The development of the former tram shed into a Centre for Sustainable Technologies
Visioning document
Draft January 2013
THE DEPOT
Creative sustainable re-use of one of Cardiff’s most complete industrial buildings

Introduction
In this document ideas for the re-use of the depot are explored. It is emphatically not a full feasibility study but it is meant to prompt discussion and further studies.

‘The Depot is a large Victorian building in the centre of Cardiff. It has been in continuous use throughout its 100-year life, and its interior is like a small settlement. The main brick walls and concrete floor register the position of many previous dividing walls and ground trenches, and record the shift in the building’s role as a repair shop for Cardiff’s trams to a maintenance shop for its municipal vehicles.’

The idea of reuse has been around at least since 2005. Because of its spatial potential within walking distance of the City Centre it presents a unique opportunity to contribute to the cultural ‘offer’ for Wales’s capital city. Rather than proposing an ‘orthodox’ refurbishment of the building or brutal and destructive carving of the site for commercial opportunity, this proposal is based on dealing with the necessity to repair, combined with the freedom to imagine what the Depot offers future users given space, form and possible function. The Depot will give Cardiff a unique space with the potential to accommodate international events and exhibitions.

The strategy for the future of the building is based on three principles

1. To adopt a financial and constructional model appropriate to enable the creative re-use of the building. This is based on combining new space for Innovation Companies alongside public facing facilities whilst demonstrating renewable technologies. The aim is to make a building that is flexible and adaptable in order to maximise revenue through its ability to house a wide range of events/users.

2. To exploit the spatial and functional opportunities offered by the existing building based on how other international class European Cities have benefited from creative re-use, rather than erasing their industrial heritage.

3. To dispose of new spaces within the existing shell in a way that an architecture of ‘continuity and accretion’ is allowed to develop. This means accepting that the building is never finished as a single compositional statement and is a conglomerate order.

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The existing building

The building has a spectacular daylit, open space

South (Street) Elevation - Victorian brickwork at its best

Interior has been in use as a vehicle maintenance shed for over a century

Entrance is now cluttered and a visual mess

The building buffers Grangtown from the railway and is within easy reach of the railway station and all City Centre Facilities
Learning from others - creative re-use - Palais de Tokyo - Paris
Demonstrating how a building can be resurrected for public use with minimal intervention

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In French a makeover is known as a ‘re-looking’, and this strikes as a better, if not more conceptual, way to understand the recent changes as the Palais de Tokyo still comes across as very much unfinished. Walls are still unpainted and it was unclear whether a pile of timber, cordoned off by caution tape, was rubbish or an art installation (likely the former).

redundant and neglected for three decades this former is now a vibrant cultural attraction owned and run by the city close to the Eiffel Tower.

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Learning from others - Building Envelope Centre, Shotton
Demonstrating repair of an existing industrial shed and insertion of r&d offices

DRUw and LCRI transformed a former 1920s steel rolling mill into a multi-functional research facility. The refurbished building now demonstrates and tests energy producing building elements:

- Pre-fabricated steel office modules were inserted into the existing shed to provide high spec research spaces.
- Completed in just 15 months, the building underwent extensive testing in the design phase - photo of daylighting models at the wsa sky and heliodon.
- The existing
- New south facing energy producing facade
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Existing building - spatial potential

The building provides a unique opportunity to use a large flexible space close to the city centre - and is already "iconic".

Over 100m long and 23m wide the building has the potential to accommodate a range of offices and public facing activities.

The building is big enough to "swallow" substantial interventions such as offices for organisations without compromising the volumetric sense.

DEPOT is a great building. It has all of the attributes (or clichés) of the archetypical Victorian structure. It is big, 120 metres long, 23 metres wide, 10 metres high, and has a toughness and scale that could accommodate the largest and heaviest installation. It has been in continuous use throughout its 100 year life and its interior is like a small settlement with solid masonry walls supporting the house-like two storey vehicle reception and mess room, and less substantial clad timber structures make other subdivisions. The main brick walls and concrete floor register the position of many previous dividing walls and ground trenches, and record the shift in the building’s role as a repair shop for Cardiff’s trams to the maintenance shop for its municipal vehicles.
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Energy and environment - a near zero carbon strategy

The building benefits from the potential for daylight, natural ventilation and solar gain whilst being buffered from the North by the railway embankment.

The existing envelope and fabric will act as an environmental umbrella and accommodate new buildings within the existing shell. The main volume will be transitional space.

Energy for the whole project is generated by a CHP energy centre using locally grown renewable bio-fuel plus slat pv’s and storage through use of existing and new pits.

*DEPOT is big enough to accommodate a number of separate but complementary uses and tenants - from R&D to public exhibition.

For the purposes of this study it is developed as an Urban Centre for Sustainable Technologies - Offices for anchor tenants, Exhibitor entrance, Bay 2 & 2 Exhibition, Bay 3 & 4 Conference and Cafe, Bay 5 Entrance Court, Bay 6-8 Innovation Centre, Bay 9-11 LCRI Offices and laboratory
The economic strategy for the new building is based on the architectural strategy. Therefore, those elements which are critical to the low carbon performance, spatial arrangement and appearance of the building – the “climatic roof, and biomass combined heat and power plant are the costliest items. These are balanced by a very pragmatic and economic approach to the other elements – exposed steel simple, repair of the existing and inexpensive new interventions.

It is anticipated that the largely day lit and naturally ventilated interiors plus the financial benefit of renewable heat incentive will help run the building.

The design approach allows phasing of the construction. After the general repair of the building and heating system to create a waterproof covering then each bay can be inhabited. The design allows for flexibility with additional uses and associated pavilions to be built or existing ones to be extended in the future if the centre requires more accommodation. These could be easily built as inserts later.

The Depot Jan-13

Ground Floor footprint 2,665 m²
New offices/facilities 1,200 m²
Renewable energy superstructure

Approx site area 3,390 m²
Net building footprint 2,640 m²
Approx external works area 750 m²

BUDGET CONSTRUCTION COST ESTIMATE-SUMMARY

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<tr>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate £</th>
<th>Total £</th>
<th>Total £/m²</th>
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Notes and exclusions:
- Budget costs based on £/m² using Gross Floor Areas produced by Welsh School of Architecture’s current sketch proposal drawings.
- The costs are based on recent tender costs for similar schemes. As such, no specific allowance is made for particular site conditions, site abnormals, contamination, abnormal mains services supply/diversion costs and the like.
- Construction costs represent:
  - Current prices as at Jan 2013.
THE DEPOT

Spatial plan

1. Cafe
2. Kitchen store
3. Kitchen/servery
4. Disabled toilet
5. Ladies toilets
6. Shower
7. Mens toilets
8. Exhibition space
9. Shop
10. Reception
11. Wheelchair store
12. Wet Store
13. Meeting space
14. Dry store
15. Offices
16. Staff toilets and shower
17. Staff room

1:500

Bay 1&2
Exhibition space 5000sf

Bay J&K
Cafe and Conference 5000sf

Bay 3
Public entrance court and garden 2500sf

Bay 4-8
Innovation Centre with lettable units 4000sf

Bay 9-11
LCRI and Laboratory lettable office space 5000sf, lab 10000sf
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Protecting and enhancing context

North elevation

Exhibitor Entrance and exhibition spaces

Cafe abd garden court
Low Energy offices - precedent the National Trust, Swindon
Feilden Clegg

Over 100m long and 23m wide the building has the potential to accommodate a range of offices and public facing activities.

Over 100m long and 23m wide the building has the potential to accommodate a range of offices. In this form 2 bays of office share an atrium space to provide daylight and natural ventilation.

The atrium and offices constructed from sustainable timber.
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Indicative plan showing functional use based on zonal diagram (p9)
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Aerial view. Interior and section through offices
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Lighting Test 1

A - Existing roof openings retained  
     (15 % glazing)
1 - opaque ceiling to 1st Floor units  
     (no partitions)

Megatron Readings

1. 7,600 lx
2. 700 lx
3. 820 lx
4. 805 lx
5. 1,200 lx
6. 1,000 lx
7. 8.5 lx
8. 30 lx
9. 1,000 lx

% Daylight Factor

2. 9.2 %
3. 10.8 %
4. 10.6 %
5. 15.8 %
6. 13.2 %
7. 0.1 %
8. 0.4 %
9. 13.2 %
THE DEPOT

Lighting Test 2

B - 3.6m central strip glazing
(15% glazing)
1 - Opaque ceiling to 1st Floor units
(no partitions)

Megatron Readings
1. 7,800 lx
2. 700 lx
3. 840 lx
4. 805 lx
5. 1,380 lx
6. 1,400 lx
7. 22 lx
8. 56 lx
9. 2,140 lx

% Daylight Factor
2. 9.2 %
3. 10.8 %
4. 10.6 %
5. 17.7 %
6. 17.9 %
7. 0.3 %
8. 0.7 %
9. 27.4 %
THE DEPOT

Lighting Test 3

A - Existing roof openings retained (15% glazing)

2 - Transparent ceiling to 1st Floor units (without partitions)

Megatron Readings

1. 7,600 lx
2. 700 lx
3. 820 lx
4. 805 lx
5. 1,200 lx
6. 1,000 lx
7. 9.5 lx
8. 380 lx
9. 1,050 lx

% Daylight Factor

2. 9.2 %
3. 10.8 %
4. 10.6 %
5. 15.8 %
6. 13.2 %
7. 0.1 %
8. 5 %
9. 13.8 %
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Lighting Test 4

B - 3.6m central strip glazing
(15 % glazing)
2 - Transparent ceiling to 1st Floor units
(without partitions)

Megatron Readings
1. 7,600 lx
2. 700 lx
3. 820 lx
4. 805 lx
5. 1,250 lx
6. 1,400 lx
7. 24 lx
8. 100 lx
9. 2100 lx

% Daylight Factor
2. 9.2 %
3. 10.8 %
4. 10.6 %
5. 16.4 %
6. 18.4 %
7. 0.3 %
8. 1.3 %
9. 27.6 %
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Lighting Test 5

C - 3.6m central strip glazing
+ 1m strip above units
(20% glazing)

2 - **Transparent ceiling** to 1st Floor units
(without partitions)

Megatron Readings

1. 8,000 lx
2. 740 lx
3. 865 lx
4. 850 lx
5. 1,200 lx
6. 1,250 lx
7. 26 lx
8. 1,200 lx
9. 2,300 lx

% Daylight Factor

2. 9.2%
3. 10.8%
4. 10.6%
5. 15%
6. 15.6%
7. 0.3%
8. 15%
9. 28.8%