

| | |
|-------------------------|--|
| APPLICATION NO. | P22/S1410/FUL |
| APPLICATION TYPE | FULL APPLICATION |
| REGISTERED | 11.4.2022 |
| PARISH | CLIFTON HAMPDEN |
| WARD MEMBER(S) | Sam Casey-Rerhaye |
| APPLICANT | UKAEA |
| SITE | Land in the North East Corner of Culham Science Centre near Clifton Hampden, OX14 3DB |
| PROPOSAL | Erection of a Fusion Demonstration Plant with ancillary office space, parking, landscaping and associated infrastructure, including plant and machinery. |
| OFFICER | Katherine Pearce |

1.0 INTRODUCTION AND PROPOSAL

1.1 This application is referred to Planning Committee because of the scale of the proposal and because of its international importance in the research and development of fusion technology. The site can be best seen from Thame Lane (Public Right of Way) immediately to the north and east of the site, from the Public Right of Way Footpath 06 that is to the north of the site, and from the Wittenham Clumps.

Culham Science Centre

1.2 The site is located on Culham Science Centre (CSC), a site run by the UK Atomic Energy Agency (UKAEA) where publicly funded research into fusion power takes place alongside related high technology and innovation. The CSC site is approximately 80ha in area located in the parishes of Clifton Hampden and Culham. It is entirely surrounded by Green Belt designation, though CSC itself has been removed from the Green Belt through Policy STRAT8 of the South Oxfordshire Local Plan. The CSC was a former military airfield, which was closed in 1953. In 1960 UKAEA secured planning permission from Oxfordshire County Council for the development of the site as a research establishment to develop fusion technology.

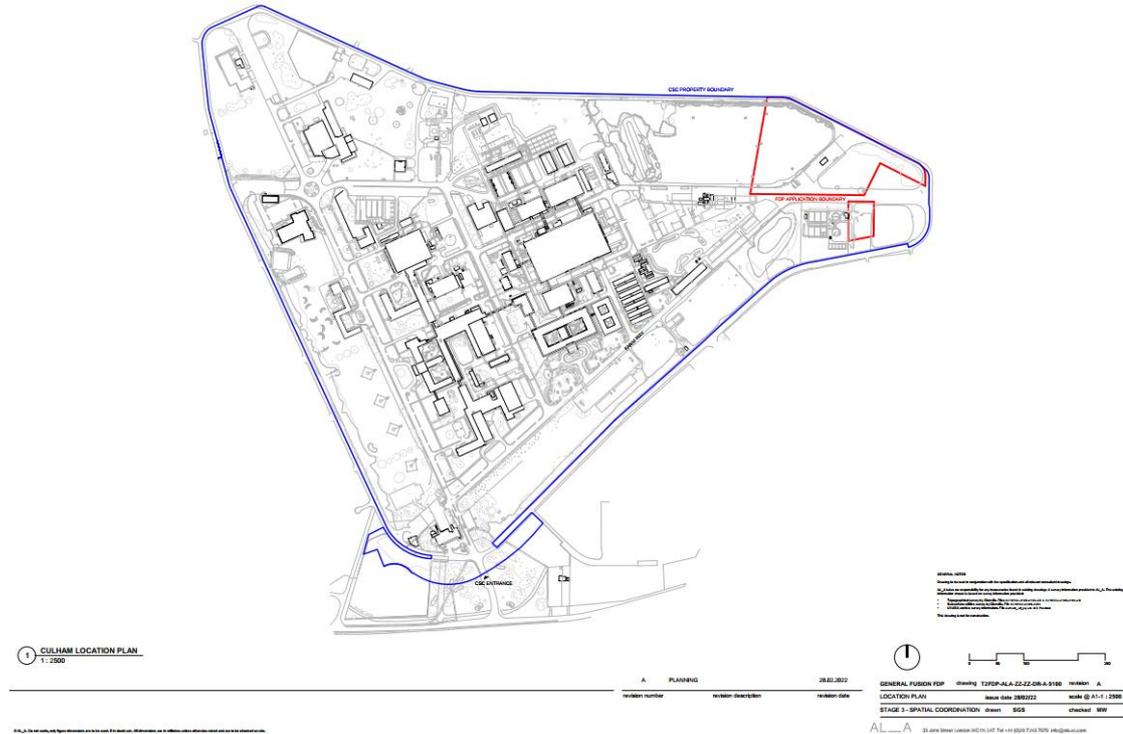
1.3 The drive to develop fusion technology has remained on the site ever since. There are various projects and programmes on the site and a glossary of all terms is attached. (Appendix 1) The central part of the CSC is occupied by buildings and infrastructure connected with the Joint European Torus (JET) project. This project was conceived as the largest project in the co-ordinated fusion programme of the European Atomic Energy Community. However, the decommissioning of JET will start in 2024. JET runs alongside the new MAST Upgrade ('MAST-U'), the UK's leading fusion experiment. MAST-U is exploring the route to compact fusion power plants, testing reactor technology and addressing physics issues for the 'International Thermonuclear Experimental Reactor' ('ITER') fusion project. This work will also feed into the UK's own new UK powerplant design activity, known as the Spherical Tokamak for Energy Production ('STEP') Programme.

1.4 In addition to MAST-U, UKAEA is growing fusion technology facilities in areas such as remote maintenance and robotics ('Remote Applications in Challenging Environments' or 'RACE'), materials (the 'Materials Research Facility' or 'MRF') and fuel handling ('MDF') will continue to make a major contribution, internationally, to the development and realisation of fusion energy in ways which are expected to grow and develop activity at CSC.

The CSC forms a key part of Science Vale and the Oxfordshire Knowledge Spine and is one of the largest employment centres in the County. CSC currently supports over 2,300 jobs.

The Site

- 1.5 The site itself is located on the eastern edge of CSC, in the north eastern corner. It is approximately 3.8ha in area.



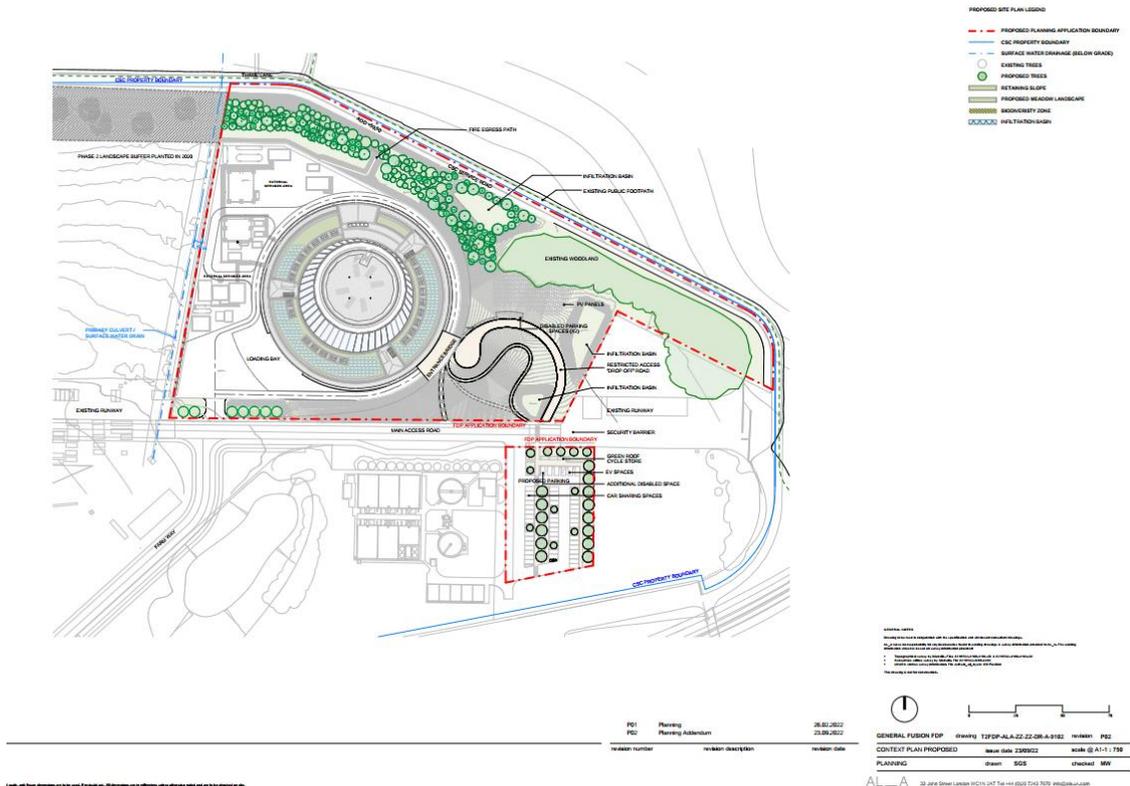
The site is mostly maintained grass with a hardstanding area used for storage of non-hazardous materials and paraphernalia. Along the northern boundary of the site is a secure perimeter fence associated with the CSC. Immediately adjacent to the fence, within the CSC is a tarmacked perimeter road. On the southern side of this road, immediately adjoining the grassed areas, is a small landscape bund. At the eastern end of this boundary is a line of mature trees (see Appendix 2 for an existing site plan).

- 1.6 Outside of the perimeter fence, immediately adjoining the site and CSC is Thame Lane, which is a Public Right of Way. Thame Lane is tarmacked in this location and follows the perimeter fence around CSC. Approximately 140m to the north of the site is the Grade I listed Nuneham Courtney Registered Park and Garden.
- 1.7 The eastern end of CSC, where the site is located, is a largely undeveloped part of the Science Centre. Immediately to the west of the site is a further open grassed area. However, a planning application for a Rig Hall building, associated with the STEP Project is currently under consideration (see Section 3 of this report).
- 1.8 The site is currently accessed through the main entrance to CSC, off the A415 Abingdon Road.

- 1.9 Approximately 300m to the east of the site is Clifton Hampden village, the majority of which is a conservation area. Between the two is currently open countryside. To the south of the site is currently open countryside. However, the land to the south and east of the site is safeguarded as the route for the Clifton Hampden bypass. This is for a new road funded as part of the Housing Infrastructure Fund (HIF), which could facilitate a new entrance at the eastern end of CSC. The planning application for HIF is currently being considered by Oxfordshire County Council, due for determination January 2023.

The Proposal

- 1.10 This is a full application for a fusion demonstration plant (FDP) with ancillary office space, parking, landscaping and associated infrastructure, including plant and machinery. The facility will focus on demonstrating Magnetised Target Fusion (MTF) and the technology required to create fusion conditions. It would not generate energy.
- 1.11 The FDP is a result of over a decade of development, assembling proven components into a scaled version of their commercial machine. The purpose of the facility is to test or 'demonstrate' that these components can work together in creating fusion. This is a critical step towards achieving commercial fusion power and will enable ongoing research, testing and refinement of fusion technology through ongoing research and development.
- 1.12 The proposed building is 10,509sqm in area, 6983sqm of which is process space and 3299sqm is office and support space. At the core of the building would be the cylindrical Demonstration Hall. This is where the machinery is housed. The Demonstration Hall would be 38m in height with a diameter of 50m. Located around this core in a concentric arrangement would be laboratories, offices, storage rooms etc. connected to the Demonstration Hall by the High Bay, a glazed atrium separating the Demonstration Hall from the support spaces. These support areas would be around 11m in height. To the west of the building would be a loading dock (see Appendix 4 – 8 for elevation plans and roof plans) and the external services area, the exact details of which are unknown at this time although illustrative details have been submitted as part of the application.



1.13 Dedicated parking for the facility would be located to the south of the building and would provide parking for 47 cars with 2 additional spaces located in a lay-by by the access road. These 49 spaces in total include 3 disabled spaces, 3 spaces for car sharers and 5 electric charging points.

Materials

1.14 The Demonstration Hall will be clad in a transparent Ethylene tetrafluoroethylene (ETFE), a fluorine-based plastic material that can be assembled and inflated with air to form insulating pillows. It is used on large structures such as stadia, airports and train stations, where a large roof span is required. This would be suspended over a cable net system fixed to the Demonstration Hall. On the roof of the Demonstration Hall would be ventilation louvres and lightning protection rods, the latter extending 6m above the parapet. A rooftop building maintenance unit will be used to access the EFTE façade and will sit behind the roof parapet when not in use.

1.15 Level 1 would house the offices and would be largely glazed with a protective sun canopy above. The roof of level 1 would be a sedum green roof and would include solar panels on the southern part of the roof.

1.16 A perimeter green roof planter would be located at the base of Level 1, on the roof of Level 0. Level 0 would house the support functions for the fusion machine, many of which require highly controlled internal environments. It would be clad in a metal rainscreen system with horizontal banding.

Landscaping

1.17 A landscaped area of around 7850sqm, including SuDS and solar panels, would lead up to Level 1 of the building, with a footbridge across. Level 0 would site below this behind green retaining walls. Along the northern boundary of the site the existing landscape bund would be reprofiled and a tree belt 20-25m thick planted along it.

Planting is also proposed around and within the car park on the north, west and eastern sides.

Access

- 1.18 The proposed access to the site remains through the CSC main entrance, off the Abingdon Road A415. Vehicles would travel up Farm Way to the north east of the site, from CSC entrance to the site. If the Clifton Hampden bypass is built, there is scope for an access to CSC off the bypass, which would also provide access to the proposed building, this would be the subject of a separate planning permission.

2.0 SUMMARY OF CONSULTATIONS & REPRESENTATIONS

- 2.1 The Statement of Community Involvement accompanying this planning application explains that a virtual consultation event was held 10-21 January 2022. Five consultation boards were uploaded to a dedicated website and feedback was invited. Leaflets were delivered to residents in the local area (Clifton Hampden and Culham villages and sporadic housing in between) informing them of the proposal and the website. The Parish Councils were also informed. A total of five responses to the consultation were received. Their main concerns related to the safety of the proposal, its relationship to Clifton Hampden by-pass, its visual impact from Clifton Hampden and the Abingdon Road A415, and its noise impact.
- 2.2 All representations can be viewed on the Council's website southoxon.gov.uk under the planning application reference number. The representations received on the application are summarised below. As part of the consultation on this planning application, the Council has sent letters to neighbours to the west and south of the site with potential for a direct line of sight of the application, to inform them of the application. Letters were also sent to residents living near the access to Culham Science Centre.
- 2.3 **Clifton Hampden Parish Council** – No comments received
- 2.4 **Culham Parish Council** –. With reference to Policy STRAT 8, the Parish Council accepts that the qualification of visual impact by the word "unacceptable" is a matter ultimately of personal preference. The Parish Council does not believe that any reasonable interpretation of that word can accommodate the construction of a 38m high building which would dominate the site and therefore the landscape around it. If such a building can be said not to have an acceptable visual impact, then we cannot see that any building the science centre might wish to construct could be objected to on these grounds in the future.
- 2.5 **Nuneham Courtenay Parish Council** – No response received
- 2.6 **Conservation Officer – Cannot support this application**
- It is clear that the greater impact of the proposals is in the long landscape aspects rather than in close proximity to the site.
 - The main receptor that would be harmed by the proposals is Nuneham Park RPG.
 - Views from most places within the RPG are very limited towards the site. The southern edge of the RPG does however have a visual relationship with the science centre and buildings on it. Views of the science centre are possible with the eastern edge being more visible due to lower tree cover.
 - Views towards the RPG from various points in its wider setting to the south are currently impacted by the existing large structures and the proposed building would exacerbate that. These views are prominent across a very large area of the wider landscape of the science centre and of Nuneham Park.

- The current science centre site marks a distinct change in the landscape and is of a clear different purpose. Despite this, the buildings do not better reveal the significance of the park as a result of their contrasting character. The high visibility of the existing structures detracts from the otherwise distinctly rural character of the RPG and its surroundings. Further very large scale development here will have a considerable impact on the setting of the RPG, drawing attention to yet more large built form further out from the centre of the science centre site, extending the visual interruption of the RPG further east. This would further compromise the experience of the RPG as being within a wide rural landscape setting and in particular further eroding the historic landscape setting of the parkland. The contribution the landscape setting makes to the significance of the RPG would be negatively impacted by this proposal.
- The impacts are indirect and the significance of the RPG as a designed landscape would not be impacted. The impact is considered to be exclusively to the setting of the RPG.
- The impact is considered to be less-than-substantial under the tests of the NPPF and Local Plan Policies ENV6 and ENV10.
- The illumination of the building is not considered appropriate given the extensive landscape views.

Additional Information:

- Understand why large scale structures are spread across the site rather than being contained in one area.
- Lighting update is useful. Operational lighting has been considered with mitigation in place. The symbolic lighting should be subject to a strict curfew.
- As before, the proposals would impact the significance of the RPG. Mitigation planting will have no substantial beneficial impacts on the impacts to the RPG when experienced from the much wider landscape.
- Satisfied that there is capacity to accommodate planting that will help to mitigate some of the impacts from the PRoW that leads to and from Clifton Hampden Conservation Area and how it is experienced in the wider area. There will be no direct harm to the Conservation Area,
- Great weight should be given to the conservation of heritage assets and their significance and the harm identified must be demonstrably outweighed by public benefits.

2.7 Landscape Architect – Objection

- The conclusions of the LVIA that the impact of the proposals on the landscape and views will be largely positive other than during the construction phase is not realistic.
- This is a very large building located in a largely undeveloped part of the CSC site, remote from any other large buildings and close to historic parkland, a village and a number of PRoW.
- There will be significant adverse effects on the landscape and views from a development of this scale.
- The good design of the building making a contribution to the landscape is immaterial as an argument given the very large scale.
- The LVIA does not address the effect of the proposal on relevant landscape character areas.
- Concerns regarding the categorisation in the LVIA.
- Unsure why viewpoint 11 was included in the photomontage when the views of the site are blocked by a building in the foreground. Provide photomontages to represent views from Abingdon Road and an unblocked view from the edge of Clifton Hampden. Views from the bypass should also be considered.

- Viewpoint 32 from the Wittenham Clumps shows that the proposed fusion plant would be somewhat isolated from the rest of the site. There would be cumulative impact from Step Rig Hall, the proposed bypass and Culham strategic allocation. I don't see why this would reduce in the long term as stated. I am also concerned about the effect of the 24 hour lighting of the building in such views. Is it necessary to have the building lit above the office levels?
- The proposed landscaping doesn't include taller growing shrubs, trees or woodland to screen from the south.
- Check labelling on view 35.
- Details of service area are lacking.
- The car park should be contained by planting on the south and east sides, break up rows of parking bays with planting.
- The infiltration basin should be designed as an attractive feature with shallow side slopes and should be located to avoid loss of perimeter planting belt.
- Ensure full depth of perimeter woodland planting is maintained.

Additional Information:

Objection maintained –

- Very limited changes have been made to the assessment of effects in the LVIA so still disagree with the assessment.
- FDP building would have an unacceptable visual and landscape impact on the surrounding countryside, contrary to Local Plan policies STRAT8 and ENV1 and paragraph 130 of the NPPF.
- Also concerned about development proposals coming forward within the Framework Masterplan, without the benefit of any overall landscape and visual assessment to determine the height of development that can be accommodated in different parts of the site.
- Remain concerned about the proposed symbolic lighting.
- Remaining issues in relation to details landscape design:
 - Additional tall trees on the southern boundary have not been included
 - Planting shown in the Masterplan Framework cannot be relied upon as it is not part of the redline boundary.
- Should the application be allowed a 20 year management and maintenance plan will be required, also detailed planting proposals including number of plants.

2.8 **Forestry Officer – No objection**, subject to condition

2.9 **Countryside Officer –**

- Adverse impacts on the nearby Furze Brake Local Wildlife Site are considered to be unlikely.
- Habitats on site are not considered to be significant constraints to development.
- It will be important to ensure external lighting does not impact on woodland or adjacent habitat corridors due to roosting, foraging and commuting bats.
- Mitigation measures during construction phase can likely avoid and mitigate impacts on other species.
- Biodiversity Metric needs to be submitted in full. It is unclear how 'good condition' woodland will be achieved.

Additional Information – **No Objection**, subject to conditions

Additional lighting information shows woodland is unlikely to be illuminated. These details should be secured by condition. Biodiversity offsetting should be secured by condition.

2.10 **Drainage** - holding objection

Additional Information – **No Objection**, subject to conditions

2.11 **Contaminated Land – No objection**, subject to condition

2.12 **Air Quality** – No observations to make on the application.

2.13 **Environmental Protection – No objection**, subject to condition

2.14 **Energy Assessor (ESE Ltd) - No objection**, subject to condition

2.15 **Oxfordshire County Council Highways** – Holding Objection

- Access to the proposed development is from the existing main access to Culham Science Centre (CSC).
- The applicant proposes a total of 49 car parking spaces, this accords with current standards.
- The applicant has provided justification for the parking levels confirming that staff arriving for the next shift will overlap with staff departing from their shift.
- The applicant is required to submit information on how the proposed car park for proposed Fusion Development Plant fits in with proposed parking hubs as part of the wider masterplan for Culham Science Centre.
- A total of 30 cycle stands are proposed, this is in excess of the relevant standards and is considered acceptable.
- The proposed development will result in additional trips onto the highway network.
- To mitigate the impact of the proposed development, prior to delivery of HIF1, OCC has agreed, in accordance with the three S106 tests, a mitigation package that will encourage active and sustainable travel to CSC ahead of the private car.

Additional Information – **No objection**, subject to conditions and legal agreement
As previously but the applicant has provided information on how the proposed car park for the Fusion Demonstration Plant fits in with the proposed parking hubs as part of the wider masterplan for CSC.

2.16 **Oxfordshire County Council Lead Local Flood Authority - No objection**, subject to condition

2.17 **Oxfordshire County Council Archaeology - No objection**, subject to condition

2.18 **Historic England (South East)** – No comment, refer to your specialist conservation and archaeological advisors

2.19 **The Gardens Trust** -

Whilst the new FDP will be part of the wider Science Centre, its height of 38m will be conspicuous within the view from the RPG and as such will contribute towards the negative impact of the Science Centre upon the setting of the Grade I RPG. We also have concerns about the proposed illumination of the drum of the FDP, which is designed to be lit from within which we feel would further exacerbate the impact upon the setting of the RPG. Notwithstanding the Heritage Statement, and the importance of the research at the Science Centre, it is self-evident that a building 38 metres high lit 24 hours a day on the edge of the historic park will have a highly detrimental effect on its setting and should be strongly resisted.

Additional Information:

Would like to reiterate the necessity and importance of tree screening and ask that should the application be permitted, the interior illumination of the FDP drum is as unobtrusive as possible. We are unable to support the application as it will have a highly detrimental effect on the setting of the Grade I registered historic park of Nuneham Courtenay and should be strongly resisted.

2.20 **North Wessex Downs AONB Board** – no response received

2.21 **Health & Safety Executive (Hazardous Substance)** – Confirm that the proposed development does not lie within the Consultation Zone of any of the major hazard sites or major accident hazard pipelines considered by HSE. Therefore, based on the information provided there is no need to consult HSE's Land Use Planning advice team on this application, and we have no comments to make.

2.22 **Environment Agency** – No response received

2.23 **Thames Water Development Control** – Existing foul water network and existing water network infrastructure is unable to accommodate the needs of the development proposal. Surface water will not be discharged to the public network so objection in relation to this. Proposed development is within 5m of a strategic water main, no building or construction within 3m of a strategic water main. Proposed development is within 15m of underground water asset.

Additional Information:

TW confirm there is foul water sewerage capacity and clear water capacity for the proposal.

2.24 **CPRE South Oxfordshire District Committee** – Question the necessity of feature lighting and ask that the impact of light spill is mitigated.

2.25 **Civil Aviation Authority** – No response received

2.26 **Neighbours (6)** – In summary:

- Concern about building being illuminated at night.
- Concern about safety of the proposal close to residential properties in relation to nuclear hazards and explosions.
- No information about the magnets used or magnet power supplies. It is not clear whether there will be high transient or constant loads on the national grid.
- Concern about scale and light pollution and impact on the Clifton Hampden Conservation Area and Registered Park and Garden
- Further industrialisation of the area, we were promised the site would be returned to Green Belt after the JET project finished.
- Why does it need to be built in the same place as JET? Modern communications mean that it could be located elsewhere
- Further damage to the view from Wittenham Clumps
- The building should be sunk so that it can be masked by trees.
- Support for the proposal

3.0 RELEVANT PLANNING HISTORY

3.1 There is an extensive planning history of the Culham Science Centre (CSC); however, there is little planning history for this particular application site. There have been several major applications approved on CSC in recent years, these were focused along the

western edge of the campus. Applications for car parking hubs and a new entrance to CSC have also been granted planning permission at the southern end of the campus. Currently under consideration is an application for a Rig Hall, which would be 32m in height. This would be located around 100m to the west of the application site (see paragraph 3.2).

- 3.2 [P21/S0052/FUL](#) – Under consideration
Erection of Class B2 development comprising a Rig Hall, ancillary office accommodation and parking.
- 3.3 [P76/W0103/O](#) - Approved (01/02/1978)
A. Erection of new building forming an extension of the present laboratory to provide an experimental hall for a large research apparatus (known as JET) with associated laboratories, workshops, power house and offices in an area of about 8 hectares. B. Intake of additional electric power from grid.
- 3.4 [P59/M1015](#) - Approved (29/01/1960)
Development of site as a research establishment with access.

4.0 ENVIRONMENTAL IMPACT ASSESSMENT

- 4.1 A Screening Opinion for the proposed development was requested (P21/S2898/SCR). The assessment found that EIA was not required on 20 December 2021.

5.0 POLICY & GUIDANCE

5.1 Development Plan Policies

South Oxfordshire Local Plan 2035 (SOLP) Policies:

- STRAT1 - The Overall Strategy
- STRAT2 - South Oxfordshire Housing and Employment Requirements
- STRAT4 – Strategic Development
- STRAT8 - Culham Science Centre
- STRAT9 – Land Adjacent to Culham Science Centre
- EMP1 - The amount and distribution of new employment land
- EMP2 - Range, Size and Mix of Employment premises
- DES1 - Delivering High Quality Development
- DES2 - Enhancing Local Character
- DES3 - Design and Access Statements
- DES4 - Masterplans for Allocated Sites and Major Development
- DES7 - Efficient Use of Resources
- DES8 - Promoting Sustainable Design
- DES9 - Renewable Energy
- DES10 – Carbon Reduction
- ENV1 - Landscape and Countryside
- ENV2 - Biodiversity - Designated sites, Priority Habitats and Species
- ENV3 - Biodiversity
- ENV5 - Green Infrastructure in New Developments
- ENV6 - Historic Environment
- ENV7 - Listed Buildings
- ENV8 - Conservation Areas
- ENV9 - Archaeology and Scheduled Monuments
- ENV11 - Pollution - Impact from existing and/ or Previous Land uses on new Development and the Natural Environment (Potential receptors of Pollution)
- ENV12 - Pollution - Impact of Development on Human Health, the Natural Environment and/or Local Amenity (Potential Sources of Pollution)
- EP1 - Air Quality

EP2 - Hazardous Substances
EP3 - Waste collection and Recycling
EP4 - Flood Risk
INF1 - Infrastructure Provision
INF2 - Electronic Communications
INF4 - Water Resources
TRANS4 - Transport Assessments, Transport Statements and Travel Plans
TRANS5 - Consideration of Development Proposals

5.2 Neighbourhood Plan

A neighbourhood Plan is being prepared for Burcot and Clifton Hampden. However, Culham Science Centre is not included within the designated area for the Neighbourhood Plan.

5.3 Supplementary Planning Guidance/Documents

South Oxfordshire Design Guide 2016 (SODG 2016)
Developer Contributions SPD

5.4 National Planning Policy Framework and Planning Practice Guidance

5.5 Other Relevant Legislation

Human Rights Act 1998

The provisions of the Human Rights Act 1998 have been taken into account in the processing of the application and the preparation of this report.

Equality Act 2010

In determining this planning application the Council has regard to its equalities obligations including its obligations under Section 149 of the Equality Act 2010. It is not considered that the planning application would prejudice any of the protected characteristics set out in the Equality Act 2010 as the relevant building regulations will ensure suitable access for those with disabilities.

5.6 Government Publications

- The Ten Point Plan for a Green Industrial Revolution (November 2020)
- White Paper 'Powering our Net Zero Future' (December 2020)
- Towards Fusion Energy: The UK Government's Fusion Strategy (October 2021)

6.0 PRINCIPLE OF DEVELOPMENT

6.1 The relevant planning considerations are the following:

- **The Development Plan**
- **Material Considerations**
- **Masterplan**

The Development Plan

6.2 Section 38(6) of the Planning and Compulsory Purchase Act requires that where regard is to be had to the Development Plan, the determination of planning applications should be made in accordance with the Development Plan unless material considerations indicate otherwise. For the purposes of determining this application, the South Oxfordshire Local Plan 2035 is the only relevant document in the Development Plan. Planning legislation and Policy STRAT1 of the SOLP require decision makers to determine whether planning proposals comply with the whole of the Development Plan.

- 6.3 Policy STRAT1 of the SOLP sets out the overall strategy for development in the District. It states that proposals for development should be consistent with the overall strategy of “i) focusing major new development in Science Vale including sustainable growth at Didcot Garden Town and Culham so that this area can play an enhanced role in providing homes, jobs and services with improved transport connectivity...
ix) protecting and enhancing the countryside...
x) supporting and enhancing our historic environment; and
xi) contributing to tackling climate change.”
- 6.4 SOLP Policy STRAT2 sets out the requirement for a minimum of 39.1ha of employment land to be in accordance with the spatial strategy set out in STRAT1. Policy EMP1 provides the locations where additional office, manufacturing and distribution jobs will be located, one of which is redevelopment and intensification of CSC (supported by Policy STRAT8) and Culham No.1 site (allocated in Policy STRAT9). Policy EMP2 requires a range of size and types of employment premises to be provided using the overall employment distribution strategy at Policy EMP1.
- 6.5 Policy STRAT8 of the SOLP sets how development on Culham Science Centre (CSC) should be determined. This policy states that the redevelopment and intensification of CSC will be supported where it does not have an unacceptable visual impact, particularly on the character and appearance of the surrounding countryside and the Registered Parkland associated with Nuneham House.
- 6.6 Paragraph 2 of Policy STRAT8 requires that, in combination with the adjacent strategic allocation at STRAT9, CSC “will deliver at least a net increase in employment land of 7.3 hectares (with the existing 10 hectares of the No.1 site retained but redistributed across the two strategic allocations). The exact siting and phasing of the employment development must be agreed through the master planning and subsequent planning application process including addressing any heritage assets and their settings in accordance with Policy ENV6 and the NPPF.”
- 6.7 Paragraph 3 of Policy STRAT8 requires proposals for development on CSC to achieve a net gain in biodiversity. Paragraph 4 states that ‘Opportunities that support job growth and appropriate diversification or enterprise “clustering” will be supported to complement the wider development proposed in the area. Working proactively with the UK Atomic Energy Authority and development partners a masterplan for the site that facilitates this growth must be prepared and agreed with the Local Planning Authority.’
- 6.8 Paragraph 5 of STRAT8 states that proposals will be expected to deliver low carbon development and renewable energy in accordance with STRAT4. Paragraph 6 explains that CSC is removed from the Green Belt to enable this development to be brought forward.
- 6.9 As with most decisions on major planning applications, there are tensions between complying with the policies in the Local Plan, and in this case, tensions within individual policies. The location of the development in Science Vale, an area for growth is clearly in accordance with the overall strategy for development. It is also supported by Policies STRAT2, EMP1 and EMP2. The principle of development is supported Policy STRAT8. The commitment to intensifying development on this site is demonstrated by its removal from the Green Belt. The development can achieve aims such as biodiversity net gain and low carbon development and renewable energy. However, the strategy for development, and for this site in particular as set out in Policy STRAT8, requires the visual impact of the development to be acceptable.

- 6.10 Paragraph 2 of STRAT8 requires, at least a net increase in employment land of 7.3ha across CSC and the strategic allocation at STRAT9. Pre application discussions are underway with the developers of the STRAT9 site in relation to development of that site. In July 2022 a public consultation was launched regarding the redevelopment of Culham No.1 site in particular, which is adjacent to CSC but outside of its boundary. The Culham No.1 site provides an opportunity to house mid-tech employment, much of which has synergies with CSC but would not meet UKAEA's policy for locating on the campus. There is therefore an opportunity for a further clustering at Culham, which can deliver on the objectives of the Local Plan of focusing growth in Science Vale through delivering homes and jobs. Culham No. 1 site could deliver an increase in employment floorspace of around 4-5ha. Around 3-4ha would therefore need to be delivered on CSC to meet the policy requirement, which sets a minimum increase in employment land ("at least a net increase of 7.3ha"). In order to meet this policy requirement, currently undeveloped parts of CSC will need to be developed.
- 6.11 The STRAT9 allocation is also for 3,500 homes and supporting services and facilities. The Local Plan (paragraph 3.69) recognises that the location of housing alongside the existing and new employment provides an opportunity to provide significant development in a sustainable location; it provides access to employment opportunities as well as public transport at Culham railway station and it will help fund much needed road infrastructure in the area through the delivery of HIF1. *"This will be a community within Science Vale that can make the most of advancing technologies such as clean heat and power generation and autonomous vehicles."* It is clear that development at STRAT8 has wider significance than just development of the fusion cluster, but also in underpinning a new sustainable community at Culham.
- 6.12 The other part of Policy STRAT8, supported by Policy STRAT4, that requires compliance, is preparation of a masterplan. A masterplan for Culham Science Centre differs from the other strategic allocations, as it is an existing operational site and it is not proposed for comprehensive re-development, nor is it on a development-free greenfield site. Development coming forward on CSC is heavily dependent on Government funding and the windows in which these can be applied for and spent are limited. The development on CSC will be coming forward in piecemeal fashion and cannot easily be predicted with much certainty in the longer time frames. Therefore any masterplan would need to be flexible and regularly reviewed to ensure it remains relevant. The development of the site will by necessity take place in a piecemeal approach, yet the masterplan will need to respond to the overarching parameters for development and environmental protection.
- 6.13 UKAEA has produced a 'Framework Masterplan' dated January 2022, which communicates an overall vision for the site, the key infrastructure requirements to facilitate development and growth at CSC and sets out the placemaking strategy. This document has been submitted with this planning application, and previous planning applications that have been determined at Planning Committee. Officers are working with UKAEA to agree a masterplan that addresses the planning parameters for development and environmental protection. Currently this document is not agreed; however it does provide an overview of how the proposed development fits into vision in the Framework Masterplan (see paragraphs 6.31-6.34). Ultimately the Council must still continue to consider applications for development in relation to the overall Development Plan and the NPPF, and each planning application must be determined on their merits.
- 6.14 The weighing of the various policies and assessment as to whether the proposal complies with the Development Plan as a whole is undertaken in Section 8 of this

report. Section 8 will also weigh up the material considerations to be taken into account, which are set out in the following paragraphs.

6.15 Material Considerations

The NPPF is a material consideration in planning decisions and also relevant ministerial statements and publications, both of which are referred to below.

- 6.16 Paragraphs 7 and 8 of the NPPF explain what sustainable development is. In the Planning system it has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways. These are an economic objective a social objective and an environmental objective.
- 6.17 Section 6 of the NPPF deals with building a strong, competitive economy. Paragraph 81 states that *“Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development.”* The supporting information for the application refers to the proposal generating £64m in total gross-value added (GVA) impacts within the local economy and support 1,170 jobs over the two-year construction period. The project will generate over £210.9 million in total GVA and support 3,289 total jobs. The direct operations of the plant will generate £9.5 million in total GVA impacts on the regional economy, as well as supporting 80 staff at the site. The proposal is therefore in accordance with paragraph 81 of the NPPF.
- 6.18 Paragraph 83 states that planning decisions *“should recognise and address the specific locational requirements of different sectors. This includes making provision for clusters or networks of knowledge and data-driven, creative or high technology industry...”*
- 6.19 These sections of the NPPF clearly offer support for the principle of the proposed development and that the weight to be given to supporting economic growth is “significant”. Paragraph 6 of the NPPF states that other statements of Government policy may be material when deciding applications, such as relevant Written Ministerial Statements.
- 6.20 In the last few years, the UK Government has made clear its intention to bring fusion technology into the green agenda. As part of its net zero targets, the UK Government is aiming for a fully decarbonised power system in the UK. In November 2020 ‘The Ten Point Plan for a Green Industrial Revolution’ was published to bring together policy and induce significant public investment, whilst seeking to mobilise private investment. Point 10: Green Finance and Innovation refers to the £222m for the STEP programme and £184m for new fusion facilities, infrastructure and apprenticeships to lay the foundations for a global hub for fusion innovation in the UK.
- 6.21 In December 2020, the White Paper ‘Powering our Net Zero Future’ was published. In this document, the aim to build a commercially viable fusion power plant by 2024 was set out. It explains that the Government has already committed over £400m towards new UK fusion programmes and that the aims are to develop the world’s first compact fusion power plant *“and to invest in facilities and infrastructure to make the UK a global fusion industry hub.”*
- 6.22 In October 2021 ‘Towards Fusion Energy: The UK Government’s Fusion Strategy’ was published. As suggested by the title, it sets out the Government’s strategy for how the UK will enable the delivery of fusion energy. The purpose of the strategy was to provide context to the Government’s consultation on the future of fusion regulation in the Green Paper ‘Towards Fusion Energy: The Government’s Proposals for a Regulatory Framework for Fusion Energy’. This consultation completed in December 2021 and in

June 2022 the Government confirmed how fusion facilities will be regulated going forward.

- 6.23 The 'Towards Fusion Energy: The UK Government's Fusion Strategy' sets out the environmental and energy context for developing fusion technology: that it is well established that we need to decarbonise the global energy system. The Fusion Strategy outlines how the UK's total generated energy is expected to roughly double by 2050 as a result of the rising use of electric vehicles and electric heating, alongside population growth. This UK trend will be played out globally under the combined pressure of population growth, increased urbanisation and expanding access to electricity in developing countries.
- 6.24 The UK Fusion Strategy sets out the advantages of generating energy using fusion, as summarised below:
1. Fuel abundance: the fuels used in fusion reactions are effectively inexhaustible.
 2. Baseload power: fusion energy does not depend on external factors such as wind or sun.
 3. High fuel efficiency: fusion produces more energy per gram of fuel than any other process that could be achieved on Earth.
 4. Carbon-free: helium is the product of the fusion process – no carbon or other greenhouse gases are produced in the reaction.
 5. No chain reaction: if there were any technical problems, a fusion facility could be immediately switched off and the process would stop within seconds or less.
 6. Shorter lived waste: fusion power plants are not expected to produce the very long lived, high level radioactive waste associated with nuclear fission.
- 6.25 The Strategy refers to three pillars: international, scientific and commercial. The first of these pillars refers to the global collaborative effort. This sets out the UK's continued involvement in projects with other countries. This began with the Joint European Torus (JET), which is used collectively for fusion research by more than 40 European laboratories. JET is being decommissioned in 2024 with the International Thermonuclear Experimental Reactor (ITER), based in France, to take over. (ITER) is the result of 35 nations, including the UK, working together on the world's largest fusion project that aims to demonstrate fusion energy generation at industrial scale.
- 6.26 The second pillar refers to the UK domestic fusion industry, where the aim is to build a prototype fusion power plant by 2040 that puts energy into the grid. Under the commercial 'pillar', the Strategy sets out the Government's aim of commercial leadership in fusion, which includes creating a vibrant fusion technology cluster, or clusters, in the UK and attracting inward investment into fusion and related technologies. The third of these 'pillars' is where FDP would sit.
- 6.27 Through commercial leadership the Strategy sets out that the UK will:
- Create a vibrant fusion technology cluster or clusters in the UK
 - Attract inward investment into fusion and related technologies
 - Develop the supply chain and skills base to support fusion delivery and equip UK firms to compete successfully in a future global fusion market

The Strategy cites the proposed FDP building as fulfilling the Fusion Foundations programme and an example of commercial leadership in the UK.

- 6.28 The supporting information from the application explains that the location of the FDP building at Culham is aligned with the UK Fusion Strategy; it will bring in funding to allow the UK to continue its own projects such as STEP and it will broaden the UK's

involvement in related fusion technologies. The project will also be able to make use of existing technologies and expertise on CSC, for example the Centre for RACE has the potential to provide robotic technology to maintain the machinery within the FDP building. These synergies will obviously benefit all parties, and it is this that drives the desire for companies to locate at Culham. The proposal would also bring new technology to Culham and develop technical collaboration with UKAEA and UK universities. General Fusion will strengthen Culham's global leadership in fusion and UK's science base.

- 6.29 The Government's support for the proposed development is further highlighted by a letter from the Department for Business, Energy & Industrial Strategy (see Appendix 9). This letter summarises the support for the development as set out in the Fusion Strategy. It also states that *"The wider economic benefits of General Fusion building their facility in the UK are considerable. General Fusion suggests it could bring R&D-based inward investment of around £300m and indirectly support up to 4,500 jobs over 18 years. The benefits to the UK's fusion supply chain would be considerable, with increased investment helping to pave the way for STEP..."*
- 6.30 This cluster of fusion and related technologies does not exist anywhere else in the UK; it is why the Government has based its Fusion Foundations programme at CSC. The support for the proposed development is clearly set out in Government statements, which go as far as to name this particular proposal as a demonstration of their commitment to *"transform UKAEA's Culham fusion campus into a global hub for fusion innovation and enhance Culham's unique fusion research capabilities."* This is a material consideration in determining this application.
- 6.31 **Culham Masterplan**
The drive to create this global hub for fusion innovation will see the redevelopment of CSC over the coming decades. Many of the structures on the site have been there since operations began and they are in need of modernising both functionally and aesthetically. UKAEA has produced a Framework Masterplan to demonstrate its vision for how this will be achieved. The Framework Masterplan is a useful document in showing how CSC will develop and change over the short, medium and long term. It shows that in the short term (by 2025) development will take place in the area around the edge of CSC where there is currently little or no development. In the medium term there will be a focus on redeveloping the older buildings in the centre of the site, creating more of a campus feel with a pedestrian focus and cars pushed to the periphery. In the long term (2050 and beyond) the area where the JET building is located will become future research zones.
- 6.32 The Framework Masterplan demonstrates that there is little available space for large scale development on CSC at the present time. Ordinarily development should be clustered together and ideally more centrally placed so that the landscape impact of tall buildings is concentrated. The land on the western flank will be developed under recent planning permissions. The land along the eastern flank is shown for redevelopment in the medium term, but the depth of the land available is not large enough to accommodate the proposed development. The land at the north-eastern end of the campus, along the northern boundary, is the only place where the proposed facility could currently be accommodated. Unfortunately this means that it is located away from the cluster of existing development on CSC, in particular the JET building, which is by the far the largest building on the campus.
- 6.33 The proposed building would be sited at the limit of the allocated area for development on CSC. In the future there may be scope to provide other development which would mean that the FDP is not such an isolated structure. The proposed Step Rig Hall would

close the gap between the JET building in the centre and the proposed FDP on the edge of the campus, meaning that it reads as part of the campus and not a stand-alone building.

- 6.34 The operations within JET will end in 2024 but the building will not be decommissioned until the mid-late 2030s. Owing to the nature of uses in the building, involving tritium, the decommissioning of the machinery will take around a decade as material will need to be very carefully handled and disposed of. Therefore there is no scope for the proposed building to be located more centrally on CSC, where the JET building is currently located.

Conclusion – Principle of Development

- 6.35 The proposed development is in accordance with the spatial strategy set out in the SOLP, which seeks to direct employment and housing development to Culham. It will provide employment in line with the employment strategy set out in Policies EMP1 and EMP2. As well as providing direct employment, the proposal will also provide indirect jobs through the construction period and through its operation, which will contribute to the local economy. The proposal is also supported by the NPPF, which states that significant weight should be given to supporting economic growth. The proposal also has Government support in delivering on the objectives for supporting and growing the fusion industry.
- 6.36 Culham Science Centre is unique in the UK, offering a cluster of knowledge and expertise in the fusion sector. The Local Plan supports redevelopment and intensification on Culham Science Centre through Policy STRAT8, the site having been removed from the Green Belt to facilitate this. There is already a precedent for buildings of considerable height on the site, particularly the JET building, which is 32m high. The JET building needs to be this height to house the required machinery, the proposed building is large scale for the same reason. In supporting fusion development and related technologies, there should be an expectation that tall buildings will be located on CSC. Ideally these tall buildings would be located closer together to minimise the impact on the surrounding landscape. However, the Framework Masterplan for the site shows that the proposed location is the only one on CSC that could accommodate this particular development and this time. A more detailed masterplan would help to guide future development to its most suitable location on the site; however, existing development and the phased nature of new development on the site means that development will not always be in the optimal location.
- 6.37 The principle of development on this site is established and supported by the Development Plan and material considerations. However, this needs to be weighed against a technical assessment of the proposal, which is discussed in the following section of this report. In particular, SOLP Policy STRAT8 only provides support for development on CSC “*where this does not have an unacceptable visual impact, particularly on the character and appearance of the surrounding countryside and the Registered Parkland associated with Nuneham House.*”

7.0 TECHNICAL PLANNING CONSIDERATIONS

The relevant technical planning considerations are as follows:

- **Landscape Impact**
- **Landscaping**
- **Heritage Impact**
- **Trees**

- Ecology
- Design and character
- Sustainability
- Flood Risk and Drainage
- Residential amenity
- Access and Parking
- Lighting
- Noise
- Contaminated Land
- Air Quality
- Hazard Substances and Shielding
- Archaeology
- Other material planning considerations

7.1 Landscape Impact

The large scale of the proposed building means that the visual impact of the landscape is a key consideration. The applicants have proposed mitigation on site, such as significant tree belt planting along the northern boundary. Over time, this will effectively screen the lower elements of the building: the support functions and the external services area. However, such planting will not screen the Demonstration Hall, which will remain visible from many viewpoints, in particular short distance views from the Public Rights of Way (PRoW) to the north of the site, and long distance views from the east, south and west of the site.

7.2 The Nuneham Courtenay Registered Park and Garden (RPG) is around 140m to the north of the site at its closest point. Despite this proximity, there aren't views of the CSC from within the RPG because of the extensive tree cover. The short distance views are located along Thame Lane PRoW, which is immediately adjacent to the northern boundary of CSC and the site, and the PRoW around 120m to the north of the site. From these points the current view of the site is of storage containers and associated paraphernalia associated with CSC. This is not a particularly attractive view but the small scale of the machinery/containers currently stored there, and their temporary nature has a neutral impact on users of the PRoW in the vicinity. The site is viewed through the security fence around the perimeter of CSC, which provide some context to the site as an institutional setting but this is not a dominant feature in the views.

7.3 Pedestrians on the Thame Lane PRoW will be around 40m from the building at its closest point. Users of Thame Lane will be very aware of their location immediately adjacent to CSC because of the boundary fence and because of the other buildings on the site and the closer they get to the site, the less the Demonstration Hall will be perceived. The office building and service area will be more immediately apparent to pedestrians from this point, which will be screened by tree planting, particularly in the later years as the vegetation matures.

7.4 The views of the proposed development from the PRoW slightly further away from the site will be significantly more harmful than those along Thame Lane. The Landscape and Visual Impact Assessment (LVIA) submitted with the application contains a photomontage of the building from the PRoW around 120m to the north of the site, which demonstrates the alien nature of the building in the landscape (see Appendix 11 for the photomontage). From here, the whole of the building, including the Demonstration Hall, can be very readily perceived. The wider context of CSC is less visible with the intervening open countryside more dominant in the view, creating a sharp contrast to the bulk of the proposed building. From this view, the tree belt

screening to the north of the site makes very little difference as the Demonstration Hall is prominent above the treeline.

- 7.5 The LVIA suggests that the significance of effect on these short-term views will be moderate to major negative during the construction period. I concur with this assessment. The LVIA rates the significance of effect on these views during year 1 of the development as moderate negative in relation to the service plants and minor positive overall. The reason given is that the built form, which is a significant new addition to the views, will be a high quality, exemplary and iconic building, framed by existing and proposed green infrastructure. These will positively influence perceptual qualities and the buffer planting will bolster the green infrastructure, filtering views of the lower built form by year 15.
- 7.6 The Council's Landscape Officer has raised concern regarding the effects of the proposed development on the landscape and on views. They required the assessments in the LVIA to be reviewed and the effects evaluated realistically: *"There will inevitably be significant adverse effects on the landscape and views from a development of this scale."* With regard to the contribution a development may make to the landscape by virtue of good design, even if out of character, the Landscape Officer considers this not to be applicable in this case given the scale of the building proposed.
- 7.7 I agree with the Landscape Officer that the LVIA underestimates the significance of the effects on these short-range viewpoints. The scale of the building creates such a significant visual impact from these viewpoints that it will inevitably have an adverse effect. The proposed development would 'tidy-up' this part of the site by removing the material being stored on the site, but this material does not currently detract from the view to the extent that a change so significant and out of character could be seen as 'minor positive'. The scale of the building and the fact that it is isolated from other development on CSC mean that, even with an iconic design, it will have a major effect on these views and as a detracting feature in the landscape it would be a major negative.
- 7.8 The medium range views assessed in the LVIA are from PRoW around Clifton Hampden to the east and from the A415 Abingdon Road to the south. The LVIA concludes that there will be a minor negative effect from the PRoW around Clifton Hampden as, though there is intervening vegetation, it is anticipated that the top of the built form will be apparent above the tree line. From the A415 there are already glimpses of the JET building and the context of CSC is established by the entrance to the campus from the road. The LVIA notes the significance of the effect from the A415 as negligible. I agree with the assessment of these views in the LVIA.
- 7.9 The Landscape Officer also suggested that views from the potential Clifton Hampden bypass be assessed, which has not been done as part of the LVIA. Given that the bypass does not yet have permission this is not necessary. If the bypass is built then it would be located a short distance to the east of the site. Planting is proposed as part of the HIF application, which would provide some screening for road users. Those travelling on the by-pass would be aware of CSC, which would frame their views in travelling along the bypass. Whilst the building would be prominent in views from the bypass, this could be seen as a positive gateway feature of the site rather than a visual detractor, particularly as the recipients are transient road users.
- 7.10 The LVIA assesses the medium-longer range viewpoints in Nuneham Courtenay Park to the north, Clifton Hampden and Long Wittenham to the south and Europa School and Thame Lane to the west. I agree with the assessment of these views in the LVIA that the proposal would have a negligible or neutral impact from the viewpoints.

- 7.11 CSC is prominent in the landscape. The JET building, at 32m high, provides a clear visual marker from around the South and Vale Districts from other elevated points, and also from West Berkshire District. In driving around south, west or east of the site the JET building will sometimes be revealed in long distance glimpses. The proposed building, which is some 6m higher (plus the lightening rods) although less bulky would also feature in long distance glimpses in a similar way.
- 7.12 The long-range views in the LVIA focus on the visibility to the south of the site. Wittenham Clumps is the place from which the site can be seen the clearest in the long-distance views. The Clumps are located in the North Wessex Downs Area of Outstanding Natural Beauty (AONB) 4km to the south east of the site. The Clumps are a pair chalk hills topped with 'clumps' of beech trees. The two hills are known as the Round Hill and Castle Hill, the latter housing an iron age hill fort, now a Scheduled Monument. The two clumps together provide a panoramic view of the surrounding countryside and towns and villages within it (see Appendix for photomontage). As part of this view the town of Didcot and the remnants of the power station are clear. Other large buildings in the vicinity of Didcot are clear. However, the view north is largely rural apart from the existing JET building.
- 7.13 The JET building is clearly visible from vantage points such as the Wittenham Clumps because it a stark, white building set against the dark wooded background of the RPG. The proposed development will similarly be a light colour against a dark background, although the façade treatment will soften the building's appearance and will reflect subtle changes in colour and tone of the sky and should assimilate into the wider landscape to a better extent than the JET building. The option of having a dark coloured building was explored with the applicant but this would have made the building much more visible in short range views, which would have been unacceptable.
- 7.14 However, the site can only be viewed from a specific part of one of the two hills forming the Wittenham Clumps. From Castle Hill views to the north are precluded by the Round Hill so there are no views of the site from this hill. The clump of trees for which the area is named mean that there are no views across the hills and the only route around them is around the perimeter of the crest. From the Round Hill, the view of CSC is only apparent from a small proportion of the perimeter, from the remainder of the perimeter it cannot be seen. This helps to frame the context of the view from the Wittenham Clumps and the significance of the impact.
- 7.15 The LVIA classifies the significance of the effect of the development from the Wittenham Clumps as negligible because it will be a very small component of a wider panorama. I agree that the site is contained within a wider panorama. However, the JET building and the proposed building are very stark against the dark, treed backdrop. The isolation of the proposed building means that it doesn't particularly read as being in the same context as the JET building, though this may change in the future if other tall buildings are located on the site. Along with JET, the proposed building would result in two prominent features in the landscape, rather than one, though it will have less of an impact than the JET building because its footprint is not as large and the materials allow for a more nuanced colouring that will reflect the colour of the sky (see Paragraph 7.38). On this basis I would classify the significance of the effect on this view as more than negligible. In my opinion the significance of the effect will be moderate adverse.
- 7.16 The JET building can be seen from across other high points around the area such as Blewburton Hill and Compton Downs in West Berkshire. It is therefore highly likely that the proposed building will also be visible from these long distance views. However the distance and the intervening land forms mean that the significance of effect on these

views is classed as 'negligible' in the LVIA. I consider the significance of effect would be greater than this, 'low' would be more a more appropriate classification.

- 7.17 The significant landscape impacts of the proposal from short and long range views, in particular from the PRow to the north of the site and from the Wittenham Clumps, demonstrate that the proposal is not in accordance with SOLP Policy ENV1, which seeks to protect the landscape, countryside and rural areas from harmful development. As demonstrated above, the proposal is also contrary to SOLP Policy STRAT8 point 1, which states that proposals on CSC will be supported *"where this does not have an unacceptable visual impact, particularly on the character and appearance of the surrounding countryside and the Registered Parkland associated with Nuneham House."*
- 7.18 Paragraph 130 of the NPPF states that planning decisions should ensure that developments *"are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change..."* This policy recognises the need to balance the landscape setting and the need to innovate and change. This will be assessed in Section 8 of this report.
- 7.19 **Landscaping**
The site currently slopes up from south to north by around 2m and there is an existing earth bund along the northern boundary, which is around 1m high. The landscape design strategy utilises these levels changes to repurpose excavated earthworks. The Landscape Design and Access Statement refers to an area of "parkland", which will lead up towards the entrance of the building and will create a naturalistic area to a footbridge allowing entrance to Level 1 of the building. This will include areas of SuDS. The building will be 'set-down' into this parkland with Level 0 behind a green retaining wall, providing effective screening for this part of the site.
- 7.20 Along the northern boundary will be a 20 – 25m tree belt, which will have an average height of 5m on day one. This tree belt will be set within a landscape bund to add further height and screening, particularly of the external service areas when viewed from the north.
- 7.21 The car park will be screened using hedgerow to the west and ornamental planting to the north, east and the middle of the car park. The Landscape Officer has stated that planting should also be used on south side of the car park, and also more generally, planting to the south of the site should be used to mitigate the visual impact from this direction. The applicant has responded that tree planting along the southern edge of the site does not perform a significant role in visual mitigation. I agree that in the short-term planting to the south would not perform a significant role, but over time there is scope for mature tree planting to soften the long-distance views such as those from Wittenham Clumps.
- 7.22 I consider the proposed landscaping will create a pleasant and interesting environment for those working at and visiting the site. The proposed tree belt will add to the character of the area and play a role in screening the development from views to the north, in particular from the users of Thame Lane immediately adjacent to the site. The proposed landscaping will not mitigate the impacts of the development in longer range views to the south, east and west, though given the scale of the proposal, planting is unlikely to play a significant role in screening from these views.
- 7.23 **Heritage Impact**

The Heritage Impact Assessment (HIA) submitted with the application notes eight designated heritage assets in the vicinity of the site. The ones with the greatest potential to be impacted by the proposal and/or the most sensitive have been identified as:

- Nuneham Park (Grade I Registered Park and Garden (RPG))
- Carfax Conduit (Grade I Listed and Scheduled Ancient Monument)
- Nuneham House (Grade II* Listed)
- Culham Railway Station (Grade II* Listed)
- Fullamoor Farmhouse (Grade II Listed)
- Clifton Hampden Conservation Area
- Courtiers (Grade II Listed)
- Wittenham Iron-Age Hill Fort, Wittenham Clumps (Scheduled Ancient Monument)

7.24 The Council's Conservation Officer confirms that the greater impact of the proposals is in the long landscape aspects rather than in closer proximity to the site where the existing massing of building and immediate boundary treatments will mitigate some of the visual impacts. The main receptor that would be harmed by the proposals is the Nuneham Park a Grade I Registered Park and Garden (RPG).

7.25 Nuneham Park is around 140m to the north of the northern corner of the site. Views from most places within the RPG are very limited towards the site, owing to the gentle sloping topography and the extensive mature tree cover. The existing CSC site therefore does not detract from the experience of the RPG or the listed buildings within it designed to experience the rural landscape and riverside setting.

7.26 As identified above, the site is visible from the southern boundary of the RPG. The Conservation Officer agrees with the HIA that the current CSC marks a distinct change in the landscape and is of a clear different purpose. The Conservation Officer continues:

“Despite this, the buildings do not better reveal the significance of the park as a result of their contrasting character. The high visibility of the existing structures detracts from the otherwise distinctly rural character of the RPG and its surroundings. As such, I consider that further very large scale development here and in particular the large towering structure of the central drum will have a considerable impact on the setting of the RPG, drawing attention to yet more large built form further out from the centre of the science centre site, extending the visual interruption of the RPG further east. This would further compromise the experience of the RPG as being within a wide rural landscape setting and in particular further eroding the historic landscape setting of the parkland. The contribution the landscape setting makes to the significance of the RPG would be negatively impacted by this proposal.

The proposal would result in harm to the significance of the RPG, which is noted in the submitted heritage statement. The impacts are indirect and the significance of the RPG as a designed landscape would not be impacted from development within the designated area. The impact is considered to be exclusively to the setting of the RPG which contributes to its significance as a designed landscape intended to enjoy and benefit from the rolling riverside landscape. As such, the impact is considered to be less-than-substantial under the tests of the NPPF and Local Plan Policies ENV6 and ENV10.”

- 7.27 Paragraph 199 of the NPPF states that when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. Paragraph 200 states that any harm to the significance of a designated heritage asset should require clear and convincing justification. Paragraph 202 states that where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal. The weighing exercise of harm against public benefits will be undertaken in Section 7 of the report.
- 7.28 In relation to the other heritage assets assessed in the HIA, the proposal is considered not to be harmful to the significance of the assets. The Council's Conservation Officer concurs with this assessment.
- 7.29 Based on this assessment, the harm from the proposed development on designated heritage assets relates only to the long-distance views of Nuneham Courtenay RPG. The proposal would erode the landscape setting of the RPG when seen from these views. This is contrary to SOLP Policy ENV10, which requires that proposals should conserve or enhance the setting of RPGs. Any harm to any heritage asset requires clear and convincing justification. It is also contrary to SOLP Policy ENV6, which requires that proposals for new development should be sensitively designed and should not cause harm to the historic environment.

Trees

- 7.30 The majority of trees located on the site are along the northern boundary. In particular, there is a group of trees at the eastern end of the site. It is proposed that the trees along the northern boundary will be retained as they play an important role in screening views of the site. Further planting along the northern boundary is proposed to enhance the boundary planting.
- 7.31 The proposed development would require the loss of two trees located centrally in the site, where the new building is proposed. These trees are of low and moderate arboricultural value. The Council's Forestry Officer does not object to the removal of these trees as replacement planting along the northern boundary will mitigate their loss.
- 7.32 In respect of trees the proposed development is in accordance with SOLP Policy ENV1, paragraph 2. point i), which requires development to protect and, where possible, enhance, features that contribute to the nature and quality of the landscape, in particular trees.

7.33 Ecology

The Ecological Impact Assessment submitted with the application found that the site was suitable for roosting, foraging and commuting bats, nesting birds, foraging badgers, commoner reptiles and reptiles and small mammals such as hedgehogs. The Council's Countryside Officer is satisfied that implementation of mitigation measures during the construction phase of development can likely avoid or mitigate impact on species found on site. Regarding bats, the key impact will be from lighting, particularly of the woodland or woodland edge. The Council's Countryside Officer is satisfied that the proposed lighting details show that these areas will not be illuminated.

- 7.34 The Countryside Officer requested further clarification regarding achieving Biodiversity Net Gain in accordance with SOLP Policy ENV3. This information has confirmed that the development will have a mostly neutral impact on biodiversity, albeit failing the trading rules for certain types of habitat. The trading rules require that habitats must be replaced by habitats of equal or greater distinctiveness. In this instance, there are -2.94 biodiversity units that are not off-set by trading up. The Countryside Officer has stated

that this can be addressed through biodiversity offsetting and has suggested conditions to secure this. This would involve a financial contribution to a recognised biodiversity offsetting provider to fund off-site biodiversity net gain. The proposed development therefore complies with SOLP Policy ENV3 and Policy STRAT8.

Design and Character

- 7.35 The design of the building has been driven by its function to house the Magnetised Target Fusion (MTF) machine, and to allow access to the machinery from the support functions and from the services area. The concentric building concept allows all process spaces to connect directly with the Demonstration Hall. The design also means that the hazards associated with the machine can be separated from the rest of the facility.
- 7.36 On this basis, the design of the building is practical and minimalist. Each element of the building is the height it needs to be to house the function it serves and there isn't any wasted space. However, the building design is also striking, down to its form and materials, and is entirely in keeping with the sort of futuristic technology that is the purpose of the building. The building is easily recognisable, not least because of its scale, and is a design that celebrates fusion technology.
- 7.37 The Demonstration Hall would be clad in ETFE (Ethylene tetrafluoroethylene), a fluorine based plastic material that can be assembled and inflated to form insulating pillows. This system is cost effective, long-lasting, recyclable, self-cleaning and non-combustible. For these reasons and its ability to achieve unique structures of complex geometric form, it is used for large spanning roofs and facades that require high thermal performance and light transmissibility.
- 7.38 The use of ETFE around the demonstration hall gives a subtle texture to it and is also reflective of the changing colours and tones of the sky in a way that the JET building is not. This will help to soften the façade and help blend in with the sky, particularly in the short and medium range views. The façade is made up of diagonal inflated ETFE cushions that curve. Unlike on a flat façade, this curved shape scatters light upwards and downwards so that any highlights are small. Reflected light is further diffused by the multiple layers of ETFE. This ensures that the building will not cause significant solar glare in surrounding views. External lighting is discussed below.
- 7.39 The building is large scale, with a large footprint and a height of 38 metres. However, this in itself is not a reason for objection, only in relation to its context would its scale become unacceptable. The various elements of the structure balance well and are in proportion with each other. The function of the building dictates its size and therefore it cannot be made any smaller.
- 7.40 The office accommodation and support spaces have been designed to be flexible so that changes to room layouts can be made should future tenants require a different set-up. Even though these spaces are glazed, the use of sun canopies and automated roller blinds will protect against glare and overheating.
- 7.41 In order to reduce the visual impact of the services area in line with the Landscape Officer's comments, the machinery has been reduced in height, so that it is not higher than the office elements of the building. This is set out in the External Areas Addendum submitted with the application. The machinery has also been moved to ensure it is outside of the landscape buffer along the northern boundary of the site. This is acceptable in principle as the service area will be screened by the tree planting along the northern boundary. However, the details for the service area are not yet available as they are linked to the process activities and would be installed later as part of the

machine commissioning phase. The details of the service area are therefore not available at this time. On this basis, a condition requiring details of the service area, in accordance with the strategy set out in the External Areas Addendum, should be required for approval by condition.

- 7.42 Paragraph 130 of the NPPF requires that development will function well over the lifetime of the development and are visually attractive as a result of good architecture, layout and appropriate and effective landscaping. Point c) of paragraph 130 also requires developments “*are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change...*” This last point demonstrates the tension between accommodating development and the need to evolve. This will be assessed in Section 8 of this report.
- 7.43 I consider the proposed design of the building to be both functional and striking. The detail in the Design and Access demonstrates that all elements of the building design have been meticulously thought through and everything is well explained. Notwithstanding the objection to the overall scale of the building in relation to its context, I find the character and appearance of the building itself to be acceptable in accordance SOLP Policies DES1 and DES2.

Sustainability

- 7.44 As would be expected of a facility of this nature, the FDP facility has been designed with sustainability at the fore. The facility will not be carbon-zero but it is being developed as a flagship project for reduced carbon building initiatives on CSC. The reduction in regulated carbon dioxide emissions compared to a 2013 compliant baseline is estimated to be 70.1%. This is well in excess of the 40% required by SOLP Policy DES10. This assessment applies only to the support building and not the Demonstration Hall, which is classed as industrial process areas nor does the assessment apply to the High Bay, because it has low energy demands. The Council’s Energy Advisor has confirmed that this is an acceptable approach.
- 7.45 The project is targeting BREEAM Excellent certification. This means the project must maintain a score of 70% or more and achieve all mandatory credits associated with the rating. The current target score is 76.89% which means that the project as designed is on-track to achieve the targeted rating. This is in accordance with SOLP Policy DES10, which requires non residential buildings to achieve BREEAM Excellent standard, and this will be secured by condition.
- 7.46 In line with the hierarchy that is outlined in Policy DES10, the energy and CO2 appraisal is based on a fabric first approach, followed by demand reduction and the incorporation of renewable and low carbon technologies. The Energy Strategy is explained in the following diagram, taken from the Energy and BREEAM Assessment:

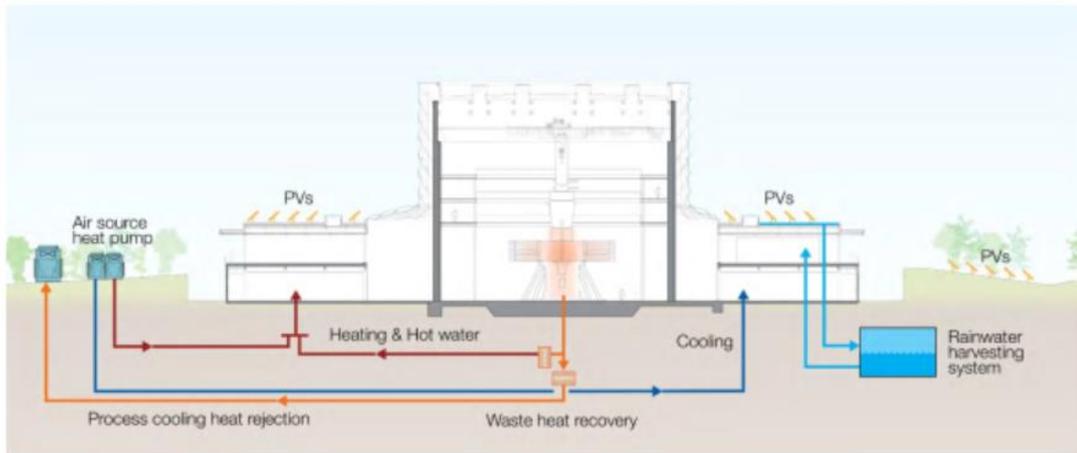


Figure 10: Energy strategy diagram

As well as the 'fabric first' design measures the proposal will utilise waste heat from the demonstration machine to meet the domestic hot water and space heating demand for 50% of the time with the heat pump fulfilling these needs for the remaining 50% of the time.

- 7.47 On site electricity generation will take place through solar photovoltaic (PV) panels installed on the roof and in the landscape. The PV output for the year is estimated to be 211MW, or a 0.4MW per module. This will provide enough power for the FDP building. There may be occasions where the PV panels will generate more electricity than required to power the FDP building and where this is the case it will be fed back into the UKAEA High Voltage network.
- 7.48 Natural ventilation has also been adopted for the process areas including the Demonstration Hall and the surrounding High Bay circulation space. The Demonstration Hall is in constant need of cooling due to the high heat load dissipated by the fusion machine. Naturally ventilating it almost entirely eliminates the need for mechanical cooling and keeps operational energy and carbon emissions to a minimum.
- 7.49 I am satisfied that the energy strategy for the proposal is sound and that it is in accordance with SOLP Policies DES8, DES9 and DES10 and Policy STRAT8.

Flood Risk and Drainage

- 7.50 The site is located in Flood Zone 1 but as it is over 1ha in area, a Flood Risk Assessment was required to be submitted with the application. Much of the development is classified as having a very low risk of flooding from surface water; However there is a stretch to the western boundary of the site that shows a clear surface water route travelling southwards through the site. In this area, the risk of surface water flooding is mostly low, with some small areas showing a medium risk. Directly north and southwest of the site there are areas which have a high risk of surface water flooding.
- 7.51 There is no history of groundwater flooding on the site but groundwater levels within the site boundary are between 1.30m and 1.83m below ground level. It is for this reason that the proposed building does not have a basement and there is potential residual risk of groundwater flooding during construction so suitable mitigation will be required. The FRA recommends a Construction Environment Management Plan (CEMP) for the proposed development, which should outline suitable methods to prevent any adverse

effects on surface waters from construction operations. A CEMP could be required by condition.

- 7.52 Chapter 14 of the NPPF recommends that SuDS should be utilised, where possible, within all new drainage schemes. An assessment of the various different elements of SuDS was reported in the FRA, based on the suitability for use on the site. It is proposed that the attenuation requirement for on-site drainage will be met via the implementation of swales, a green roof, a planted attenuation basin and below ground storage tank with restricted outfall. The proposed car park is intended to drain via infiltration.
- 7.53 The Council's Drainage Engineer and the County Council as Lead Local Flood Authority (LLFA) have no objection to the proposed drainage scheme, subject to conditions. The proposed development is in accordance with SOLP Policies INF4 and EP4.
- 7.54 Thames Water has no objection to the proposal and has confirmed that there is capacity to accommodate foul and clear water in the network.
- 7.55 **Access and Parking**
The proposed building will operate 7 days a week with the core process team working 7 days but with a reduced support team on the weekends. The building will be operational 24 hours a day though the majority of staff (60%) will be in for 9am-5pm 'office hours'. The maximum staff occupancy will be 80 staff split across the 24 hour period. In addition, there could be up to 10 visitors per day.
- 7.56 At change-over times there would obviously be more people on site for a short period of time (80% maximum), which needed to be factored into the amount of parking provision. The proposal is for 49 car parking spaces. The applicant has explained that parking is required closer to the facility than that offered by the parking hubs at the site entrance due to the nature of the facility operating 24 hours a day.
- 7.57 Oxfordshire County Council requested information about how the proposed parking fits with the masterplan for the wider site. The response refers to the submitted 'Culham Science Centre Framework Masterplan', in particular a diagram showing an indicative location for car parking at the eastern end of the campus. One of the main tenets of the Framework Masterplan is to remove parking from the centre of the site and locate it on the periphery to allow for a more 'campus', pedestrian-focussed character. The proposed parking would align with this as the parking would be at the periphery of the site and would be particularly beneficial if an entrance to the campus were opened off the Clifton Hampden bypass. The parking is surface level as proposed by there is potential for this to become decked in the future, based on requirements from future development.
- 7.58 Oxfordshire County Council Highways Officer is satisfied with the level of parking to be provided and the explanation as to how it fits with the wider masterplan. The proposal will include 30 cycle stands, which is in excess of the relevant standards and is considered acceptable.
- 7.59 In order to encourage and facilitate travel by means other than the private car, and to mitigate the impact of the proposed development prior to the delivery of HIF1, a mitigation package has been agreed between the applicant and the County Council. This mitigation package has been agreed on previous planning applications on CSC and consists of a financial contribution towards improvements of the local bus service to CSC and production, and monitoring of, a Travel Plan.

7.60 Paragraph 111 of the NPPF states that *“Development should only be prevented or refused on highway grounds if there would be unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.”*

7.61 The proposed use will generate a small number of vehicular trips, spread across a 24-hour period. The proposed mitigation measures as agreed with OCC mean that there will not be a severe impact on the road network and therefore I am satisfied that the proposed development can be accommodated on the road network. The proposal is in accordance with SOLP Policies TRANS4 and TRANS5.

7.62 **Lighting**

A Lighting Strategy has been submitted in support of the application, which details three separate elements to lighting:

- ‘Symbolic’ lighting
- Interior lighting; and
- Landscape/Access/ Façade lighting.

7.63 The ‘symbolic’ lighting involves the lighting of the exterior of the Demonstration Hall itself. This could be controlled to be of various hues and colours. This feature lighting would be switched off around 10pm onwards. The supporting documentation describes this lighting as ‘designed to reflect and celebrate the ground-breaking research operations within the FDP’. I understand the concept of using lighting to showcase the building; however, I do not think that it is appropriate in this instance. I share the Landscape Officer’s concern regarding the symbolic lighting increasing the visual impact of the building unnecessarily. In the winter months the building would be lit for several hours. The assessment of the site from a visual impact assessment point of view has already highlighted the visibility of the building in long range views throughout the Districts and beyond, particularly viewed against an unlit wooded backcloth. Paragraph 185 of the NPPF notes that planning decisions should ensure new development is appropriate to its location, taking into account the potential sensitivity of the site or wider area; this includes limiting the impact of light pollution on local amenity and intrinsically dark landscapes. As the symbolic lighting is not necessary for the operation of the building, I consider its use should be limited and a seasonal lighting curfew should apply so that the building is not lit for such a long time in the winter. I suggest the lighting of the building should be restricted and agreed by condition.

7.64 The FDP will operate 24 hours a day so lighting to the internal parts of the building and to the external access areas will need to be operational throughout the night. After working hours, sensors will be used to ensure unoccupied areas are not lit. General lighting in the interior design is reduced in night-time hours in favour of horizontal task lighting thereby minimising internal reflections and further light escaping into the landscape.

7.65 Low-level lighting around the building’s perimeter road and in the landscape pedestrian paths are necessary for security and visibility. All exterior security lighting would be motion activated to mitigate unnecessary illumination. In support of dark-sky initiatives all exterior light sources would be orientated downward to minimise light spill, and low-level lighting is used on pathways. No uplighting is proposed to the existing and proposed trees within the site, in particular the woodland to the north. The Council’s Countryside Officer has reviewed the External Lighting Addendum and is satisfied that the woodland and woodland edge will not be illuminated.

7.66 There will inevitably be some light spill from the office elements of the proposed building, though this will be mitigated as far as possible by the lighting strategy. I

consider a suitable lighting design could be achieved, based on the aspirations set out in the Design and Access Statement and External Lighting Addendum.

7.67 Noise

A Noise Impact Assessment has been produced in support of the application. This report assessed noise from the operation of the fusion vessel, indoor plant equipment and outdoor mechanical equipment to determine potential noise impacts on nearby Noise Sensitive Receptors (NSRs). Thirteen NSRs were identified within 1km of the site, four represented nearby residential communities and the remainder were commercial/industrial receptors.

7.68 As well as continuous noise sources in the proposed building, the noise assessment takes into account the impact of the fusion 'impulse', which will be generated once every 24 hours and will last less than 5 seconds. The assessment found that if unmitigated, the equipment in the building would exceed current background noise levels, therefore mitigation strategies are required to reduce the noise impact.

7.69 Rather than outlining specific mitigation strategies for each piece of mechanical equipment, particularly as the exact machinery required is not yet known, the mitigation strategy is to provide maximum allowable sound power levels. For electrical equipment, a 5m 3-sided noise barrier should be installed around the transformers.

7.70 For the impulse scenario, the main sources of the noise impact were from the roof-top ventilators and the at-grade vents. To mitigate these, the strategy suggests steel shutters on the roof-top vents to be closed during the impulse event. An acoustic door is suggested at each at-grade vent, to do be closed during the impulse event.

7.71 A condition should be attached to planning permission, requiring compliance with the Noise Impact Assessment, to ensure that mitigation measures are carried out. This will ensure that the continuous noise from the FDP facility is at or below background levels, and that the impulse noise is no more than 4dB above background levels, thus eliminating any adverse effects on noise sensitive receptors from the operation of the proposed FDP facility. The proposal is therefore in accordance with SOLP Policies ENV11 and ENV12.

7.72 Contaminated Land

The applicant completed a contaminated land questionnaire, which has indicated that the site may be contaminated as a result of the former industrial use, including fuel and chemical storage and waste transfer facility. The questionnaire mentioned that additional investigations are to be undertaken to characterise any legacy of contamination. For this reason, the Council's Contaminated Land Officer requires the standard contaminated land conditions to be applied to planning permission. This would ensure the proposal would be in accordance with SOLP Policies ENV11 and ENV12.

7.73 Air Quality

An Air Quality Assessment has been submitted to support the application. This found that there is a 'medium' risk from dust-generating activities from construction. With appropriate mitigation measures there are likely to be no significant effects arising from the construction phase. The report recommends that the mitigation measures set out in Section 7 of the Assessment are included in a Construction Environmental Management Plan. Planning permission should include a condition requiring a Construction Environmental Management Plan to ensure such measures are incorporated.

- 7.74 Construction and operational traffic were scoped out of the Air Quality Assessment as the proposal will not generate sufficient levels of traffic to warrant assessment. The off-gas scope is on-going so details of emissions from flues and vents associated with combustion and laboratories have not been finalised. Where required, emission control equipment will be installed to ensure the process stack emissions remain within allowable levels. It is anticipated that the off-gas contaminants would consist of water soluble particulate, and, if emission control equipment is found to be required, it is expected that a water based scrubber system will satisfy these requirements.
- 7.75 **Hazardous Substances and Shielding**
All fusion energy facilities will continue to be regulated by the Environment Agency and the Health and Safety Executive. Both of these bodies have been consulted on this planning application but have not responded as their involvement is separate from the Planning process. These bodies will ensure the facility will meet the necessary health and safety and environmental tests going forward.
- 7.76 When fusion power plants are up and running they will use deuterium and tritium. Tritium is radioactive and causes activation of the fusion reactor. However the Fusion Demonstration Plant (FDP) will not use or contain tritium and therefore shielding is not required in the same way as for the JET building. Fusion cannot cause a nuclear accident because it is not based on a chain reaction, as nuclear fission it. The plasma required to create fusion must be kept at very high temperatures. Any shift or change in the reactor would cause the plasma to cool and the reaction would just stop.
- 7.77 The FDP will use deuterium, which is non radioactive but is highly flammable. It will also use lithium, which reacts intensely with water and is the primary hazard within the FDP.
- 7.78 The design of the machine, the process equipment and the building have been carefully developed to provide multiple layers of containment and to maximise safety. The areas containing lithium must be completely separated from the other building functions. It is present intermittently in the machine (during operation only) but is always present in the lithium laboratory and store. These will be constructed from fireproof reinforced concrete.
- 7.79 The presence of lithium on site has driven the fire strategy and is considered separately from the rest of the building. The extra-large industrial doors between the High Bay and Demonstration Hall will close and seal automatically in the event of a fire. This will allow occupants of the building to escape.
- 7.80 **Archaeology**
An Archaeological Evaluation has been undertaken, which shows that archaeological remains do not survive on this site. The County Archaeologist has therefore stated that no further assessment is required.
- 7.81 **Infrastructure**
The highway authority has requested the following financial contributions as a mitigation package that will encourage active and suitable travel to Culham Science Centre (CSC) instead of the private car:
- £82,256 towards improvements of the local bus services to CSC
 - £2,563 for monitoring of approved Travel Plan

The proposed use is not CIL liable and therefore the development is not required to pay CIL.

8.0 CONCLUSION AND PLANNING BALANCE

- 8.1 Section 38(6) of the Planning and Compulsory Purchase Act requires that where regard is to be had to the Development Plan, the determination of planning applications should be made in accordance with the Development Plan unless material considerations indicate otherwise. Planning Case Law explains that an assessment needs to be made as to whether the proposal complies with the Development Plan as a whole. This is not simply an exercise in adding up where it complies and where it does not but requires planning judgement in weighing up the significance of the impacts and the relative importance of the policies and material considerations in this case.
- 8.2 The proposed development is clearly in line with the spatial strategy for the District set out in SOLP Policy STRAT1, in that it focuses development towards Science Vale, in particular that development should be focused at Culham as per SOLP Policy EMP1 and EMP2. The principle of development on Culham Science Centre (CSC) is also supported by SOLP Policy STRAT8, which is the strategic policy for determining planning applications at CSC. This policy offers support for development at CSC; however this is caveated that it will only be supported where it *“does not have an unacceptable visual impact, particularly on the character and appearance of the surrounding countryside and the Registered Parkland associated with Nuneham House.”*
- 8.3 The assessment of the proposal in this report has demonstrated that the proposed development will have an adverse visual impact on short-range views from the north of the site, and in long distance views, particularly from the Wittenham Clumps. The Wittenham Clumps provide panoramic views of the surrounding countryside but the proposed building would not be visible from the majority of the viewpoints. These long distance views will also result in harm to the setting of the Registered Park and Garden (RPG), further eroding the historic landscape setting of the parkland. The harm identified is only to the setting of the RPG, not the RPG itself, and has been categorised as less than substantial harm. I give the harm to the landscape due to visual impact, and the harm to the setting of the RPG significant weight.
- 8.4 As the requirement relating to landscape and visual impact is in the strategic policy for determining planning application on this site (STRAT8), I find that the proposed development cannot comply with the Development Plan as a whole. It therefore falls to material considerations to determine whether the proposed development is acceptable and should be granted planning permission.
- 8.5 The National Planning Policy Framework (NPPF) is a material consideration in planning decisions. Paragraph 81 of the NPPF attributes significant weight to be placed on the need to support economic growth, taking into account both local business needs and wider opportunities for development. Paragraph 83 requires decision makers to recognise the need to make provision for clusters of knowledge and industry. CSC is cluster of fusion technology, unique in the UK. The assessment in this report has demonstrated that Culham is the most appropriate location for the proposed development for this reason.
- 8.6 This report has demonstrated that the proposed development could not be located anywhere else on CSC as there isn't space available at the present time. It has also been demonstrated that the impact of the proposed development could not be reduced by making the building smaller, as it is the size it needs to be to house the required machinery. The building itself is of exemplary design and is meticulously thought through. The proposal will benefit the appearance of CSC by elevating the design standard in line with its future aims and status. The scale and appearance of the building could be seen as a positive attribute that should be celebrated rather than hidden away.

- 8.7 Government policy is also capable of being a material consideration in determining planning applications and the assessment in this report has shown significant Government support for the proposal. 'Towards Fusion Energy: The UK Government's Fusion Strategy' demonstrates the importance of investing in fusion technology for the role it can play in decarbonising energy generation. This is a concern of international scale. The Strategy sets out how this will be achieved, including the encouragement of investment from private enterprises, which will provide funding to allow the UK to continue its own fusion projects such as STEP and it will broaden the UK's involvement in related fusion technologies. The project is expected to bring Research and Development based inward investment of around £300m. The Fusion Strategy names this particular project in demonstrating the Government's commitment to "transform UKAEA's Culham fusion campus into a global hub for fusion innovation and enhance Culham's unique research capabilities." I attribute significant weight to achieving the Government's aims for fusion, as set out in the 'Ten Point Plan for a Green Industrial Revolution' (2020), the White Paper 'Powering our Net Zero Future' (2020) and the 'Towards Fusion Energy: The UK Government's Fusion Strategy' (2021).
- 8.8 The proposed development would provide significant benefits: as well as continuing the UK's world leading role in fusion technology, it would also provide a significant number of jobs in the local area, both direct and indirect. Culham is also a key part of the spatial strategy for growth in South Oxfordshire, with further job, housing and retail development to come alongside it through the STRAT9 allocation in the Local Plan. It is because of CSC that this growth is able to happen in this location so continued investment in its jobs and growth is a priority for the Local Plan. I give this benefit significant weight.
- 8.9 There are indirect environmental benefits of the proposal in the long term, as it allows the UK and the world to move closer to achieving fusion energy, which would facilitate moving towards a low carbon economy. I give this benefit significant weight.
- 8.10 The harm of the proposed development is mitigated as far as possible with on-site planting, particularly through a substantial tree belt to along the northern boundary. Though more planting to the south of the site has been recommended, I do not consider it would materially alter the appearance of the proposal in the longer-range views to the south.
- 8.11 The development results in less than substantial harm to the setting of the Grade I Nuneham Courtenay Registered Park and Garden. In accordance with paragraph 202 of the NPPF, this harm should be weighed against the public benefits of the proposal. In light of the material considerations set out in this report, particularly the role in progressing fusion technology and the potential benefits to carbon reduction, I consider this harm is outweighed by the public benefits.
- 8.11 The proposed development is acceptable in all other respects such as impact on trees; species and biodiversity net gain; flood risk and drainage; highway impact; noise impact; air quality; contaminated land; hazardous material and archaeology.
- 8.12 Overall, I consider the benefits of the proposal outweigh the harm to the visual impact of the surrounding countryside and the less than substantial harm to the setting of the Grade I Nuneham Courtenay Registered Park and Garden. Whilst the proposal does not comply with the Development Plan as a whole, material considerations indicate that planning permission should be granted subject to conditions and the signing of a Section 106 agreement.

9.0 RECOMMENDATION

To delegate to the Head of Planning and the Chair of the Planning Committee the approval of planning permission subject to:

a) The completion of a S106 agreement for infrastructure outlined in the report towards improvements of the local bus services to Culham Science Centre and monitoring of an approved Travel Plan: and

b) The following conditions:

1. Commencement
2. Approved Plans
3. Schedule of Materials to be submitted
4. BREEAM Standard - Excellent
5. Energy Statement Verification
6. Cycle parking facilities to be submitted
7. Green Travel Plan to be submitted
8. Landscaping (incl hardsurfacing and boundary treatment) to be submitted
9. Landscape Management Plan to be submitted
10. Arboricultural Statement and Tree Protection Plan to be submitted
11. Ecological Impact Assessment – development to be in compliance with
12. Biodiversity Enhancement Plan to be submitted
13. Biodiversity Offsetting Scheme to be entered in to
14. Detailed surface water drainage scheme to be submitted
15. SuDS compliance report to be submitted
16. Foul drainage scheme to be submitted
17. Construction Environment Management Plan to be submitted
18. Hours of construction
19. Contaminated Land phased risk assessment to be submitted
20. Contaminated Land remediation Strategy and validation report to be submitted
21. Contaminated Land unsuspected contamination encountered
22. Noise impact assessment – in compliance with
23. Lighting details to be submitted
24. Details of External Areas to be submitted

Author: Katherine Pearce

Tel no: 01235 422600

Email: Planning@southoxon.gov.uk

Appendix 1 - Glossary of Terms

CSC – Culham Science Centre

ETFE - Ethylene tetrafluoroethylene

FDP – Fusion Demonstration Plant

HIF - Housing Infrastructure Fund

ITER - International Thermonuclear Experimental Reactor

JET – Joint European Torus

MTF - Magnetised Target Fusion

PRoW – Public Right of Way

STEP - Spherical Tokamak for Energy Production

RACE - Remote Applications in Challenging Environments

RPG – Registered Park and Garden

UKAEA – United Kingdom Atomic Energy Authority