

**BRADWELL WINDMILL IMPROVEMENT AND MODERNISATION**

Luke Bonwick - BMHC

Section	Section of report	Element	Description	Comment	Cost (to be filled in by millwright)
<b>1. SITE WORKS</b>	3.1	Exterior - site boundary	On the north side, reduce the trees to less than half of their existing height. Trim back the overhanging branches level with the fence, and maintain this position.	Improvement	£0
		Exterior - site boundary	On the east side, request that the Leylandii be reduced in height to just above the level of the fence. Trim back the overhanging branches level with the fence, and maintain this position.	Improvement	£0
<b>TOTAL:</b>					<b>£0</b>
<b>2. EXTERIOR STONEMWORK</b>	3.2	Stone base	Rake out cement mortar from joints of stone base. Re-point stonework in lime mortar, filling cracks where present.	Improvement and possibly modernisation	£0
		Mill tower exterior at ground floor level	Rake out cement mortar from joints in mill tower exterior, up to level of first floor. Re-point stonework in lime mortar.	Improvement and possibly modernisation	£0
<b>TOTAL:</b>					<b>£0</b>
<b>3. EXTERIOR/INTERIOR DAMPNSS - GROUND FLOOR</b>	3.3	Mill tower interior - ground floor	Commission report on dampness in walls/base of windmill	Improvement	£0
	3.3	Wall finish	Strip the internal plaster and paint finish from these areas to reveal the full extent of the deterioration.	Improvement	£0
	3.3	Wall substrate	Dismantle and rebuild the affected areas of stonework.	Improvement	£0
	3.3	West door lintel	Carry out timberwork repairs to the timber ground floor west door lintel.	Improvement	£0
	3.3	Wall finish	Re-line the repaired areas with lime plaster and limewash.	Improvement	£0
	3.3	Storage bins	Remove affected woodwork of storage bins.	Improvement	£0
	3.3	Ground floor finish	Break out concrete floor. Install limecrete floor.	Improvement	£0
<b>TOTAL:</b>					<b>£0</b>

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4. WINDOWS	3.4	Window casements	Replace windows throughout the mill with casements of a more traditional design, prioritising those on the ground floor and those on the south and west sides of the upper floors.	Modernisation	£0
	3.4	Window detailing	Modify external detailing to achieve improved water runoff and deflection. Strengthen lintels and stonework above windows as necessary.	Modernisation	£0
<b>TOTAL:</b>					<b>£0</b>
5. INTERNAL FINISHES - 1st-3rd FLOORS	3.5	Wall finish	Carefully strip the paint and plaster finish from the tower walls on the first, second and third floors.	Improvement	£0
	3.5	Wall substrate	Consolidate and repair any substrate unaffected by previous works.	Improvement	£0
	3.5	Wall finish	Apply lime plaster and limewash finish.	Improvement	£0
<b>TOTAL:</b>					<b>£0</b>
6. INTERIOR - FLOOR STRUCTURE AND ACCESS	3.6	Floor beams and joists	Undertake minor timberwork repairs to first and second floor structural timbers following removal of internal plaster.	Modernisation	£0
	3.6	Floorboards	Lift floorboards of first and second floors. Lay and re-fix the boards with stainless steel nails. Allow for new boarding to fill gaps generated.	Modernisation	£0
	3.6	Ladders	Attach hessian sacks to the underside of each access ladder.	Modernisation	£0
	3.6	Lighting	Improve lighting provision throughout the windmill.	Modernisation	£0
<b>TOTAL:</b>					<b>£0</b>
7. INTERIOR - GEARING	3.7.1	Primary gearing	Carry out maintenance inspection and lubrication of all bearings and working parts.	Improvement	£0
	3.7.2	Brake wheel and brake	Check alignment of brake shoe and adjust if necessary. Fit brake lever guide to ensure smooth travel. Leave in working order.	Improvement	£0
	3.7.3	Curb	Check and tighten all fixings between track plates and curb.	Improvement	£0
	3.7.4	Winding gear	Overhaul and lubricate winding gear, ensuring all bearings are securely fixed and lubricated. Turn cap one full revolution in both directions and leave in working order.	Improvement	£0
	3.7.5	Grain bins	Fit hoppers bottom and protective cover to east grain bin.	Improvement	£0
	3.7.6	East millstones	Dismantle millstones and turn over runner stone. Re-dress and level working faces of both stones.	Improvement	£0

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		Re-pack and lubricate the neck bearing of the stone spindle. Check spindle is vertical.	Improvement	£0
		Clean and overhaul wooden stone furniture and spouts. Rub down interior of stone case with a stainless steel scourer and seal any gaps between the staves to create a smooth surface suitable for flour production.	Improvement	£0
		Re-assemble millstones, set up crook strings, test tentering gear and leave in working order.	Improvement	£0
3.7.7	West millstones		Modernisation	£0
		Prepare designs for west millstone and elevator assembly Insert temporary props to provide additional support to the first floor. Lower the peak millstone to the ground floor and remove it from the mill.	Modernisation	£0
		Provide suitable grey or composition runner stone, dressed in correct direction. The existing eye bar, preserved on first floor, can be used if required.	Modernisation	£0
		Provide suitable replacement bed stone, dressed in correct direction. Install a neck box (preserved on the first floor) and bearing brasses (to be supplied new) to fit the existing stone spindle.	Modernisation	£0
		Replicate the missing wooden items of stone furniture: grain spout, hopper, horse, shoe, damsel, millstone case and flour spout.	Modernisation	£0
		Set up the hand tentering gear and millstone governor using preserved metal parts where available and replicating missing items that are required.	Modernisation	£0
		Install a 3-phase 12hp electric motor with slow start mechanism, coupled to the millstone spindle below the millstones.	Modernisation	£0
		Install an electrically-powered grain elevator to raise grain from the ground floor to the hopper above the millstones.	Modernisation	£0
3.7.8	Flour dressing machine	Prepare designs for flour dresser.	Improvement	£0
		Replicate the missing wire machine flour dresser, using the existing metal brush spindle, with new casing and brushes.	Improvement	£0
		Install flour dresser on first floor complete with feed mechanism and flour spouts to ground floor.		£0

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			Commission dresser with single-phase electric motor.		£0
			Carry out minor repairs to crown wheel. Remove existing cogs. Re-cog wheel in beech or hornbeam.		£0
			Manufacture wooden pattern for cast-iron pinion to engage crown wheel.		£0
			Fit oak hangers and bearers to support lay shaft, allowing pinion to be raised out of mesh with crown wheel.		£0
			Install steel lay shaft, wooden belt pulley and bearings. Fit pinion and set up to engage crown wheel cogs.		£0
			Fit leather belt to enable flour dresser to be driven by wind power if desired.		£0
<b>TOTAL:</b>					<b>£0</b>
<b>8. INTERIOR - CAP FRAME</b>	3.8	Cap frame timberwork	Carry out minor woodwork repairs to cap frame.	Improvement	£0
<b>TOTAL:</b>					<b>£0</b>
<b>9. EXTERIOR - CAP ROOF</b>	3.9	Designs for cap cladding	Prepare design drawings for sail repairs, cap repairs and weathering details.	Modernisation	£0
			Erect structural scaffolding up to level of cap petticoat.	Modernisation	£0
			Strip off existing weatherboarding.	Modernisation	£0
			Repair existing rafters and treat all exposed woodwork with clear timber preservative.	Modernisation	£0
			Renew weatherboarding, reinstating correct weathering details.	Modernisation	£0
			Cover projecting rear ends of sheers and transverse timbers with code 3 lead flashings.	Modernisation	£0
			Apply a layer of Belzona membrane to the exterior face of the weatherboards to weatherproof the joints.	Modernisation	£0
<b>TOTAL:</b>					<b>£0</b>
<b>10. EXTERIOR - SAILS</b>	3.10	Exterior - sails	Lower sails to ground level using mobile crane.	Improvement	£0
			Transport sails and stocks to workshop for overhaul by millwright / to Museum site for overhaul by volunteers.	Improvement	£0
			Strip sail frames to bare wood, replace decayed timber, treat with clear timber preservative and redecorate with white microporous paint (Holkham linseed oil paint or equivalent).	Improvement	£0

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	Strip stocks back to bare wood. Plug stop block holes at centre with oak dowels glued in position and trimmed off. Cut out any decayed timber and let in blocks of air-dried softwood using West system 2-part boatbuilding resin glue as required. Treat exposed area with wood preservative and allow to dry. Redecorate stocks.		
		Improvement	£0
	Manufacture and install six wooden shutters to replace existing damaged shutters.	Modernisation	£0
	Manufacture 42 new wooden sail shutters.	Improvement	£0
	Replace existing closed cleats with open cleats on outer two bays of each spring sail.	Modernisation	£0
	Transport sails and stocks to site.	Improvement	£0
	Re-hang sails and stocks using mobile crane.	Improvement	£0
	Renew poll end wedges in air-dried oak. Test-fit, remove, decorate and re-fit wedges. Install metal retaining bar system to prevent wedges from working loose.	Modernisation	£0
<b>TOTAL:</b>			<b>£0</b>

<b>Total for section 1 (site works)</b>	<b>£0</b>
<b>Total for section 2 (exterior stonework)</b>	<b>£0</b>
<b>Total for section 3 (ground floor dampness)</b>	<b>£0</b>
<b>Total for section 4 (windows)</b>	<b>£0</b>
<b>Total for section 5 (interior finishes)</b>	<b>£0</b>
<b>Total for section 6 (interior structure)</b>	<b>£0</b>
<b>Total for section 7 (gearing)</b>	<b>£0</b>
<b>Total for section 8 (cap frame)</b>	<b>£0</b>
<b>Total for section 9 (cap roof)</b>	<b>£0</b>
<b>Total for section 10 (sails)</b>	<b>£0</b>
<b>TOTAL for sections 1-10 excluding VAT</b>	<b>£0</b>
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<b>TOTAL for sections 1-10 including VAT</b>	<b>£0</b>