhaust openings are not blocked. Even though the air surrounding the projector is 40°C (104°F) or less, if hot exhaust air accumulates inside the space, it may cause the projector's protective circuit to interrupt projector operation. Pay particular attention to the surrounding temperature conditions when planning the installation.
7. If the projector is not to be set on the floor using adjuster legs, install it by using the five ceiling-mount screw holes (screw diameter: M6, length of each screw hole in the projector: 30 mm (1-3/16 inches)). Provide a space of 5 mm (3/16 inches) or more between the projector and the mounting surface by inserting metal spacers.



**Direction of air intake and exhaust****Operating the projector continuously**

1. If the projector is to be operated continuously one week, use the quad-lamp optical system's alternating lamp operation (lamp relay) function. The projector cannot be operated continuously one week in quad-lamp mode. Allow a minimum of two hours per day of non-operation time for each lamp if the projector is to be operated continuously for more than one week.
2. The lamp replacement cycle duration becomes shorter if the projector is operated repeatedly for short periods.

Weights and dimensions shown are approximate. Specifications and appearance are subject to change without notice. Product availability differs depending on region and country. This product may be subject to export control regulations.

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