Kingsdale Foundation School
Fee Proposal Tender Information

Project Outputs

The image below annotates the various flat roof areas of the school. This project proposes to reroof areas 2, 3 & 3a and repair specialist covering roof area 1.

Evidence

The roofs have been surveyed by specialist building surveyors and specialist flat roofing consultants/suppliers. The following pertinent excerpts / points from the surveys are noted:

Condition Survey excerpts:

4.1.1 **Main Block**

Exterior

The single ply roof appears not to be performing well. A number of leaks are noted internally and the core sample indicated widespread water entry. We have recommended the replacement of the roofing membrane as a result.

The ETFE roof is known to require fairly regular repair attendance due to birds pecking holes through the cushion membrane which in some cases gives rise to internal leakage. Discolouration seen from the interior indicates areas where leakage occurs, and some of the membrane sags as positive pressure is no longer maintained within damaged cushions. We understand that a contractor visits site to make repairs

when such damage occurred and a guarantee may be in place. The terms of this guarantee may mean that the contractor charges for such attendance; the guarantee may also state when this support will cease. You should be familiar with these terms for purposes of future planning. Ongoing attention to the condition of this roof is likely to be required.

Following advice received from the ETFE roof's supplier/installing contractor, we understand that damage to the inflated cushions, and related deflation, places additional burden on the operation of inflation pump equipment, which can also require repair/additional maintenance as a result. The installation of permanent bird control measures would alleviate the risk of ongoing damage of this kind and lengthen the lifespan of the ETFE roof beyond our 10 year reporting period.

We have therefore amended our schedule to remove the cost of complete replacement of this ETFE roof, but to include allowance for estimated cost of patch repair of damaged cushions, repairs of inflation pump equipment etc. and also for the estimated cost of bird control measures.

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School Name	Info Grou	Block	Element	Sub-Element	Description	Cor	Prio	Costs £	Remarks
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Single ply	D	2	£400,000.00	Ponding issues, saturation
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Plastic membrane	C	4		ETFE cushion roof
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Plastic membrane	D	2	£50,000.00	ETFE cushion roof. Local damage repairs
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Plastic membrane	D	2	£50,000.00	ETFE cushion roof. Install bird control measures
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Plastic membrane	C	1	£5,000.00	ETFE cushion roof. Allowance for local repairs
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Drainage	Metallic	B	3	£10,000.00	Wide, single ply lined gutter around membrane - reline
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Single ply	D	2	£32,000.00	Kitchen - time expired history of repairs
Kingsdale Foundation School	Exterior	Main Block	Flat Roofs	Covering & Insulation	Single ply	C	3	£14,000.00	Front (offices) - time expiry
					Total			**£561,000.00**	

Waterproofing Excerpts:

ROOFS 2, 3, 3a, 5, 8a & 9 HAVE BEEN AWARDED 'GRADE D' STATUS.

Grade D Roof Recommendations Table

Roof Area	Grade	Deck Type	Insulation Present	Existing Waterproofing	Recommendations
2 (Main Block)	D	Woodwool Slab	Yes CTF 60mm – 120mm Polystyrene Insulation (WET)	PVC Single Ply Membrane	Remove existing defective insulation and waterproofing to expose asphalt firm base. Once prepared, install new BUR warm roof system incorporating tapered insulation.
3 (Main Block)	D	Concrete	No	PVC Single Ply Membrane	Remove existing defective waterproofing to reveal screeded concrete deck and install new BUR warm roof system incorporating tapered insulation.
3a (Main Block)	D	Concrete	No	PVC Single Ply Membrane	Remove existing defective waterproofing to reveal screeded concrete deck and install new BUR warm roof system incorporating tapered insulation.

Roof Defects:

- Many internal leaks have been reported by the school and evidence was offered when requested. Damage to internal decorations and school property recorded. Water ingress damage was consistent throughout flat roof areas graded 'D' as highlighted above. Hallways and classrooms have been disrupted as a consequence.
- Visually the Grade C and D flat roofs are in poor condition and this is illustrated by the large number of defects, liquid repairs, self-adhesive flashband repairs and silicone mastic repairs all present.
- The existing single ply waterproofing particularly to roof 2 and 3 (main block) has become brittle in areas mainly due to age and UV degradation. Joint laps are de-bonding to details and penetration collars. Failure of waterproofing upstand details to rooflights are consistent.
- Crazing of the single ply cap-sheet was noted, age and UV exposure contribute to cause this type of defect. As the membrane becomes brittle the lap weld deteriorates and loses adhesion resulting in 'fish mouth' lap defects.

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- We would recommend the replacement of transparent ethyl tetra fluoro ethylene membrane roof within the next 5 years. If the existing aesthetic is desired to be kept then the replacement membrane should be installed on a like for like basis. However, should the school wish to change the aesthetic of the roof we would recommend that existing structural joists are assessed by a structural engineer and strengthened before a new lightweight metal clad roof or BUR felt roof is installed with insulation to achieve current regulations. The new roof could incorporate structural glazing to maintain the level of natural light transfer.
- Core sample analysis of roof 2 (main block) revealed high levels of moisture within the existing Polystyrene insulation. Wet insulation conducts energy instead of repelling it. When insulation becomes saturated, it can lose up to 40% of its U-value, which can result in significantly higher energy bills for the school.
- Pipe penetrations have been poorly installed and likely to be a key cause of water ingress into the school.
- Rooflights are extensively repaired using liquid, self-adhesive flashband and silicone. Repairs have been installed at waterproofing upstand level as well as top of upstand and glazing itself. Many of the rooflights to surveyed roofs comprise of single skin Georgian wired glass units. These units are considered fragile with low thermal properties and offer a low level of security.
- Reactive repairs have been continually installed, sometimes on top of one another suggesting that a repair schedule has now become ineffective.
- Waterproofing skirtings to brickwork and chase lines are terminated using silicone mastic. This has been continually applied as mastic becomes brittle and breaks down. Silicone mastic repairs noted as being multi coloured, suggesting continual application over time.

The photographic evidence below illustrates the project issues and requirements to be overcome.

Photo 1

General view of the roof illustrating single ply membrane and specialist 'bubble' roof fabric.

Photo 2

Typical example of patch repair to outlet and temporary grate due to leaking internal down pipe.

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Photo 3

Typical example of patch repair due to punctured single ply membrane.

Photo 4

The natural colour of the single ply membrane is light grey (see other pictures). This picture illustrates a significant area of dark material which is a liquid water proofing which has been used to try to stop various leaks in the single ply membrane.

Photo 5

Further patch repair example.

Photo 6

Further patch repair example.

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Photo 7

Further patch repair example.

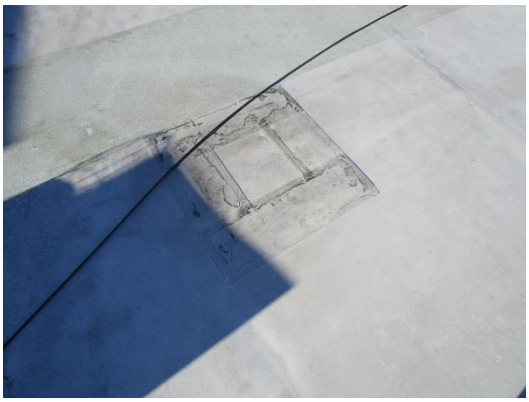

Photo 8

Further patch repair example.

Photo 9

Bottom right corner of this photo illustrates damage to single ply, yet to be repaired.

Photo 10

Further example of temporary patch repairs.

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Photo 11

Damaged roof plant ducting allowing water ingress to services and fabric below.

Photo 12

Defects to service pipe junctions allowing water to penetrate roof structure.

Photo 13

Poor condition plant insulation which will be replaced / protected as part of the plant removal / reinstatement works.

Photo 14

The specialist roof is being damaged by birds – Photo illustrates typical example of bids that rest on the roof and peck the membrane which causes damage.

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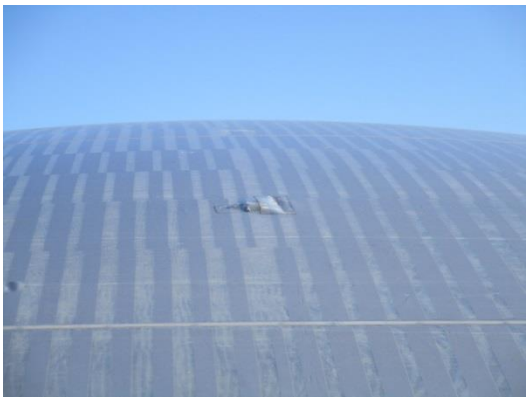

Photo 15

Illustrates damage and temporary repair to the ‘bubble’.

Photo 16

The ripples in the adjacent photos illustrate damage and remedial works.

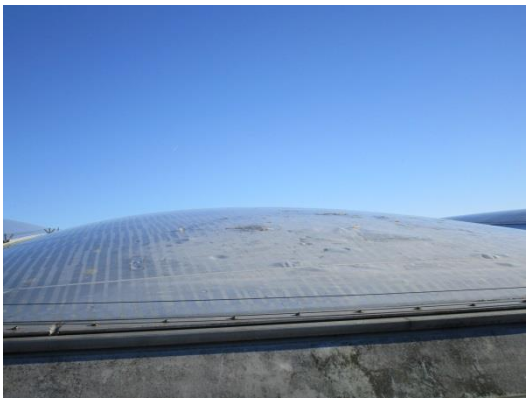

Photo 17

Further example of damage and remedial works.

Photo 18

Deflated roof due to punctures – This is yet to be repaired. This is of significant concern as it is in this situation where water can gather and potentially fail as happened at ‘Greater Manchester Station’

Photo 19

Stained / broken ceiling tiles due to water ingress from leaking roof.

Photo 20

Stained / damaged ceiling due to water ingress.

Photo 21

Further example of damage to ceiling tiles.

Photo 22

Stained ceiling tiles and missing tiles due to damage caused by leaking roof.

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Photo 23

Staining to specialist acoustic ceiling finish.

Photo 24

Staining to plasterboard ceiling.

Photo 25

Significant damage to ceiling tiles due to leaking roofs.

Photo 26

Stained and missing ceiling tiles due to roof leaks.

Photo 27

Evidence of leak. Note: School using laminated paper to direct the roof leak away from the classroom door so that the classroom can remain in use.

Photo 28

Buckets strategically placed above ceiling to try to catch water before it damages ceiling finishes.

Photo 29

Photo taken from ~~t~~waterproofing report giving evidence of water penetration as the insulation below the 'waterproof' membrane is WET. This should be completely DRY.

Summary of the defects and issues highlighted by the project evidence (surveyor and specialist report/s) and above photographs:

- Photos 1 to 10 illustrate various remedial works which have been carried out over the last 5yrs to try to prevent water ingress. The installation of a single ply membrane to a roof which will frequently be accessed for maintenance (i.e. to service the plant and repair/clean the 'bubble') is not appropriate as single ply is not a robust finish. This work was completed under the BSF programme with the government leaving the school with a maintenance legacy of an inappropriate finish. Refer to proposal section below describing an appropriate solution.
- Photos 11 to 13 illustrate defects and damage to roof plant which will be repaired as part of the plant removal and reinstatement works.
- Photo 14 illustrates the culprit causing the damage to the specialist roofing membrane 'bubble'. This roof was installed under the BSF programme, however due to lack of funds protection was not installed to the roof to prevent damage

from birds. This has left the school with an ongoing and costly maintenance issue. Refer to proposal section below describing an appropriate solution.

- Photos 15 to 18 illustrate the defects being caused by bird damage and patch repairs caused. Photo 18 illustrates a section of the roof bubble which is yet to be repaired, also see comment regarding similar issue at 'Greater Manchester Station'.
- Photos 19 to 26 illustrate significant internal fabric damage being caused by the roof leaks.
- Photos 27 and 28 illustrate example of preventative measures that the school are putting in place to catch water leaking through the roof.
- Photo 29 is taken from report to highlight the sodden roof insulation. This should be 100% dry, not wet!

Proposed Works

The response to the project need is as follows:

- Strip off defective single ply water proofing and insulation to the previous asphalt roof covering (which had failed) and overlay with a 3 layer high performance felt roof covering. Works include lifting all plant and reinstatement where plant will be installed in accordance with manufacturer's instructions.
- Roofing system to be complete with a 25yr insurance backed guarantee.

Recommendations:

From the survey undertaken, we suggest the following;

- From the survey undertaken, we suggest that the Roof 2, 3, 4, 6, 7, 8, 8a and 9 are stripped of defective waterproofing and any insulation found to reveal original asphalt firm base (roof 2, 4, 6, 7 and 8) or structural deck (roof 3 and 9). A new High-Performance SBS modified elastomeric membrane warm roof system should be installed incorporating tapered insulation to achieve a U-value of 0.18 W/m^2K and to improve poor falls. Roof 8 once stripped of defective waterproofing to reveal structural deck can receive a new High-Performance SBS modified elastomeric membrane cold roof system, no insulation required.

- The defective ETFE cushions are to be repaired, or replaced where necessary, by specialist contractors including the provision of a replacement inflation plant. In addition, bird netting is to be installed to prevent further damage being caused to the bubble.
- Ensuring the correct operation of the roof ventilation system following ETFE works.
- Internal repairs, making good and redecoration to classrooms affected by roof leaks.
- Associated access and safety equipment for contractors also ensuring the full use of the school for the duration of the contract.
- Allow for associated asbestos material removal management.
- Appoint specialist lighting consultant / designer to consult with the client and design, specify, tender and manage the replacement of the lighting within the Atrium / Courtyard area.

Professional Services

The feasibility of the project has been completed to determine the works that are required as detailed above.

Consultants are to allow for **all** professional services required in order to oversee this project inclusive (not an exhaustive list) of:

- Project Management (Including CIF technical advisor role / management of CIF process, project monitoring forms, liaison with EFA etc.)
- Quantity Surveying
- Mechanical Engineer
- Electrical Engineer
- Energy saving calculations.
- Other professional services in order to fully design and specify repairs such as the specialist ETFE cushions.

Allow for all RIBA Work Stages through to expiry of the defects liability period.

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Budget Cost

The construction cost is estimated to be in the region of:

- **£1.1million + Vat.**

Consultants will be expected to manage the budget bringing the total cost of the works within budget6 whilst maintaining the project brief.

Programme

Construction works are to be completed by End August 2018. Consultants will be expected to manage the programme including reporting to all stakeholders and the EFA. Consultants are also to manage the defects liability period.

Consultants are expected to manage the delivery plan with works being safely executed.

Risk Management

Consultants are to complete risk management and reporting to stakeholders.

Statutory Permissions

Consultants are to manage statutory permissions (where applicable).

Tendering & Benchmarking

The project is to be traditionally procured and managed (unless otherwise agreed this includes consultant design, single stage tendering and JCT contract). Consultants are to competitively tender the works and benchmark to confirm value for money.

Contractor / Consultant Selection

Consultants are to manage the contractor selection process liaising with stakeholders.

Cash Flow Forecast

Consultants are to mange cash flow including reporting to stakeholders (including the EFA).