Site Location Plan - 1:1250 @ A3

Ariel Photograph - not to scale

Indicative location of proposal

P/11371/006

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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL102 A
Drawing Title	Site Location Plan
Scale	1:1250 @ A3
Date	06th July 2015
Drawn by	exedra architects

Thresholds Centre, Picklescott, Shropshire, SY6 6NU
t 01694 751411 e info@small-earth.com

Site Location Plan - 1:1250 @ A3

Location of proposal

Ariel Photograph - not to scale

P/11371/006

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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL102
Drawing Title	Site Location Plan
Scale	1:1250 @ A3
Date	06th July 2015
Drawn by	exedra architects

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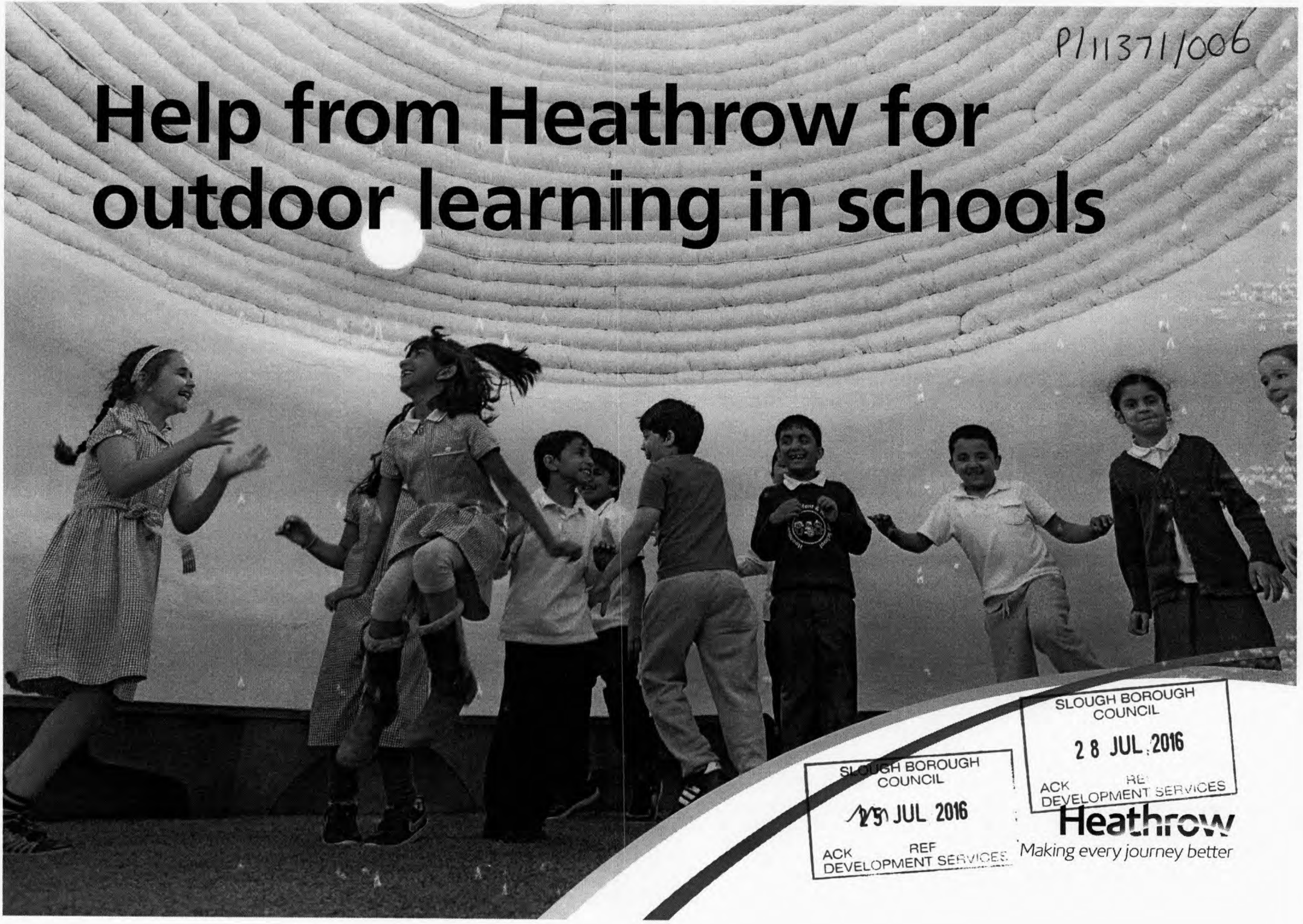
P/11371/006

Help from Heathrow for outdoor learning in schools



Heathrow

Making every journey better

Introduction

Since 2005 Heathrow has provided noise insulation for schools around the airport through the Community Buildings Noise Insulation Scheme. While this has significantly reduced the impact of aircraft noise in the classroom, we acknowledge that the benefits don't extend beyond the school buildings.

We've been exploring ways to provide alternative solutions for schools to assist with outside learning and play. One approach that has already proved successful in a local school under Heathrow's flight path, is the provision of 'Adobe buildings'.

In response Heathrow has launched a scheme to provide financial support to all eligible primary schools for the provision of Adobe buildings in school grounds.

What are Adobe buildings?

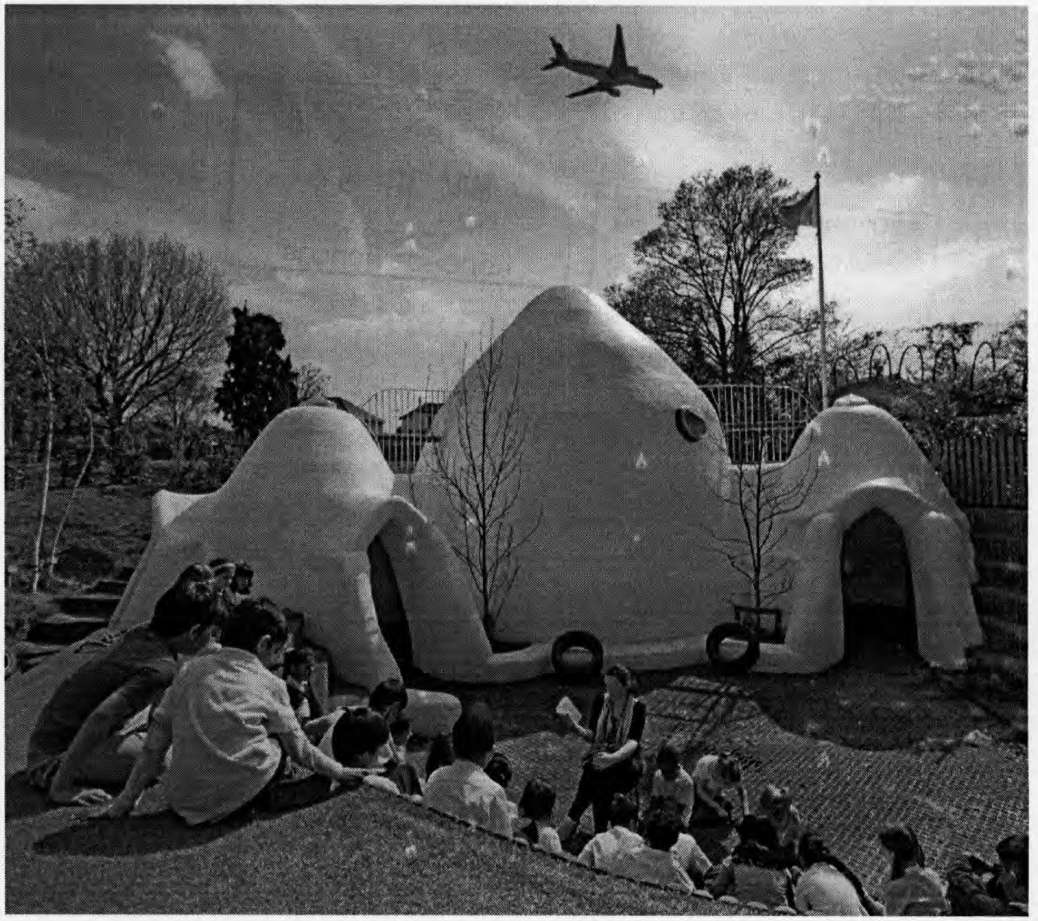
Adobe buildings are specially designed eco-friendly domes. They were originally designed for earthquake and emergency zones in Asia and Africa but their benefits have spread further afield.

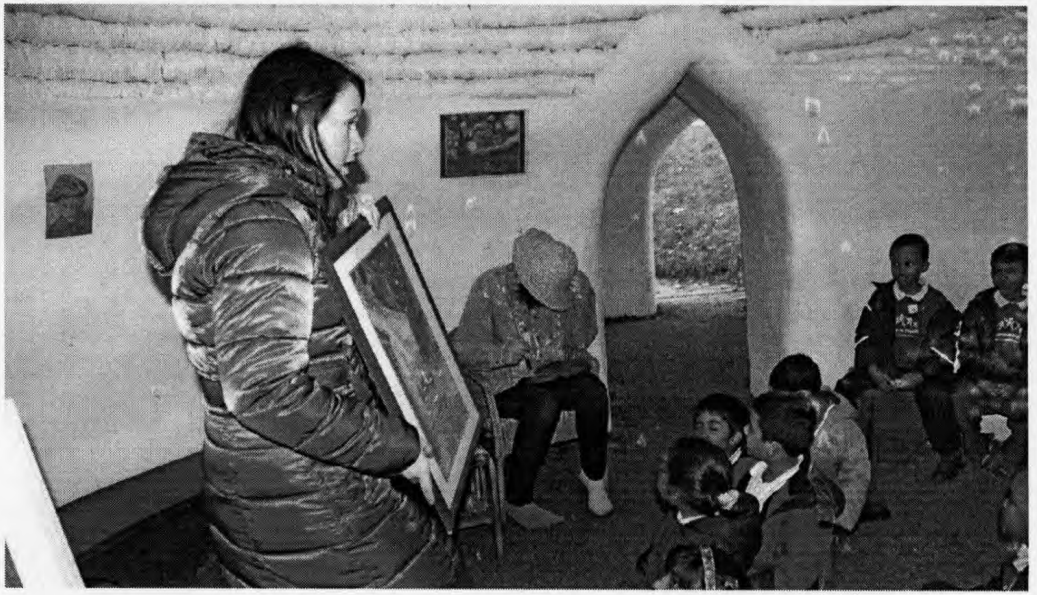
The structure which is made from long tubes of soil gives a sense of being outside because it has no doors but reduces the noise from overhead aircraft significantly.

The Adobe buildings can be used by pupils during playtime and lunch breaks. We also want them to support the school's curriculum and provide opportunities for outdoor learning.

"Schools that are located close to large airports are subjected to significant levels of noise which make outdoor learning more challenging. At Hounslow Heath Infants we are delighted with the impact the installation of our wonderful Adobe buildings have had on these opportunities. Children and staff can enjoy and benefit from carefully planned experiences in the outdoors without this disruption and the loss of learning time that occurs in spaces unprotected from aircraft noise!"

Kathryn Harper-Quinn,
Headteacher of Hounslow Heath Primary School





What is Heathrow offering?

Heathrow will provide a grant of up to £85,000 (excl VAT) per school.

We estimate this is what's required to construct an Adobe Building big enough for a class of 30 (or a series of smaller adobes); pathways to the Adobe(s); and reasonable costs associated with any required planning permissions. The school is required to pay any costs above this.

There are currently three Adobe options available – 'Big Adobe' with amphitheatre, 'Explorers Adobes' or the 'Adobe Village'. Whichever option you choose, it must provide space for at least one classroom (30 pupils) or a series of smaller spaces which add up to space for 30 pupils.

Which schools are eligible for a grant?

The scheme is open to primary schools that fall within the boundary for the Community Buildings Noise Insulation Scheme that meet the terms and conditions of the policy.

Monday
22nd April 2013

theguardian
newspaper of the year

Earth houses give pupils refuge from Heathrow noise

Super adobe domes first used for Gulf war refugees rise up at Hounslow schools coping with lessons under flight path.

Next steps?

To apply for a grant, the Adobe Grant application form will need to be completed. We would be happy to arrange a site visit with the supplier to answer any questions you have. Please email:

sharan_chahal@heathrow.com

or call:

0208 745 7930

More information is available by visiting:

www.small-earth.com

www.hounslowheathinfants.sch.uk

Terms and conditions

- Only schools within the Community Buildings Noise Insulation Scheme boundary are eligible.
- The school must demonstrate how the provision of the Adobe building(s) supports the school's curriculum and provides opportunities for outdoor learning in addition to playtimes. Evidence will be required.
- The Adobe building must provide space for one classroom (30 pupils) or a series of smaller spaces which add up to space for 30 pupils.
- The school will seek any necessary planning permission and provide proof of this to Heathrow Airport prior to the grant being made. The contract shall be between the school and the supplier undertaking the works. Heathrow will provide the contribution as a grant.
- The school will be responsible for liaison with the supplier to undertake the works and provide quotations to Heathrow Airport with a clear breakdown of costs.
- Heathrow Airport Limited will not pay for any landscaping, sandpits or additional works outside the Adobe building scope.
- Heathrow shall not make any further contributions towards nor be responsible in any way for the on-going maintenance or repair of the Adobe building.

www.heathrowairport.com/noise

NND 1013

Heathrow
Making every journey better

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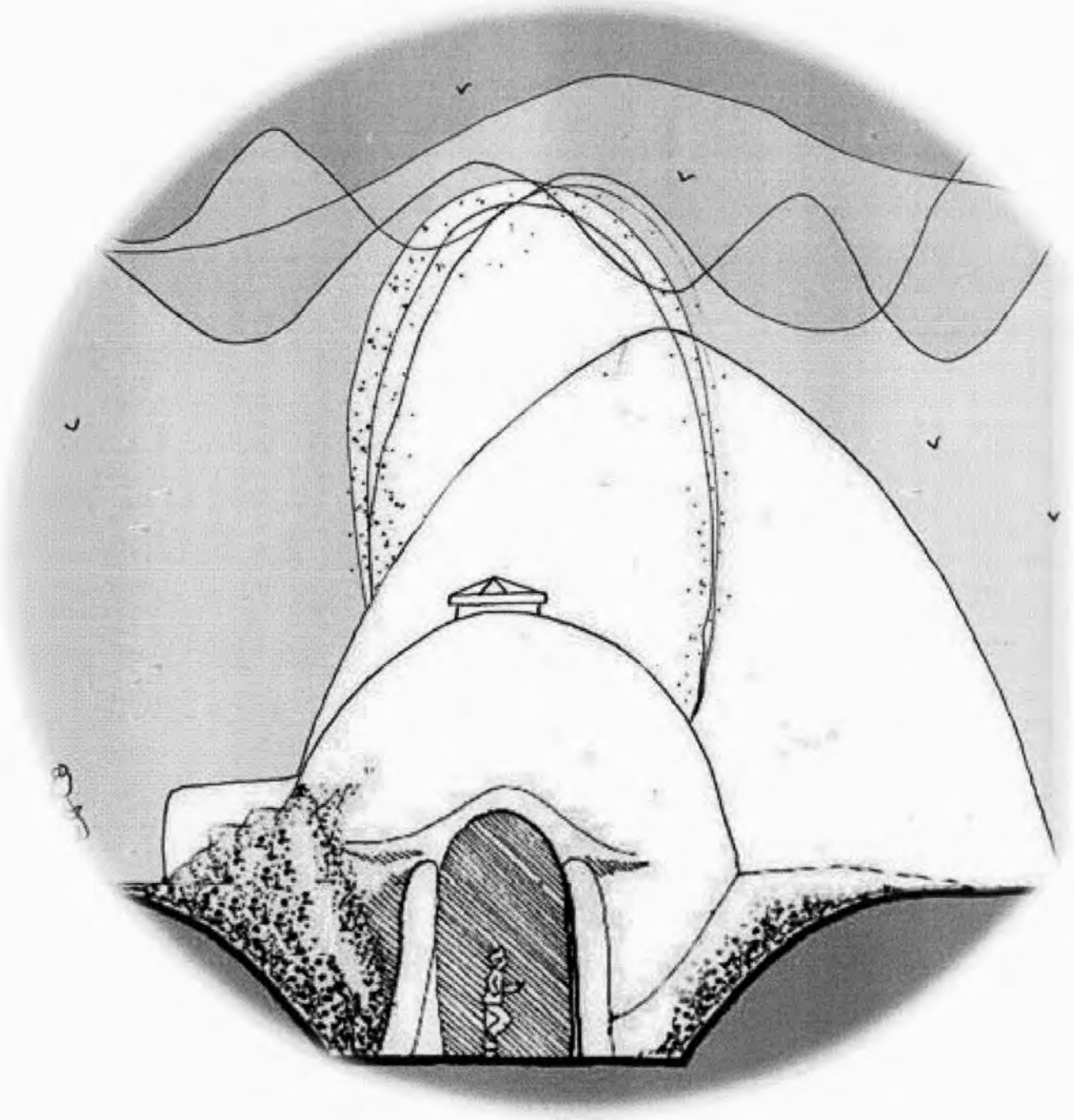
Surface Water Management Plan

for the site at
Colnbrook C of E Primary School,
High Street, Colnbrook, SL3 0JZ
On behalf of the school by Small Earth Ltd.



Report: Surface Water Management Plan
Site: Colnbrook C of E Primary School, Colnbrook SL3 0JZ
Client: Colnbrook C of E Primary School
Author: Julian Faulkner
Date: 4 February 2016
Version: v1

Small Earth Ltd. Thresholds Centre, Shropshire, SY6 6NU

Contents

Executive Summary

Introduction	Background to the use of earth domes for mitigating aeroplane noise in school playgrounds
Form of development	An earth dome flanked by two entrance domes with amphitheatre and contoured landforms.
Site description	The construction zone is in the SW corner of the playing field behind the main school building, adjacent to agricultural land
Ground Conditions	Existing turf playing field & sub soil over River Terrace Gravel Formations.
Ground Water	Groundwater typically encountered at between 2.0mbgl and 2.2mbgl
Foundations	Broad base pyramid style sitting directly on undisturbed gravel deposits.
Excavations	Limited to stable ground 1.6m above ground water level
Footpaths	Porous, water-permeable construction
Soil Contamination	None found, virgin ground
Building Materials	Locally sourced as-dug sub-soil, aggregate & clay. Woven polypropylene tubing, barbed wire. Natural Hydraulic Lime (NHL) Water permeable, cellular paving system
Discovery strategy	A discovery strategy will be employed so that any evidence of archaeology, landfill, extraneous material or contamination can be dealt with appropriately.
Usage	For the school's recreational & operational use during term time.
Maintenance	Operations Manual provided for safe use during lifetime of development.
This Executive Summary is intended to provide a brief summary of the surface water drainage plan. For more detailed information please refer to the main report.	

1.0 Introduction

1.1 General

Small Earth Ltd specialize in building with earth. Using a technology known as Superadobe, we have constructed over 80 rammed earth domes both in the UK and abroad.

North Kathmandu Valley, Nepal

Alexandra Infants School, Hounslow

The zero carbon buildings are generally timber-free and by using the earth excavated on site, have very low embodied energy in their construction.

They are fire, flood and earthquake resistant, have good thermal mass but also have the ability to mitigate noise and it is within this context that Heathrow Ltd have commissioned Small Earth to build earth domes in the infant and primary schools that are adversely affected by low flying aircraft noise in the boroughs surrounding the airport.

Even though these buildings are completely open (there are no doors in the structural openings) they are able to achieve between a 16dB – 20dB reduction in any one noise event and maintain around 50 dB LAeq 30 min despite aircraft flying just 600 feet overhead.

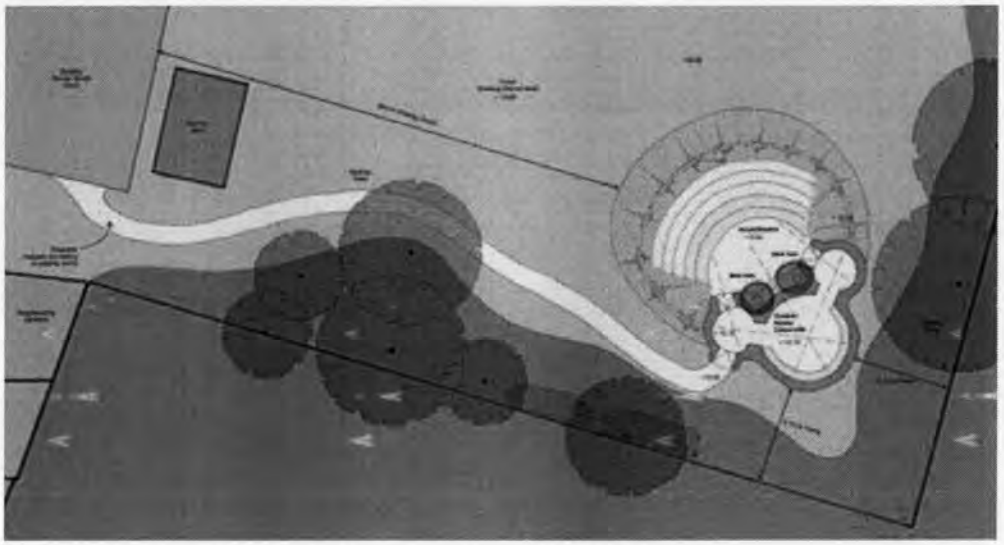
This high level of noise attenuation is achieved through the combination of various design elements. The dome shape itself, wall thickness and density, orientation of the entrances and the siting of the domes partly underground all contribute to the creation of quieter environment for outdoor play, congregation and learning.

However, the latter design element of siting the domes partly underground also creates the issue of how to effectively deal with rainwater, surface run-off and occasional pluvial flood events.

1.2 Typical Form of Development

The typical form of development comprises one 5m diameter dome flanked by two 3m diameter domes set approximately 0.7m below ground level (mbgl). To the front of the domes is a sunken amphitheatre floor with tiered seating rising to approximately 1m above ground level. The entire construction is surrounded by contoured landforms and is accessed via a water-permeable footpath network linked to the main school buildings.

The proposed development at Colnbrook C of E Primary is located in the South West corner of the playing field and is flanked by a thin tree line with agricultural land beyond.



Plan view of the earth dome with amphitheatre and pathway network

2.0 Desk Study

Small Earth will usually carry out a short desk top study to ascertain whether or not the proposed site is in a Flood Risk Zone as identified by the Environment Agency or over previously developed land and follow this up with an intrusive site investigation to determine the depth of the water table and to satisfy themselves of the viability of building with the as-dug, on-site material.

2.1 Drainage Area

The proposed development site is 19.2m AOD with the surrounding playing field falling away to the East towards the River Colne.

This fall, away from the proposed site, gives the development a natural topographical height advantage over the rest of the site and would suggest that surface run-off from high pluvial events will naturally gravitate to the lower topographical levels.

With reference to the E.A.'s flood risk map the proposed development at Colnbrook C of E Primary is in Flood Risk Zone 1 and outside of any designated critical drainage area, however, it is within 90m or so of the River Colne and consideration must be given to the possibility of localized flooding due to high pluvial events.

2.2 Geology

The underlying superficial geology of the land around Heathrow is predominantly of river terrace gravels known variously as Taplow Gravel and Kempton Park Formations to the East and Lynch Hill Gravel Member to the West and consists of gravelly sand or sandy gravel. Colnbrook C of E Primary is located over the Lynch Hill Gravel Member formations.

If one of our projects is close to a stream or river bed we sometimes encounter layers of heavy clay but on most sites there's a layer of hoggin just below the topsoil which then gives way to larger aggregates.

Our excavations are generally shallow with the deepest trial pits finding Springtime groundwater levels at or around 2 mbgl.

2.3 Hydrogeology

Generally, the river terrace sands and gravels encountered during the course of our work can be considered to be free draining with high leaching potential and several of our sites overlie areas classified as a Major Aquifer.

However, with reference to the EA's Groundwater Source Protection Zone map Colnbrook C of E Primary is outside of any protection zones. The nearest, Total Catchment Zone 3, is 1200m to the West of the proposed site.

2.4 Hydrology

We take note of the ground conditions on all of our sites, specifically with a view as to whether there is evidence of surface water bodies, however, as previously stated, we have so far found all sites in the area to be free draining.

The Heathrow scheme covers schools that lie within the 63rd Contour, a noise contour that reflects the highest levels of noise as aircraft are landing and taking off. With reference to the EA's interactive Flood Map, the very large majority of the 63rd contour around the airport is outside of Flood Zones 2 & 3.

Colnbrook C of E Primary is less than 100m from the River Colne to the East and 2.9k from the Thames to the South West. The proposed site is 55m from the nearest Flood Zone 2, which runs through the River Colne Valley to the East.

3.0 Groundwater

Groundwater flooding occurs as a result of water rising up from the underlying aquifer or from water flowing from springs. This tends to occur after long periods of sustained high rainfall and the areas at most risk are often low-lying where the water table is more likely to be at shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although increasingly it is also being associated with more localised floodplain sands and gravels.

When working around Heathrow, groundwater is usually encountered within the majority of the investigated positions with short-term standing levels in the range of 2m to 2.2mbgl.

The consistent level at which groundwater is encountered across the area indicates to us the free movement of groundwater through the gravels and must therefore be considered as liable to fluctuation due to seasonal effects and other considerations.

This assumption determines the amount of "freeboard" that we allow for our main excavation.

4.0 Construction

Although every build is different there is a typical sequence to our works as summarized below.

4.1 Trial Pits

We use a common sense approach during the excavation of the trial pits backed up by considerable experience in working with earth. Team members carry out a watching brief during this phase of the work and any anomalies or unexpected ground conditions are reported and discussed.

Examples of typical trial pits dug to 2m depth or until ground water encountered.

In preparation for the intrusive investigation, we mark out the full peripheral boundary of our proposed excavation and then choose the areas for the excavation which we dig down to 2 mbgl or until we encounter ground water.

I must point out here that neither myself, nor any of our operatives, have any professional qualifications regarding construction, engineering, environmental or geotechnical assessment. However, we have a wealth of accumulated knowledge around working with and in the earth coupled with a passionate enthusiasm for low-environmental-impact construction.

We have developed our own methods and protocols over many years of working in construction and we take pride in exercising diligence and integrity in the pursuance of our vocation.

Examples of shallow dug trial pits showing depth of topsoil and hoggin encountered

4.2 Main Excavation

Our workforce are aware of their responsibility to observe, report and act on any archaeological, potentially suspicious or contaminated materials that they may encounter during the excavation stage of our projects and our excavation work is always carried out with a watching brief.

Excavations to a maximum depth of 1.5mbgl are made across the construction zone and no excavations are made below the water table. Typically, we allow a margin of 0.8m between the encountered level of groundwater and the laying of our foundation course. The finished floor level is then set approximately 200mm above that foundation course at 1m above the Springtime groundwater level.

Geology to the East of the airport – Bedfont Primary, Bedfont

4.3 Construction

The Superadobe construction technique consists of filling long lengths of woven polypropylene tubing with earth, laying them into the required shape and then compacting them. Strands of barbed wire are fixed on top ready to receive the next layer. The whole process is carried out manually. The total impermeable surface area of the domes' footprint is 43m2.
Once we've got a few layers down, we then install the horizontal and vertical damp proof membranes, followed by the installation of the drainage system.

5.0 Drainage Layout

The site's below-ground-level drainage infrastructure relies on natural percolation through the water-permeable surface finishes, backed up by a pumped system.

5.1 Surface Finishes

The floor to the amphitheatre comprises artificial grass over compacted sharp sand over the aggregate subsoil – all of these elements are free-draining and able to handle most moderate to heavy rainfall events through natural infiltration.

In the event that infiltration is found to be ineffective, either due to underlying geology or a high water table then a pumped system is constructed to provide an appropriate method of water management to prevent internal flooding of the domes.

5.2 Pumped System

The pumped system consists of an 600mm deep, 450mm diameter chamber that we sink within the floor area of the amphitheatre into which we install a high performance pump activated by a float switch.

In the event that the water table rises to within 200mm of the amphitheatre floor, the pump kicks in and discharges either into the existing stormwater system if available or into a purpose built soakaway constructed at distance from the building.

If there is a wooded is available nearby then we will discharge into a shallow network of perforated pipe laid amongst the trees. This will be the preferred method of groundwater management at Colnbrook C of E Primary.

5.3 French drains

To the back of the domes, behind the vertical damp course, we lay two 110mm perforated twin-wall pipes in a bed of graded 10mm to 20mm shingle. The pipes in this French drain extend around the dome and terminate in the tree planters flanking the dome entrances.

Perforated twin-wall pipes laid behind the vertical dpm

5.4 Footpaths

All footpaths leading to, in and around the domes are usually of water-permeable construction and are excavated to a depth of no more than 0.150mbgl.

Where the footpath ramps down to the below-ground-level entrance of the domes interceptor slotted drains are laid across the ramped access path and these discharge into the surrounding subsoil via perforated pipe.

Water-permeable footpath leading to domes and amphitheatre

6.0 Usage

The domes and amphitheatre are able to be flooded without either detrimental impact to the structural integrity of the construction or to the fabric of the building and as such can be used as a floodable void during times of flooding.

It should be noted here that during times of flood none of the structure will be available for recreational or operational use by the school.

6.1 Flooding

As stated earlier, there are no doors in any of the five structural openings. The entire building is therefore to be considered an open structure enabling quick emergency access/egress in the event of sudden flooding.

6.2 On-going Maintenance

The school will be provided with an Operations Manual setting out a programme of scheduled maintenance to enable the safe use of the building for the lifetime of the development.

7.0 Summary

The proposed methods of rainwater disposal and groundwater flood management have been tried and tested in various locations on similar projects in boroughs around Heathrow Airport since 2010.

Earlier projects have been monitored for performance during extreme weather events and seasonal fluctuations in groundwater levels have been noted to enable a comprehensive and effective solution that can be sustainably implemented in this and other similar design proposals.

The ability of the structure to be flooded without detriment effectively makes the proposed development a floodable asset within the school's existing surface water management system.

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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL100
Drawing Title	Proposed Floor Plan
Scale	1:100 @ A2
Date	06th July 2015
Drawn by	exedra architects

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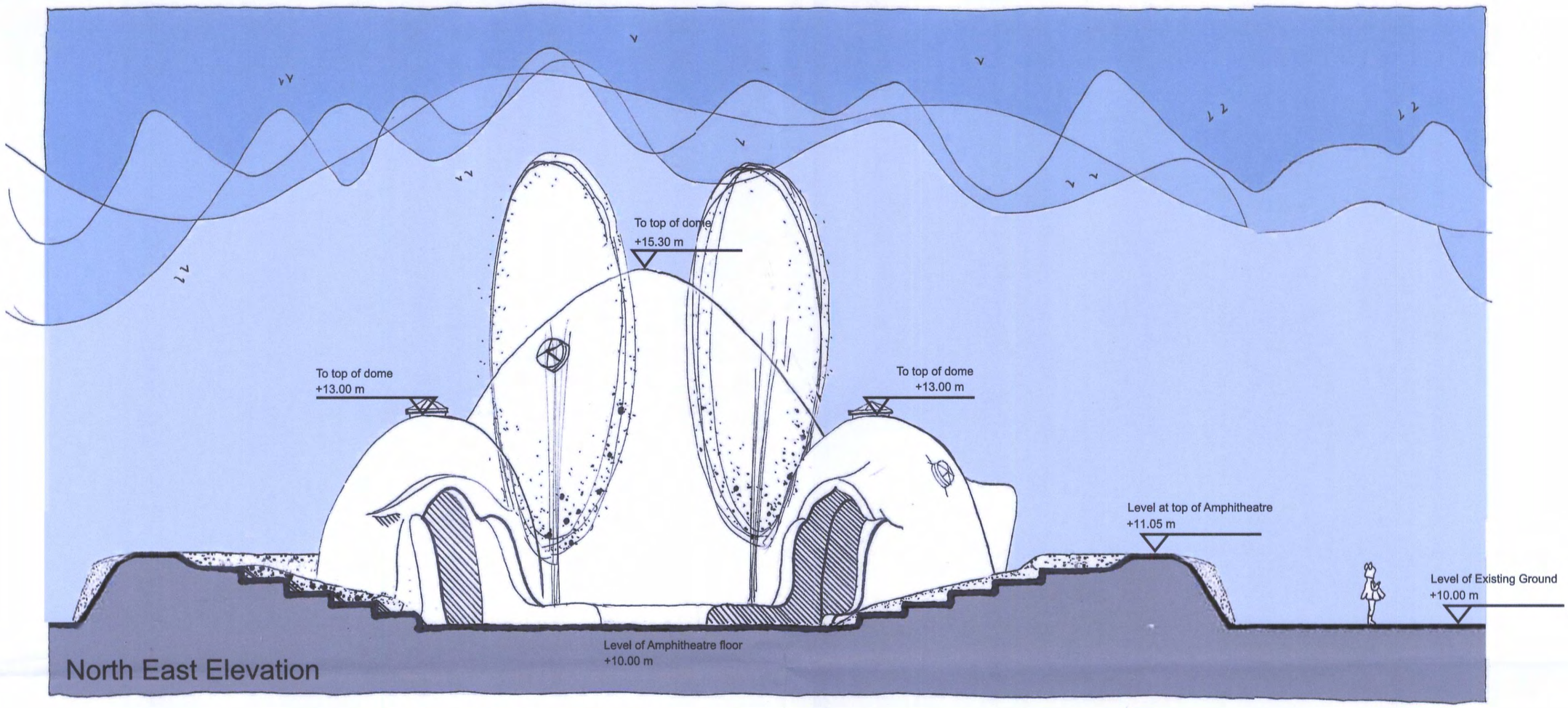
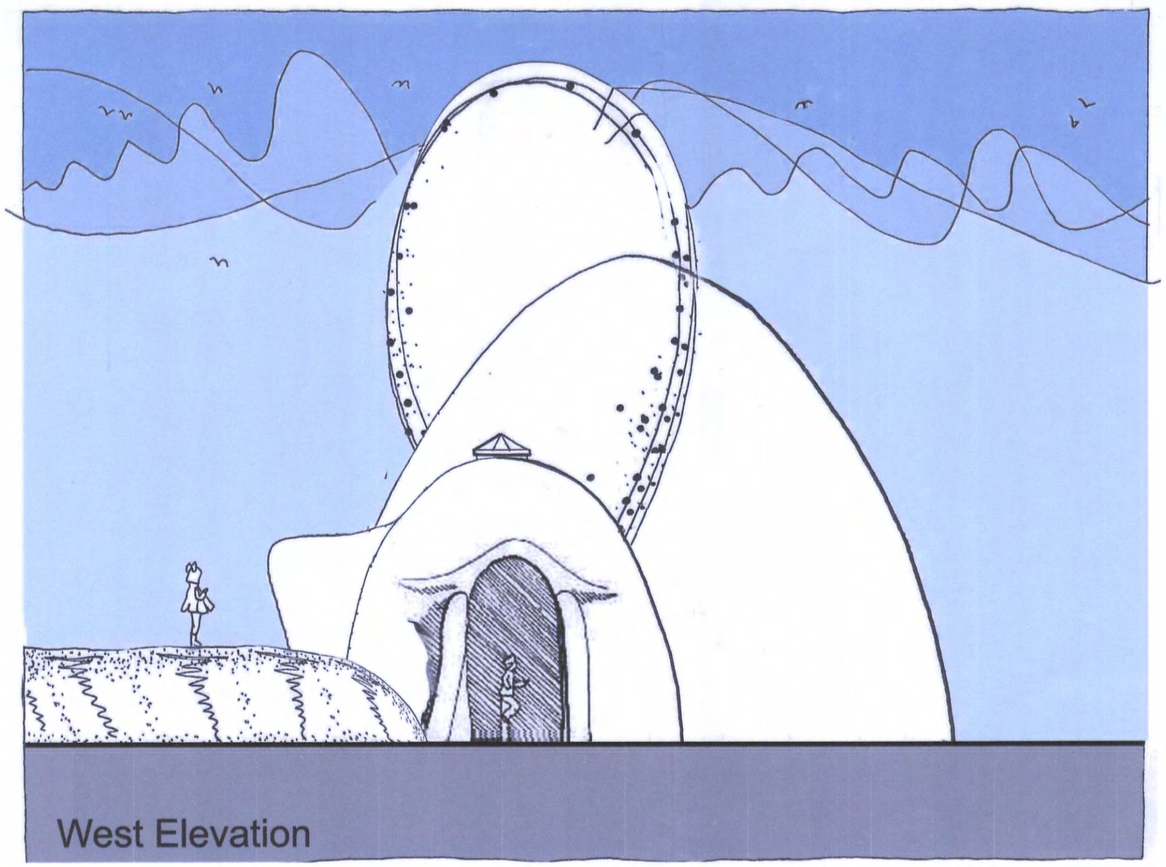
t 01694 751411 e info@small-earth.com



North East Elevation



West Elevation

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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL200
Drawing Title	Proposed Elevations
Scale	1:50 @ A2
Date	06th July 2015
Drawn by	exedra architects

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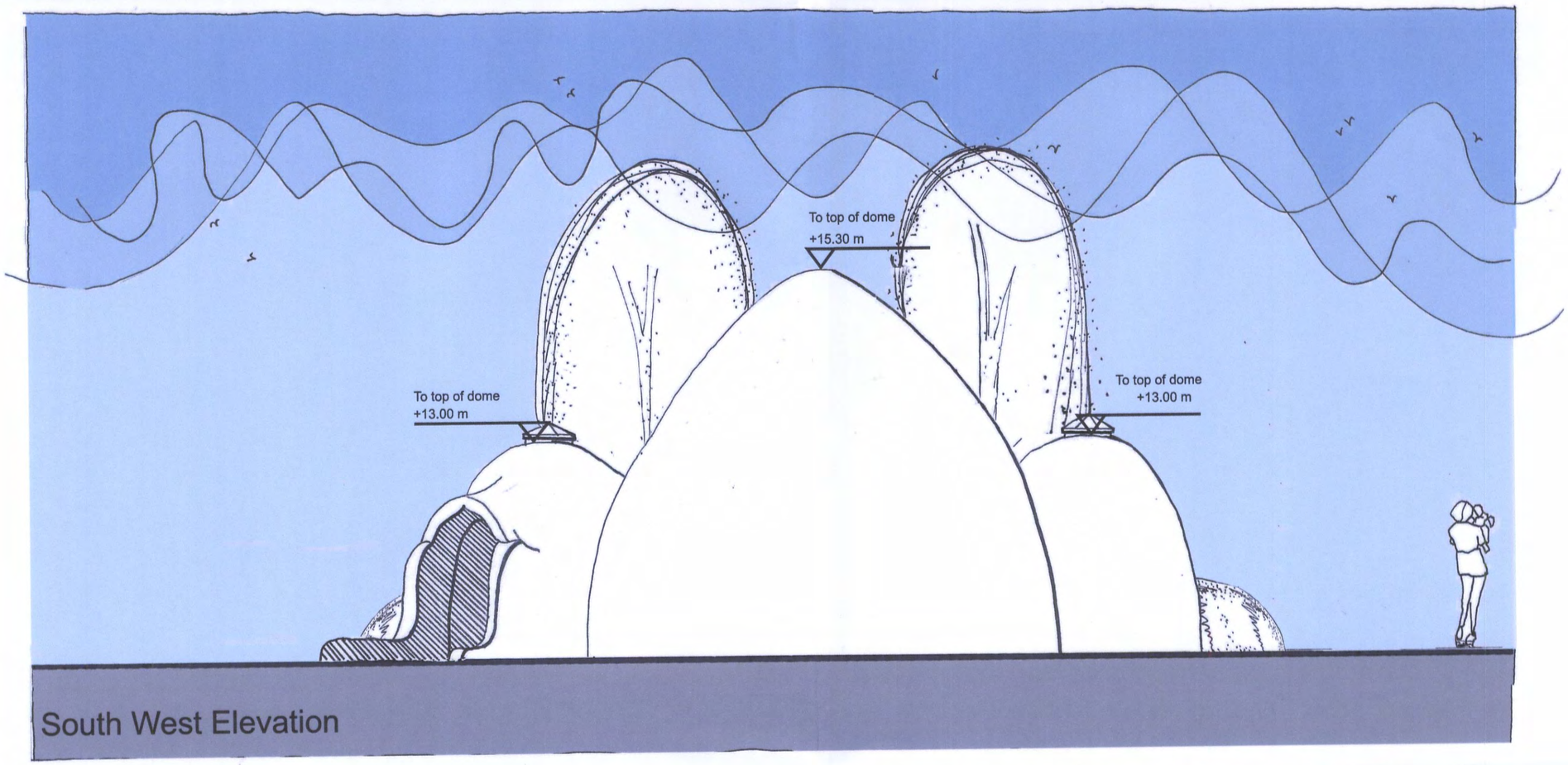
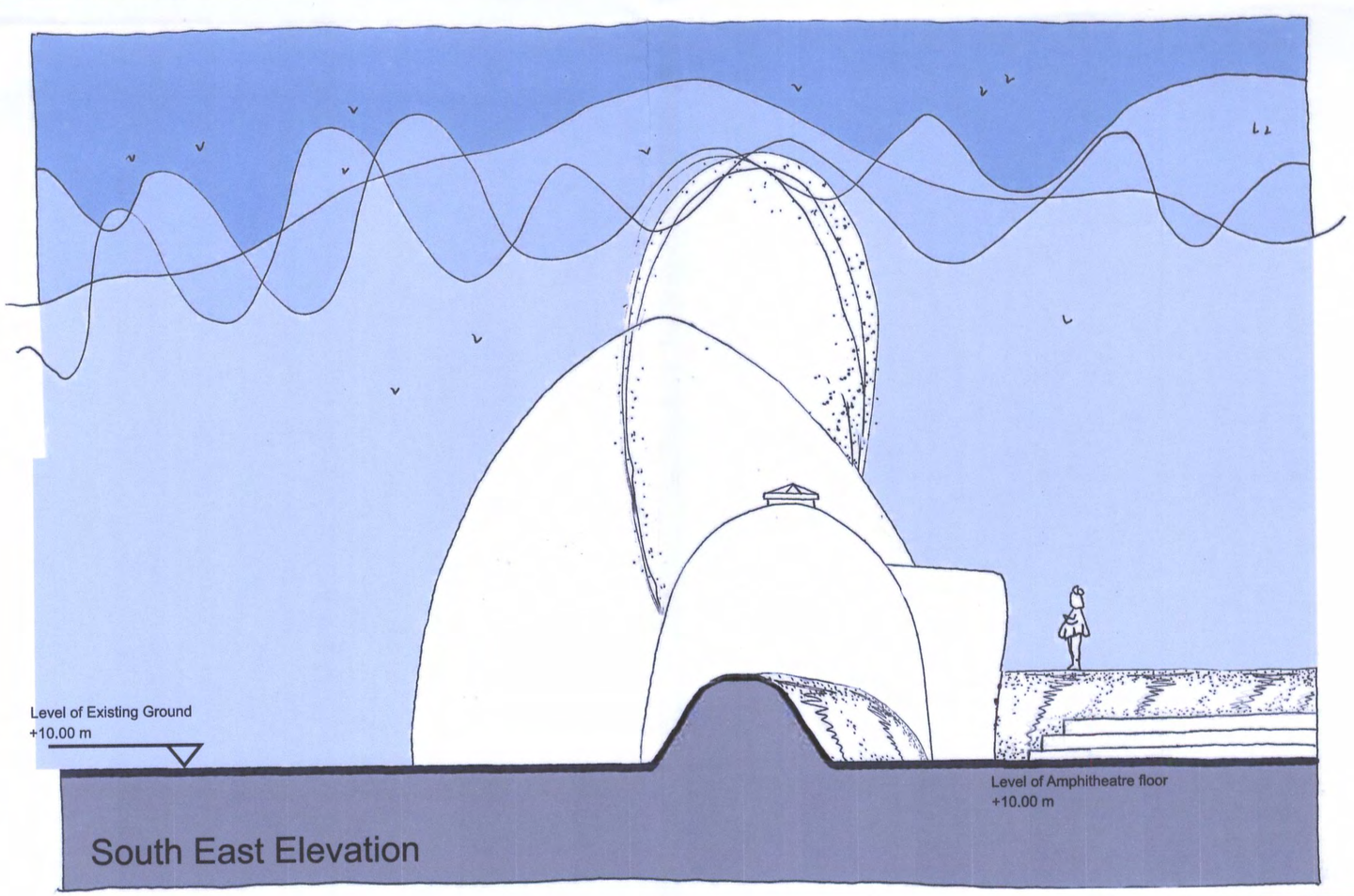


South West Elevation



South East Elevation

P/11371/006

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Environmental Creative Organic

Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL201
Drawing Title	Proposed Elevations
Scale	1:50 @ A2
Date	06th July 2015
Drawn by	exedra architects

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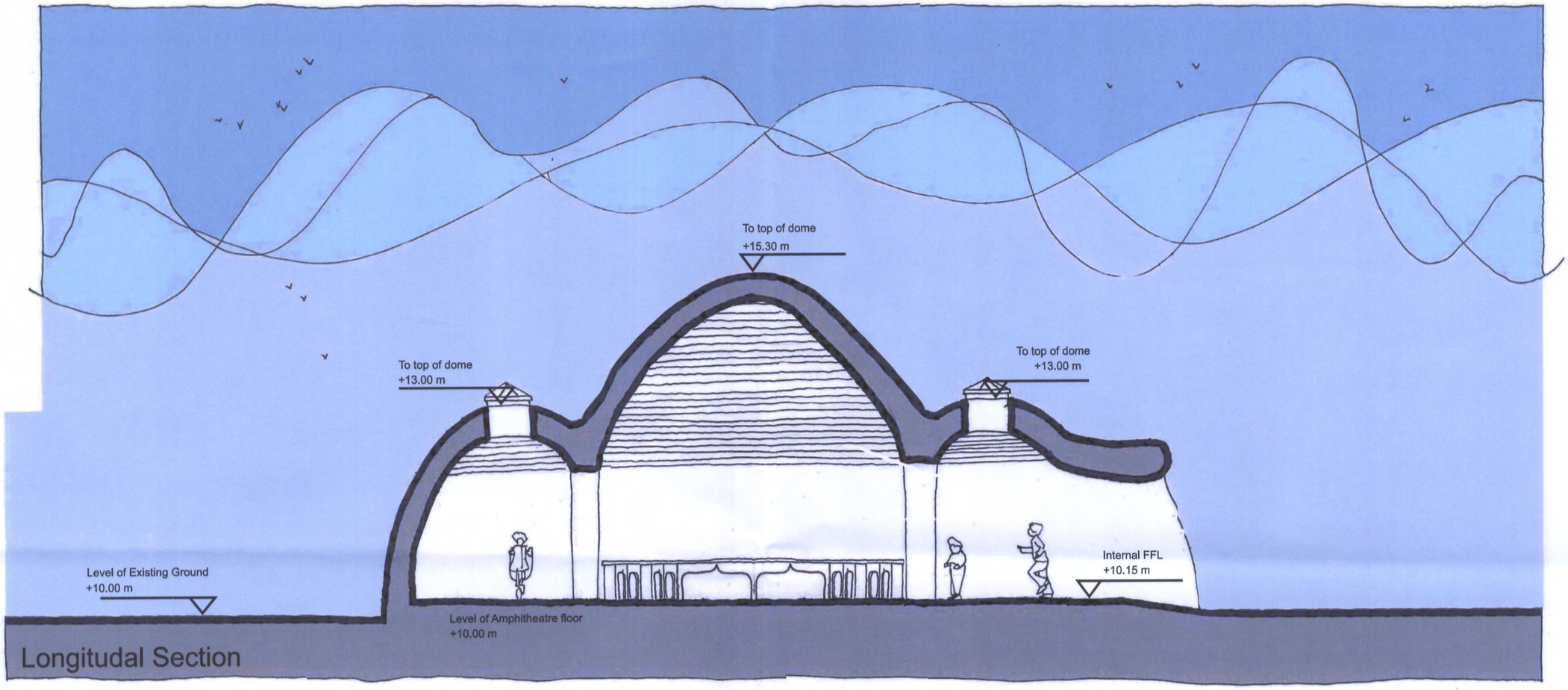

Longitudal Section

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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL202
Drawing Title	Proposed Section
Scale	1:50 @ A2
Date	06th July 2015
Drawn by	exedra architects

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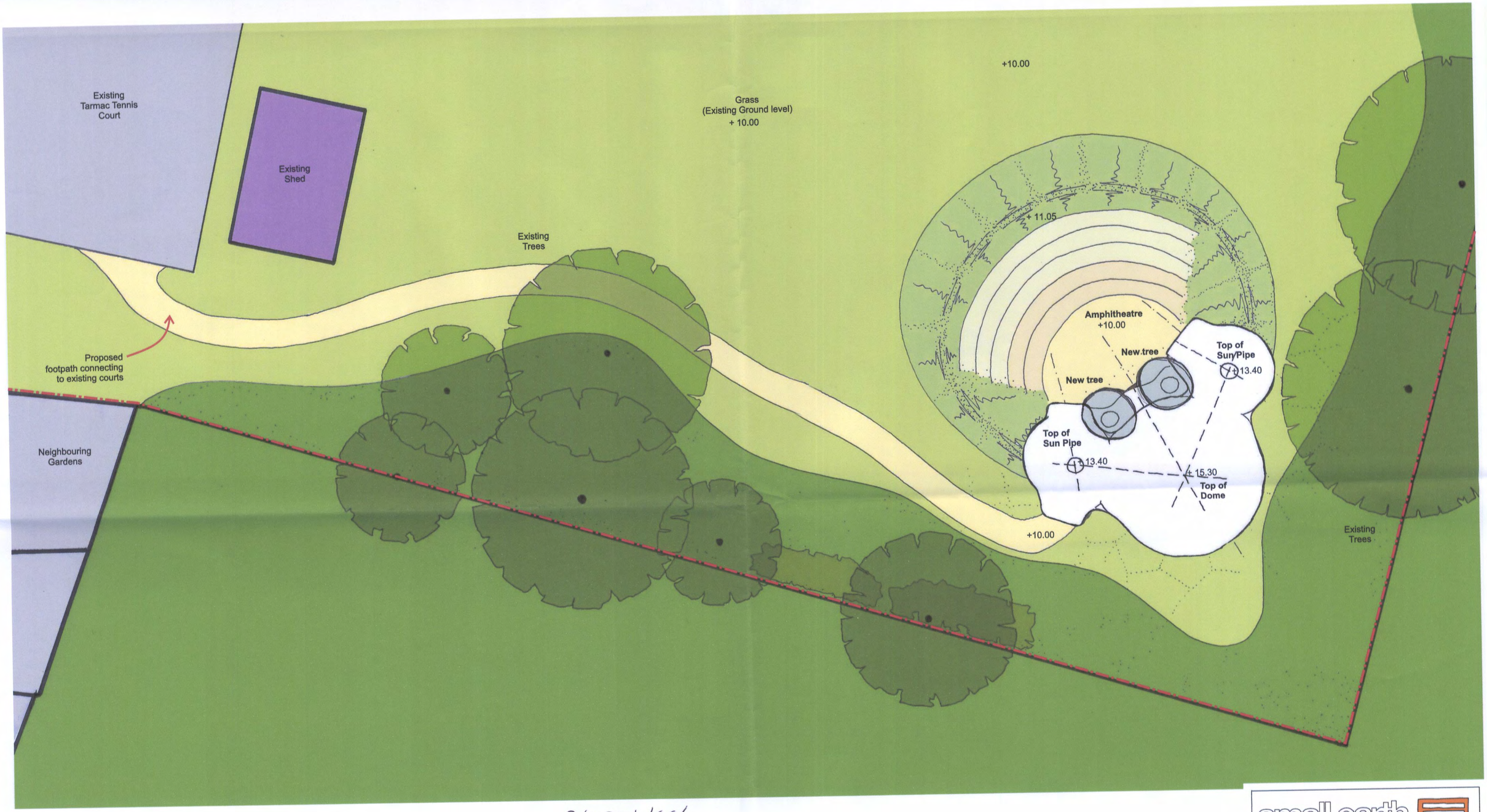

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25 JUL 2016
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Client	Colnbrook C of E Primary School, Colnbrook, Berks
Drawing Number	89.PL101
Drawing Title	Proposed Roof Plan
Scale	1:100 @ A2
Date	06th July 2015
Drawn by	exedra architects

Thresholds Centre, Picklescott, Shropshire, SY6 6NU
t 01694 751411 e info@small-earth.com